

Leonard DeBastien
Executive Director
Gwich'in Land and Water Board
Box 2018
Inuvik NT X0E 0T0

March 31, 2020

Project #
60600398

Dear Sir:

**Subject: Town of Inuvik – Water Licence No. G17L3-001
2019 Summary Report**

On behalf of Inuvik, we are pleased to provide the Annual Report for 2019.

WATER DEMANDS, STATION 0036-1

The total volume of water used from the East Channel is listed in Table G17L3-001-1 attached. Water use remained well within the Licence limit throughout the year. It was also at ordinary levels relative to recent times: about 1% more than consumption in 2018. Water Licence G17L3-001 dictated the maximum volume of water that can be withdrawn from the East Channel is 1,000,000 m³ per year. The total water demand in 2019 is approximately 54% of the maximum withdraw volume.

WASTEWATER VOLUMES

Annually, about 97 percent of the wastewater reaching Inuvik's lagoon is distributed and re-collected by the Town's above ground utilidor system. About three percent is distributed from Inuvik's truck fill point and is then re-collected by wastewater trucks.

There is no extraneous inflow, and rarely much loss to leakage. Inuvik will accept in its lagoon wastewater from a source other than the Town's water supply on a fee for service basis, but volumes being received are negligible. There are a few water uses that do not contribute to sewage (such as firefighting, and, in summer, gardening and vehicle washing) but these are a very small portion of the total water usage that they can be neglected. For practical purposes, inflow into the lagoon is essentially equal to the Town's metered production of water, reported in Table G17L3-001-1.

It is Inuvik's practice to obtain assurance from waste hauling contractors and waste generators that discharges to the lagoon from trucks will be restricted to wastewater of domestic origin and character, not contaminated by solvents, petroleum products, glycol, drilling fluids, or any other industrial waste of any sort in concentrations exceeding what would ordinarily be expected from domestic activities such as washing of clothes and hands. Inuvik did not accept wastewater from sources outside the Town's boundaries during this year.

SEWAGE EFFLUENT QUANTITIES

Inuvik's lagoon is normally operated at a constant level, with a dyke freeboard of 1.0 m or slightly more. Therefore, in normal operation, monthly quantities of effluent are about equal to monthly water use. Lagoon level was normal and consistent throughout 2019, other than during the sludge removal period.

Information on the Town's sludge removal activities can be found in the relevant section below.

SOLID WASTE DISPOSAL FACILITY OPERATIONS AND MAINTENANCE

In 2019, Inuvik's solid waste disposal facility was operated routinely. Based on rates from the Municipal Solid Waste Facility O&M Manual - Appendix A, the estimated municipal solid waste generated in 2019 was approximately 6,299 tonnes of Municipal Solid Waste, which used approximately 20,997 m³ of space at the Municipal Solid Waste Facility. Detailed estimates are presented in Table G17L3-001-2, attached.

No other projects were undertaken, beyond routine covering and compaction of completed cells. Typically Inuvik will accept Municipal Solid Waste from outside sources, though the quantities tend to be very low. 34 loads of out of Town ordinary garbage was received from the ESSO clean up project in Tuktoyaktuk, however no hazardous waste was accepted from outside sources in 2019.

In 2019, no collection event for household hazardous waste was undertaken.

It should be noted that The Town of Inuvik has sent the Solid Waste Disposal Facility Operator and Town employee to a Solid Waste Site Course in Norman Wells.

SEWAGE EFFLUENT QUALITY MONITORING, STATION G17L3-0036-3

Lagoon effluent is sampled monthly, except in August and September 2019 at Station 0036-3 due to the decanting work related to secondary cell desludging. Laboratory test results are listed in Table G17L3-001-3, attached. Generally, results are within typical ranges for the time of year. With the exception of oil and grease, for which routine testing was only recently implemented (at licence renewal), running averages of parameters measured in routine monthly samples, and pH measurements (which are not averaged), remained within licence limits during the year.

BOD₅ monitoring was changed to CBOD monitoring in the licence renewal; the limit for CBOD was set at 135 mg/L, compared to 150 mg/L for BOD₅. There were no concerns with either parameter during the year. It is relevant that the full effluent CBOD load in East Channel is not exerted at or close to Inuvik, in a concentrated way. Rather, it is distributed quite thinly far downstream, due to the slow BOD exertion rate in a northern river environment, especially at winter temperatures.

There were no concerns with Suspended Solids or Fecal Coliforms, as both parameters were within normal ranges and well below the licence limits.

The Town does not have a standard for ammonia but is required to monitor for it. The ammonia levels all appeared to be within normal ranges.

The treatment performance seen in 2019 was typical for a primary-secondary lagoon system operating normally in a high-latitude setting. In summer a good standard of secondary treatment is achieved; in winter there is just primary treatment. To achieve a secondary-level effluent in winter Inuvik would need a mechanical plant or at

minimum lagoon aeration, in either case involving major capital investment and significantly increased operating cost.

Oil and grease sample results were higher than the average criteria permitted by the licence, for the majority of the testing samples. In March 2019, a review of sample collection methodology indicates that operators were collecting samples for oil and grease by skimming the surface. As oil and grease can accumulate at the surface of quiescent waters as a surface film or emulsion, it is believed that the samples collected are not representative samples. The Town's operators are changing their sampling procedure for oil and grease (effective starting March 2019) to be consistent with the EPA's SESD Operating Procedure – Wastewater Sampling procedure. It is believed that that future results will be more consistent with the representative sampling intent for the parameter and that the sampling results will be within licence requirements.

High levels of oil and grease detected in November and December 2019 is believed to be the result of prolonged oil and grease build up in the secondary cell after the decanting process (and subsequent sludge removal) was performed in the summer.

SOLID WASTE DISPOSAL FACILITY RUN-OFF QUALITY MONITORING, STATIONS G06L3-001-4,-5 AND -9

Runoff from the Mt. Baldy solid waste disposal facility is sampled monthly during periods of flow. Station 0036-4 monitors flow westward; Station 0036-5 monitors near-shore water quality in a pond to the east; and SNP 0036-9 was added in the latest licence renewal to monitor potential impacts of the Solid Waste Disposal Facilities on surface water at Boot Creek. Sample results are shown in Tables G17L3-001-4, -5, and -9 respectively.

Five tests were taken at each SNP station in 2019, during months of flow (May to September).

PONDS AT LAGOON, STATIONS G17L3-001-6 AND -7; CONTROL STATION G17L3-001-8

Sampling of ponds adjacent to the lagoon is done once a year, in September; starting in 2007. The purpose is to monitor for possible evidence of leakage from the lagoon. Samples are tested for the same parameters as lagoon effluent.

"Gate Pond", Station 6, occupies a former small gravel quarry just outside the lagoon system's west dike, adjacent to the west sludge cell. "Far Pond", Station 7, is located just outside the lagoon system's west dike, opposite the middle-north part of the secondary cell, about 800 m northwest of Gate Pond and 250 m direct distance south of the outlet structure. Twin Lake is used as a background benchmark, and its Station 8 is located at the south end of north Twin Lake.

The 2019 sample results for these stations' traditional parameters are shown in Table G17L3-001-6, 7 & 8. They are in line with the patterns of preceding years. Complete data for the stations is presented in the results appendix.

SOLID WASTE FACILITY FENCING PLAN

The Solid Waste Fencing Plan requirement (Part D, Item 15) was added to the 2017 licence renewal. The Plan was submitted on May 21, 2019.

SURVEILLANCE NETWORK PROGRAM (SNP) LOCATIONS

A map of the SNP Locations is attached. Active SNP location data is presented in the following table.

SNP #	Description	Purpose	Coordinates
0036-1	Raw Water Intake at the Mackenzie River Water Supply Facilities	To monitor monthly and annual quantity of water withdrawn for municipal purposes.	68°21'10.36"N, 133°43'35.53" W
0036-3	Decant Structure at Sewage Treatment Facilities	Site of Compliance. To monitor final effluent quality prior to discharge to the receiving environment and in case of an emergency decant.	68°22'20.58"N, 133°45'38.85" W
0036-4	Run-off below the Solid Waste Disposal Facilities	To monitor potential impacts of the Solid Waste Disposal Facilities on Surface water.	68°21'7"N, 133°41'1.3" W
0036-5	Run-off to two (2) tundra ponds southwest of Solid Waste Disposal Facilities	To monitor potential impacts of the Solid Waste Disposal Facilities on Surface water.	68°20'36.22"N, 133°40'32.41" W
0036-6	"Gate Pond" – near SW corner of Sewage Treatment Facility	To monitor potential impacts of the Sewage Lagoon on Surface Water	68°21'51.45"N, 133°44'1.00" W
0036-7	"Far Pond" – near the NW corner of Sewage Treatment Facility	To monitor potential impacts of the Sewage Lagoon on Surface Water	68°22'15.73"N, 133°45'41.60" W
0036-8	Twin Lakes at Happy Valley	Control for Sewage Lagoon Sampling	68°21'239.14"N, 133°44'28.10" W
0036-9	Boot Creek upstream of Boot Lake	To monitor potential impacts of the Solid Waste Disposal Facilities on Surface water.	68°21'13.35"N, 133°41'51.48" W

SOLIDS REMOVED FROM SEWAGE TREATMENT FACILITY

Sludge that had accumulated in the lagoon's primary cells since their commissioning in 1980 was transferred to the adjacent sludge holding cells in July 1993. A survey done in the fall of 2006 found that that subsequent sludge accumulations were still well below levels requiring the next transfer by dredging. The apparently reduced accumulation rate (relative to 1981-1993) may be due to a lagoon conditioner that Inuvik has been adding to the primary cells since the mid 1990's.

In many years, small amounts of settled and floating solids need to be removed from around ends of pipes passing through primary cell dikes. This is done with a backhoe, the solids being deposited in the sludge holding cells. Routine solids removal as described was not done in 2019 as the larger scope sludge removal was performed.

Sludge removal was performed in the summer of 2019 (July 2nd to Aug 3rd). In total, 14,235 cubic meters of sludge was removed from the lagoon. The sludge was dewatered utilizing geotubes. It was estimated roughly 724 dry tonnes of sludge was removed from the cells. The Lagoon sludge removal report is included in Appendix D.

INSPECTION OF LAGOON EARTHEN CONTAINMENT STRUCTURES

The 2019 inspection of lagoon dikes (Water Licence Condition D8) report is attached in Appendix C. There are no immediate concerns arising from the 2019 lagoon dike inspection. Routine maintenance work was done on

the lagoon's earthwork dikes, and all dikes appear to be at or very near to design shapes and levels. Continued longitudinal cracking does indicate that at some point in the future, a major restoration project will be required.

CONSTRUCTION, MODIFICATIONS AND MAJOR MAINTENANCE WORK

In 2019, pipes connecting the primary cells, the secondary cell were replaced. Naturally, routine maintenance work was done as needed.

UNAUTHORIZED DISCHARGES

There were no unauthorized discharges in 2019.

SPILL TRAINING AND COMMUNICATIONS EXERCISES

No additional training was completed. Spill kits and spill containment equipment was purchased in 2017 for implementation of actions identified in the Spill Containment Plan (2017), which was updated and submitted with the 2017 Water Licence renewal application.

ABANDONMENT, CLOSURE, AND RECLAMATION

No such projects were undertaken in 2019. The future of the Lake B – Hidden Lake water supply infrastructure needs to be confirmed but is expected to be abandoned at a future date.

CURRENT WATER LICENCE RELATED PLANS

Documents currently on file with the Water Board are summarized in the list below.

- Spill Contingency Plan: Revised February 2017 (AECOM)
- O&M Manual for the Solid Waste Disposal Facility: Revised April 2018 (AECOM)
- O&M Manual for the Water Treatment Facility: September, 2018 (Nappaq Design and Construction)
- O&M Manual for the Sewage Treatment Facility: Revised June 2019 (AECOM)

CLOSURE

We trust that this submission fulfills the reporting requirements for the period referred to.

Sincerely,
AECOM Canada Ltd.



Jordan Hoffart, P.Eng.
Project Manager
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JH/lw
Encl.

cc: GLWB – AlecSandra MacDonald, Regulatory Officer
Inuvik: Grant Hood, S.A.O.; Rick Campbell; Utilidor Shop
Inuvik Public Works Committee

Ref: 60600398

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- may be based on information provided to AECOM which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

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Appendix **A**

Summary Tables and SNP Map



Hidden Lake

#7 #3

#6

#8

Water Plant

Pumphouse

start
end screen

#9

#4

#5

Inuvik

Image © 2018 DigitalGlobe

Image © 2018 DigitalGlobe

Google Earth

2002

Imagery Date: 8/17/2016 68°21'27.53" N 133°43'16.49" W elev 77 ft eye alt 16061 ft

WATER USE ("SNP")

Station 0036-1, Mackenzie River pumphouse.

Measure quantities daily. Report by month.

The total volumes of water used from SNP 0036-1 are listed below.

2019 Month	Intake from the East Channel m ³
January	45,035
February	46,398
March	48,505
April	49,789
May	49,338
June	38,030
July	44,171
August	41,764
September	40,231
October	42,126
November	48,959
December	49,628
Total	543,974

Notes:

1. Quantities are well within Licence limits. No known concerns.

The total estimated solid waste generated is listed below.

Month 2019	Solid Waste Generated tonnes	Solid Waste Deposited m ³
January	535	1,783
February	483	1,611
March	535	1,783
April	518	1,726
May	535	1,783
June	518	1,726
July	535	1,783
August	535	1,783
September	518	1,726
October	535	1,783
November	518	1,726
December	535	1,783
Total	6,299	20,997

Notes:

1. Latest population estimates based on data from GNWT Bureau of Statistics as of July 1, 2019.
2. Solid Waste Generation estimates based on generation rates outlined in 2017 Inuvik Municipal Solid Waste Facility O&M Manual.

Station 0036-3, Sewage Discharge to Receiving Water.
SNP requirements. Sample monthly. Report parameters tabulated below.

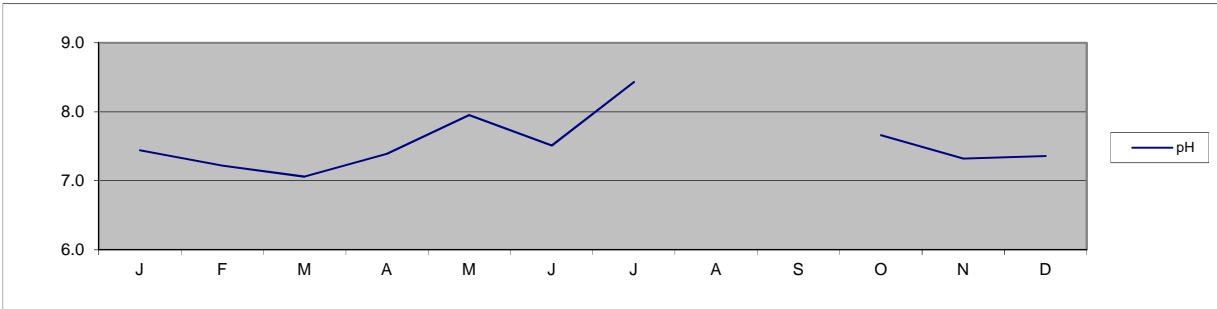
SAMPLE RESULTS									AMBIENT CONDITIONS			
Date			pH	BOD/ CBOD mg/L	SS mg/L	NH3-N mg/L	Un- ionized Ammonia mg/L	Fecal Coli CFU/dL	Oil and Grease mg/L	Temp ° C	Wind km/h	OC/ Prcp
YYYY	MM	DD										
2019	01	16	7.4	04	12	14	0.11	106,000	5	-21	ENE 26	Cloudy
2019	02	13	7.2	96	49	16	0.07	170,000	97	-19	SE 19	Clear
2019	03	13	7.1	45	5	18	0.06	174,000	32	-22	ENE 17	Light Snow
2019	04	17	7.4	73	23	20	0.14	6,000	8	-6	E 19	Cloudy
2019	05	15	8.0	87	8	16	0.39	53,000	5	5	E 24	Clear
2019	06	06	7.5	04	48	00	0.00	60	7	13	SE 22	Cloudy
2019	06	12	7.8	11	25	12	0.23	4,000	5	8	N 28	Drizzle
2019	06	25	8.6	17	43	06	0.68	600	7	5	NW 28	Cloudy
2019	07	02	8.4	25	65	03	0.21	600	6	12	WNW 20	Cloudy
2019	07	17	8.5	16	43	04	0.30	3,100	6	18	NNE 17	Cloudy
2019	08		No Testing Performed during Sludge Removal Period									
2019	09		No Testing Performed during Sludge Removal Period									
2019	10	16	7.7	04	1	14	0.18	10	5	-5	ENE 26	Clear
2019	11	13	7.3	12	17	18	0.10	6,000	40	-21	NW 19	Light Snow
2019	12	10	7.4	47	13	11	0.07	6,000	23	-22	E 24	Light Snow
2019	12	12	7.1	26	17	19	0.07	300,000	53	-27	E 20	Clear

RUNNING AVERAGES OF SAMPLE RESULTS											
Item Unit			pH	BOD/ CBOD mg/L	SS mg/L	NH3-N mg/L	Un- ionized Ammonia mg/L	Fecal Coli CFU/dL	Oil and Grease mg/L	Limit, avg. 4 consec.	
YYYY	MM	DD									
2019	01	16	7.4	16	12	9.6	0.06	83,078	20.00		
2019	02	13	7.2	39	22	12.6	0.06	155,083	42.50		
2019	03	13	7.1	48	20	15.0	0.07	175,128	46.75		
2019	04	17	7.4	55	22	17.3	0.09	65,859	35.50		
2019	05	15	8.0	75	21	17.8	0.16	55,380	35.50		
2019	06	06	7.5	52	21	13.7	0.15	7,591	13.00		
2019	06	12	7.8	44	26	12.3	0.19	2,956	6.25		
2019	06	25	8.6	30	31	8.8	0.32	1,662	6.00		
2019	07	02	8.4	14	45	5.4	0.28	542	6.25		
2019	07	17	8.5	17	44	6.4	0.35	1,454	6.00		
2019	08		No Testing Performed during Sludge Removal Period								
2019	09		No Testing Performed during Sludge Removal Period								
2019	10	16	7.7	16	38	6.8	0.34	325	6.00		
2019	11	13	7.3	14	32	9.7	0.20	578	14.25		
2019	12	10	7.4	20	19	11.7	0.16	1,028	18.50		
2019	12	12	7.1	22	12	15.5	0.10	3,224	30.25		

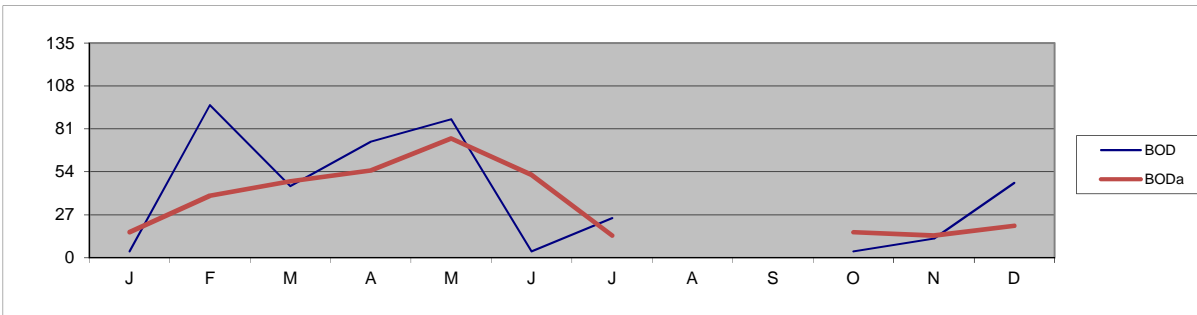
Notes:

- In the table header above, "avg. 4 con" is shorthand for "average of four consecutive samples". There is no average requirement for pH, only an upper and lower limit. Values presented for pH are monthly sample results.
- In the graphs below, the red line (coded with suffix "a" in the key) shows the average of four consecutive samples. The thinner line shows individual monthly readings.
- NT represents not tested in this sample. NR represents not reported.
- Requirements in the new licence took affect July 1, 2017. Average reported for Fecal Coliforms changed from geometric to arithmetic averages at that time. Averages for CBOD were calculated using BOD where CBOD values were unavailable.
- Extra tests conducted in June and July were part of the decanting process.

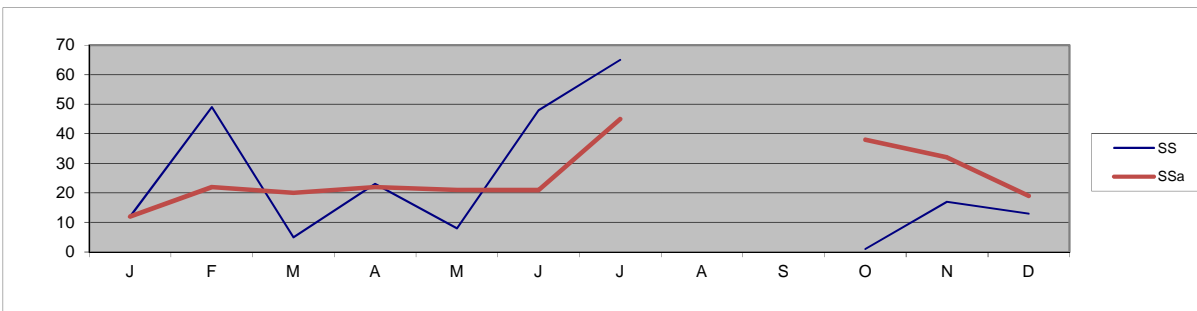
pH, BY MONTH 2019



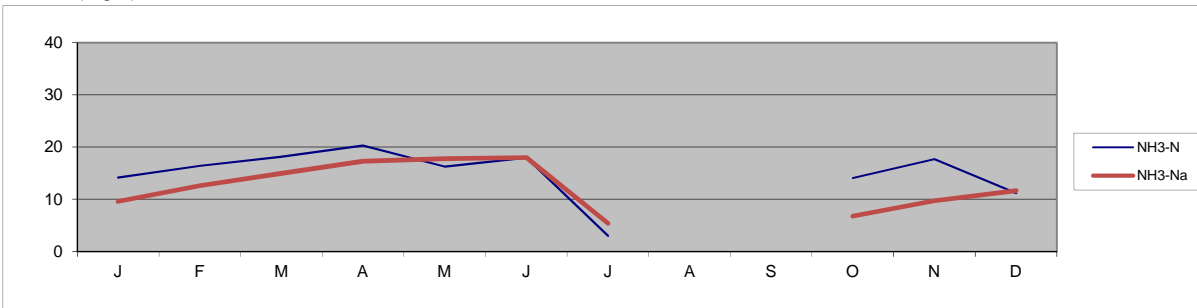
BOD5 / CBOD (mg/L), BY MONTH 2019



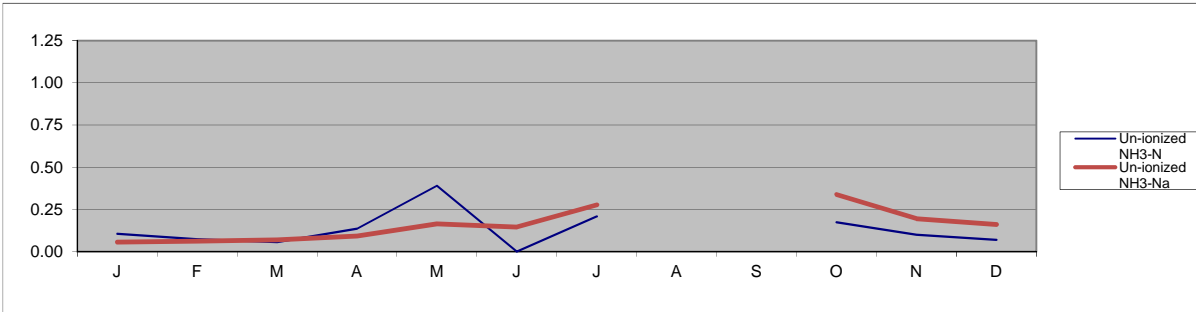
SUSPENDED SOLIDS (mg/L) BY MONTH 2019



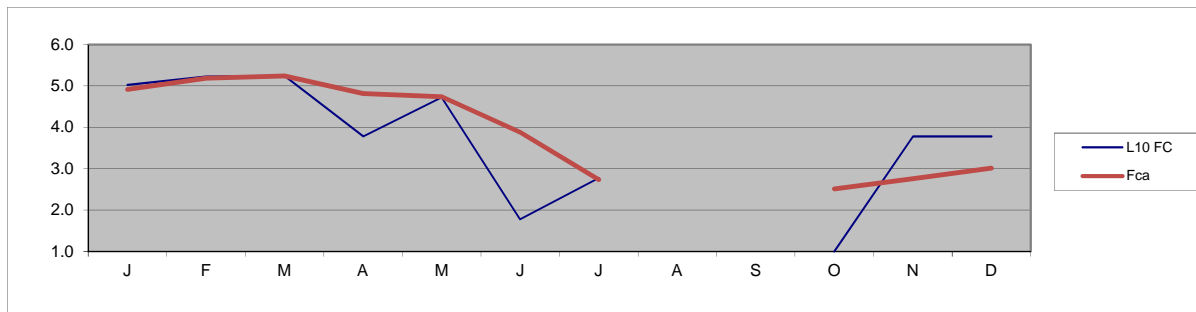
NH3-N (mg/L) BY MONTH 2019



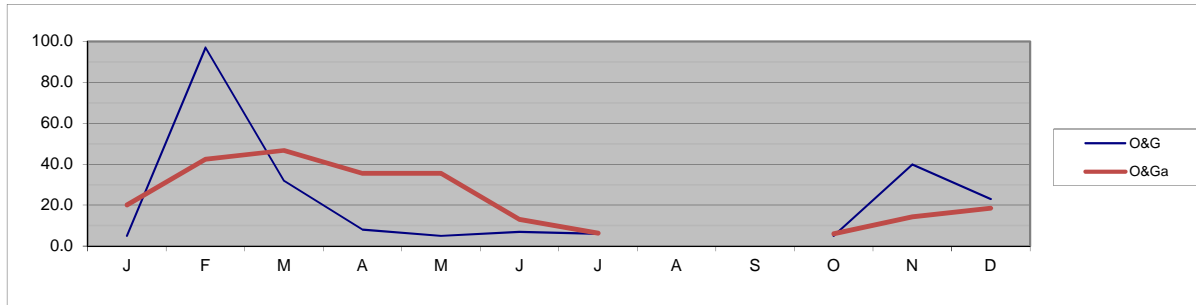
Un-ionized NH₃-N (mg/L) BY MONTH 2019



FECAL COLIFORMS (LOG₁₀ CFU/100 mL) BY MOI 2019



Oil and Grease (mg/L) BY MONTH 2019



Note: the chart for Fecal Coliforms, shows the Log(10) of the measured value.

Note: Data charted are monthly measured values and running averages.
 Averages are identified by the suffix "a".

Station 0036-4 Sample monthly when there is flow. Report parameters tabulated below.

SAMPLE DATES & OBSERVATIONS			Temp ° C	Wind km/h	Sky	Prcp
April				Frozen - No Sample Taken		
May	22	2019	20	E 26	Cloudy	-
June	12	2019	12	N 30	Cloudy	-
July	17	2019	25	NE 17	Partly Cloudy	-
August	14	2019	13	WNW 45	Cloudy	-
September	11	2019	17	WNW 17	Partly Cloudy	-
October				Frozen - No Sample Taken		

SAMPLE ANALYSIS RESULTS						
Item		Date				
		May 22	June 12	July 17	Aug 14	Sept 11
pH	NA	8.15	8.15	7.79	7.71	7.89
Conductivity	uS/cm	1640	2310	2210	2010	2260
Sodium	mg/L	94.8	162.0	170.0	161.0	174.0
Potassium	mg/L	18.7	38.5	37.1	31.0	32.8
Magnesium	mg/L	80.8	122.0	115.0	100.0	118.0
Calcium	mg/L	166	218	226	207	233
Cadmium	mg/L	0.00025	0.00003	<0.00002	0.00030	<0.00002
Chromium	mg/L	0.0016	0.0015	<0.001	0.0196	<0.001
Copper	mg/L	0.021	0.002	<0.002	0.032	<0.002
Iron	mg/L	2.4400	2.6300	0.3700	31.8000	1.3
Lead	mg/L	0.002300	0.000400	<0.0002	0.010500	0.0004
Mercury	mg/L	0.000024	0.000015	0.00001	0.000072	0.00002
Nickel	mg/L	0.0127	0.0103	0.0095	0.0491	0.0088
Zinc	mg/L	0.067	0.009	0.006	0.117	0.007
Sulphate	mg/L	518	606	539	592	717
Phosphate	mg/L	0.13	0.07	0.07	1.11	0.12
Phenols	mg/L	0.003	0.001	0.002	0.006	0.001
BOD5	mg/L	<4	<4	<4	<4	<4
Oil & Grease	mg/L	NR	NR	NR	NR	NR
Suspend. Solid	mg/L	22	11	7	764	19
TPH	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2

Notes:

- "Phosphate" is reported as total P.
- "NR" denotes Not Reported.
- TPH value listed is summation of F1 and F2.

Station 0036-5. Sample monthly when there is flow. Report parameters tabulated below.

SAMPLE DATES & OBSERVATIONS			Temp ° C	Wind km/h	Sky	Prcp
April				Frozen - No Sample Taken		
May	22	2019	20	E 26	Cloudy	-
June	12	2019	12	N 30	Cloudy	-
July	17	2019	25	NE 17	Partly Cloudy	-
August	14	2019	13	WNW 45	Cloudy	-
September	11	2019	17	WNW 17	Partly Cloudy	-
October				Frozen - No Sample Taken		

SAMPLE ANALYSIS RESULTS						
Item		Date				
		May 22	June 12	July 17	Aug 14	Sept 11
pH	NA	7.37	7.78	7.47	7.97	7.39
Conductivity	uS/cm	177	287	331	318	380
Sodium	mg/L	7.0	14.1	16.1	18.0	19.6
Potassium	mg/L	3.5	4.1	3.5	3.0	4.2
Magnesium	mg/L	6.2	11.3	13.4	13.9	15.2
Calcium	mg/L	16.8	29.4	33.5	33.5	39.2
Cadmium	mg/L	0.00050	<0.00001	<0.00001	0.00006	<0.00001
Chromium	mg/L	<0.0005	0.00060	<0.0005	<0.0005	<0.0005
Copper	mg/L	0.001	0.001	<0.001	<0.001	<0.001
Iron	mg/L	0.88	0.77	0.61	0.43	1.47
Lead	mg/L	0.0002	0.0001	0.0001	0.0001	0.0003
Mercury	mg/L	0.000015	0.000016	0.000022	0.000016	0.000017
Nickel	mg/L	0.0016	0.0022	0.0020	0.0020	0.0018
Zinc	mg/L	0.011	0.003	0.002	0.001	0.002
Sulphate	mg/L	32.4	57.9	68.4	69.3	81.0
Phosphate	mg/L	0.25	0.13	0.23	0.07	0.12
Phenols	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
BOD5	mg/L	<4	<4	10	<4	<4
Oil & Grease	mg/L	NR	NR	NR	NR	NR
Suspend. Solid	mg/L	3	6	17	4	3
TPH	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2

Notes:

1. "Phosphate" is reported as total P.
2. "NR" denotes Not Reported.
3. TPH value listed is summation of F1 and F2.

**INUVIK SURVEILLANCE NETWORK PROGRAM
MONITORING OF PONDS NEAR LAGOON**

2019

Table G17L3-001-6, 7 & 8

Station 0036-6, "Gate Pond", W dike, SW, near gate. 68° 21' 51.45" N; 133° 44' 1.00" W
 Station 0036-7, "Far Pond", W dike, mid-north. 68° 22' 15.73" N; 133° 45' 41.60" W
 Station 0036-8, control, Twin Lakes at Happy Valley. 68° 21' 239.14" N; 133° 44' 28.10" W

SNP requirements. Sample annually. Report parameters tabulated below.
 Reports are due for the calendar year by March 31.

Date			SNP #	SAMPLE RESULTS					AMBIENT CONDITIONS		
				pH	BOD ₅ mg/L	SS mg/L	NH ₃ -N mg/L	Fecal Coli CFU/dL	Temp ° C	Wind km/h	Sky
2019	09	11	6	7.9	<4	<2	12.1	<10			
2019	09	11	7	8.1	<4	3	<0.025	<10	17	WNW 17	Partly Cloudy
2019	09	11	8	8.2	<4	<2	1.5	20			

Note: Results from recent earlier years are included below for comparison.

Date			SNP #	SAMPLE RESULTS					AMBIENT CONDITIONS		
				pH	BOD ₅ mg/L	SS mg/L	NH ₃ -N mg/L	Fecal Coli CFU/dL	Temp ° C	Wind km/h	Sky
2018	09	12	6	7.8	<4	1	8.9	1			
2018	09	12	7	8.3	<4	3	<0.025	1	-4	E 13	Partly Cloudy
2018	09	12	8	8.1	<4	<2	0.5	<1			
2017	09	13	6	7.8	<4	19	nd	2			
2017	09	13	7	8.0	<4	<1	nd	2	11	SE 12	Clear
2017	09	13	8	8.0	<4	10	nd	<1			
2016	09	13	6	8.1	<4	2	14.1	<1			
2016	09	13	7	8.1	<4	<1	<0.025	<1	0	E 18	Cloudy
2016	09	13	8	8.1	<4	2	3.1	2			
2015	09	08	6	7.7	<4	3	12.8	2			
2015	09	08	7	8.4	<4	<7	<0.025	<1	1	NW 4	Cloudy
2015	09	08	8	8.2	<4	8	1.6	1			
2014	10	07	6	7.7	<4	4	12.4	81			
2014	10	07	7	8.0	<4	4	<0.05	<1	-3	NW 30	Snow
2014	10	07	8	8.1	<4	47	1.9	1			
2013	09	24	6	7.8	<4	<1	14.4	2			
2013	09	24	7	8.1	<4	15	<0.05	24	0	NE 5	Cloudy
2013	09	24	8	8.1	<4	<2	1.9	<1			
2012	09	18	6	8.1	<4	3	10.4	4			
2012	09	18	7	8.3	<4	<1	<0.05	1	7	S 10	Clear
2012	09	18	8	8.2	<4	<2	3.4	2			
2011	09	19	6	8.0	<4	<2	13.6	<1			
2011	09	19	7	8.3	<4	<2	<0.05	<1	0	NE 15	Cloudy
2011	09	19	8	8.1	<4	6	1.6	<1			
2010	09	21	6	7.8	<4	<1	14.3	1			
2010	09	21	7	8.1	<4	<1	<0.05	<1	1	NW 15	Cloudy
2010	09	21	8	8.1	<4	50	2.6	<1			
2009	09	28	6	7.1	<4	3	11.2	<1			
2009	09	28	7	8.2	5	6	<0.05	<1	-3	NW 4	Snow
2009	09	28	8	7.8	<4	6	2.8	<1			
2008	09	15	6	7.7	<4	5	10.0	1			
2008	09	15	7	8.6	<4	3	<0.05	<1	-3	E 12	Clear
2008	09	15	8	8.3	<4	6	1.3	<1			
2007	11	14	6	7.2	<4	13	8.9	<1			
2007	11	14	7	7.3	14	303	0.3	1	-12	SE 07	Snow
2007	11	14	8	7.4	5	6	4.3	<1			

Station 0036-9. Sample monthly when there is flow. Report parameters tabulated below - effective for new licence.

SAMPLE DATES & OBSERVATIONS			Temp ° C	Wind km/h	Sky	Prcp
April				Frozen - No Sample Taken		
May	22	2019	20	E 26	Cloudy	-
June	12	2019	12	N 30	Cloudy	-
July	17	2019	25	NE 17	Partly Cloudy	-
August	14	2019	13	WNW 45	Cloudy	-
September	11	2019	17	WNW 17	Partly Cloudy	-
October				Frozen - No Sample Taken		

SAMPLE ANALYSIS RESULTS						
Item		Date				
		May 22	June 12	July 17	Aug 14	Sept 11
pH	NA	6.96	7.81	7.77	7.67	7.24
Conductivity	uS/cm	139	1020	1720	1960	412
Sodium	mg/L	4.0	46.0	100.0	127.0	15.9
Potassium	mg/L	1.7	3.3	4.1	4.9	1.6
Magnesium	mg/L	5.6	41.2	77.6	91.2	19.2
Calcium	mg/L	13.4	114.0	221.0	254.0	38.1
Cadmium	mg/L	0.00040	0.00001	<0.00001	<0.00001	0.00002
Chromium	mg/L	0.0009	<0.0005	<0.0005	<0.0005	<0.0005
Copper	mg/L	0.003	0.002	<0.001	<0.001	0.002
Iron	mg/L	1.50	0.40	0.71	0.73	1.10
Lead	mg/L	0.0003	<0.0001	<0.0001	<0.0001	0.0002
Mercury	mg/L	0.000019	0.000012	0.000017	0.000014	0.000018
Nickel	mg/L	0.0077	0.0062	0.0042	0.0040	0.0080
Zinc	mg/L	0.012	0.007	0.010	0.019	0.011
Sulphate	mg/L	43	438	793	964	158
Phosphate	mg/L	0.09	<0.05	<0.05	<0.05	<0.05
Phenols	mg/L	0.001	<0.001	<0.001	<0.001	0.004
BOD5	mg/L	<4	<4	<4	<4	<4
Oil & Grease	mg/L	NR	NR	NR	NR	NR
Suspend. Solid	mg/L	11	<2	3	8	5
TPH	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2

Notes:

1. "Phosphate" is reported as total P.
2. "NR" denotes Not Reported.
3. TPH value listed is summation of F1 and F2.

Appendix **B**

SNP Station Sampling Data

Report Transmission Cover Page

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0 Attn: Rick Campbell Sampled By: Matt Company: Town of Inuvik	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1328137 Control Number: Date Received: Jan 17, 2019 Date Reported: Jan 23, 2019 Report Number: 2372242
--	--	---

Contact	Company	Address
Jason Casault	AECOM - Edmonton	101, 18817 Stony Plain Road Edmonton, AB T5S 0C2 Phone: (780) 486-7050 Fax: (780) 486-7070 Email: Jason.Casault@aecom.com

Delivery	Format	Deliverables
Email - Merge Reports	PDF	COC / COA
Email - Merge Reports	PDF	COC / Test Report

Kim Wainman	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: kwainman@town.inuvik.nt.ca
--------------------	-----------------------	--

Delivery	Format	Deliverables
Email - Single Report	PDF	Invoice

Richard Feilden	AECOM - Edmonton	17203 - 103 Avenue Edmonton, AB T5S 1J4 Phone: (780) 488-6800 Fax: (780) 488-2121 Email: richard.feilden@aecom.com
------------------------	-------------------------	---

Delivery	Format	Deliverables
Email - Merge Reports	PDF	COC / Test Report

Rick Campbell	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: rcampbell@town.inuvik.nt.ca
----------------------	-----------------------	---

Delivery	Format	Deliverables
Email - Merge Reports	PDF	COC / Test Report
Email - Single Report	PDF	Invoice

Utilidor	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-2607 Fax: (867) 777-2071 Email: utilidor@town.inuvik.nt.ca
-----------------	-----------------------	--

Delivery	Format	Deliverables
Email - Single Report	PDF	Invoice

Notes To Clients:

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Analytical Report

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada XOE 0T0 Attn: Rick Campbell	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1328137 Control Number: Date Received: Jan 17, 2019 Date Reported: Jan 23, 2019 Report Number: 2372242
Sampled By: Matt Company: Town of Inuvik		

Reference Number 1328137-1
Sample Date Jan 16, 2019
Sample Time 09:50
Sample Location
Sample Description Sewage Lagoon /
SNP0036-3 / 0.9°C

Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Biochemical Oxygen Demand	Inhibited	mg/L	<4		4
Oil and Grease	Total	mg/L	<5		5
pH adjustment	adjustment required		No		
Inorganic Nonmetallic Parameters					
Ammonia - N		mg/L	14.2		0.025
Un-ionized Ammonia-N	15 °C	mg/L	0.107		
Ammonium/Ammonia Preservation			Yes		
Microbiological Analysis					
Fecal Coliforms	Membrane Filtration	CFU/100 mL	106000		1
Physical and Aggregate Properties					
Solids	Total Suspended	mg/L	12		2
Routine Water					
pH	15 °C	pH	7.44		
Temperature of observed		°C	15		
pH			7.71		
Temperature of observed		°C	19.6		
pH					

Approved by:



Murray Klutz
Senior Agronomist

Data have been validated by Analytical Quality Control and Exova's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada XOE 0T0 Attn: Rick Campbell	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1328137 Control Number: Date Received: Jan 17, 2019 Date Reported: Jan 23, 2019 Report Number: 2372242
Sampled By: Matt Company: Town of Inuvik		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jan 17, 2019	Exova Edmonton
Ammonium-N in Water	APHA	* Automated Phenate Method, 4500-NH3 G	Jan 23, 2019	Exova Edmonton
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	Jan 22, 2019	Exova Edmonton
Coliforms - Membrane Filtration	APHA	Fecal Coliform Membrane Filter Procedure, 9222 D	Jan 17, 2019	Exova Calgary
Oil and Grease in water	US EPA	* n-Hexane Extractable Material and Silica Gel Treated n-Hexane Extractable Material by Extraction and Gravimetry, 1664	Jan 18, 2019	Exova Edmonton
pH at 15°C	APHA	* pH - Electrometric Method, 4500-H+ B	Jan 18, 2019	Exova Edmonton
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D	Jan 22, 2019	Exova Edmonton

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

Please direct any inquiries regarding this report to our Client Services Group or to the Operations Manager at the coordinates indicated at the top left of this page.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

Billing Information:		Copy of Report To:		RUSH Priority	
Company	Town of Inuvik	Company	Aecom - Edmonton	Upon filling out this section, client accepts that surcharges will be applied to the analysis	
Address	Box 1160 2 Firth Street Inuvik, NT X0E 0T0	Address	17203-103rd Avenue Edmonton, AB T5S 1J4	Date Required	
Attention	Rick Campbell	Attention	Richard Feilden	As Indicated	All Analysis
Phone	(867) 777-8615	Phone	(780) 488-6800	When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples	
Cell	(867) 678-5388	Cell		Signature	
Fax	(867) 777-8601	Fax	(780) 488-2121	Sample Custody (please print)	
E-mail	rcampbell@town.inuvik.nt.ca	E-mail	richard.feilden@aecom.com	Sampled by: <i>Matt O'Rourke</i>	
Agreement ID	2909	Copy of invoice		Company: Town of Inuvik	
Copy of Report				I authorize Exova to proceed with the work indicated on this form:	

Project Information	Project ID: SNP 0036- 3
Project Name	
Project Location	Inuvik
Legal Location	
PO/AFE#	100104
Proj. Acct.Code	

Report Results	<input checked="" type="checkbox"/>	E-Mail	<input type="checkbox"/>	Online	<input type="checkbox"/>	PDF	<input type="checkbox"/>
		Mail	<input checked="" type="checkbox"/>	Fax	<input type="checkbox"/>	Excel	<input type="checkbox"/>

Special Instructions/Comments (please include contact information including ph. # if different from above).
 Sampler: note weather:
 Temp -26 C, precip 0, Wind dir E Vel 9 km/h

QA/QC Report	
Indicate Regulatory Requirements below	
Number of Containers	
pH	
CBOD5	
Suspended Solids	
Ammonia	
Fecal Coliforms	
Oil & Grease	

Date: 01-16-19 Initial: MO

This section for Lab use only

Date/Time stamp:
JAN 17 AM 7:13

Sample Identification	Location	Depth in cm m	Date/Time sampled	Matrix	Sampling method	Number of Containers	pH	CBOD5	Suspended Solids	Ammonia	Fecal Coliforms	Oil & Grease
1 SNP0036-3	Sewage Lagoon		01-16-19 9:50 A		Dip	5	x	x	x	x	x	x
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												

Indicate below any deficiencies in the condition of samples:

Were Exova supplies used?	
Was there any damage to the shipping container?	
Were the containers packaged well?	
Were the expected number of samples received (document below)?	
Are samples within recommended holding times/temp?	

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

Please indicate any potentially hazardous samples

Page 1 of 1 Control #

Lot: 1328137 ^{COC}



Shipping: COD Y/N

Cooler temp: 0.9

and size of coolers received:

Delivery Method: COURIER

Waybill: LAUNEZ

Received by: LAUNEZ

Report Transmission Cover Page

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0 Attn: Rick Campbell	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1333250 Control Number: Date Received: Feb 14, 2019 Date Reported: Feb 22, 2019 Report Number: 2379588
Sampled By: M. O'Rourke Company: Town of Inuvik		

Contact	Company	Address
Jason Casault	AECOM - Edmonton	101, 18817 Stony Plain Road Edmonton, AB T5S 0C2 Phone: (780) 486-7050 Fax: (780) 486-7070 Email: Jason.Casault@aecom.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Merge Reports	PDF	COC / COA
Email - Merge Reports	PDF	COC / Test Report
Kim Wainman	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: kwainman@town.inuvik.nt.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Single Report	PDF	Invoice
Richard Feilden	AECOM - Edmonton	17203 - 103 Avenue Edmonton, AB T5S 1J4 Phone: (780) 488-6800 Fax: (780) 488-2121 Email: richard.feilden@aecom.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Merge Reports	PDF	COC / Test Report
Rick Campbell	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: rcampbell@town.inuvik.nt.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Merge Reports	PDF	COC / Test Report
Email - Single Report	PDF	Invoice
Utilidor	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-2607 Fax: (867) 777-2071 Email: utilidor@town.inuvik.nt.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Single Report	PDF	Invoice

Notes To Clients:

- Feb 20, 2019 - Sample 1333250-1; 6492076: Sample formed an emulsion during oil and grease extraction. Centrifugation was required in order to complete analysis.

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Analytical Report

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada XOE 0T0 Attn: Rick Campbell	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1333250 Control Number: Date Received: Feb 14, 2019 Date Reported: Feb 22, 2019 Report Number: 2379588
Sampled By: M. O'Rourke Company: Town of Inuvik		

Reference Number 1333250-1
Sample Date Feb 13, 2019
Sample Time 09:05
Sample Location
Sample Description Sewage Lagoon /
SNP0036-3 / -0.9°C

Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Biochemical Oxygen Demand	Inhibited	mg/L	96		4
Oil and Grease	Total	mg/L	97		5
pH adjustment	adjustment required		No		
Inorganic Nonmetallic Parameters					
Ammonia - N		mg/L	16.4		0.025
Un-ionized Ammonia-N	15 °C	mg/L	0.0744		
Ammonium/Ammonia Preservation			Yes		
Microbiological Analysis					
Fecal Coliforms	Membrane Filtration	CFU/100 mL	170000		1
Physical and Aggregate Properties					
Solids	Total Suspended	mg/L	49		2
Routine Water					
pH	15 °C	pH	7.22		
Temperature of observed		°C	15		
pH			7.35		
Temperature of observed		°C	22.6		
pH					

Approved by:



Darlene Lintott, MSc
Consulting Scientist

Data have been validated by Analytical Quality Control and Exova's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada XOE 0T0 Attn: Rick Campbell	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1333250 Control Number: Date Received: Feb 14, 2019 Date Reported: Feb 22, 2019 Report Number: 2379588
Sampled By: M. O'Rourke Company: Town of Inuvik		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Feb 14, 2019	Exova Edmonton
Ammonium-N in Water	APHA	* Automated Phenate Method, 4500-NH3 G	Feb 14, 2019	Exova Edmonton
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	Feb 14, 2019	Exova Edmonton
Coliforms - Membrane Filtration	APHA	Fecal Coliform Membrane Filter Procedure, 9222 D	Feb 14, 2019	Exova Calgary
Oil and Grease in water	US EPA	* n-Hexane Extractable Material and Silica Gel Treated n-Hexane Extractable Material by Extraction and Gravimetry, 1664	Feb 19, 2019	Exova Edmonton
pH at 15°C	APHA	* pH - Electrometric Method, 4500-H+ B	Feb 20, 2019	Exova Edmonton
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D	Feb 14, 2019	Exova Edmonton

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

Comments:

- Feb 20, 2019 - Sample 1333250-1; 6492076: Sample formed an emulsion during oil and grease extraction. Centrifugation was required in order to complete analysis.

Please direct any inquiries regarding this report to our Client Services Group or to the Operations Manager at the coordinates indicated at the top left of this page.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

Project Information
 Project ID: SNP 0036- 3
 Project Name:
 Project Location: Inuvik
 Legal Location:
 PO/AFE#: 100104
 Proj. Acct.Code:

Billing Information:
 Company: Town of Inuvik
 Address: Box 1160 2 Firth Street
 Inuvik, NT X0E 0T0
 Attention: Rick Campbell
 Phone: (867) 777-8615
 Cell: (867) 678-5388
 Fax: (867) 777-8601
 E-mail: rcampbell@town.inuvik.nt.ca
 Agreement ID: 2909
 Copy of Report

Copy of Report To:
 Company: Aecom - Edmonton
 Address: 17203-103rd Avenue
 Edmonton, AB T5S 1J4
 Attention: Richard Feilden
 Phone: (780) 488-6800
 Cell:
 Fax: (780) 488-2121
 E-mail: richard.feilden@aecom.com
 Copy of invoice

RUSH Priority
 Upon filling out this section, client accepts that surcharges will be applied to the analysis
Date Required
As Indicated **All Analysis**
 When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples
Signature

Report Results
 X E-Mail
 Mail X
 Online PDF
 Fax Excel

Special Instructions/Comments (please include contact information including ph. # if different from above).
 Sampler: note weather:
 Temp -14 C, precip 0, Wind dir A/W Vel 34 km/h

QA/QC Report	Indicate Regulatory Requirements below	Number of Containers	pH	CBOD5	Suspended Solids	Ammonia	Fecal Coliforms	Oil & Grease												

Sample Custody (please print)
 Sampled by: Matt O'Rourke
 Company: Town of Inuvik
 I authorize Exova to proceed with the work indicated on this form:
 Date: 02-13-14 Initial: MO
This section for Lab use only
 Date/Time stamp:
FEB 14 AM 7:09

Sample Identification	Location	Depth in cm m	Date/Time sampled	Matrix	Sampling method	Number of Containers	pH	CBOD5	Suspended Solids	Ammonia	Fecal Coliforms	Oil & Grease										
1 SNP0036-3	Sewage Lagoon		02-13-14 9:55A		Dip	5	x	x	x	x	x	x										
2																						
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						
13																						
14																						
15																						

Indicate below any deficiencies in the condition of samples:
 Were Exova supplies used?
 Was there any damage to the shipping container?
 Were the containers packaged well?
 Were the expected number of samples received (document below)?
 Are samples within recommended holding times/temp?

Environmental Sample Information Sheet
 Note: Proper completion of this form is required in order to proceed with analysis
Please indicate any potentially hazardous samples
 Page 1 of 1 Control #

Lot: 1333250^{COC}

 Shipping: COD Y/N
 Cooler temp: -0.9

and size of coolers received:
 Delivery Method: COURIER
 Waybill: SNWEZ
 Received by:

Report Transmission Cover Page

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0 Attn: Rick Campbell	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1338374 Control Number: Date Received: Mar 14, 2019 Date Reported: Mar 21, 2019 Report Number: 2386793
Sampled By: M. O'Rouke Company: Town of Inuvik		

Contact	Company	Address
Jason Casault	AECOM - Edmonton	101, 18817 Stony Plain Road Edmonton, AB T5S 0C2 Phone: (780) 486-7050 Fax: (780) 486-7070 Email: Jason.Casault@aecom.com

Delivery	Format	Deliverables
Email - Merge Reports	PDF	COC / COA
Email - Merge Reports	PDF	COC / Test Report

Contact	Company	Address
Kim Wainman	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: kwainman@town.inuvik.nt.ca

Delivery	Format	Deliverables
Email - Single Report	PDF	Invoice

Contact	Company	Address
Richard Feilden	AECOM - Edmonton	17203 - 103 Avenue Edmonton, AB T5S 1J4 Phone: (780) 488-6800 Fax: (780) 488-2121 Email: richard.feilden@aecom.com

Delivery	Format	Deliverables
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Contact	Company	Address
Rick Campbell	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: rcampbell@town.inuvik.nt.ca

Delivery	Format	Deliverables
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Contact	Company	Address
Utilidor	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-2607 Fax: (867) 777-2071 Email: utilidor@town.inuvik.nt.ca

Delivery	Format	Deliverables
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Notes To Clients:

- Mar 21, 2019 - Sample 1338374-1; 6536671: Sample formed an emulsion during oil and grease extraction. Centrifugation was required in order to complete analysis.

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Analytical Report

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada XOE 0T0 Attn: Rick Campbell	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1338374 Control Number: Date Received: Mar 14, 2019 Date Reported: Mar 21, 2019 Report Number: 2386793
Sampled By: M. O'Rourke Company: Town of Inuvik		

Reference Number 1338374-1
Sample Date Mar 13, 2019
Sample Time 09:30
Sample Location
Sample Description Sewage Lagoon /
SNP0036-3 / 2.8°C

Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Biochemical Oxygen Demand	Inhibited	mg/L	45		4
Oil and Grease	Total	mg/L	32		5
pH adjustment	adjustment required		No		
Inorganic Nonmetallic Parameters					
Ammonia - N		mg/L	18.2		0.025
Un-ionized Ammonia-N	15 °C	mg/L	0.0573		
Ammonium/Ammonia Preservation			Yes		
Microbiological Analysis					
Fecal Coliforms	Membrane Filtration	CFU/100 mL	174000		1
Physical and Aggregate Properties					
Solids	Total Suspended	mg/L	5		2
Routine Water					
pH	15 °C	pH	7.06		
Temperature of observed		°C	15		
pH			7.59		
Temperature of observed		°C	22.0		
pH					

Approved by:



Darlene Lintott, MSc
Consulting Scientist

Data have been validated by Analytical Quality Control and Exova's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada XOE 0T0 Attn: Rick Campbell	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1338374 Control Number: Date Received: Mar 14, 2019 Date Reported: Mar 21, 2019 Report Number: 2386793
Sampled By: M. O'Rourke Company: Town of Inuvik		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Mar 14, 2019	Exova Edmonton
Ammonium-N in Water	APHA	* Automated Phenate Method, 4500-NH3 G	Mar 18, 2019	Exova Edmonton
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	Mar 14, 2019	Exova Edmonton
Coliforms - Membrane Filtration	APHA	Fecal Coliform Membrane Filter Procedure, 9222 D	Mar 14, 2019	Exova Calgary
Oil and Grease in water	US EPA	* n-Hexane Extractable Material and Silica Gel Treated n-Hexane Extractable Material by Extraction and Gravimetry, 1664	Mar 19, 2019	Exova Edmonton
pH at 15°C	APHA	* pH - Electrometric Method, 4500-H+ B	Mar 15, 2019	Exova Edmonton
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D	Mar 15, 2019	Exova Edmonton

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

Comments:

- Mar 21, 2019 - Sample 1338374-1; 6536671: Sample formed an emulsion during oil and grease extraction. Centrifugation was required in order to complete analysis.

Please direct any inquiries regarding this report to our Client Services Group or to the Operations Manager at the coordinates indicated at the top left of this page.

Results relate only to samples as submitted.

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Billing Information:		Copy of Report To:		RUSH Priority	
Company	Town of Inuvik	Company	Aecom - Edmonton	Upon filling out this section, client accepts that surcharges will be applied to the analysis	
Address	Box 1160 2 Firth Street Inuvik, NT X0E 0T0	Address	17203-103rd Avenue Edmonton, AB T5S 1J4	Date Required	
Attention	Rick Campbell	Attention	Richard Feilden	As Indicated	All Analysis
Phone	(867) 777-8615	Phone	(780) 488-6800	When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples	
Cell	(867) 678-5388	Cell		Signature	
Fax	(867) 777-8601	Fax	(780) 488-2121	Sample Custody (please print)	
E-mail	rcampbell@town.inuvik.nt.ca	E-mail	richard.feilden@aecom.com	Sampled by: <u>Matt O'Rourke</u>	
Agreement ID	2909	Copy of Report	Copy of invoice	Company: <u>Town of Inuvik</u>	

Report Results	<input checked="" type="checkbox"/> Online	<input type="checkbox"/> PDF	<input type="checkbox"/> QA/QC Report	Number of Containers	pH	CBOD5	Suspended Solids	Ammonia	Fecal Coliforms	Oil & Grease	Special Instructions/Comments (please include contact information including ph. # if different from above).		Indicate Regulatory Requirements below	
<input checked="" type="checkbox"/> E-Mail	<input type="checkbox"/> Fax	<input type="checkbox"/> Excel									Sampler: note weather:			

Temp 23 C, precip 0, Wind dir N Vel 7 km/h

Sample Identification	Location	Depth in cm m	Date/Time sampled	Matrix	Sampling method	Number of Containers	pH	CBOD5	Suspended Solids	Ammonia	Fecal Coliforms	Oil & Grease	Indicate below any deficiencies in the condition of samples:	
1 SNP0036-3	Sewage Lagoon		03-13-19 9:24		Dip	5	x	x	x	x	x	x	Were Exova supplies used?	
2													Was there any damage to the shipping container?	
3													Were the containers packaged well?	
4													Were the expected number of samples received (document below)?	
5													Are samples within recommended holding times/temp?	
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														

Environmental Sample Information Sheet		Indicate lot number or affix lot label here:	Shipping:	# and size of coolers received:
Note: Proper completion of this form is required in order to proceed with analysis		Lot: 1338374 COC	COD Y/N	
Please indicate any potentially hazardous samples			Cooler temp:	Delivery Method: <u>Cooler</u>
Page 1 of 1	Control #		<u>2.8</u>	Waybill: <u>Canadian North</u>
				Received by: <u>WV</u>

Report Transmission Cover Page

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1345336 Control Number: Date Received: Apr 18, 2019 Date Reported: Apr 25, 2019 Report Number: 2397498
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

Contact	Company	Address
Jason Casault	AECOM - Edmonton	101, 18817 Stony Plain Road Edmonton, AB T5S 0C2 Phone: (780) 486-7050 Fax: (780) 486-7070 Email: Jason.Casault@aecom.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Kim Wainman	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: kwainman@town.inuvik.nt.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Single Report	PDF	Invoice
Richard Feilden	AECOM - Edmonton	17203 - 103 Avenue Edmonton, AB T5S 1J4 Phone: (780) 488-6800 Fax: (780) 488-2121 Email: richard.feilden@aecom.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Rick Campbell	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: rcampbell@town.inuvik.nt.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Notes To Clients:

- Apr 18, 2019 - Sample received over temperature for micro analysis.
- Apr 23, 2019 - Sample 1345336-1; 6572482: Sample formed an emulsion during oil and grease extraction. Centrifugation was required in order to complete analysis.

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Analytical Report

Bill To: Town of Inuvik
Box 1160
2 Firth Street
Inuvik, NT, Canada
X0E 0T0
Attn: Rick Campbell
Sampled By: Matt O'Rourke
Company: Town of Inuvik

Project ID: SNP 0036-3
Project Name:
Project Location: Inuvik
LSD:
P.O.: 100104
Proj. Acct. code:

Lot ID: **1345336**
Control Number:
Date Received: Apr 18, 2019
Date Reported: Apr 25, 2019
Report Number: 2397498

Reference Number 1345336-1
Sample Date Apr 17, 2019
Sample Time 09:00
Sample Location Sewage Lagoon
Sample Description SNP0036-3 / 11.7°C

Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Biochemical Oxygen Demand	Inhibited	mg/L	73		4
Oil and Grease	Total	mg/L	8		5
pH adjustment	adjustment required		No		
Inorganic Nonmetallic Parameters					
Ammonia - N		mg/L	20.3		0.025
Ammonium/Ammonia Preservation			Yes		
Microbiological Analysis					
Fecal Coliforms	Membrane Filtration	CFU/100 mL	6000		1
Physical and Aggregate Properties					
Solids	Total Suspended	mg/L	23		2
Routine Water					
pH			7.39		
Temperature of observed pH		°C	21.7		

Approved by: 
Anthony Neumann, MSc
Laboratory Operations Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).

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Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3	Lot ID: 1345336
Attn: Rick Campbell	Project Name:	Control Number:
Sampled By: Matt O'Rourke	Project Location: Inuvik	Date Received: Apr 18, 2019
Company: Town of Inuvik	LSD:	Date Reported: Apr 25, 2019
	P.O.: 100104	Report Number: 2397498
	Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Apr 18, 2019	Element Edmonton - Roper Road
Ammonium-N in Water	APHA	* Automated Phenate Method, 4500-NH3 G	Apr 18, 2019	Element Edmonton - Roper Road
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	Apr 18, 2019	Element Edmonton - Roper Road
Coliforms - Membrane Filtration	APHA	Fecal Coliform Membrane Filter Procedure, 9222 D	Apr 18, 2019	Element Calgary
Oil and Grease in water	US EPA	* n-Hexane Extractable Material and Silica Gel Treated n-Hexane Extractable Material by Extraction and Gravimetry, 1664	Apr 22, 2019	Element Edmonton - Roper Road
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D <i>* Reference Method Modified</i>	Apr 23, 2019	Element Edmonton - Roper Road

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

Comments:

- Apr 18, 2019 - Sample received over temperature for micro analysis.
- Apr 23, 2019 - Sample 1345336-1; 6572482: Sample formed an emulsion during oil and grease extraction. Centrifugation was required in order to complete analysis.

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Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1351102 Control Number: Date Received: May 18, 2019 Date Reported: May 28, 2019 Report Number: 2406285
Attn: Rick Campbell Sampled By: Dale Huatum Company: Town of Inuvik		

Contact	Company	Address
Jason Casault	AECOM - Edmonton	101, 18817 Stony Plain Road Edmonton, AB T5S 0C2 Phone: (780) 486-7050 Fax: (780) 486-7070 Email: Jason.Casault@aecom.com
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Rick Campbell	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: rcampbell@town.inuvik.nt.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Steven Pickle	AECOM - Edmonton	101-18817 Stony Plain Road NW Edmonton, AB T5S 0C2 Phone: (780) 732-9439 Fax: Email: steven.pickle@aecom.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Utilidor	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-2607 Fax: (867) 777-2071 Email: utilidor@town.inuvik.nt.ca
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Box 1160
2 Firth Street
Inuvik, NT, Canada
X0E 0T0
Attn: Rick Campbell
Sampled By: Dale Huatum
Company: Town of Inuvik

Project ID: SNP 0036-3
Project Name:
Project Location: Inuvik
LSD:
P.O.: 100104
Proj. Acct. code:

Lot ID: **1351102**
Control Number:
Date Received: May 18, 2019
Date Reported: May 28, 2019
Report Number: 2406285

Analytical Report

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1351102 Control Number: Date Received: May 18, 2019 Date Reported: May 28, 2019 Report Number: 2406285
Attn: Rick Campbell Sampled By: Dale Huatum Company: Town of Inuvik		

Reference Number 1351102-1
Sample Date May 15, 2019
Sample Time 09:40
Sample Location Sewage Lagoon
Sample Description SNP0036-3 / 8.8C

Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Biochemical Oxygen Demand	Inhibited mg/L	87			4
Oil and Grease	Total mg/L	5			5
pH adjustment	adjustment required	No			
Inorganic Nonmetallic Parameters					
Ammonia - N	mg/L	16.3			0.025
Ammonium/Ammonia Preservation		Yes			
Microbiological Analysis					
Fecal Coliforms	Membrane Filtration CFU/100 mL	53000			1
Physical and Aggregate Properties					
Solids	Total Suspended mg/L	8			2
Routine Water					
pH		7.95			
Temperature of observed pH	°C	21.0			

Approved by:



Murray Klutz
Senior Agronomist

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1351102 Control Number: Date Received: May 18, 2019 Date Reported: May 28, 2019 Report Number: 2406285
Attn: Rick Campbell Sampled By: Dale Huatum Company: Town of Inuvik		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 16, 2019	Element Edmonton - Roper Road
Ammonium-N in Water	APHA	* Automated Phenate Method, 4500-NH3 G	May 28, 2019	Element Edmonton - Roper Road
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	May 16, 2019	Element Edmonton - Roper Road
Coliforms - Membrane Filtration	APHA	Fecal Coliform Membrane Filter Procedure, 9222 D	May 16, 2019	Element Calgary
Oil and Grease in water	US EPA	* n-Hexane Extractable Material and Silica Gel Treated n-Hexane Extractable Material by Extraction and Gravimetry, 1664	May 23, 2019	Element Edmonton - Roper Road
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D <i>* Reference Method Modified</i>	May 21, 2019	Element Edmonton - Roper Road

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

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Report Transmission Cover Page

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1355758 Control Number: Date Received: Jun 7, 2019 Date Reported: Jun 17, 2019 Report Number: 2412741
Attn: Rick Campbell Sampled By: D. Kerd Company: Town of Inuvik		

Contact	Company	Address
Jason Casault	AECOM - Edmonton	101, 18817 Stony Plain Road Edmonton, AB T5S 0C2 Phone: (780) 486-7050 Fax: (780) 486-7070 Email: Jason.Casault@aecom.com
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<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Notes To Clients:

- Jun 12, 2019 - Sample 1355758-1; 6626141: Sample formed an emulsion during oil and grease extraction. Centrifugation was required in order to complete analysis.

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Analytical Report

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1355758 Control Number: Date Received: Jun 7, 2019 Date Reported: Jun 17, 2019 Report Number: 2412741
Attn: Rick Campbell Sampled By: D. Kerd Company: Town of Inuvik		

Reference Number 1355758-1
Sample Date Jun 06, 2019
Sample Time 09:10
Sample Location Sewage Lagoon
Sample Description SNP0036-3 / 4.8°C

Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Biochemical Oxygen Demand	Inhibited mg/L	<4			4
Oil and Grease	Total mg/L	7			5
pH adjustment	adjustment required	No			
Inorganic Nonmetallic Parameters					
Ammonia - N	mg/L	0.054			0.025
Ammonium/Ammonia Preservation		Yes			
Microbiological Analysis					
Fecal Coliforms	Membrane Filtration CFU/100 mL	60			1
Physical and Aggregate Properties					
Solids	Total Suspended mg/L	49			2
Routine Water					
pH		7.51			
Temperature of observed pH	°C	20.1			

Approved by:



Murray Klutz
Senior Agronomist

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1355758 Control Number: Date Received: Jun 7, 2019 Date Reported: Jun 17, 2019 Report Number: 2412741
Attn: Rick Campbell Sampled By: D. Kerd Company: Town of Inuvik		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 10, 2019	Element Edmonton - Roper Road
Ammonium-N in Water	APHA	* Automated Phenate Method, 4500-NH3 G	Jun 14, 2019	Element Edmonton - Roper Road
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	Jun 12, 2019	Element Edmonton - Roper Road
Coliforms - Membrane Filtration	APHA	Fecal Coliform Membrane Filter Procedure, 9222 D	Jun 8, 2019	Element Calgary
Oil and Grease in water	US EPA	* n-Hexane Extractable Material and Silica Gel Treated n-Hexane Extractable Material by Extraction and Gravimetry, 1664	Jun 10, 2019	Element Edmonton - Roper Road
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D <i>* Reference Method Modified</i>	Jun 17, 2019	Element Edmonton - Roper Road

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

Comments:

- Jun 12, 2019 - Sample 1355758-1; 6626141: Sample formed an emulsion during oil and grease extraction. Centrifugation was required in order to complete analysis.

Please direct any inquiries regarding this report to our Client Services group.

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Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1356837 Control Number: Date Received: Jun 13, 2019 Date Reported: Jun 20, 2019 Report Number: 2414256
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

Contact	Company	Address
Kim Wainman	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: kwainman@town.inuvik.nt.ca
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<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Notes To Clients:

- Jun 14, 2019 - Sample 1356837-1; 6631804: Sample formed an emulsion during oil and grease extraction. Centrifugation was required in order to complete analysis.

Analytical Report

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1356837 Control Number: Date Received: Jun 13, 2019 Date Reported: Jun 20, 2019 Report Number: 2414256
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

Reference Number 1356837-1
Sample Date Jun 12, 2019
Sample Time 10:00
Sample Location
Sample Description Sewage Lagoon /
SNP0036-3 / 9.6°C

Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Biochemical Oxygen Demand	Inhibited	mg/L	11		4
Oil and Grease	Total	mg/L	5		5
pH adjustment	adjustment required		No		
Inorganic Nonmetallic Parameters					
Ammonia - N		mg/L	12.4		0.025
Un-ionized Ammonia-N	15 °C	mg/L	0.226		
Ammonium/Ammonia Preservation			Yes		
Microbiological Analysis					
Fecal Coliforms	Membrane Filtration	CFU/100 mL	4000		1
Physical and Aggregate Properties					
Solids	Total Suspended	mg/L	25		2
Routine Water					
pH	15 °C	pH	7.83		
Temperature of observed		°C	16		
pH			7.82		
Temperature of observed		°C	20.0		
pH					

Approved by: 
Anthony Neumann, MSc
General Manager

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Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1356837 Control Number: Date Received: Jun 13, 2019 Date Reported: Jun 20, 2019 Report Number: 2414256
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 13, 2019	Element Edmonton - Roper Road
Ammonium-N in Water	APHA	* Automated Phenate Method, 4500-NH3 G	Jun 18, 2019	Element Edmonton - Roper Road
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	Jun 13, 2019	Element Edmonton - Roper Road
Coliforms - Membrane Filtration	APHA	Fecal Coliform Membrane Filter Procedure, 9222 D	Jun 13, 2019	Element Calgary
Oil and Grease in water	US EPA	* n-Hexane Extractable Material and Silica Gel Treated n-Hexane Extractable Material by Extraction and Gravimetry, 1664	Jun 13, 2019	Element Edmonton - Roper Road
pH at 15°C	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 20, 2019	Element Edmonton - Roper Road
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D <i>* Reference Method Modified</i>	Jun 18, 2019	Element Edmonton - Roper Road

References

APHA Standard Methods for the Examination of Water and Wastewater
US EPA US Environmental Protection Agency Test Methods

Comments:

- Jun 14, 2019 - Sample 1356837-1; 6631804: Sample formed an emulsion during oil and grease extraction. Centrifugation was required in order to complete analysis.

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Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1359871 Control Number: Date Received: Jun 26, 2019 Date Reported: Jul 3, 2019 Report Number: 2418387
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

Contact	Company	Address
Jason Casault	AECOM - Edmonton	101, 18817 Stony Plain Road Edmonton, AB T5S 0C2 Phone: (780) 486-7050 Fax: (780) 486-7070 Email: Jason.Casault@aecom.com
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<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Notes To Clients:

- Jun 27, 2019 - Sample 1359871-1; 6648767: Sample formed an emulsion during oil and grease extraction. Centrifugation was required in order to complete analysis.

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Bill To: Town of Inuvik
Box 1160
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Inuvik, NT, Canada
X0E 0T0
Attn: Rick Campbell
Sampled By: Matt O'Rourke
Company: Town of Inuvik

Project ID: SNP 0036-3
Project Name:
Project Location: Inuvik
LSD:
P.O.: 100104
Proj. Acct. code:

Lot ID: **1359871**
Control Number:
Date Received: Jun 26, 2019
Date Reported: Jul 3, 2019
Report Number: 2418387

Reference Number 1359871-1
Sample Date Jun 25, 2019
Sample Time 09:00
Sample Location
Sample Description Sewage Lagoon /
SNP0036-3 / 6.1°C

Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Biochemical Oxygen Demand	Inhibited	mg/L	17		4
Oil and Grease	Total	mg/L	7		5
pH adjustment	adjustment required		No		
Inorganic Nonmetallic Parameters					
Ammonia - N		mg/L	6.29		0.025
Un-ionized Ammonia-N	15 °C	mg/L	0.675		
Ammonium/Ammonia Preservation			Yes		
Microbiological Analysis					
Fecal Coliforms	Membrane Filtration	CFU/100 mL	600		1
Physical and Aggregate Properties					
Solids	Total Suspended	mg/L	43		2
Routine Water					
pH	15 °C	pH	8.64		
Temperature of observed		°C	15		
pH			7.80		
Temperature of observed		°C	19.4		
pH					

Approved by:



Murray Klutz
Senior Agronomist

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Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1359871 Control Number: Date Received: Jun 26, 2019 Date Reported: Jul 3, 2019 Report Number: 2418387
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 26, 2019	Element Edmonton - Roper Road
Ammonium-N in Water	APHA	* Automated Phenate Method, 4500-NH3 G	Jul 2, 2019	Element Edmonton - Roper Road
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	Jun 27, 2019	Element Edmonton - Roper Road
Coliforms - Membrane Filtration	APHA	Fecal Coliform Membrane Filter Procedure, 9222 D	Jun 26, 2019	Element Calgary
Oil and Grease in water	US EPA	* n-Hexane Extractable Material and Silica Gel Treated n-Hexane Extractable Material by Extraction and Gravimetry, 1664	Jun 26, 2019	Element Edmonton - Roper Road
pH at 15°C	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 27, 2019	Element Edmonton - Roper Road
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D <i>* Reference Method Modified</i>	Jun 27, 2019	Element Edmonton - Roper Road

References

APHA Standard Methods for the Examination of Water and Wastewater
US EPA US Environmental Protection Agency Test Methods

Comments:

- Jun 27, 2019 - Sample 1359871-1; 6648767: Sample formed an emulsion during oil and grease extraction. Centrifugation was required in order to complete analysis.

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Attn: Rick Campbell Sampled By: Dale Huatua Company: Town of Inuvik		

Contact	Company	Address
Kim Wainman	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: kwainman@town.inuvik.nt.ca
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Attn: Rick Campbell Sampled By: Dale Huatua Company: Town of Inuvik		

Reference Number 1361261-1
Sample Date Jul 02, 2019
Sample Time 09:00
Sample Location
Sample Description SNP0036-3 / 9.4C /
Sewage Lagoon

Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Biochemical Oxygen Demand	Inhibited	mg/L	16		4
Oil and Grease	Total	mg/L	6		5
pH adjustment	adjustment required		No		
Inorganic Nonmetallic Parameters					
Ammonia - N		mg/L	3.81		0.025
Un-ionized Ammonia-N	15 °C	mg/L	0.299		
Ammonium/Ammonia Preservation			Yes		
Microbiological Analysis					
Fecal Coliforms	Membrane Filtration	CFU/100 mL	3100		1
Physical and Aggregate Properties					
Solids	Total Suspended	mg/L	43		2
Routine Water					
pH	15 °C	pH	8.49		
Temperature of observed		°C	15		
pH			8.58		
Temperature of observed		°C	19.7		
pH					

Approved by: 
Anthony Neumann, MSc
General Manager

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Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1361261 Control Number: Date Received: Jul 3, 2019 Date Reported: Jul 9, 2019 Report Number: 2420288
Attn: Rick Campbell Sampled By: Dale Huatua Company: Town of Inuvik		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jul 3, 2019	Element Edmonton - Roper Road
Ammonium-N in Water	APHA	* Automated Phenate Method, 4500-NH3 G	Jul 5, 2019	Element Edmonton - Roper Road
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	Jul 3, 2019	Element Edmonton - Roper Road
Coliforms - Membrane Filtration	APHA	Fecal Coliform Membrane Filter Procedure, 9222 D	Jul 3, 2019	Element Calgary
Oil and Grease in water	US EPA	* n-Hexane Extractable Material and Silica Gel Treated n-Hexane Extractable Material by Extraction and Gravimetry, 1664	Jul 3, 2019	Element Edmonton - Roper Road
pH at 15°C	APHA	* pH - Electrometric Method, 4500-H+ B	Jul 8, 2019	Element Edmonton - Roper Road
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D <i>* Reference Method Modified</i>	Jul 4, 2019	Element Edmonton - Roper Road

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

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Attn: Rick Campbell Sampled By: David Kendi Company: Town of Inuvik		

Contact	Company	Address
Kim Wainman	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: kwainman@town.inuvik.nt.ca
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Bill To: Town of Inuvik
Box 1160
2 Firth Street
Inuvik, NT, Canada
X0E 0T0
Attn: Rick Campbell
Sampled By: David Kendi
Company: Town of Inuvik

Project ID: SNP 0036-3
Project Name:
Project Location: Inuvik
LSD:
P.O.: 100104
Proj. Acct. code:

Lot ID: **1364588**
Control Number:
Date Received: Jul 18, 2019
Date Reported: Jul 25, 2019
Report Number: 2424882

Reference Number 1364588-1
Sample Date Jul 17, 2019
Sample Time 09:55
Sample Location
Sample Description Sewage Lagoon /
SNP0036-3 / 6.6°C

Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Biochemical Oxygen Demand	Inhibited	mg/L	25		4
Oil and Grease	Total	mg/L	6		5
pH adjustment	adjustment required		No		
Inorganic Nonmetallic Parameters					
Ammonia - N		mg/L	3.01		0.025
Un-ionized Ammonia-N	15 °C	mg/L	0.208		
Ammonium/Ammonia Preservation			Yes		
Microbiological Analysis					
Fecal Coliforms	Membrane Filtration	CFU/100 mL	600		1
Physical and Aggregate Properties					
Solids	Total Suspended	mg/L	65		2
Routine Water					
pH	15 °C	pH	8.43		
Temperature of observed		°C	15		
pH			7.79		
Temperature of observed		°C	21.6		
pH					

Approved by: 
Anthony Neumann, MSc
General Manager

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Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1364588 Control Number: Date Received: Jul 18, 2019 Date Reported: Jul 25, 2019 Report Number: 2424882
Attn: Rick Campbell Sampled By: David Kendi Company: Town of Inuvik		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jul 22, 2019	Element Edmonton - Roper Road
Ammonium-N in Water	APHA	* Automated Phenate Method, 4500-NH3 G	Jul 23, 2019	Element Edmonton - Roper Road
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	Jul 18, 2019	Element Edmonton - Roper Road
Coliforms - Membrane Filtration	APHA	Fecal Coliform Membrane Filter Procedure, 9222 D	Jul 19, 2019	Element Calgary
Oil and Grease in water	US EPA	* n-Hexane Extractable Material and Silica Gel Treated n-Hexane Extractable Material by Extraction and Gravimetry, 1664	Jul 22, 2019	Element Edmonton - Roper Road
pH at 15°C	APHA	* pH - Electrometric Method, 4500-H+ B	Jul 19, 2019	Element Edmonton - Roper Road
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D <i>* Reference Method Modified</i>	Jul 22, 2019	Element Edmonton - Roper Road

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

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Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1384264 Control Number: Date Received: Oct 17, 2019 Date Reported: Oct 25, 2019 Report Number: 2452649
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

Contact	Company	Address
Kim Wainman	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: kwainman@inuvik.ca
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<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Notes To Clients:

- Oct 25, 2019 - Sample 1384264-1; 6799827: Sample formed an emulsion during oil and grease extraction. Centrifugation was required in order to complete analysis.

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Analytical Report

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1384264 Control Number: Date Received: Oct 17, 2019 Date Reported: Oct 25, 2019 Report Number: 2452649
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

Reference Number	1384264-1
Sample Date	Oct 16, 2019
Sample Time	09:10
Sample Location	
Sample Description	SNP0036-3
Matrix	Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Biochemical Oxygen Demand	Inhibited	mg/L	<4		4
Oil and Grease	Total	mg/L	5		5
pH adjustment	adjustment required		No		
Inorganic Nonmetallic Parameters					
Ammonia - N		mg/L	14.1		0.025
Un-ionized Ammonia-N	15 °C	mg/L	0.175		
Ammonium/Ammonia Preservation			Yes		
Microbiological Analysis					
Fecal Coliforms	Membrane Filtration	CFU/100 mL	<10		1
Physical and Aggregate Properties					
Solids	Total Suspended	mg/L	<1		2
Routine Water					
pH	15 °C	pH	7.66		
Temperature of observed		°C	15		
pH			7.98		
Temperature of observed		°C	19.6		
pH					

Approved by:



Darlene Lintott, MSc
Consulting Scientist

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3	Lot ID: 1384264
Attn: Rick Campbell	Project Name:	Control Number:
Sampled By: Matt O'Rourke	Project Location: Inuvik	Date Received: Oct 17, 2019
Company: Town of Inuvik	LSD:	Date Reported: Oct 25, 2019
	P.O.: 100104	Report Number: 2452649
	Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Oct 17, 2019	Element Edmonton - Roper Road
Ammonium-N in Water	APHA	* Automated Phenate Method, 4500-NH3 G	Oct 23, 2019	Element Edmonton - Roper Road
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	Oct 17, 2019	Element Edmonton - Roper Road
Coliforms - Membrane Filtration	APHA	Fecal Coliform Membrane Filter Procedure, 9222 D	Oct 17, 2019	Element Calgary
Oil and Grease in water	US EPA	* n-Hexane Extractable Material and Silica Gel Treated n-Hexane Extractable Material by Extraction and Gravimetry, 1664	Oct 24, 2019	Element Edmonton - Roper Road
pH at 15°C	APHA	* pH - Electrometric Method, 4500-H+ B	Oct 21, 2019	Element Edmonton - Roper Road
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D	Oct 22, 2019	Element Edmonton - Roper Road

** Reference Method Modified*

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

Comments:

- Oct 25, 2019 - Sample 1384264-1; 6799827: Sample formed an emulsion during oil and grease extraction. Centrifugation was required in order to complete analysis.

Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

Report Transmission Cover Page

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1391323 Control Number: Date Received: Nov 14, 2019 Date Reported: Nov 22, 2019 Report Number: 2465415
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

Contact	Company	Address
Kim Wainman	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: kwainman@inuvik.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Single Report	PDF	Invoice
Richard Feilden	AECOM - Edmonton	17203 - 103 Avenue Edmonton, AB T5S 1J4 Phone: (780) 488-6800 Fax: (780) 488-2121 Email: richard.feilden@aecom.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Merge Reports	PDF	COC / Test Report
Rick Campbell	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: rcampbell@inuvik.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Merge Reports	PDF	COC / Test Report
Email - Single Report	PDF	Invoice
Utilidor	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-2607 Fax: (867) 777-2071 Email: utilidor@inuvik.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Single Report	PDF	Invoice

Notes To Clients:

- Nov 22, 2019 - Sample 1391323-1; 6854289: Sample formed an emulsion during oil and grease extraction. Centrifugation was required in order to complete analysis.

Analytical Report

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1391323 Control Number: Date Received: Nov 14, 2019 Date Reported: Nov 22, 2019 Report Number: 2465415
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

Reference Number 1391323-1
Sample Date Nov 13, 2019
Sample Time 09:30
Sample Location
Sample Description Sewage Lagoon /
SNP0036-3 / 5.9C

Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Biochemical Oxygen Demand	Inhibited	mg/L	12		4
Oil and Grease	Total	mg/L	40		5
pH adjustment	adjustment required		No		
Inorganic Nonmetallic Parameters					
Ammonia - N		mg/L	17.7		0.025
Un-ionized Ammonia-N	15 °C	mg/L	0.101		
Ammonium/Ammonia Preservation			No		
Microbiological Analysis					
Fecal Coliforms	Membrane Filtration	CFU/100 mL	>6000		1
Physical and Aggregate Properties					
Solids	Total Suspended	mg/L	17		2
Routine Water					
pH	15 °C	pH	7.32		
Temperature of observed		°C	15		
pH			4.75		
Temperature of observed		°C	20.2		
pH					

Approved by: 
Randy Neumann, BSc
Division Director

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1391323 Control Number: Date Received: Nov 14, 2019 Date Reported: Nov 22, 2019 Report Number: 2465415
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Nov 15, 2019	Element Edmonton - Roper Road
Ammonium-N in Water	APHA	* Automated Phenate Method, 4500-NH3 G	Nov 19, 2019	Element Edmonton - Roper Road
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	Nov 15, 2019	Element Edmonton - Roper Road
Coliforms - Membrane Filtration	APHA	Fecal Coliform Membrane Filter Procedure, 9222 D	Nov 15, 2019	Element Calgary
Oil and Grease in water	US EPA	* n-Hexane Extractable Material and Silica Gel Treated n-Hexane Extractable Material by Extraction and Gravimetry, 1664	Nov 22, 2019	Element Edmonton - Roper Road
pH at 15°C	APHA	* pH - Electrometric Method, 4500-H+ B	Nov 21, 2019	Element Edmonton - Roper Road
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D <i>* Reference Method Modified</i>	Nov 20, 2019	Element Edmonton - Roper Road

References

APHA Standard Methods for the Examination of Water and Wastewater
US EPA US Environmental Protection Agency Test Methods

Comments:

- Nov 22, 2019 - Sample 1391323-1; 6854289: Sample formed an emulsion during oil and grease extraction. Centrifugation was required in order to complete analysis.

Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted.

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Report Transmission Cover Page

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1397239 Control Number: Date Received: Dec 11, 2019 Date Reported: Jan 2, 2020 Report Number: 2475089
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

Contact	Company	Address
Kim Wainman	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: kwainman@inuvik.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Single Report	PDF	Invoice
Li Wang	AECOM - Edmonton	101-18817 Stony Plain Road NW Edmonton, AB T5S 0C2 Phone: (780) 453-0710 Fax: Email: li.wang@aecom.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Merge Reports	PDF	COC / Test Report
Email - Single Report	Legacy Crosstab in CSV	Test Report
Richard Feilden	AECOM - Edmonton	17203 - 103 Avenue Edmonton, AB T5S 1J4 Phone: (780) 488-6800 Fax: (780) 488-2121 Email: richard.feilden@aecom.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Merge Reports	PDF	COC / Test Report
Rick Campbell	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: rcampbell@inuvik.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Merge Reports	PDF	COC / Test Report
Email - Single Report	PDF	Invoice
Utilidor	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-2607 Fax: (867) 777-2071 Email: utilidor@inuvik.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Single Report	PDF	Invoice

Notes To Clients:


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Analytical Report

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1397239 Control Number: Date Received: Dec 11, 2019 Date Reported: Jan 2, 2020 Report Number: 2475089
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

Reference Number 1397239-1
Sample Date Nov 10, 2019 Dec 10, 2019 - See transit sheet
Sample Time 09:00
Sample Location
Sample Description Sewage Lagoon / SNP0036-3 / 1.1 °C

Analyte	Units	Matrix	Water		Nominal Detection Limit
			Results	Results	
Aggregate Organic Constituents					
Biochemical Oxygen Demand	Inhibited	mg/L	26		4
Oil and Grease	Total	mg/L	23		2
pH adjustment	required prior to O&G extraction		No		
Inorganic Nonmetallic Parameters					
Ammonia - N		mg/L	19.1		0.025
Un-ionized Ammonia-N	15 °C	mg/L	0.120		
Ammonium/Ammonia Preservation			Yes		
Microbiological Analysis					
Fecal Coliforms	Membrane Filtration	CFU/100 mL	>6000		1
Physical and Aggregate Properties					
Solids	Total Suspended	mg/L	17		2
Routine Water					
pH	15 °C	pH	7.36		
Temperature of observed pH		°C	15		
pH			7.58		
Temperature of observed pH		°C	21.2		

Approved by: 
 Benjamin Morris, B.Sc
 Operations Manager

Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1397239 Control Number: Date Received: Dec 11, 2019 Date Reported: Jan 2, 2020 Report Number: 2475089
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Dec 12, 2019	Element Edmonton - Roper Road
Ammonium-N in Water	APHA	* Automated Phenate Method, 4500-NH3 G	Dec 16, 2019	Element Edmonton - Roper Road
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	Dec 11, 2019	Element Edmonton - Roper Road
Coliforms - Membrane Filtration	APHA	Fecal Coliform Membrane Filter Procedure, 9222 D	Dec 12, 2019	Element Calgary
Oil and Grease in water (VAN)	BCELM	* Oil & Grease in Water - Direct Hexane Extraction, Oil & Grease	Dec 24, 2019	Element Vancouver
pH at 15°C	APHA	* pH - Electrometric Method, 4500-H+ B	Dec 16, 2019	Element Edmonton - Roper Road
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D	Dec 12, 2019	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
BCELM	B.C. Environmental Laboratory Manual

Please direct any inquiries regarding this report to our Client Services group.

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Billing Information:		Copy of Report To:		RUSH Priority	
Company	Town of Inuvik	Company	Aecom - Edmonton	Upon filling out this section, client accepts that surcharges will be applied to the analysis	
Address	Box 1160 2 Firth Street Inuvik, NT X0E 0T0	Address	17203-103rd Avenue Edmonton, AB T5S 1J4	Date Required	
Attention	Rick Campbell	Attention	Richard Feilden	As Indicated	All Analysis
Phone	(867) 777-8615	Phone	(780) 488-6800	When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples	
Cell	(867) 678-5388	Cell		Signature	
Fax	(867) 777-8601	Fax	(780) 488-2121	Sample Custody (please print)	
E-mail	rcampbell@town.inuvik.nt.ca	E-mail	richard.feilden@aecom.com	Sampled by: <i>Math O'Rourke</i>	
Agreement ID	2909	Copy of invoice		Company: Town of Inuvik	
Copy of Report				I authorize Exova to proceed with the work indicated on this form:	

Report Results	X	E-Mail		Online		PDF		QA/QC Report								
		Mail	X	Fax		Excel										
Special Instructions/Comments (please include contact information including ph. # if different from above). Sampler: note weather: Temp <u>-22</u> C, precip <u>0</u> , Wind dir <u>SE</u> Vel <u>21</u> km/h								Indicate Regulatory Requirements below		Number of Containers ↓	pH	CBOD5	Suspended Solids	Ammonia	Fecal Coliforms	Oil & Grease

Date: 12-10-19 Initial: MO

This section for Lab use only

Date/Time stamp:
DEC 11 AM 6:58

Sample Identification	Location	Depth in cm m	Date/Time sampled	Matrix	Sampling method	Number of Containers	pH	CBOD5	Suspended Solids	Ammonia	Fecal Coliforms	Oil & Grease	Indicate below any deficiencies in the condition of samples:			
1 SNP0036-3	Sewage Lagoon		12-10-19 9:00 A		Dip	5	x	x	x	x	x	x				Were Exova supplies used?
2																Was there any damage to the shipping container?
3																Were the containers packaged well?
4																Were the expected number of samples received (document below)?
5																Are samples within recommended holding times/temp?
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

Please indicate any potentially hazardous samples

Page 1 of 1 Control #

Lot: 1397239 COC



Shipping: COD Y/N

Cooler temp: 1.1

and size of coolers received:

Delivery Method: BOX

Waybill:

Received by: JANU NEZ

Report Transmission Cover Page

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0 Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1322978 Control Number: Date Received: Dec 13, 2018 Date Reported: Dec 20, 2018 Report Number: 2364729
---	--	---

Contact	Company	Address
Jason Casault	AECOM - Edmonton	101, 18817 Stony Plain Road Edmonton, AB T5S 0C2 Phone: (780) 486-7050 Fax: (780) 486-7070 Email: Jason.Casault@aecom.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Merge Reports	PDF	COC / COA
Email - Merge Reports	PDF	COC / Test Report
Kim Wainman	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: kwainman@town.inuvik.nt.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Single Report	PDF	Invoice
Richard Feilden	AECOM - Edmonton	17203 - 103 Avenue Edmonton, AB T5S 1J4 Phone: (780) 488-6800 Fax: (780) 488-2121 Email: richard.feilden@aecom.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Merge Reports	PDF	COC / Test Report
Rick Campbell	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: rcampbell@town.inuvik.nt.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Merge Reports	PDF	COC / Test Report
Email - Single Report	PDF	Invoice
Utilidor	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-2607 Fax: (867) 777-2071 Email: utilidor@town.inuvik.nt.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Single Report	PDF	Invoice

Notes To Clients:

- Dec 17, 2018 - Sample 1322978-1; 6422718: Sample formed an emulsion during oil and grease extraction. Centrifugation was required in order to complete analysis.

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Analytical Report

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada XOE 0T0 Attn: Rick Campbell	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1322978 Control Number: Date Received: Dec 13, 2018 Date Reported: Dec 20, 2018 Report Number: 2364729
Sampled By: Matt O'Rourke Company: Town of Inuvik		

Reference Number 1322978-1
Sample Date Dec 12, 2018
Sample Time 09:07
Sample Location
Sample Description Sewage Lagoon /
SNP0036-3 / 3.9°C

Matrix Water

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents					
Biochemical Oxygen Demand	Inhibited	mg/L	47		4
Oil and Grease	Total	mg/L	53		5
pH adjustment	adjustment required		No		
Inorganic Nonmetallic Parameters					
Ammonia - N		mg/L	11.2		0.025
Un-ionized Ammonia-N	15 °C	mg/L	0.0423		
Ammonium/Ammonia Preservation			Yes		
Microbiological Analysis					
Fecal Coliforms	Membrane Filtration	CFU/100 mL	300000		1
Physical and Aggregate Properties					
Solids	Total Suspended	mg/L	13		2
Routine Water					
pH	15 °C	pH	7.14		
Temperature of observed		°C	15		
pH			7.62		
Temperature of observed		°C	22.8		
pH					

Approved by: 
Randy Neumann, BSc
Division Director

Data have been validated by Analytical Quality Control and Exova's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada XOE 0T0 Attn: Rick Campbell	Project ID: SNP 0036-3 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1322978 Control Number: Date Received: Dec 13, 2018 Date Reported: Dec 20, 2018 Report Number: 2364729
Sampled By: Matt O'Rourke Company: Town of Inuvik		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Dec 13, 2018	Exova Edmonton
Ammonium-N in Water	APHA	* Automated Phenate Method, 4500-NH3 G	Dec 19, 2018	Exova Edmonton
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	Dec 13, 2018	Exova Edmonton
Coliforms - Membrane Filtration	APHA	Fecal Coliform Membrane Filter Procedure, 9222 D	Dec 13, 2018	Exova Calgary
Oil and Grease in water	US EPA	* n-Hexane Extractable Material and Silica Gel Treated n-Hexane Extractable Material by Extraction and Gravimetry, 1664	Dec 14, 2018	Exova Edmonton
pH at 15°C	APHA	* pH - Electrometric Method, 4500-H+ B	Dec 20, 2018	Exova Edmonton
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D	Dec 13, 2018	Exova Edmonton

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

Comments:

- Dec 17, 2018 - Sample 1322978-1; 6422718: Sample formed an emulsion during oil and grease extraction. Centrifugation was required in order to complete analysis.

Please direct any inquiries regarding this report to our Client Services Group or to the Operations Manager at the coordinates indicated at the top left of this page.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

Billing Information:

Company: Town of Inuvik
Address: Box 1160 2 Firth Street
Inuvik, NT X0E 0T0
Attention: Rick Campbell
Phone: (867) 777-8615
Cell: (867) 678-5388
Fax: (867) 777-8601
E-mail: rcampbell@town.inuvik.nt.ca
Agreement ID: 2909
Copy of Report

Copy of Report To:

Company: Aecom - Edmonton
Address: 17203-103rd Avenue
Edmonton, AB T5S 1J4
Attention: Richard Feilden
Phone: (780) 488-6800
Cell:
Fax: (780) 488-2121
E-mail: richard.feilden@aecom.com
Copy of invoice

RUSH Priority

Upon filling out this section, client accepts that surcharges will be applied to the analysis

Date Required: As Indicated All Analysis

When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples

Signature: _____

Sample Custody (please print)

Sampled by: Math O'Rourke
Company: Town of Inuvik

I authorize Exova to proceed with the work indicated on this form:

Date: 12-12-18 Initial: MO

This section for Lab use only

Date/Time stamp:
DEC 18 AM 7:11

Project Information

Project ID: SNP 0036-3
Project Name:
Project Location: Inuvik
Legal Location:
PO/AFE#: 100104
Proj. Acct.Code:

Report Results: E-Mail Mail
Online PDF
Fax Excel

Special Instructions/Comments (please include contact information including ph. # if different from above).

Sampler: note weather:

Temp: 20 C, precip _____, Wind dir: NINE Vel: 10 km km/h

Indicate Regulatory Requirements below

Number of Containers	pH	CBOD5	Suspended Solids	Ammonia	Fecal Coliforms	Oil & Grease

Sample Identification	Location	Depth in cm m	Date/Time sampled	Matrix	Sampling method	Number of Containers	pH	CBOD5	Suspended Solids	Ammonia	Fecal Coliforms	Oil & Grease
1 SNP0036-3	Sewage Lagoon		<u>12-12-18 9:07 AM</u>		Dip	5	x	x	x	x	x	x
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												

Indicate below any deficiencies in the condition of samples:

Were Exova supplies used?
Was there any damage to the shipping container?
Were the containers packaged well?
Were the expected number of samples received (document below)?
Are samples within recommended holding times/temp?

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

Please indicate any potentially hazardous samples

Lot: 1322978 COC



Shipping: COD Y/N

Cooler temp: 3.9

and size of coolers received:

Delivery Method: Box

Waybill: SNUVEZ
Received by: _____

Report Transmission Cover Page

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-4.5 & 9 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1352596 Control Number: Date Received: May 23, 2019 Date Reported: May 30, 2019 Report Number: 2408230
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

Contact	Company	Address
Kim Wainman	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: kwainman@town.inuvik.nt.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Single Report	PDF	Invoice
Richard Feilden	AECOM - Edmonton	17203 - 103 Avenue Edmonton, AB T5S 1J4 Phone: (780) 488-6800 Fax: (780) 488-2121 Email: richard.feilden@aecom.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Merge Reports	PDF	COC / Test Report
Rick Campbell	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: rcampbell@town.inuvik.nt.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Merge Reports	PDF	COC / Test Report
Email - Single Report	PDF	Invoice
Utilidor	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-2607 Fax: (867) 777-2071 Email: utilidor@town.inuvik.nt.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Single Report	PDF	Invoice

Notes To Clients:

- May 30, 2019 - Some trace total metal results were less than dissolved metal results for sample 1352596-1 to -3. The results were verified and are within expected measurement uncertainty.

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Analytical Report

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-4,5 & 9 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1352596 Control Number: Date Received: May 23, 2019 Date Reported: May 30, 2019 Report Number: 2408230
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

		Reference Number	1352596-1	1352596-2	1352596-3	
		Sample Date	May 22, 2019	May 22, 2019	May 22, 2019	
		Sample Time	09:30	09:13	09:42	
		Sample Location				
		Sample Description	Pit N/W of Dump / SNP0036-4 / 3.6°C	Pond S/E of Dump / SNP0036-5 / 3.6°C	Creek N/W of Dump / SNP0036-9 / 3.6°C	
		Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Aggregate Organic Constituents						
Biochemical Oxygen Demand	Inhibited	mg/L	<4	<4	<4	4
Phenol		mg/L	0.003	<0.001	0.001	0.001
Inorganic Nonmetallic Parameters						
Phosphorus	Total	mg/L	0.13	0.25	0.09	0.05
Metals Dissolved						
Subsample			Lab Filtered	Lab Filtered	Lab Filtered	
Metals Total						
Aluminum	Total	mg/L	0.31	0.09	0.42	0.02
Calcium	Total	mg/L	166	16.8	13.4	0.2
Iron	Total	mg/L	2.44	0.88	1.50	0.05
Magnesium	Total	mg/L	80.8	6.2	5.6	0.2
Manganese	Total	mg/L	1.52	0.184	0.999	0.005
Potassium	Total	mg/L	18.7	3.5	1.7	0.4
Silicon	Total	mg/L	3.58	0.82	1.43	0.05
Sodium	Total	mg/L	94.8	7.0	4.0	0.4
Sulfur	Total	mg/L	176	11.2	14.9	0.3
Mercury	Total	mg/L	0.000024	0.000015	0.000019	0.000005
Antimony	Total	mg/L	0.0007	<0.0002	<0.0002	0.0002
Arsenic	Total	mg/L	0.0017	0.0012	0.0010	0.0002
Barium	Total	mg/L	0.040	0.027	0.022	0.001
Beryllium	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Bismuth	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Boron	Total	mg/L	0.643	0.028	0.017	0.002
Cadmium	Total	mg/L	0.00025	0.00005	0.00004	0.00001
Chromium	Total	mg/L	0.0016	<0.0005	0.0009	0.0005
Cobalt	Total	mg/L	0.0031	0.0004	0.0022	0.0001
Copper	Total	mg/L	0.021	0.001	0.003	0.001
Lead	Total	mg/L	0.0023	0.0002	0.0003	0.0001
Lithium	Total	mg/L	0.028	0.003	0.005	0.001
Molybdenum	Total	mg/L	0.001	<0.001	<0.001	0.001
Nickel	Total	mg/L	0.0127	0.0016	0.0077	0.0005
Selenium	Total	mg/L	0.0005	<0.0002	<0.0002	0.0002
Silver	Total	mg/L	0.00005	<0.00001	<0.00001	0.00001
Strontium	Total	mg/L	0.654	0.049	0.043	0.001
Thallium	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Tin	Total	mg/L	<0.001	<0.001	<0.001	0.001
Titanium	Total	mg/L	0.0055	0.0006	0.0038	0.0005

Analytical Report

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-4,5 & 9 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1352596 Control Number: Date Received: May 23, 2019 Date Reported: May 30, 2019 Report Number: 2408230
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

		Reference Number	1352596-1	1352596-2	1352596-3	
		Sample Date	May 22, 2019	May 22, 2019	May 22, 2019	
		Sample Time	09:30	09:13	09:42	
		Sample Location				
		Sample Description	Pit N/W of Dump / SNP0036-4 / 3.6°C	Pond S/E of Dump / SNP0036-5 / 3.6°C	Creek N/W of Dump / SNP0036-9 / 3.6°C	
		Matrix	Water	Water	Water	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Metals Total - Continued						
Uranium	Total	mg/L	0.0008	<0.0005	<0.0005	0.0005
Vanadium	Total	mg/L	0.0020	0.0011	0.0018	0.0001
Zinc	Total	mg/L	0.067	0.011	0.012	0.001
Zirconium	Total	mg/L	<0.001	<0.001	<0.001	0.001
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	22	3	11	2
Routine Water						
pH			8.15	7.37	6.96	
Temperature of observed		°C	21.2	21.1	21.3	
pH						
Electrical Conductivity	at 25 °C	µS/cm	1640	177	139	1
Electrical Conductivity	at 25 °C	dS/m	1.64	0.177	0.139	0.001
Calcium	Dissolved	meq/L	8.47	0.81	0.65	0.01
Calcium	Dissolved	mg/L	170	16.3	13.0	0.2
Magnesium	Dissolved	meq/L	6.52	0.49	0.44	0.01
Magnesium	Dissolved	mg/L	79.2	5.9	5.3	0.2
Sodium	Dissolved	meq/L	4.13	0.31	0.18	0.02
Sodium	Dissolved	mg/L	94.9	7.1	4.2	0.4
Potassium	Dissolved	meq/L	0.50	0.09	0.04	0.01
Potassium	Dissolved	mg/L	19.5	3.7	1.7	0.4
Chloride	Dissolved	mg/L	55.1	7.9	2.5	0.4
Chloride		meq/L	1.55	0.22	0.07	0.01
Sulfate (SO4)	Dissolved	mg/L	518	32.4	43.2	0.9
Sulfate-S		meq/L	10.8	0.673	0.899	
Sulfate-S	Dissolved	mg/L	173	10.8	14.4	0.3
Total Dissolved Solids	Estimated	mg/L	1050	113	89	1
SAR	Dissolved		1.5	0.4	0.2	
Mono-Aromatic Hydrocarbons - Water						
Benzene		mg/L	<0.001	<0.001	<0.001	0.001
Toluene		mg/L	<0.0004	<0.0004	<0.0004	0.0004
Ethylbenzene		mg/L	<0.0010	<0.0010	<0.0010	0.0010
Total Xylenes (m,p,o)		mg/L	<0.001	<0.001	<0.001	0.001
Volatile Petroleum Hydrocarbons - Water						
F1 -BTEX		mg/L	<0.1	<0.1	<0.1	0.1
F1 C6-C10		mg/L	<0.1	<0.1	<0.1	0.1
F2 C10-C16		mg/L	<0.1	<0.1	<0.1	0.1

Analytical Report

Bill To: Town of Inuvik	Project ID: SNP 0036-4,5 & 9	Lot ID: 1352596
Box 1160	Project Name:	Control Number:
2 Firth Street	Project Location: Inuvik	Date Received: May 23, 2019
Inuvik, NT, Canada	LSD:	Date Reported: May 30, 2019
X0E 0T0	P.O.: 100104	Report Number: 2408230
Attn: Rick Campbell	Proj. Acct. code:	
Sampled By: Matt O'Rourke		
Company: Town of Inuvik		

Approved by:

Randy Neumann, BSc
Division Director

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).

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Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-4,5 & 9	Lot ID: 1352596
Attn: Rick Campbell	Project Name:	Control Number:
Sampled By: Matt O'Rourke	Project Location: Inuvik	Date Received: May 23, 2019
Company: Town of Inuvik	LSD:	Date Reported: May 30, 2019
	P.O.: 100104	Report Number: 2408230
	Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	May 24, 2019	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	May 24, 2019	Element Edmonton - Roper Road
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	May 24, 2019	Element Edmonton - Roper Road
BTEX-CCME - Water	US EPA	* Volatile Organic Compounds in Various Sample Matrices Using Equilibrium Headspace Analysis/Gas Chromatography Mass Spectrometry, 5021/8260	May 24, 2019	Element Calgary
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl-E	May 28, 2019	Element Edmonton - Roper Road
Mercury (Total) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	May 23, 2019	Element Edmonton - Roper Road
Mercury (Total) in water	US EPA	* Determination of Hg in Sediment by Cold Vapor Atomic Absorption Spec, 245.5	May 23, 2019	Element Edmonton - Roper Road
Metals ICP-MS (Total) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	May 24, 2019	Element Edmonton - Roper Road
Metals ICP-MS (Total) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	May 24, 2019	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 25, 2019	Element Edmonton - Roper Road
Metals Trace (Total) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	May 24, 2019	Element Edmonton - Roper Road
Phenol in water	APHA	* Direct Photometric Method, 5530 D	May 30, 2019	Element Edmonton - Roper Road
Phosphorus - Total in Water	APHA	* Automated Ascorbic Acid Reduction Method, 4500-P F	May 24, 2019	Element Edmonton - Roper Road
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D	May 24, 2019	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Comments:

- May 30, 2019 - Some trace total metal results were less than dissolved metal results for sample 1352596-1 to -3. The results were verified and are within expected measurement uncertainty.

Methodology and Notes

Bill To: Town of Inuvik	Project ID: SNP 0036-4,5 & 9	Lot ID: 1352596
Box 1160	Project Name:	Control Number:
2 Firth Street	Project Location: Inuvik	Date Received: May 23, 2019
Inuvik, NT, Canada	LSD:	Date Reported: May 30, 2019
X0E 0T0	P.O.: 100104	Report Number: 2408230
Attn: Rick Campbell	Proj. Acct. code:	
Sampled By: Matt O'Rourke		
Company: Town of Inuvik		

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Report Transmission Cover Page

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-4.5 & 9 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1356870 Control Number: Date Received: Jun 13, 2019 Date Reported: Jun 27, 2019 Report Number: 2414309
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

Contact	Company	Address
Kim Wainman	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: kwainman@town.inuvik.nt.ca
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Rick Campbell	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: rcampbell@town.inuvik.nt.ca
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Utilidor	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-2607 Fax: (867) 777-2071 Email: utilidor@town.inuvik.nt.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Notes To Clients:

- Jun 19, 2019 - Some trace total metal results were less than dissolved metal results for sample 1356870-1, -2, and -3. The results were verified and are within expected measurement uncertainty.

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Analytical Report

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-4,5 & 9 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1356870 Control Number: Date Received: Jun 13, 2019 Date Reported: Jun 27, 2019 Report Number: 2414309
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

		Reference Number	1356870-1	1356870-2	1356870-3	
		Sample Date	Jun 12, 2019	Jun 12, 2019	Jun 12, 2019	
		Sample Time	09:35	09:15	09:50	
		Sample Location				
		Sample Description	SNP0036-4	SNP0036-5	SNP0036-9	
		Matrix	Water	Water	Water	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents						
Biochemical Oxygen Demand	Inhibited	mg/L	<4	<4	<4	4
Phenol		mg/L	0.001	<0.001	<0.001	0.001
Inorganic Nonmetallic Parameters						
Phosphorus	Total	mg/L	0.07	0.13	<0.05	0.05
Metals Dissolved						
Subsample			Lab Filtered	Lab Filtered	Lab Filtered	
Metals Total						
Aluminum	Total	mg/L	0.36	0.06	0.04	0.02
Calcium	Total	mg/L	218	29.4	114	0.2
Iron	Total	mg/L	2.63	0.77	0.40	0.05
Magnesium	Total	mg/L	122	11.3	41.2	0.2
Manganese	Total	mg/L	1.35	0.072	0.441	0.005
Potassium	Total	mg/L	38.5	4.1	3.3	0.4
Silicon	Total	mg/L	5.80	0.41	1.46	0.05
Sodium	Total	mg/L	162	14.1	46.0	0.4
Sulfur	Total	mg/L	211	20.1	145	0.3
Mercury	Total	mg/L	0.000015	0.000016	0.000012	0.000005
Antimony	Total	mg/L	0.0003	<0.0002	<0.0002	0.0002
Arsenic	Total	mg/L	0.0019	0.0016	0.0007	0.0002
Barium	Total	mg/L	0.066	0.039	0.027	0.001
Beryllium	Total	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Bismuth	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Boron	Total	mg/L	0.897	0.033	0.086	0.002
Cadmium	Total	mg/L	0.00003	<0.00001	0.00001	0.00001
Chromium	Total	mg/L	0.0015	0.0006	<0.0005	0.0005
Cobalt	Total	mg/L	0.0019	0.0002	0.0004	0.0001
Copper	Total	mg/L	0.002	0.001	0.002	0.001
Lead	Total	mg/L	0.0004	0.0001	<0.0001	0.0001
Lithium	Total	mg/L	0.041	0.005	0.021	0.001
Molybdenum	Total	mg/L	<0.001	<0.001	<0.001	0.001
Nickel	Total	mg/L	0.0103	0.0022	0.0062	0.0005
Selenium	Total	mg/L	0.0002	<0.0002	<0.0002	0.0002
Silver	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Strontium	Total	mg/L	0.803	0.092	0.380	0.001
Thallium	Total	mg/L	<0.00005	<0.00005	<0.00005	0.00005
Tin	Total	mg/L	<0.001	<0.001	<0.001	0.001
Titanium	Total	mg/L	0.0043	<0.0005	<0.0005	0.0005

Analytical Report

Bill To: Town of Inuvik
Box 1160
2 Firth Street
Inuvik, NT, Canada
X0E 0T0
Attn: Rick Campbell
Sampled By: Matt O'Rourke
Company: Town of Inuvik

Project ID: SNP 0036-4,5 & 9
Project Name:
Project Location: Inuvik
LSD:
P.O.: 100104
Proj. Acct. code:

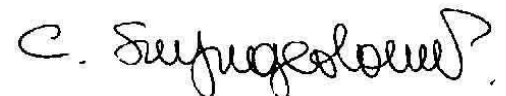
Lot ID: **1356870**
Control Number:
Date Received: Jun 13, 2019
Date Reported: Jun 27, 2019
Report Number: 2414309

	Reference Number	1356870-1	1356870-2	1356870-3		
	Sample Date	Jun 12, 2019	Jun 12, 2019	Jun 12, 2019		
	Sample Time	09:35	09:15	09:50		
	Sample Location					
	Sample Description	SNP0036-4	SNP0036-5	SNP0036-9		
	Matrix	Water	Water	Water		
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Metals Total - Continued						
Uranium	Total	mg/L	0.0008	<0.0005	0.0009	0.0005
Vanadium	Total	mg/L	0.0019	0.0015	0.0003	0.0001
Zinc	Total	mg/L	0.009	0.003	0.007	0.001
Zirconium	Total	mg/L	<0.001	<0.001	<0.001	0.001
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	11	6	<2	2
Routine Water						
pH			8.15	7.78	7.81	
Temperature of observed pH		°C	19.4	19.4	19.3	
Electrical Conductivity	at 25 °C	µS/cm	2310	287	1020	1
Electrical Conductivity	at 25 °C	dS/m	2.31	0.287	1.02	0.001
Calcium	Dissolved	meq/L	11.7	1.48	5.82	0.01
Calcium	Dissolved	mg/L	234	29.6	117	0.2
Magnesium	Dissolved	meq/L	10.0	0.90	3.36	0.01
Magnesium	Dissolved	mg/L	122	11.0	40.8	0.2
Sodium	Dissolved	meq/L	7.31	0.62	2.03	0.02
Sodium	Dissolved	mg/L	168	14.2	46.7	0.4
Potassium	Dissolved	meq/L	1.00	0.10	0.08	0.01
Potassium	Dissolved	mg/L	39.0	4.0	3.2	0.4
Chloride	Dissolved	mg/L	108	13.0	17.8	0.4
Chloride	Dissolved	meq/L	3.06	0.37	0.50	0.01
Sulfate (SO4)	Dissolved	mg/L	606	57.9	438	0.9
Sulfate-S		meq/L	12.6	1.20	9.11	
Sulfate-S	Dissolved	mg/L	202	19.3	146	0.3
Total Dissolved Solids	Estimated	mg/L	1480	184	656	1
SAR	Dissolved		2.2	0.6	0.9	
Mono-Aromatic Hydrocarbons - Water						
Benzene		mg/L	<0.001	<0.001	<0.001	0.001
Toluene		mg/L	<0.0004	<0.0004	<0.0004	0.0004
Ethylbenzene		mg/L	<0.0010	<0.0010	<0.0010	0.0010
Total Xylenes (m,p,o)		mg/L	<0.001	<0.001	<0.001	0.001
Volatile Petroleum Hydrocarbons - Water						
F1 -BTEX		mg/L	<0.1	<0.1	<0.1	0.1
F1 C6-C10		mg/L	<0.1	<0.1	<0.1	0.1
F2 C10-C16		mg/L	<0.1	<0.1	<0.1	0.1

Analytical Report

Bill To: Town of Inuvik	Project ID: SNP 0036-4,5 & 9	Lot ID: 1356870
Box 1160	Project Name:	Control Number:
2 Firth Street	Project Location: Inuvik	Date Received: Jun 13, 2019
Inuvik, NT, Canada	LSD:	Date Reported: Jun 27, 2019
X0E 0T0	P.O.: 100104	Report Number: 2414309
Attn: Rick Campbell	Proj. Acct. code:	
Sampled By: Matt O'Rourke		
Company: Town of Inuvik		

Approved by:

Chris Swyngedouw, PhD, PChem
Consulting Scientist

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).

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Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-4,5 & 9	Lot ID: 1356870
Attn: Rick Campbell	Project Name:	Control Number:
Sampled By: Matt O'Rourke	Project Location: Inuvik	Date Received: Jun 13, 2019
Company: Town of Inuvik	LSD:	Date Reported: Jun 27, 2019
	P.O.: 100104	Report Number: 2414309
	Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jun 13, 2019	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jun 13, 2019	Element Edmonton - Roper Road
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	Jun 13, 2019	Element Edmonton - Roper Road
BTEX-CCME - Water	US EPA	* Volatile Organic Compounds in Various Sample Matrices Using Equilibrium Headspace Analysis/Gas Chromatography Mass Spectrometry, 5021/8260	Jun 23, 2019	Element Calgary
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl-E	Jun 17, 2019	Element Edmonton - Roper Road
Mercury (Total) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jun 14, 2019	Element Edmonton - Roper Road
Mercury (Total) in water	US EPA	* Determination of Hg in Sediment by Cold Vapor Atomic Absorption Spec, 245.5	Jun 14, 2019	Element Edmonton - Roper Road
Metals ICP-MS (Total) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jun 13, 2019	Element Edmonton - Roper Road
Metals ICP-MS (Total) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jun 13, 2019	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 17, 2019	Element Edmonton - Roper Road
Metals Trace (Total) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jun 13, 2019	Element Edmonton - Roper Road
Phenol in water	APHA	* Direct Photometric Method, 5530 D	Jun 13, 2019	Element Edmonton - Roper Road
Phosphorus - Total in Water	APHA	* Automated Ascorbic Acid Reduction Method, 4500-P F	Jun 14, 2019	Element Edmonton - Roper Road
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D	Jun 18, 2019	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Comments:

- Jun 19, 2019 - Some trace total metal results were less than dissolved metal results for sample 1356870-1, -2, and -3. The results were verified and are within expected measurement uncertainty.

Methodology and Notes

Bill To: Town of Inuvik	Project ID: SNP 0036-4,5 & 9	Lot ID: 1356870
Box 1160	Project Name:	Control Number:
2 Firth Street	Project Location: Inuvik	Date Received: Jun 13, 2019
Inuvik, NT, Canada	LSD:	Date Reported: Jun 27, 2019
X0E 0T0	P.O.: 100104	Report Number: 2414309
Attn: Rick Campbell	Proj. Acct. code:	
Sampled By: Matt O'Rourke		
Company: Town of Inuvik		

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Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-4, 5 & 9 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1364617 Control Number: Date Received: Jul 18, 2019 Date Reported: Jul 25, 2019 Report Number: 2424933
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

Contact	Company	Address
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<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Single Report	PDF	Invoice

Notes To Clients:

- Jul 24, 2019 - Some trace total metal results were less than dissolved metal results for sample 1364617-2 and -3. The results were verified and are within expected measurement uncertainty.

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Analytical Report

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-4, 5 & 9 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1364617 Control Number: Date Received: Jul 18, 2019 Date Reported: Jul 25, 2019 Report Number: 2424933
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

	Reference Number	1364617-1	1364617-2	1364617-3		
	Sample Date	Jul 17, 2019	Jul 17, 2019	Jul 17, 2019		
	Sample Time	09:15	08:30	09:30		
	Sample Location					
	Sample Description	Pit N/W of Dump / SNP0036-4 / 6.6°C	Pond S/E of Dump / SNP0036-5 / 6.6°C	Creek N/W of Dump / SNP0036-6 / 6.6°C		
	Matrix	Water	Water	Water		
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Aggregate Organic Constituents						
Biochemical Oxygen Demand	Inhibited	mg/L	<4	10	<4	4
Phenol		mg/L	0.002	<0.001	<0.001	0.001
Inorganic Nonmetallic Parameters						
Phosphorus	Total	mg/L	0.07	0.23	<0.05	0.05
Metals Dissolved						
Subsample		Lab Filtered	Lab Filtered	Lab Filtered		
Metals Total						
Aluminum	Total	mg/L	0.06	0.05	0.07	0.02
Calcium	Total	mg/L	226	33.5	221	0.2
Iron	Total	mg/L	0.37	0.61	0.71	0.05
Magnesium	Total	mg/L	115	13.4	77.6	0.2
Manganese	Total	mg/L	0.616	0.041	0.629	0.005
Potassium	Total	mg/L	37.1	3.5	4.1	0.4
Silicon	Total	mg/L	4.39	0.11	1.96	0.05
Sodium	Total	mg/L	170	16.1	100.0	0.4
Sulfur	Total	mg/L	219	22.6	281	0.3
Mercury	Total	mg/L	0.000013	0.000022	0.000017	0.000005
Antimony	Total	mg/L	<0.0004	<0.0002	<0.0002	0.0002
Arsenic	Total	mg/L	0.001	0.0016	0.0008	0.0002
Barium	Total	mg/L	0.073	0.041	0.023	0.001
Beryllium	Total	mg/L	<0.0002	<0.0001	<0.0001	0.0001
Bismuth	Total	mg/L	<0.001	<0.0005	<0.0005	0.0005
Boron	Total	mg/L	1.18	0.022	0.154	0.002
Cadmium	Total	mg/L	<0.00002	<0.00001	<0.00001	0.00001
Chromium	Total	mg/L	<0.001	<0.0005	<0.0005	0.0005
Cobalt	Total	mg/L	0.0010	0.0002	0.0005	0.0001
Copper	Total	mg/L	<0.002	<0.001	<0.001	0.001
Lead	Total	mg/L	<0.0002	0.0001	<0.0001	0.0001
Lithium	Total	mg/L	0.045	0.006	0.035	0.001
Molybdenum	Total	mg/L	<0.002	<0.001	<0.001	0.001
Nickel	Total	mg/L	0.0095	0.0020	0.0042	0.0005
Selenium	Total	mg/L	0.0002	<0.0002	<0.0002	0.0002
Silver	Total	mg/L	<0.00002	<0.00001	<0.00001	0.00001
Strontium	Total	mg/L	0.796	0.102	0.757	0.001
Thallium	Total	mg/L	<0.0001	<0.00005	<0.00005	0.00005
Tin	Total	mg/L	<0.002	<0.001	<0.001	0.001
Titanium	Total	mg/L	<0.001	<0.0005	0.0010	0.0005

Analytical Report

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-4, 5 & 9	Lot ID: 1364617
Attn: Rick Campbell	Project Name:	Control Number:
Sampled By: Matt O'Rourke	Project Location: Inuvik	Date Received: Jul 18, 2019
Company: Town of Inuvik	LSD:	Date Reported: Jul 25, 2019
	P.O.: 100104	Report Number: 2424933
	Proj. Acct. code:	

		Reference Number	1364617-1	1364617-2	1364617-3	
		Sample Date	Jul 17, 2019	Jul 17, 2019	Jul 17, 2019	
		Sample Time	09:15	08:30	09:30	
		Sample Location				
		Sample Description	Pit N/W of Dump / SNP0036-4 / 6.6°C	Pond S/E of Dump / SNP0036-5 / 6.6°C	Creek N/W of Dump / SNP0036-6 / 6.6°C	
		Matrix	Water	Water	Water	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Metals Total - Continued						
Uranium	Total	mg/L	<0.001	<0.0005	0.0017	0.0005
Vanadium	Total	mg/L	0.0004	0.0014	0.0004	0.0001
Zinc	Total	mg/L	0.006	0.002	0.010	0.001
Zirconium	Total	mg/L	<0.002	<0.001	<0.001	0.001
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	7	17	3	2
Routine Water						
pH			7.79	7.47	7.77	
Temperature of observed		°C	21.5	21.8	22.1	
pH						
Electrical Conductivity	at 25 °C	µS/cm	2210	331	1720	1
Electrical Conductivity	at 25 °C	dS/m	2.21	0.331	1.72	0.001
Calcium	Dissolved	meq/L	9.47	1.69	10.4	0.01
Calcium	Dissolved	mg/L	190	33.9	208	0.2
Magnesium	Dissolved	meq/L	8.24	1.16	6.39	0.01
Magnesium	Dissolved	mg/L	100	14.1	77.7	0.2
Sodium	Dissolved	meq/L	5.67	0.70	4.14	0.02
Sodium	Dissolved	mg/L	130	16.1	95.1	0.4
Potassium	Dissolved	meq/L	0.73	0.09	0.10	0.01
Potassium	Dissolved	mg/L	28.5	3.5	4.0	0.4
Chloride	Dissolved	mg/L	115	15.1	38.6	0.4
Chloride		meq/L	3.25	0.43	1.09	0.01
Sulfate (SO4)	Dissolved	mg/L	539	68.4	793	0.9
Sulfate-S		meq/L	11.2	1.42	16.5	
Sulfate-S	Dissolved	mg/L	180	22.8	264	0.3
Total Dissolved Solids	Estimated	mg/L	1410	212	1100	1
SAR	Dissolved		1.9	0.6	1.4	
Mono-Aromatic Hydrocarbons - Water						
Benzene		mg/L	<0.001	<0.001	<0.001	0.001
Toluene		mg/L	<0.0004	<0.0004	<0.0004	0.0004
Ethylbenzene		mg/L	<0.0010	<0.0010	<0.0010	0.0010
Total Xylenes (m,p,o)		mg/L	<0.001	<0.001	<0.001	0.001
Volatile Petroleum Hydrocarbons - Water						
F1 -BTEX		mg/L	<0.1	<0.1	<0.1	0.1
F1 C6-C10		mg/L	<0.1	<0.1	<0.1	0.1
F2 C10-C16		mg/L	<0.1	<0.1	<0.1	0.1

Analytical Report

Bill To: Town of Inuvik	Project ID: SNP 0036-4, 5 & 9	Lot ID: 1364617
Box 1160	Project Name:	Control Number:
2 Firth Street	Project Location: Inuvik	Date Received: Jul 18, 2019
Inuvik, NT, Canada	LSD:	Date Reported: Jul 25, 2019
X0E 0T0	P.O.: 100104	Report Number: 2424933
Attn: Rick Campbell	Proj. Acct. code:	
Sampled By: Matt O'Rourke		
Company: Town of Inuvik		

Approved by: 
Anthony Neumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).

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Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-4, 5 & 9	Lot ID: 1364617
Attn: Rick Campbell	Project Name:	Control Number:
Sampled By: Matt O'Rourke	Project Location: Inuvik	Date Received: Jul 18, 2019
Company: Town of Inuvik	LSD:	Date Reported: Jul 25, 2019
	P.O.: 100104	Report Number: 2424933
	Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Jul 22, 2019	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Jul 22, 2019	Element Edmonton - Roper Road
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	Jul 18, 2019	Element Edmonton - Roper Road
BTEX-CCME - Water	US EPA	* Volatile Organic Compounds in Various Sample Matrices Using Equilibrium Headspace Analysis/Gas Chromatography Mass Spectrometry, 5021/8260	Jul 19, 2019	Element Calgary
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl-E	Jul 23, 2019	Element Edmonton - Roper Road
Mercury (Total) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jul 19, 2019	Element Edmonton - Roper Road
Mercury (Total) in water	US EPA	* Determination of Hg in Sediment by Cold Vapor Atomic Absorption Spec, 245.5	Jul 19, 2019	Element Edmonton - Roper Road
Metals ICP-MS (Total) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Jul 18, 2019	Element Edmonton - Roper Road
Metals ICP-MS (Total) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jul 18, 2019	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jul 23, 2019	Element Edmonton - Roper Road
Metals Trace (Total) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Jul 18, 2019	Element Edmonton - Roper Road
Phenol in water	APHA	* Direct Photometric Method, 5530 D	Jul 24, 2019	Element Edmonton - Roper Road
Phosphorus - Total in Water	APHA	* Automated Ascorbic Acid Reduction Method, 4500-P F	Jul 22, 2019	Element Edmonton - Roper Road
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D	Jul 22, 2019	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Comments:

- Jul 24, 2019 - Some trace total metal results were less than dissolved metal results for sample 1364617-2 and -3. The results were verified and are within expected measurement uncertainty.

Methodology and Notes

Bill To: Town of Inuvik	Project ID: SNP 0036-4, 5 & 9	Lot ID: 1364617
Box 1160	Project Name:	Control Number:
2 Firth Street	Project Location: Inuvik	Date Received: Jul 18, 2019
Inuvik, NT, Canada	LSD:	Date Reported: Jul 25, 2019
X0E 0T0	P.O.: 100104	Report Number: 2424933
Attn: Rick Campbell	Proj. Acct. code:	
Sampled By: Matt O'Rourke		
Company: Town of Inuvik		

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Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

Contact	Company	Address
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Analytical Report

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-4,5 & 9 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1370319 Control Number: Date Received: Aug 15, 2019 Date Reported: Aug 20, 2019 Report Number: 2432614
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

		Reference Number	1370319-1	1370319-2	1370319-3	
		Sample Date	Aug 14, 2019	Aug 14, 2019	Aug 14, 2019	
		Sample Time	08:45	09:10	08:30	
		Sample Location				
		Sample Description	SNP0036-4 / 6.9C	SNP0036-5 / 6.9C	SNP0036-9 / 6.9C	
		Matrix	Water	Water	Water	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Aggregate Organic Constituents						
Biochemical Oxygen Demand	Inhibited	mg/L	<4	<4	<4	4
Phenol		mg/L	0.006	<0.001	<0.001	0.001
Inorganic Nonmetallic Parameters						
Phosphorus	Total	mg/L	1.11	0.07	<0.05	0.05
Metals Dissolved						
Subsample			Lab Filtered	Lab Filtered	Lab Filtered	
Metals Total						
Aluminum	Total	mg/L	7.31	0.04	0.04	0.02
Calcium	Total	mg/L	207	33.5	254	0.2
Iron	Total	mg/L	31.8	0.43	0.73	0.05
Magnesium	Total	mg/L	100	13.9	91.2	0.2
Manganese	Total	mg/L	1.27	0.014	1.09	0.005
Potassium	Total	mg/L	31.0	3.0	4.9	0.4
Silicon	Total	mg/L	13.9	0.08	2.90	0.05
Sodium	Total	mg/L	161	18.0	127	0.4
Sulfur	Total	mg/L	202	23.9	329	0.3
Mercury	Total	mg/L	0.000072	0.000016	0.000014	0.000005
Antimony	Total	mg/L	0.0007	<0.0002	<0.0002	0.0002
Arsenic	Total	mg/L	0.0263	0.0016	0.0006	0.0002
Barium	Total	mg/L	0.309	0.042	0.021	0.001
Beryllium	Total	mg/L	0.0005	<0.0001	<0.0001	0.0001
Bismuth	Total	mg/L	<0.0005	<0.0005	<0.0005	0.0005
Boron	Total	mg/L	0.735	0.017	0.196	0.002
Cadmium	Total	mg/L	0.00030	0.00006	<0.00001	0.00001
Chromium	Total	mg/L	0.0196	<0.0005	<0.0005	0.0005
Cobalt	Total	mg/L	0.0153	0.0002	0.0006	0.0001
Copper	Total	mg/L	0.032	<0.001	<0.001	0.001
Lead	Total	mg/L	0.0105	0.0001	<0.0001	0.0001
Lithium	Total	mg/L	0.059	0.007	0.044	0.001
Molybdenum	Total	mg/L	0.003	<0.001	<0.001	0.001
Nickel	Total	mg/L	0.0491	0.0020	0.0040	0.0005
Selenium	Total	mg/L	0.0013	<0.0002	<0.0002	0.0002
Silver	Total	mg/L	0.00020	<0.00001	<0.00001	0.00001
Strontium	Total	mg/L	0.754	0.116	0.961	0.001
Thallium	Total	mg/L	0.00013	<0.00005	<0.00005	0.00005
Tin	Total	mg/L	<0.001	<0.001	<0.001	0.001
Titanium	Total	mg/L	0.0547	<0.0005	<0.0005	0.0005

Analytical Report

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-4,5 & 9 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1370319 Control Number: Date Received: Aug 15, 2019 Date Reported: Aug 20, 2019 Report Number: 2432614
Attn: Rick Campbell Sampled By: Matt O'Rourke Company: Town of Inuvik		

	Reference Number	1370319-1	1370319-2	1370319-3		
	Sample Date	Aug 14, 2019	Aug 14, 2019	Aug 14, 2019		
	Sample Time	08:45	09:10	08:30		
	Sample Location					
	Sample Description	SNP0036-4 / 6.9C	SNP0036-5 / 6.9C	SNP0036-9 / 6.9C		
	Matrix	Water	Water	Water		
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Metals Total - Continued						
Uranium	Total	mg/L	0.0014	<0.0005	0.0021	0.0005
Vanadium	Total	mg/L	0.0461	0.0017	0.0003	0.0001
Zinc	Total	mg/L	0.117	0.001	0.019	0.001
Zirconium	Total	mg/L	0.003	<0.001	<0.001	0.001
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	764	4	8	2
Routine Water						
pH			7.71	7.97	7.67	
Temperature of observed pH		°C	21.4	21.5	21.6	
Electrical Conductivity	at 25 °C	µS/cm	2010	318	1960	1
Electrical Conductivity	at 25 °C	dS/m	2.01	0.318	1.96	0.001
Calcium	Dissolved	meq/L	9.45	1.64	12.4	0.01
Calcium	Dissolved	mg/L	189	32.9	249	0.2
Magnesium	Dissolved	meq/L	7.52	1.14	7.35	0.01
Magnesium	Dissolved	mg/L	91.5	13.8	89.4	0.2
Sodium	Dissolved	meq/L	6.58	0.75	5.31	0.02
Sodium	Dissolved	mg/L	151	17.2	122	0.4
Potassium	Dissolved	meq/L	0.70	0.07	0.12	0.01
Potassium	Dissolved	mg/L	27.6	2.9	4.7	0.4
Chloride	Dissolved	mg/L	124	16.0	48.5	0.4
Chloride	Dissolved	meq/L	3.49	0.45	1.37	0.01
Sulfate (SO4)	Dissolved	mg/L	592	69.3	964	0.9
Sulfate-S		meq/L	12.3	1.44	20.0	
Sulfate-S	Dissolved	mg/L	197	23.1	321	0.3
Total Dissolved Solids	Estimated	mg/L	1290	204	1260	1
SAR	Dissolved		2.3	0.6	1.7	
Mono-Aromatic Hydrocarbons - Water						
Benzene		mg/L	<0.001	<0.001	<0.001	0.001
Toluene		mg/L	<0.0004	<0.0004	<0.0004	0.0004
Ethylbenzene		mg/L	<0.0010	<0.0010	<0.0010	0.0010
Total Xylenes (m,p,o)		mg/L	<0.001	<0.001	<0.001	0.001
Volatile Petroleum Hydrocarbons - Water						
F1 -BTEX		mg/L	<0.1	<0.1	<0.1	0.1
F1 C6-C10		mg/L	<0.1	<0.1	<0.1	0.1
F2 C10-C16		mg/L	<0.1	<0.1	<0.1	0.1

Analytical Report

Bill To: Town of Inuvik	Project ID: SNP 0036-4,5 & 9	Lot ID: 1370319
Box 1160	Project Name:	Control Number:
2 Firth Street	Project Location: Inuvik	Date Received: Aug 15, 2019
Inuvik, NT, Canada	LSD:	Date Reported: Aug 20, 2019
X0E 0T0	P.O.: 100104	Report Number: 2432614
Attn: Rick Campbell	Proj. Acct. code:	
Sampled By: Matt O'Rourke		
Company: Town of Inuvik		

Approved by:

Darlene Lintott, MSc
Consulting Scientist

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-4,5 & 9	Lot ID: 1370319
Attn: Rick Campbell	Project Name:	Control Number:
Sampled By: Matt O'Rourke	Project Location: Inuvik	Date Received: Aug 15, 2019
Company: Town of Inuvik	LSD:	Date Reported: Aug 20, 2019
	P.O.: 100104	Report Number: 2432614
	Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Aug 15, 2019	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Aug 15, 2019	Element Edmonton - Roper Road
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	Aug 15, 2019	Element Edmonton - Roper Road
BTEX-CCME - Water	US EPA	* Volatile Organic Compounds in Various Sample Matrices Using Equilibrium Headspace Analysis/Gas Chromatography Mass Spectrometry, 5021/8260	Aug 16, 2019	Element Calgary
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl-E	Aug 19, 2019	Element Edmonton - Roper Road
Mercury (Total) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Aug 19, 2019	Element Edmonton - Roper Road
Mercury (Total) in water	US EPA	* Determination of Hg in Sediment by Cold Vapor Atomic Absorption Spec, 245.5	Aug 19, 2019	Element Edmonton - Roper Road
Metals ICP-MS (Total) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Aug 15, 2019	Element Edmonton - Roper Road
Metals ICP-MS (Total) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Aug 15, 2019	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Aug 19, 2019	Element Edmonton - Roper Road
Metals Trace (Total) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Aug 15, 2019	Element Edmonton - Roper Road
Phenol in water	APHA	* Direct Photometric Method, 5530 D	Aug 15, 2019	Element Edmonton - Roper Road
Phosphorus - Total in Water	APHA	* Automated Ascorbic Acid Reduction Method, 4500-P F	Aug 19, 2019	Element Edmonton - Roper Road
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D	Aug 15, 2019	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Methodology and Notes

Bill To: Town of Inuvik	Project ID: SNP 0036-4,5 & 9	Lot ID: 1370319
Box 1160	Project Name:	Control Number:
2 Firth Street	Project Location: Inuvik	Date Received: Aug 15, 2019
Inuvik, NT, Canada	LSD:	Date Reported: Aug 20, 2019
X0E 0T0	P.O.: 100104	Report Number: 2432614
Attn: Rick Campbell	Proj. Acct. code:	
Sampled By: Matt O'Rourke		
Company: Town of Inuvik		

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Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-4,5&9 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1376392 Control Number: Date Received: Sep 12, 2019 Date Reported: Sep 19, 2019 Report Number: 2440850
Attn: Rick Campbell Sampled By: Matt D'Rourke Company: Town of Inuvik		

Contact	Company	Address
Jason Casault	AECOM - Edmonton	101, 18817 Stony Plain Road Edmonton, AB T5S 0C2 Phone: (780) 486-7050 Fax: (780) 486-7070 Email: Jason.Casault@aecom.com
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Email - Merge Reports	PDF	COC / Test Report
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Rick Campbell	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: rcampbell@inuvik.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Utilidor	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-2607 Fax: (867) 777-2071 Email: utilidor@inuvik.ca
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Report Transmission Cover Page

Bill To: Town of Inuvik	Project ID: SNP 0036-4,5&9	Lot ID: 1376392
Box 1160	Project Name:	Control Number:
2 Firth Street	Project Location: Inuvik	Date Received: Sep 12, 2019
Inuvik, NT, Canada	LSD:	Date Reported: Sep 19, 2019
X0E 0T0	P.O.: 100104	Report Number: 2440850
Attn: Rick Campbell	Proj. Acct. code:	
Sampled By: Matt D'Rourke		
Company: Town of Inuvik		

Analytical Report

Bill To: Town of Inuvik
Box 1160
2 Firth Street
Inuvik, NT, Canada
X0E 0T0
Attn: Rick Campbell
Sampled By: Matt D'Rourke
Company: Town of Inuvik

Project ID: SNP 0036-4,5&9
Project Name:
Project Location: Inuvik
LSD:
P.O.: 100104
Proj. Acct. code:

Lot ID: **1376392**
Control Number:
Date Received: Sep 12, 2019
Date Reported: Sep 19, 2019
Report Number: 2440850

	Reference Number	1376392-1	1376392-2	1376392-3		
	Sample Date	Sep 11, 2019	Sep 11, 2019	Sep 11, 2019		
	Sample Time	09:15	08:35	09:35		
	Sample Location					
	Sample Description	Pit N/W of Dump / SNP0036-4 / 6.2C	Pond S/E of Dump / SNP0036-5 / 6.2C	Creek N/W of Dump / SNP0036-9 / 6.2C		
	Matrix	Water	Water	Water		
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Aggregate Organic Constituents						
Biochemical Oxygen Demand	Inhibited	mg/L	<4	<4	<4	4
Phenol		mg/L	0.001	<0.001	0.004	0.001
Inorganic Nonmetallic Parameters						
Phosphorus	Total	mg/L	0.12	0.12	<0.05	0.05
Metals Dissolved						
Subsample		Lab Filtered	Lab Filtered	Lab Filtered		
Metals Total						
Aluminum	Total	mg/L	0.28	0.11	0.33	0.02
Calcium	Total	mg/L	233	39.2	38.1	0.2
Iron	Total	mg/L	1.3	1.47	1.10	0.05
Magnesium	Total	mg/L	118	15.2	19.2	0.2
Manganese	Total	mg/L	0.758	0.162	0.320	0.005
Potassium	Total	mg/L	32.8	4.2	1.6	0.4
Silicon	Total	mg/L	4.21	0.42	2.06	0.05
Sodium	Total	mg/L	174	19.6	15.9	0.4
Sulfur	Total	mg/L	262	28.5	53.5	0.3
Mercury	Total	mg/L	0.000016	0.000017	0.000018	0.000005
Antimony	Total	mg/L	<0.0004	<0.0002	<0.0002	0.0002
Arsenic	Total	mg/L	0.002	0.0027	0.0008	0.0002
Barium	Total	mg/L	0.106	0.068	0.024	0.001
Beryllium	Total	mg/L	<0.0002	<0.0001	<0.0001	0.0001
Bismuth	Total	mg/L	<0.001	<0.0005	<0.0005	0.0005
Boron	Total	mg/L	0.865	0.026	0.031	0.002
Cadmium	Total	mg/L	<0.00002	<0.00001	0.00002	0.00001
Chromium	Total	mg/L	<0.001	<0.0005	<0.0005	0.0005
Cobalt	Total	mg/L	0.001	0.0003	0.0007	0.0001
Copper	Total	mg/L	<0.002	<0.001	0.002	0.001
Lead	Total	mg/L	0.0004	0.0003	0.0002	0.0001
Lithium	Total	mg/L	0.049	0.008	0.013	0.001
Molybdenum	Total	mg/L	<0.002	<0.001	<0.001	0.001
Nickel	Total	mg/L	0.0088	0.0018	0.0080	0.0005
Selenium	Total	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Silver	Total	mg/L	<0.00002	<0.00001	<0.00001	0.00001
Strontium	Total	mg/L	0.835	0.135	0.132	0.001
Thallium	Total	mg/L	<0.0001	<0.00005	<0.00005	0.00005
Tin	Total	mg/L	<0.002	<0.001	<0.001	0.001
Titanium	Total	mg/L	0.0040	0.0017	0.0015	0.0005

Analytical Report

Bill To: Town of Inuvik
Box 1160
2 Firth Street
Inuvik, NT, Canada
X0E 0T0
Attn: Rick Campbell
Sampled By: Matt D'Rourke
Company: Town of Inuvik

Project ID: SNP 0036-4,5&9
Project Name:
Project Location: Inuvik
LSD:
P.O.: 100104
Proj. Acct. code:

Lot ID: **1376392**
Control Number:
Date Received: Sep 12, 2019
Date Reported: Sep 19, 2019
Report Number: 2440850

		Reference Number	1376392-1	1376392-2	1376392-3	
		Sample Date	Sep 11, 2019	Sep 11, 2019	Sep 11, 2019	
		Sample Time	09:15	08:35	09:35	
		Sample Location				
		Sample Description	Pit N/W of Dump / SNP0036-4 / 6.2C	Pond S/E of Dump / SNP0036-5 / 6.2C	Creek N/W of Dump / SNP0036-9 / 6.2C	
	Matrix		Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Metals Total - Continued						
Uranium	Total	mg/L	<0.001	<0.0005	<0.0005	0.0005
Vanadium	Total	mg/L	0.002	0.0022	0.0010	0.0001
Zinc	Total	mg/L	0.007	0.002	0.011	0.001
Zirconium	Total	mg/L	<0.002	<0.001	<0.001	0.001
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	19	3	5	2
Routine Water						
pH			7.89	7.39	7.24	
Temperature of observed		°C	19.2	19.2	19.2	
pH						
Electrical Conductivity	at 25 °C	µS/cm	2260	380	412	1
Electrical Conductivity	at 25 °C	dS/m	2.26	0.380	0.412	0.001
Calcium	Dissolved	meq/L	10.9	1.86	1.85	0.01
Calcium	Dissolved	mg/L	217	37.2	37.1	0.2
Magnesium	Dissolved	meq/L	9.00	1.19	1.55	0.01
Magnesium	Dissolved	mg/L	109	14.5	18.8	0.2
Sodium	Dissolved	meq/L	6.76	0.79	0.66	0.02
Sodium	Dissolved	mg/L	155	18.2	15.1	0.4
Potassium	Dissolved	meq/L	0.75	0.10	0.03	0.01
Potassium	Dissolved	mg/L	29	3.7	1.3	0.4
Chloride	Dissolved	mg/L	110	19.0	5.9	0.4
Chloride	Dissolved	meq/L	3.11	0.54	0.17	0.01
Sulfate (SO4)	Dissolved	mg/L	717	81.0	158	0.9
Sulfate-S		meq/L	14.9	1.68	3.28	
Sulfate-S	Dissolved	mg/L	239	27.0	52.5	0.3
Total Dissolved Solids	Estimated	mg/L	1450	243	264	1
SAR	Dissolved		2.1	0.6	0.5	
Mono-Aromatic Hydrocarbons - Water						
Benzene		mg/L	<0.001	<0.001	<0.001	0.001
Toluene		mg/L	<0.0004	<0.0004	<0.0004	0.0004
Ethylbenzene		mg/L	<0.0010	<0.0010	<0.0010	0.0010
Total Xylenes (m,p,o)		mg/L	<0.001	<0.001	<0.001	0.001
Volatile Petroleum Hydrocarbons - Water						
F1 -BTEX		mg/L	<0.1	<0.1	<0.1	0.1
F1 C6-C10		mg/L	<0.1	<0.1	<0.1	0.1
F2 C10-C16		mg/L	<0.1	<0.1	<0.1	0.1

Analytical Report

Bill To: Town of Inuvik	Project ID: SNP 0036-4,5&9	Lot ID: 1376392
Box 1160	Project Name:	Control Number:
2 Firth Street	Project Location: Inuvik	Date Received: Sep 12, 2019
Inuvik, NT, Canada	LSD:	Date Reported: Sep 19, 2019
X0E 0T0	P.O.: 100104	Report Number: 2440850
Attn: Rick Campbell	Proj. Acct. code:	
Sampled By: Matt D'Rourke		
Company: Town of Inuvik		

Approved by:

Darlene Lintott, MSc
Consulting Scientist

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Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-4,5&9	Lot ID: 1376392
Attn: Rick Campbell	Project Name:	Control Number:
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Company: Town of Inuvik	LSD:	Date Reported: Sep 19, 2019
	P.O.: 100104	Report Number: 2440850
	Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Sep 13, 2019	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Sep 13, 2019	Element Edmonton - Roper Road
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	Sep 12, 2019	Element Edmonton - Roper Road
BTEX-CCME - Water	US EPA	* Volatile Organic Compounds in Various Sample Matrices Using Equilibrium Headspace Analysis/Gas Chromatography Mass Spectrometry, 5021/8260	Sep 13, 2019	Element Calgary
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl-E	Sep 16, 2019	Element Edmonton - Roper Road
Mercury (Total) in water	EPA	* Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Sep 13, 2019	Element Edmonton - Roper Road
Mercury (Total) in water	US EPA	* Determination of Hg in Sediment by Cold Vapor Atomic Absorption Spec, 245.5	Sep 13, 2019	Element Edmonton - Roper Road
Metals ICP-MS (Total) in water	APHA/USEPA	* Metals By Inductively Coupled Plasma/Mass Spectrometry, APHA 3125 B / USEPA 200.2, 200.8	Sep 13, 2019	Element Edmonton - Roper Road
Metals ICP-MS (Total) in water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Sep 13, 2019	Element Edmonton - Roper Road
Metals Trace (Dissolved) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Sep 13, 2019	Element Edmonton - Roper Road
Metals Trace (Total) in water	APHA	* Inductively Coupled Plasma (ICP) Method, 3120 B	Sep 13, 2019	Element Edmonton - Roper Road
Phenol in water	APHA	* Direct Photometric Method, 5530 D	Sep 12, 2019	Element Edmonton - Roper Road
Phosphorus - Total in Water	APHA	* Automated Ascorbic Acid Reduction Method, 4500-P F	Sep 13, 2019	Element Edmonton - Roper Road
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D	Sep 12, 2019	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA	Standard Methods for the Examination of Water and Wastewater
APHA/USEPA	Standard Methods For Water/ Environmental Protection Agency
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Methodology and Notes

Bill To: Town of Inuvik	Project ID: SNP 0036-4,5&9	Lot ID: 1376392
Box 1160	Project Name:	Control Number:
2 Firth Street	Project Location: Inuvik	Date Received: Sep 12, 2019
Inuvik, NT, Canada	LSD:	Date Reported: Sep 19, 2019
X0E 0T0	P.O.: 100104	Report Number: 2440850
Attn: Rick Campbell	Proj. Acct. code:	
Sampled By: Matt D'Rourke		
Company: Town of Inuvik		

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 Cell: (867) 678-5388
 Fax: (867) 777-8601
 E-mail: rcampbell@town.inuvik.nt.ca
 Agreement ID: 2909
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 Phone: (780) 488-6800
 Cell:
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 E-mail: richard.feilden@aecom.com
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Project Information
 Project ID: SNP 0036- 4,5 & 9.
 Project Name:
 Project Location: Inuvik
 Legal Location:
 PO/AFE#: 100104
 Proj. Acct.Code:

Report Results
 E-Mail Online PDF
 Mail Fax Excel

QA/QC Report

Special Instructions/Comments (please include contact information including ph. # if different from above). Dissolved S,P,C is Sodium, Potassium and Calcium.
 Sampler: note weather:
 Temp 7 C, precip 0, Wind dir W Vel 11 km/h

Indicate Regulatory Requirements below

Number of Containers
CCMEBF12W
Total Metal+Total mercury
pH
CBOD5
Suspended Solids
Total Phosphate
Sulphate
Total Phenols
Conductivity
Dissolved S,P,C


Sample Custody (please print)
 Sampled by: Matt O'Rourke
 Company: Town of Inuvik
 I authorize Exova to proceed with the work indicated on this form:
 Date: 09-11-19 Initial: MO
This section for Lab use only
 Date/Time stamp:
SEP 12 4:53:39

Sample Identification	Location	Depth in cm m	Date/Time sampled	Matrix	Sampling method	↓														
1 SNP0036-4	Pit N/W of Dump		09-11-19 9:5A		Dip	8	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2 SNP0036-5	Pond S/E of Dump		09-11-19 3:3A		Dip	8	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3 SNP0036-9	Creek N/W of Dump		09-11-19 4:5A 9:3A		Dip	8	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				
13																				
14																				
15																				

Indicate below any deficiencies in the condition of samples:

Were Exova supplies used?
Was there any damage to the shipping container?
Were the containers packaged well?
Were the expected number of samples received (document below)?
Are samples within recommended holding times/temp?

Environmental Sample Information Sheet
 Note: Proper completion of this form is required in order to proceed with analysis
 Please indicate any potentially hazardous samples
 Page 1 of 1 Control # _____

Lot: 1376392 COC


Shipping: COD Y/N
 Cooler temp: 6.2
 # and size of coolers received:
 Delivery Method: DropBox
 Waybill:
 Received by: JS

Report Transmission Cover Page

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-6,7&8 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1376386 Control Number: Date Received: Sep 12, 2019 Date Reported: Sep 19, 2019 Report Number: 2440847
Attn: Rick Campbell Sampled By: David Kendi Company: Town of Inuvik		

Contact	Company	Address
Jason Casault	AECOM - Edmonton	101, 18817 Stony Plain Road Edmonton, AB T5S 0C2 Phone: (780) 486-7050 Fax: (780) 486-7070 Email: Jason.Casault@aecom.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Kim Wainman	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: kwainman@inuvik.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Li Wang	AECOM - Edmonton	101-18817 Stony Plain Road NW Edmonton, AB T5S 0C2 Phone: (780) 453-0710 Fax: Email: li.wang@aecom.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
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Email - Single Report	Legacy Crosstab in CSV	Test Report
Richard Feilden	AECOM - Edmonton	17203 - 103 Avenue Edmonton, AB T5S 1J4 Phone: (780) 488-6800 Fax: (780) 488-2121 Email: richard.feilden@aecom.com
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Merge Reports	PDF	COC / Test Report
Rick Campbell	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-8615 Fax: (867) 777-8601 Email: rcampbell@inuvik.ca
<u>Delivery</u>	<u>Format</u>	<u>Deliverables</u>
Email - Merge Reports	PDF	COC / Test Report
Email - Single Report	PDF	Invoice
Utilidor	Town of Inuvik	Box 1160, 2 Firth Street Inuvik, NT X0E 0T0 Phone: (867) 777-2607 Fax: (867) 777-2071 Email: utilidor@inuvik.ca
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Report Transmission Cover Page

Bill To: Town of Inuvik	Project ID: SNP 0036-6,7&8	Lot ID: 1376386
Box 1160	Project Name:	Control Number:
2 Firth Street	Project Location: Inuvik	Date Received: Sep 12, 2019
Inuvik, NT, Canada	LSD:	Date Reported: Sep 19, 2019
X0E 0T0	P.O.: 100104	Report Number: 2440847
Attn: Rick Campbell	Proj. Acct. code:	
Sampled By: David Kendi		
Company: Town of Inuvik		

Analytical Report

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-6,7&8 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1376386 Control Number: Date Received: Sep 12, 2019 Date Reported: Sep 19, 2019 Report Number: 2440847
Attn: Rick Campbell Sampled By: David Kendi Company: Town of Inuvik		

	Reference Number	1376386-1	1376386-2	1376386-3		
	Sample Date	Sep 11, 2019	Sep 11, 2019	Sep 11, 2019		
	Sample Time	08:35	08:45	08:55		
	Sample Location					
	Sample Description	Gate Pond / SNP0036-6 / 6.2C	Far Pond / SNP0036-7 / 6.2C	Twin Lakes / SNP0036-8 / 6.2C		
	Matrix	Water	Water	Water		
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Aggregate Organic Constituents						
Biochemical Oxygen Demand	Inhibited	mg/L	<4	<4	<4	4
Inorganic Nonmetallic Parameters						
Ammonia - N		mg/L	12.1	<0.025	1.50	0.025
Un-ionized Ammonia-N	15 °C	mg/L	0.278	<0.00086	0.0612	
Ammonium/Ammonia Preservation			Yes	Yes	Yes	
Microbiological Analysis						
Fecal Coliforms	Membrane Filtration	CFU/100 mL	<10	<10	20	1
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2	3	<2	2
Routine Water						
pH	15 °C	pH	7.93	8.11	8.19	
Temperature of observed		°C	15	15	15	
pH			7.30	7.76	7.89	
Temperature of observed		°C	18.8	19.0	19.2	
pH						

Approved by:



Darlene Lintott, MSc
Consulting Scientist

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Methodology and Notes

Bill To: Town of Inuvik Box 1160 2 Firth Street Inuvik, NT, Canada X0E 0T0	Project ID: SNP 0036-6,7&8 Project Name: Project Location: Inuvik LSD: P.O.: 100104 Proj. Acct. code:	Lot ID: 1376386 Control Number: Date Received: Sep 12, 2019 Date Reported: Sep 19, 2019 Report Number: 2440847
Attn: Rick Campbell Sampled By: David Kendi Company: Town of Inuvik		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Sep 13, 2019	Element Edmonton - Roper Road
Ammonium-N in Water	APHA	* Automated Phenate Method, 4500-NH3 G	Sep 17, 2019	Element Edmonton - Roper Road
BOD (Carbonaceous) in water	APHA	* 5 Day, 5210 B	Sep 12, 2019	Element Edmonton - Roper Road
Coliforms - Membrane Filtration	APHA	Fecal Coliform Membrane Filter Procedure, 9222 D	Sep 13, 2019	Element Calgary
pH at 15°C	APHA	* pH - Electrometric Method, 4500-H+ B	Sep 17, 2019	Element Edmonton - Roper Road
Solids Suspended (Total, Fixed and Volatile)	APHA	* Total Suspended Solids Dried at 103-105°C, 2540 D	Sep 12, 2019	Element Edmonton - Roper Road

* Reference Method Modified

References

APHA Standard Methods for the Examination of Water and Wastewater

Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

Billing Information:	Copy of Report To:	RUSH Priority
Company: Town of Inuvik Address: Box 1160 2 Firth Street Inuvik, NT X0E 0T0 Attention: Rick Campbell Phone: (867) 777-8615 Cell: (867) 678-5388 Fax: (867) 777-8601 E-mail: rcampbell@town.inuvik.nt.ca Agreement ID: 2909 Copy of Report	Company: Aecom - Edmonton Address: 17203-103rd Avenue Edmonton, AB T5S 1J4 Attention: Richard Feilden Phone: (780) 488-6800 Cell: Fax: (780) 488-2121 E-mail: richard.feilden@aecom.com Copy of invoice	<p>Upon filling out this section, client accepts that surcharges will be applied to the analysis</p> <p>Date Required</p> <p>As Indicated <input type="checkbox"/> All Analysis <input checked="" type="checkbox"/></p> <p>When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples</p> <p>Signature</p>

Report Results	<input checked="" type="checkbox"/>	E-Mail	<input type="checkbox"/>		<input type="checkbox"/>	PDF		<input type="checkbox"/>	QA/QC Report									
		Mail		<input checked="" type="checkbox"/>		Excel												

Special Instructions/Comments (please include contact information including ph. # if different from above).
 Sampler: note weather:
 Temp 7 C, precip 0, Wind dir W Vel 11 km/h

Number of Containers	pH	CBOD5	Suspended Solids	Ammonia	Fecal Coliforms								
4	x	x	x	x	x								

Sample Custody (please print)

Sampled by: David Keri
 Company: Town of Inuvik

I authorize Exova to proceed with the work indicated on this form:
 Date: Sept. 11/19 Initial: AK

This section for Lab use only

Date/Time stamp:
 SEP 12 AM 5:39

Sample Identification	Location	Depth in cm m	Date/Time sampled	Matrix	Sampling method														
1 SNP0036-6	Gate Pond		Sept 11/19 835 A		Dip	4	x	x	x	x	x								
2 SNP0036-7	Far Pond		Sept 11/19 845 A		Dip	4	x	x	x	x	x								
3 SNP0036-8	Twin Lakes		Sept 11/19 855 A		Dip	4	x	x	x	x	x								
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			

Indicate below any deficiencies in the condition of samples:

Were Exova supplies used?

Was there any damage to the shipping container?

Were the containers packaged well?

Were the expected number of samples received (document below)?

Are samples within recommended holding times/temp?


Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

Please indicate any potentially hazardous samples

Page 1 of 1 Control # _____

Lot: 1376386^{COC}



Shipping: COD Y/N

Cooler temp: 6.2

and size of coolers received:

Delivery Method: Drop Box

Waybill:

Received by: [Signature]

Appendix **C**

Lagoon Berm Inspection Report

Mr. Leonard DeBastien
Executive Director
Gwich'in Land and Water Board
Box 2018
Inuvik NT X0E 0T0

January 6, 2020

Project #
60616280

Dear Sir:

**Subject: Town of Inuvik – Water Licence No. G17L3-001
Licence Condition D8, Lagoon Earthen Water Retaining Structure**

On behalf of Inuvik, we wish to respond to Water License Condition D8 for year 2019.

Water Licence Condition D8 states, "The dams, dykes and other engineered earth structures designed to contain waste within the Sewage Disposal facilities shall be inspected annually by a professional engineer to determine the stability of the structures". In Water Licence A2, Definitions, "Professional Engineer – a person registered with the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientist, and whose principal field of specialization is appropriate to address the components of the undertaking at hand".

The lagoon's west dyke was built on native permafrost soils in the late 1950's. The interior dykes forming the sludge cells and primary lagoon cells were added in 1981. The west dyke was rebuilt at the same time. In 1987-88, initial settlement of the new interior dikes and further erosion of the west dike were restored in a major re-grading project. In 2003, subsidence and erosion of the inner face of the west dike was again repaired, and the inner face was armored with geotextile and blast rock. In 2006, subsidence of the interior dikes was repaired by raising the dike crests back to designed level. In 2015, subsidence of the dike along the north end of the lagoon was repaired by raising the dike crests back to designed level.

Inuvik has the dikes inspected by its engineers, AECOM, at least annually.

Gradual uneven settlement of the dikes has been ongoing since they were first built. Settlement is believed to be due primarily to thawing of the permafrost under the dykes, and subsequent consolidation of the soils. Historically, slow subsidence has not threatened the integrity or water tightness of the dikes and it is not expected to do so as long as it is countered by periodic restoration.

In some years significant thaw-subsidence occurs in the portion of the lagoon system's west dike that runs between the west sludge cell and "Gate Pond" (as named in the SNP program). Gate Pond was formed early in Inuvik's history by gravel borrowing, and is thought to have been deepened (and probably enlarged) by subsequent thaw-subsidence. Gate pond probably is the main heat source causing the recurrent dike thaw-subsidence in the vicinity. Routinely, the dike is restored to designed levels and lines whenever significant thaw-subsidence has occurred.

Undercutting and sloughing of inner faces has also been ongoing since the dikes were first built, caused by soft subsoils and the flat slopes that the dike soils trend toward under water. Permafrost thaw subsidence and seasonal freeze-thaw may contribute locally. Sloughing narrows the crest. From time to time, dikes need to be restored to designed width in order to maintain water tightness, stability, and safe vehicle access along the crests. Sloughing affects all dikes, and major restoration projects have been needed roughly every ten to fifteen

years. The 2003 armoring work was intended to reduce sloughing of the inner face of the west dike. Dikes around the smaller cells have not been armored.

Over the years the two karst ponds just outside the west dike, toward its downstream end, have shown a tendency to grow. There has been some undercutting and sloughing of the outer face of the west dike along the pond shorelines. Fill was added to slope toes in the fall of 2006 and again in 2007 and 2009. It is reasonably certain similar restoration work will be needed in future at these locations, probably in most years.

In late 2010 the dykes separating the inner ponds were rebuilt and the west dyke was graded to fill all the cracks. During summer 2015, the north dyke was raised about 0.5 metre to restore grade, and the surface of all other dykes was graded.

During spring of 2016, the Town of Inuvik hired a local contractor to drill test holes along the lagoon dykes and obtain soils samples at various depths. The samples were sent to AECOM for laboratory testing. According to the results the soil beneath the dykes generally consists of ice rich clays, silts and sands.

The 2019 annual inspection was carried out on October 16, 2019. All dykes were found to be in satisfactory condition. No unusual longitudinal cracks or fissures were noted. Maintenance activities carried out in 2019 included grading of all the dykes to fill longitudinal cracks.

It was noted that the outer slope of the west dike along the karst pond shorelines has increased. It is recommended that a bathymetric survey be carried out along the west dyke in the affected area during summer 2020 in order to determine the depth of the ponds, the slope of the dyke underwater and to prepare a plan to restore the slope of the west dyke in the vicinity of the two karst ponds.

The longitudinal cracking that occurs on an annual basis confirms that subsidence and undercutting continue to occur at a slow rate, and in some future year major restoration work will be required. This underscores the need for continued maintenance. Nevertheless, all dikes appear to remain at or very near to designed shapes and levels, and on that basis, we believe that all the dikes around Inuvik's lagoon at this time are safe and adequate water retaining structures.

We trust that this submission fulfills the requirements of the Town of Inuvik water license Condition D8 for year 2019.

Sincerely,
AECOM Canada Ltd.



Michel Lanteigne, P.Eng.
Manager, Northwest Territories
Michel.lanteigne@aecom.com



Jordan Hoffart, P.Eng.
Project Engineer, Municipal Infrastructure
Jordan.hoffart@aecom.com

ML:blb
cc: Mr. Rolland Malegana, Energy and Natural Resources
Mr. Rick Campbell, Town of Inuvik
Mr. Grant Hood, S.A.O., Town of Inuvik
Inuvik Utilidor Crew Foreman
Inuvik Public Works Committee

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- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
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AECOM: 2015-04-13

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Appendix **D**

Lagoon Sludge Removal Report



August 8, 2019

Town of Inuvik Final Report

Please find the following project data summary for the Town of Inuvik desludging and dewatering project.

Project Data

Project data and volumes were determined by using a certified 6” Krohne flowmeter and dry down samples collected periodically throughout the day to derive the percent solids of the sludge slurry. An average of the dry down samples are determined and then multiplied by the volume of slurry pumped resulting in the Dry Tonnes (DT) removed for the day. A summary of the data collected and totals for the project are displayed in the table below.

	m ³ removed	Dry Tonnes (DT) removed	Bags of Polymer Used
TOTALS	14,234.32	732.57	154
2-Jul-19	Mobilization and set up. Pumping supernatant. Mixing cell.		
3-Jul-19			
4-Jul-19			
5-Jul-19			
6-Jul-19			
7-Jul-19			
8-Jul-19			
9-Jul-19			
10-Jul-19	693.70	17.69	3
11-Jul-19	725.54	24.16	5
12-Jul-19	518.00	34.55	5
13-Jul-19	730.76	61.96	8
14-Jul-19	Off		
15-Jul-19	1042.46	74.95	9
16-Jul-19	852.90	67.96	8
17-Jul-19	976.10	77.89	13
18-Jul-19	Fixed Houles and equipment maintenance. Pumping supernatant. Mixing cell.		
19-Jul-19			
20-Jul-19			
21-Jul-19			
22-Jul-19	548.32	9.40	1

23-Jul-19	497.91	9.49	4
24-Jul-19	948.56	34.33	8
25-Jul-19	809.39	35.91	8
26-Jul-19	978.89	51.37	13
27-Jul-19	703.43	39.04	10
28-Jul-19	Off		
29-Jul-19	1064.97	48.24	13
30-Jul-19	1085.86	45.17	12
31-Jul-19	998.77	47.64	16
1-Aug-19	1004.37	48.10	16
Received approval from the Town of Inuvik that the project is complete.			
2-Aug-19	54.39	4.72	2
Top up bags, tear down and pack up.			
3-Aug-19	Demob. Crew flown back to Red Deer.		

Summary

The project spanned 32 days total:

- 7 Mobilization, set up and mix
- 18 production
- 2 Demob
- 3 scheduled off
- 2 maintenance/repairs

	Estimated (Original Proposal)	Survey	Actual
m ³	12,000	15,000	14,234.32
Dry Tonnes (DT)	720		*723.57
Days on site	+/- 40 days		32

*Dry down samples average 5% solids for the duration of the project.

Geotube Maintenance

After operations, the rate at which the Geotubes dewater decreases and will continue to slowly dewater over time. In general, the longer the Geotubes are left in place to dewater the better the dewatering result. In order to properly manage the laydown yard and optimal dewatering of the Geotubes ensuring proper drainage and filtrate management is key with the following:

- 1) Monitor the laydown yard regularly. This can be factored into regular rounds and inspections for public works personnel. Inspect for but not limited to:

- Pooling especially after larger precipitation events.
 - Blocked or clogged Geotubes to ensure the filtering mesh is able to pass water.
 - Damage to the Geotubes (ie. leaks, punctures, abnormalities).
- 2) Discharge any excess or undrained water back to the cells if there is water pooling in the laydown yard around the Geotubes.
 - 3) If possible, regrade or fix any blockages in drainage channels within the yard and downstream.

Closing

I trust this provides you with the information you require. If you have any questions please do not hesitate to contact me.

Yours truly,
Lambourne Environmental Ltd.

A handwritten signature in black ink, appearing to read 'D Linsley', with a long horizontal stroke extending to the right.

David Linsley,
General Manager