

ANNUAL REPORT FOR THE MUNICIPALITY OF ARVIAT

YEAR BEING REPORTED: 2023

The following information is compiled pursuant to the requirements of Part B, Item 1 of Water License No. **3AM-ARV2232** issued to the **Municipality of Arviat**.

- a) The daily, monthly and annual quantities in cubic metres of fresh water withdrawn from Wolf Creek at Monitoring Station ARV-1
- b) The monthly and annual quantities in cubic metres of any Sewage discharge into the Sewage Disposal Facility at Monitoring Station ARV-3.
- c) The monthly and annual quantities in cubic metres of sludge removed from the Sewage Disposal Facility – *no sludge removed from Sewage Disposal Facility*.

Table 1: Summary of water obtained and estimated sewage water discharge in m³

Month Reported	Quantity of Water Obtained from all sources (m ³)	Quantity of Sewage Waste Discharged (m ³)
January	9,361.785	Same
February	8,959.641	Same
March	9,367.455	Same
April	9,307.725	Same
May	9,251.581	Same
June	8,983.608	Same
July	9,030.596	Same
August	1,017.335	Same
September	9,097.974	Same
October	9,621.865	Same
November	9,110.678	Same
December	8,578.326	Same
ANNUAL TOTAL	101,688.569	Same

Note: No meter exists to measure the sewage discharge volumes, therefore Sewage discharge volumes are considered equal to the water consumption volumes.

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Table 2: Summary of water obtained from Wolf Creek to Raw Water Cells in m³

Month Reported	Estimated Water Transferred from Wolf Creek to Raw Water Cells (m ³)
July	25,774.4
August	7753.7
TOTAL	33,528.2

Pumping from Wolf Creek River began on July 10th, 2023, and ended on August 06^h, 2023. An estimated total of 33,528.2 m³ was pumped to raw water cells in 2023. Daily quantities reported in Appendix D. Note: significantly less water was pumped from Wolf Creek than in 2022 as none of the cells were emptied for maintenance.

d. A summary report which includes all data and information generated under the Monitoring Program, including QA/QC program, in electronic formats acceptable to the Board

See Appendices.

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

None.

f. A progress report and revisions of any studies requested by the Board that relate to waste disposal, water use or reclamation, and a brief description of any future studies planned by the Licensee including, a non-technical executive summary for the general public, translated into Inuktitut.

- Sewage Disposal Facility is in design, construction anticipated to begin spring 2026.
- Solid waste site upgrades planning study anticipated to be completed in late 2024.
- The consultants are still evaluating if the old lagoon cells can be repurposed, if not an Abandonment and Restoration plan will be submitted.

g. Any revisions required, in the form of addenda to Plans, Manuals and Reports approved under the Licence;

None

h. A list and description, including volumes, of all unauthorized discharges, spills and

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summaries of follow-up action taken;

Spills: None.

i. A summary of any closure and reclamation work undertaken and an outline of any work anticipated for the next year, including any changes to implementation and scheduling;

- Plans to upgrade and improve the Sewage Disposal Facility are in design, including plan for abandoned sewage lagoon cells.
- Solid waste site upgrades planning anticipated to be completed in late 2024.

j. A summary of actions taken to address concerns or deficiencies listed in the inspection reports and/or compliance reports filed by an Inspector;

CIRNAC inspection took place July 27, 2023. No inspection report was received for 2023.

k. A summary of any studies, reports and plans requested by the Board that relate to the use of Water, Waste disposal, and/or reclamation and a brief description of any future studies planned; and

None.

l. Any other details on the use of Water or Waste disposal requested by the Board by November 1st of the year being reported.

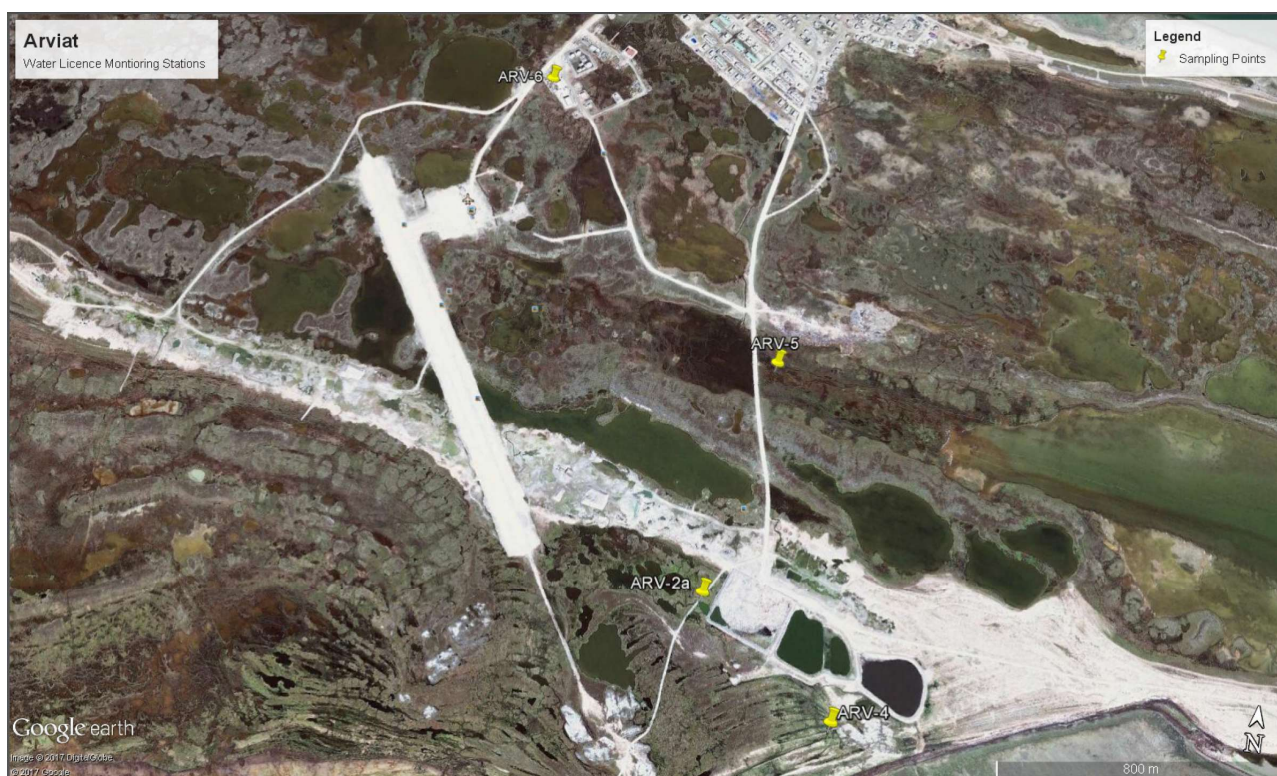
None.

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ADDITIONAL INFORMATION THAT THE LICENSEE DEEMS USEFUL:

Emergency decants at Arviat sewage lagoon occurs every year in spring since 2018. There are plans to upgrade the sewage disposal facility to increase capacity to prevent future emergency decants. The emergency decant is required to maintain freeboard and protect berm stability. Exceedances are expected to be resolved once new treatment is in place. Refer to Appendix C.

Water Licensing Sampling Points:



- ARV- 2a: Effluent discharge from the Discharge Point of the Solid Waste Disposal Facility
- ARV- 4: Effluent from the discharge point of the Sewage Disposal Facility (End of wetland)
- ARV- 5: Discharge from the Bulky Metal Waste Area
- ARV- 6: Discharge from the Hazardous Waste Storage Area

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Appendix A: ARV-4 Effluent Quality Limits

Appendix B: Certificate of Analysis WP2316436 – July 18, 2023

Appendix C: Notice to CIRNAC to Decant Sewage Lagoon – April 3, 2023

Appendix D: Daily Resupply Pumping Data

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Appendix A

ARV-4 Effluent Quality limits

Parameter	Maximum Concentration of any Grab Sample	July 18, 2023
BOD ₅	100 mg/L	51
Total Suspended Solids	120 mg/L	184
Fecal Coliform	1x10 ⁶ CFU/100 mL	3450
Oil and Grease	No visible sheen	7.9
pH	Between 6 and 9	7.34

Appendix B: Certificate of Analysis

Certificate of Analysis WP2316436 – July 18, 2023

CERTIFICATE OF ANALYSIS

Work Order	: WP2316436	Page	: 1 of 7
Client	: Hamlet of Arviat	Laboratory	: ALS Environmental - Winnipeg
Contact	: Steve England	Account Manager	: Craig Riddell
Address	: PO Box 150 Arviat NU Canada X0C 0E0	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg MB Canada R2J 3T4
Telephone	: 867 857 2841	Telephone	: +1 204 255 9720
Project	: ----	Date Samples Received	: 21-Jul-2023 13:51
PO	: ----	Date Analysis Commenced	: 21-Jul-2023
C-O-C number	: ----	Issue Date	: 28-Jul-2023 14:48
Sampler	: ----		
Site	: ----		
Quote number	: Analytical Testing 01		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Ana Srzic		Organics, Winnipeg, Manitoba
Gerry Vera	Analyst	Organics, Winnipeg, Manitoba
Jeremy Gingras	Team Leader - Semi-Volatile Instrumentation	Organics, Waterloo, Ontario
Jon Fisher	Production Manager, Environmental	Inorganics, Waterloo, Ontario
Lee McTavish		Inorganics, Winnipeg, Manitoba
Lee McTavish		Metals, Winnipeg, Manitoba
Leila Conyard	Lab Assistant	Metals, Winnipeg, Manitoba
Livia Ciolan	Analyst	Organics, Winnipeg, Manitoba
Michelle Michalchuk	Analyst	Organics, Winnipeg, Manitoba
William Lake	Analyst	Microbiology, Winnipeg, Manitoba



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	Description
-	no units
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
MPN/100mL	most probable number per hundred millilitres
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).



Analytical Results

Sub-Matrix: Wastewater					Client sample ID	ARV-2	ARV-4	ARV-5	ARV-6	----
(Matrix: Water)										
Client sampling date / time					21-Jul-2023 00:00	21-Jul-2023 00:00	21-Jul-2023 00:00	21-Jul-2023 00:00	21-Jul-2023 00:00	----
Analyte	CAS Number	Method/Lab	LOR	Unit	WP2316436-001	WP2316436-002	WP2316436-003	WP2316436-004	WP2316436-004	-----
					Result	Result	Result	Result	Result	----
Physical Tests										
Alkalinity, bicarbonate (as HCO3)	71-52-3	E290/WP	1.0	mg/L	837	278	244	47.8	47.8	----
Alkalinity, carbonate (as CO3)	3812-32-6	E290/WP	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	----
Alkalinity, hydroxide (as OH)	14280-30-9	E290/WP	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	----
Conductivity	----	E100/WP	2.0	µS/cm	2980	1110	2140	771	771	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/WP	0.50	mg/L	974	93.3	120	334	334	----
pH	----	E108/WP	0.10	pH units	7.79	7.34	7.69	6.94	6.94	----
Solids, total suspended [TSS]	----	E160/WP	3.0	mg/L	33.6	184	<3.0	36.8	36.8	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E303/WP	0.010	mg/L	10.5	36.5	0.034	0.068	0.068	----
Chloride	16887-00-6	E235.Cl/WP	0.50	mg/L	407	182	166	248	248	----
Nitrate (as N)	14797-55-8	E235.NO3/WP	0.020	mg/L	<0.400 ^{DLM}	<0.100 ^{DLM}	<0.020	<0.040 ^{DLM}	<0.040 ^{DLM}	----
Nitrate + Nitrite (as N)	----	EC235.N+N/W P	0.0050	mg/L	<0.447	<0.112	<0.0224	<0.0447	<0.0447	----
Nitrite (as N)	14797-65-0	E235.NO2/WP	0.010	mg/L	<0.200 ^{DLM}	<0.050 ^{DLM}	<0.010	<0.020 ^{DLM}	<0.020 ^{DLM}	----
Phosphorus, total	7723-14-0	E372/WP	0.020	mg/L	0.484	9.02	<0.020	0.033	0.033	----
Sulfate (as SO4)	14808-79-8	E235.SO4/WP	0.30	mg/L	342	11.0	10.6	<0.60 ^{DLM}	<0.60 ^{DLM}	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC]	----	E355-L/WP	0.50	mg/L	102	56.7	9.61	7.44	7.44	----
Microbiological Tests										
Coliforms, Escherichia coli [E. coli]	----	E010-H/WP	10	MPN/100mL	910	3450	<10	<10	<10	----
Coliforms, thermotolerant [fecal]	----	E010.FC-H/W P	10	MPN/100mL	1080	3450	10	<10	<10	----
Coliforms, total	----	E010-H/WP	10	MPN/100mL	7270	>24200	1720	880	880	----
Total Metals										
Aluminum, total	7429-90-5	E420/WP	0.0030	mg/L	0.114	0.152	0.0284	0.0283	0.0283	----
Antimony, total	7440-36-0	E420/WP	0.00010	mg/L	0.0227	0.00040	<0.00010	<0.00010	<0.00010	----
Arsenic, total	7440-38-2	E420/WP	0.00010	mg/L	0.00310	0.00441	0.00042	0.00048	0.00048	----
Barium, total	7440-39-3	E420/WP	0.00010	mg/L	0.0511	0.0258	0.0195	0.208	0.208	----
Beryllium, total	7440-41-7	E420/WP	0.000020	mg/L	0.000072	0.000024	<0.000020	<0.000020	<0.000020	----
Bismuth, total	7440-69-9	E420/WP	0.000050	mg/L	<0.000050	0.000498	<0.000050	<0.000050	<0.000050	----



Analytical Results

Sub-Matrix: Wastewater					Client sample ID	ARV-2	ARV-4	ARV-5	ARV-6	----
(Matrix: Water)										
Client sampling date / time					21-Jul-2023 00:00	21-Jul-2023 00:00	21-Jul-2023 00:00	21-Jul-2023 00:00	21-Jul-2023 00:00	----
Analyte	CAS Number	Method/Lab	LOR	Unit	WP2316436-001	WP2316436-002	WP2316436-003	WP2316436-004	WP2316436-004	-----
					Result	Result	Result	Result	Result	----
Total Metals										
Boron, total	7440-42-8	E420/WP	0.010	mg/L	2.40	0.274	0.060	0.059	0.059	----
Cadmium, total	7440-43-9	E420/WP	0.0000050	mg/L	0.000244	0.0000683	<0.0000050	0.0000066	0.0000066	----
Calcium, total	7440-70-2	E420/WP	0.050	mg/L	296	16.9	22.2	103	103	----
Cesium, total	7440-46-2	E420/WP	0.000010	mg/L	0.000046	0.000086	0.000022	0.000020	0.000020	----
Chromium, total	7440-47-3	E420/WP	0.00050	mg/L	0.00707	0.00132	<0.00050	<0.00050	<0.00050	----
Cobalt, total	7440-48-4	E420/WP	0.00010	mg/L	0.00527	0.00117	0.00011	0.00212	0.00212	----
Copper, total	7440-50-8	E420/WP	0.00050	mg/L	0.0572	0.0802	0.00062	<0.00050	<0.00050	----
Iron, total	7439-89-6	E420/WP	0.010	mg/L	5.36	3.51	0.354	19.4	19.4	----
Lead, total	7439-92-1	E420/WP	0.000050	mg/L	0.0110	0.00163	<0.000050	<0.000050	<0.000050	----
Lithium, total	7439-93-2	E420/WP	0.0010	mg/L	0.0725	0.0071	0.0110	0.0828	0.0828	----
Magnesium, total	7439-95-4	E420/WP	0.0050	mg/L	57.0	12.4	15.6	18.7	18.7	----
Manganese, total	7439-96-5	E420/WP	0.00010	mg/L	2.20	0.267	0.0325	2.64	2.64	----
Molybdenum, total	7439-98-7	E420/WP	0.000050	mg/L	0.000549	0.000597	0.000270	0.000148	0.000148	----
Nickel, total	7440-02-0	E420/WP	0.00050	mg/L	0.0191	0.00469	0.00051	0.00136	0.00136	----
Phosphorus, total	7723-14-0	E420/WP	0.050	mg/L	0.561	11.1	<0.050	<0.050	<0.050	----
Potassium, total	7440-09-7	E420/WP	0.050	mg/L	67.5	26.0	4.84	7.30	7.30	----
Rubidium, total	7440-17-7	E420/WP	0.00020	mg/L	0.0517	0.0248	0.00450	0.00942	0.00942	----
Selenium, total	7782-49-2	E420/WP	0.000050	mg/L	0.000245	0.000334	<0.000050	<0.000050	<0.000050	----
Silicon, total	7440-21-3	E420/WP	0.10	mg/L	7.34	2.18	0.17	3.33	3.33	----
Silver, total	7440-22-4	E420/WP	0.000010	mg/L	0.000122	0.000101	<0.000010	<0.000010	<0.000010	----
Sodium, total	7440-23-5	E420/WP	0.050	mg/L	358	128	96.1	50.7	50.7	----
Strontium, total	7440-24-6	E420/WP	0.00020	mg/L	1.65	0.196	0.159	0.956	0.956	----
Sulfur, total	7704-34-9	E420/WP	0.50	mg/L	168	9.30	4.94	<0.50	<0.50	----
Tellurium, total	13494-80-9	E420/WP	0.00020	mg/L	0.00024	<0.00020	<0.00020	<0.00020	<0.00020	----
Thallium, total	7440-28-0	E420/WP	0.000010	mg/L	0.000011	0.000020	<0.000010	<0.000010	<0.000010	----
Thorium, total	7440-29-1	E420/WP	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	----
Tin, total	7440-31-5	E420/WP	0.00010	mg/L	0.00048	0.00062	<0.00010	<0.00010	<0.00010	----
Titanium, total	7440-32-6	E420/WP	0.00030	mg/L	0.00367	0.00788	0.00141	0.00156	0.00156	----
Tungsten, total	7440-33-7	E420/WP	0.00010	mg/L	0.00011	0.00014	<0.00010	<0.00010	<0.00010	----
Uranium, total	7440-61-1	E420/WP	0.000010	mg/L	0.000983	0.000176	0.000084	0.000039	0.000039	----
Vanadium, total	7440-62-2	E420/WP	0.00050	mg/L	0.00211	0.00335	<0.00050	<0.00050	<0.00050	----



Analytical Results

Sub-Matrix: Wastewater

Client sample ID

(Matrix: Water)

					ARV-2	ARV-4	ARV-5	ARV-6	----
Client sampling date / time					21-Jul-2023 00:00	21-Jul-2023 00:00	21-Jul-2023 00:00	21-Jul-2023 00:00	----
Analyte	CAS Number	Method/Lab	LOR	Unit	WP2316436-001	WP2316436-002	WP2316436-003	WP2316436-004	-----
					Result	Result	Result	Result	----
Total Metals									
Zinc, total	7440-66-6	E420/WP	0.0030	mg/L	0.847	0.0402	<0.0030	0.0101	----
Zirconium, total	7440-67-7	E420/WP	0.00020	mg/L	0.00183	0.00094	<0.00020	<0.00020	----
Dissolved Metals									
Mercury, dissolved	7439-97-6	E509/WP	0.0000050	mg/L	0.0000491	<0.0000050	<0.0000050	<0.0000050	----
Dissolved mercury filtration location	----	EP509/WP	-	-	Field	Field	Field	Field	----
Aggregate Organics									
Biochemical oxygen demand [BOD]	----	E550/WP	2.0	mg/L	78.7	51.0	<2.0	<6.0	----
Carbonaceous biochemical oxygen demand [CBOD]	----	E555/WP	2.0	mg/L	69.4	41.3	<2.0	<6.0	----
Oil & grease (gravimetric)	----	E567/WP	5.0	mg/L	8.2	7.9	5.8	5.8	----
Oil & grease, animal/vegetable (gravimetric)	----	EC567A.SG/ WP	5.0	mg/L	8.2	7.9	5.8	5.8	----
Oil & grease, mineral (gravimetric)	----	E567SG/WP	5.0	mg/L	<5.0	<5.0	<5.0	<5.0	----
Phenols, total (4AAP)	----	E562/WT	0.0010	mg/L	0.0175 ^{DLM}	<0.0050 ^{DLM}	0.0012	0.0013	----
Volatile Organic Compounds									
Benzene	71-43-2	E611A/WP	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
Ethylbenzene	100-41-4	E611A/WP	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
Toluene	108-88-3	E611A/WP	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
Xylene, m+p-	179601-23-1	E611A/WP	0.00040	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	----
Xylene, o-	95-47-6	E611A/WP	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	----
Xylenes, total	1330-20-7	E611A/WP	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
BTEX, total	----	E611A/WP	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
Hydrocarbons									
F1 (C6-C10)	----	E581.F1/WP	0.10	mg/L	<0.10	<0.10	<0.10	<0.10	----
F1-BTEX	----	EC580/WP	0.100	mg/L	<0.100	<0.100	<0.100	<0.100	----
F2 (C10-C16)	----	E601/WP	0.10	mg/L	0.25	0.12	<0.10	<0.10	----
F3 (C16-C34)	----	E601/WP	0.25	mg/L	0.38	<0.25	<0.25	<0.25	----
F4 (C34-C50)	----	E601/WP	0.25	mg/L	<0.25	<0.25	<0.25	<0.25	----
TEH (C10-C50)	n/a	E601/WP	0.40	mg/L	0.63	<0.40	<0.40	<0.40	----
TEH (C16-C50)	----	E601/WP	0.40	mg/L	<0.40	<0.40	<0.40	<0.40	----
Hydrocarbons Surrogates									



Analytical Results

Sub-Matrix: Wastewater

Client sample ID

(Matrix: Water)

Sub-Matrix: Wastewater (Matrix: Water)					Client sample ID	ARV-2	ARV-4	ARV-5	ARV-6	----
Client sampling date / time					21-Jul-2023 00:00	21-Jul-2023 00:00	21-Jul-2023 00:00	21-Jul-2023 00:00	21-Jul-2023 00:00	----
Analyte	CAS Number	Method/Lab	LOR	Unit	WP2316436-001	WP2316436-002	WP2316436-003	WP2316436-004	-----	
					Result	Result	Result	Result	----	
Hydrocarbons Surrogates										
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	392-83-6	E601/WP	1.0	%	98.3	90.8	92.2	89.7	----	
Dichlorotoluene, 3,4-	95-75-0	E581.F1/WP	1.0	%	93.7	86.8	98.7	97.7	----	
Volatile Organic Compounds Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611A/WP	1.0	%	94.7	91.7	93.3	93.4	----	
Difluorobenzene, 1,4-	540-36-3	E611A/WP	1.0	%	111	111	110	111	----	
Polycyclic Aromatic Hydrocarbons										
Acenaphthene	83-32-9	E641A/WT	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
Acenaphthylene	208-96-8	E641A/WT	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
Acridine	260-94-6	E641A/WT	0.010	µg/L	<0.010	0.091	<0.010	<0.010	----	
Anthracene	120-12-7	E641A/WT	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
Benz(a)anthracene	56-55-3	E641A/WT	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
Benzo(a)pyrene	50-32-8	E641A/WT	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	----	
Benzo(b+j)fluoranthene	n/a	E641A/WT	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
Benzo(b+j+k)fluoranthene	n/a	E641A/WT	0.015	µg/L	<0.015	<0.015	<0.015	<0.015	----	
Benzo(g,h,i)perylene	191-24-2	E641A/WT	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
Benzo(k)fluoranthene	207-08-9	E641A/WT	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
Chrysene	218-01-9	E641A/WT	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
Dibenz(a,h)anthracene	53-70-3	E641A/WT	0.0050	µg/L	<0.0050	<0.0050	<0.0050	<0.0050	----	
Fluoranthene	206-44-0	E641A/WT	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
Fluorene	86-73-7	E641A/WT	0.010	µg/L	<0.010	<0.012 ^{DLM}	<0.010	<0.010	----	
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A/WT	0.010	µg/L	<0.010	<0.039 ^{DLM}	<0.010	<0.010	----	
Methylnaphthalene, 1-	90-12-0	E641A/WT	0.010	µg/L	0.014	<0.010	<0.010	0.015	----	
Methylnaphthalene, 1+2-	----	E641A/WT	0.015	µg/L	<0.015	<0.015	<0.015	0.015	----	
Methylnaphthalene, 2-	91-57-6	E641A/WT	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
Naphthalene	91-20-3	E641A/WT	0.050	µg/L	<0.050	<0.050	<0.050	<0.050	----	
Phenanthrene	85-01-8	E641A/WT	0.020	µg/L	<0.020	<0.020	<0.020	<0.020	----	
Pyrene	129-00-0	E641A/WT	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
Quinoline	91-22-5	E641A/WT	0.050	µg/L	<0.050	0.060	<0.050	<0.050	----	
B(a)P total potency equivalents [B(a)P TPE]	----	E641A/WT	0.010	µg/L	<0.010	<0.010	<0.010	<0.010	----	
PAHs, high molecular weight (BC AWQ)	n/a	E641A/WT	0.030	µg/L	<0.030	<0.048	<0.030	<0.030	----	
PAHs, low molecular weight (BC AWQ)	n/a	E641A/WT	0.060	µg/L	<0.060	<0.060	<0.060	<0.060	----	



Analytical Results

Sub-Matrix: Wastewater					Client sample ID	ARV-2	ARV-4	ARV-5	ARV-6	----
(Matrix: Water)										
					Client sampling date / time	21-Jul-2023 00:00	21-Jul-2023 00:00	21-Jul-2023 00:00	21-Jul-2023 00:00	----
Analyte	CAS Number	Method/Lab	LOR	Unit	WP2316436-001	WP2316436-002	WP2316436-003	WP2316436-004	-----	
					Result	Result	Result	Result	----	
Polycyclic Aromatic Hydrocarbons										
PAHs, total (CCME sewer 18)	n/a	E641A/WT	0.070	µg/L	<0.070	<0.076	<0.070	<0.070	<0.070	----
PAHs, total (EPA 16)	n/a	E641A/WT	0.065	µg/L	<0.065	<0.075	<0.065	<0.065	<0.065	----
Polycyclic Aromatic Hydrocarbons Surrogates										
Chrysene-d12	1719-03-5	E641A/WT	0.1	%	101	115	117	118	118	----
Naphthalene-d8	1146-65-2	E641A/WT	0.1	%	130	103	108	108	108	----
Phenanthrene-d10	1517-22-2	E641A/WT	0.1	%	112	109	115	113	113	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: WP2316436	Page	: 1 of 20
Client	: Hamlet of Arviat	Laboratory	: ALS Environmental - Winnipeg
Contact	: Steve England	Account Manager	: Craig Riddell
Address	: PO Box 150 Arviat NU Canada X0C 0E0	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	: 867 857 2841	Telephone	: +1 204 255 9720
Project	: ----	Date Samples Received	: 21-Jul-2023 13:51
PO	: ----	Issue Date	: 28-Jul-2023 14:50
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Analytical Testing 01		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] ARV-2	E550	21-Jul-2023	----	----	----		21-Jul-2023	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] ARV-4	E550	21-Jul-2023	----	----	----		21-Jul-2023	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] ARV-5	E550	21-Jul-2023	----	----	----		21-Jul-2023	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] ARV-6	E550	21-Jul-2023	----	----	----		21-Jul-2023	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d] ARV-2	E555	21-Jul-2023	----	----	----		21-Jul-2023	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d] ARV-4	E555	21-Jul-2023	----	----	----		21-Jul-2023	3 days	1 days	✓
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d] ARV-5	E555	21-Jul-2023	----	----	----		21-Jul-2023	3 days	1 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE [BOD HT 3d] ARV-6	E555	21-Jul-2023	----	----	----		21-Jul-2023	3 days	1 days	✓
Aggregate Organics : Mineral Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid) ARV-2	E567SG	21-Jul-2023	27-Jul-2023	28 days	6 days	✓	27-Jul-2023	40 days	0 days	✓
Aggregate Organics : Mineral Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid) ARV-4	E567SG	21-Jul-2023	27-Jul-2023	28 days	6 days	✓	27-Jul-2023	40 days	0 days	✓
Aggregate Organics : Mineral Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid) ARV-5	E567SG	21-Jul-2023	27-Jul-2023	28 days	6 days	✓	27-Jul-2023	40 days	0 days	✓
Aggregate Organics : Mineral Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid) ARV-6	E567SG	21-Jul-2023	27-Jul-2023	28 days	6 days	✓	27-Jul-2023	40 days	0 days	✓
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid) ARV-2	E567	21-Jul-2023	27-Jul-2023	28 days	6 days	✓	27-Jul-2023	40 days	0 days	✓
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid) ARV-4	E567	21-Jul-2023	27-Jul-2023	28 days	6 days	✓	27-Jul-2023	40 days	0 days	✓
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid) ARV-5	E567	21-Jul-2023	27-Jul-2023	28 days	6 days	✓	27-Jul-2023	40 days	0 days	✓
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid) ARV-6	E567	21-Jul-2023	27-Jul-2023	28 days	6 days	✓	27-Jul-2023	40 days	0 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) ARV-2	E562	21-Jul-2023	26-Jul-2023	28 days	6 days	✓	27-Jul-2023	22 days	1 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) ARV-4	E562	21-Jul-2023	26-Jul-2023	28 days	6 days	✓	27-Jul-2023	22 days	1 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) ARV-5	E562	21-Jul-2023	26-Jul-2023	28 days	6 days	✓	27-Jul-2023	22 days	1 days	✓
Aggregate Organics : Phenols (4AAP) in Water by Colorimetry										
Amber glass total (sulfuric acid) ARV-6	E562	21-Jul-2023	26-Jul-2023	28 days	6 days	✓	27-Jul-2023	22 days	1 days	✓
Anions and Nutrients : Ammonia in Water by Colour										
Amber glass total (sulfuric acid) ARV-2	E303	21-Jul-2023	24-Jul-2023	28 days	4 days	✓	24-Jul-2023	24 days	0 days	✓
Anions and Nutrients : Ammonia in Water by Colour										
Amber glass total (sulfuric acid) ARV-4	E303	21-Jul-2023	24-Jul-2023	28 days	4 days	✓	24-Jul-2023	24 days	0 days	✓
Anions and Nutrients : Ammonia in Water by Colour										
Amber glass total (sulfuric acid) ARV-5	E303	21-Jul-2023	24-Jul-2023	28 days	4 days	✓	24-Jul-2023	24 days	0 days	✓
Anions and Nutrients : Ammonia in Water by Colour										
Amber glass total (sulfuric acid) ARV-6	E303	21-Jul-2023	24-Jul-2023	28 days	4 days	✓	24-Jul-2023	24 days	0 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE ARV-2	E235.Cl	21-Jul-2023	21-Jul-2023	28 days	1 days	✓	21-Jul-2023	27 days	0 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Chloride in Water by IC										
HDPE ARV-4	E235.Cl	21-Jul-2023	21-Jul-2023	28 days	1 days	✓	21-Jul-2023	27 days	0 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE ARV-5	E235.Cl	21-Jul-2023	21-Jul-2023	28 days	1 days	✓	21-Jul-2023	27 days	0 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE ARV-6	E235.Cl	21-Jul-2023	21-Jul-2023	28 days	1 days	✓	21-Jul-2023	27 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE ARV-2	E235.NO3	21-Jul-2023	21-Jul-2023	3 days	1 days	✓	21-Jul-2023	2 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE ARV-4	E235.NO3	21-Jul-2023	21-Jul-2023	3 days	1 days	✓	21-Jul-2023	2 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE ARV-5	E235.NO3	21-Jul-2023	21-Jul-2023	3 days	1 days	✓	21-Jul-2023	2 days	0 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE ARV-6	E235.NO3	21-Jul-2023	21-Jul-2023	3 days	1 days	✓	21-Jul-2023	2 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE ARV-2	E235.NO2	21-Jul-2023	21-Jul-2023	3 days	1 days	✓	21-Jul-2023	2 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE ARV-4	E235.NO2	21-Jul-2023	21-Jul-2023	3 days	1 days	✓	21-Jul-2023	2 days	0 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrite in Water by IC										
HDPE ARV-5	E235.NO2	21-Jul-2023	21-Jul-2023	3 days	1 days	✓	21-Jul-2023	2 days	0 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE ARV-6	E235.NO2	21-Jul-2023	21-Jul-2023	3 days	1 days	✓	21-Jul-2023	2 days	0 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE ARV-2	E235.SO4	21-Jul-2023	21-Jul-2023	28 days	1 days	✓	21-Jul-2023	27 days	0 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE ARV-4	E235.SO4	21-Jul-2023	21-Jul-2023	28 days	1 days	✓	21-Jul-2023	27 days	0 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE ARV-5	E235.SO4	21-Jul-2023	21-Jul-2023	28 days	1 days	✓	21-Jul-2023	27 days	0 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE ARV-6	E235.SO4	21-Jul-2023	21-Jul-2023	28 days	1 days	✓	21-Jul-2023	27 days	0 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.02 mg/L)										
Amber glass total (sulfuric acid) ARV-2	E372	21-Jul-2023	25-Jul-2023	28 days	5 days	✓	26-Jul-2023	23 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.02 mg/L)										
Amber glass total (sulfuric acid) ARV-4	E372	21-Jul-2023	25-Jul-2023	28 days	5 days	✓	26-Jul-2023	23 days	1 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.02 mg/L)										
Amber glass total (sulfuric acid) ARV-5	E372	21-Jul-2023	25-Jul-2023	28 days	5 days	✓	26-Jul-2023	23 days	1 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Total Phosphorus by Colourimetry (0.02 mg/L)										
Amber glass total (sulfuric acid) ARV-6	E372	21-Jul-2023	25-Jul-2023	28 days	5 days	✓	26-Jul-2023	23 days	1 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) ARV-2	E509	21-Jul-2023	27-Jul-2023	28 days	6 days	✓	27-Jul-2023	22 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) ARV-4	E509	21-Jul-2023	27-Jul-2023	28 days	6 days	✓	27-Jul-2023	22 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) ARV-5	E509	21-Jul-2023	27-Jul-2023	28 days	6 days	✓	27-Jul-2023	22 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) ARV-6	E509	21-Jul-2023	28-Jul-2023	28 days	8 days	✓	28-Jul-2023	20 days	0 days	✓
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) ARV-2	E581.F1	21-Jul-2023	25-Jul-2023	14 days	4 days	✓	25-Jul-2023	10 days	0 days	✓
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) ARV-4	E581.F1	21-Jul-2023	25-Jul-2023	14 days	4 days	✓	25-Jul-2023	10 days	0 days	✓
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) ARV-5	E581.F1	21-Jul-2023	25-Jul-2023	14 days	4 days	✓	25-Jul-2023	10 days	0 days	✓
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) ARV-6	E581.F1	21-Jul-2023	25-Jul-2023	14 days	4 days	✓	25-Jul-2023	10 days	0 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) ARV-2	E601	21-Jul-2023	24-Jul-2023	14 days	4 days	✓	25-Jul-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) ARV-4	E601	21-Jul-2023	24-Jul-2023	14 days	4 days	✓	25-Jul-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) ARV-5	E601	21-Jul-2023	24-Jul-2023	14 days	4 days	✓	25-Jul-2023	40 days	1 days	✓
Hydrocarbons : CCME PHCs - F2-F4 by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) ARV-6	E601	21-Jul-2023	24-Jul-2023	14 days	4 days	✓	25-Jul-2023	40 days	1 days	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate) 1:10										
Sterile HDPE (Sodium thiosulphate) ARV-2	E010.FC-H	21-Jul-2023	----	----	----		21-Jul-2023	30 hrs	17 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate) 1:10										
Sterile HDPE (Sodium thiosulphate) ARV-4	E010.FC-H	21-Jul-2023	----	----	----		21-Jul-2023	30 hrs	17 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate) 1:10										
Sterile HDPE (Sodium thiosulphate) ARV-5	E010.FC-H	21-Jul-2023	----	----	----		21-Jul-2023	30 hrs	17 hrs	✓
Microbiological Tests : Thermotolerant (Fecal) Coliform (Enzyme Substrate) 1:10										
Sterile HDPE (Sodium thiosulphate) ARV-6	E010.FC-H	21-Jul-2023	----	----	----		21-Jul-2023	30 hrs	17 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)- 1:10										
Sterile HDPE (Sodium thiosulphate) ARV-2	E010-H	21-Jul-2023	----	----	----		21-Jul-2023	30 hrs	17 hrs	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)- 1:10										
Sterile HDPE (Sodium thiosulphate) ARV-4	E010-H	21-Jul-2023	----	----	----		21-Jul-2023	30 hrs	17 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)- 1:10										
Sterile HDPE (Sodium thiosulphate) ARV-5	E010-H	21-Jul-2023	----	----	----		21-Jul-2023	30 hrs	17 hrs	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)- 1:10										
Sterile HDPE (Sodium thiosulphate) ARV-6	E010-H	21-Jul-2023	----	----	----		21-Jul-2023	30 hrs	17 hrs	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) ARV-2	E355-L	21-Jul-2023	22-Jul-2023	28 days	1 days	✓	22-Jul-2023	27 days	0 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) ARV-4	E355-L	21-Jul-2023	22-Jul-2023	28 days	1 days	✓	22-Jul-2023	27 days	0 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) ARV-5	E355-L	21-Jul-2023	22-Jul-2023	28 days	1 days	✓	22-Jul-2023	27 days	0 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) ARV-6	E355-L	21-Jul-2023	22-Jul-2023	28 days	1 days	✓	22-Jul-2023	27 days	0 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE ARV-2	E290	21-Jul-2023	24-Jul-2023	14 days	3 days	✓	24-Jul-2023	11 days	0 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE ARV-4	E290	21-Jul-2023	24-Jul-2023	14 days	3 days	✓	24-Jul-2023	11 days	0 days	✓



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Alkalinity Species by Titration										
HDPE ARV-5	E290	21-Jul-2023	24-Jul-2023	14 days	3 days	✓	24-Jul-2023	11 days	0 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE ARV-6	E290	21-Jul-2023	24-Jul-2023	14 days	3 days	✓	24-Jul-2023	11 days	0 days	✓
Physical Tests : Conductivity in Water										
HDPE ARV-2	E100	21-Jul-2023	24-Jul-2023	28 days	3 days	✓	24-Jul-2023	25 days	0 days	✓
Physical Tests : Conductivity in Water										
HDPE ARV-4	E100	21-Jul-2023	24-Jul-2023	28 days	3 days	✓	24-Jul-2023	25 days	0 days	✓
Physical Tests : Conductivity in Water										
HDPE ARV-5	E100	21-Jul-2023	24-Jul-2023	28 days	3 days	✓	24-Jul-2023	25 days	0 days	✓
Physical Tests : Conductivity in Water										
HDPE ARV-6	E100	21-Jul-2023	24-Jul-2023	28 days	3 days	✓	24-Jul-2023	25 days	0 days	✓
Physical Tests : pH by Meter										
HDPE ARV-2	E108	21-Jul-2023	24-Jul-2023	0.01 hrs	0.25 hrs	✖ EHTR-FM	24-Jul-2023	-83.09 hrs	0.01 hrs	✖ UCP
Physical Tests : pH by Meter										
HDPE ARV-4	E108	21-Jul-2023	24-Jul-2023	0.01 hrs	0.25 hrs	✖ EHTR-FM	24-Jul-2023	-83.09 hrs	0.01 hrs	✖ UCP
Physical Tests : pH by Meter										
HDPE ARV-5	E108	21-Jul-2023	24-Jul-2023	0.01 hrs	0.25 hrs	✖ EHTR-FM	24-Jul-2023	-83.09 hrs	0.01 hrs	✖ UCP



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : pH by Meter										
HDPE ARV-6	E108	21-Jul-2023	24-Jul-2023	0.01 hrs	0.25 hrs	* EHTR-FM	24-Jul-2023	-83.09 hrs	0.01 hrs	* UCP
Physical Tests : TSS by Gravimetry										
HDPE ARV-2	E160	21-Jul-2023	----	----	----		24-Jul-2023	7 days	3 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ARV-4	E160	21-Jul-2023	----	----	----		24-Jul-2023	7 days	3 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ARV-5	E160	21-Jul-2023	----	----	----		24-Jul-2023	7 days	3 days	✓
Physical Tests : TSS by Gravimetry										
HDPE ARV-6	E160	21-Jul-2023	----	----	----		24-Jul-2023	7 days	3 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) ARV-2	E641A	21-Jul-2023	26-Jul-2023	14 days	6 days	✓	27-Jul-2023	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) ARV-4	E641A	21-Jul-2023	26-Jul-2023	14 days	6 days	✓	27-Jul-2023	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) ARV-5	E641A	21-Jul-2023	26-Jul-2023	14 days	6 days	✓	27-Jul-2023	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) ARV-6	E641A	21-Jul-2023	26-Jul-2023	14 days	6 days	✓	27-Jul-2023	40 days	1 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid) ARV-2	E420	21-Jul-2023	26-Jul-2023	180 days	5 days	✓	26-Jul-2023	175 days	0 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid) ARV-4	E420	21-Jul-2023	26-Jul-2023	180 days	5 days	✓	26-Jul-2023	175 days	0 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid) ARV-5	E420	21-Jul-2023	26-Jul-2023	180 days	5 days	✓	26-Jul-2023	175 days	0 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid) ARV-6	E420	21-Jul-2023	26-Jul-2023	180 days	5 days	✓	26-Jul-2023	175 days	0 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) ARV-2	E611A	21-Jul-2023	25-Jul-2023	14 days	4 days	✓	25-Jul-2023	10 days	0 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) ARV-4	E611A	21-Jul-2023	25-Jul-2023	14 days	4 days	✓	25-Jul-2023	10 days	0 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) ARV-5	E611A	21-Jul-2023	25-Jul-2023	14 days	4 days	✓	25-Jul-2023	10 days	0 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) ARV-6	E611A	21-Jul-2023	25-Jul-2023	14 days	4 days	✓	25-Jul-2023	10 days	0 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

UCP: Unsuitable Container and/or Preservative used (invalidates standard hold time). Maximum hold time of zero applied. Test results may be biased low / unreliable, and may not meet regulatory requirements.



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
Ammonia in Water by Colour	E303	1053441	2	30	6.6	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	1050767	1	19	5.2	5.0	✔
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1050760	1	20	5.0	5.0	✔
BTEX by Headspace GC-MS	E611A	1054184	1	6	16.6	5.0	✔
CCME PHC - F1 by Headspace GC-FID	E581.F1	1054185	1	6	16.6	5.0	✔
Chloride in Water by IC	E235.Cl	1050590	1	8	12.5	5.0	✔
Conductivity in Water	E100	1052822	1	16	6.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1058797	2	40	5.0	5.0	✔
Nitrate in Water by IC	E235.NO3	1050587	1	8	12.5	5.0	✔
Nitrite in Water by IC	E235.NO2	1050588	1	8	12.5	5.0	✔
pH by Meter	E108	1052823	1	20	5.0	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1057226	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	1050586	1	18	5.5	5.0	✔
Thermotolerant (Fecal) Coliform (Enzyme Substrate) 1:10	E010.FC-H	1050786	1	8	12.5	5.0	✔
Total Coliforms and E. coli (Enzyme Substrate)- 1:10	E010-H	1050779	1	7	14.2	5.0	✔
Total metals in Water by CRC ICPMS	E420	1056284	0	18	0.0	5.0	✖
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1051168	2	37	5.4	5.0	✔
Total Phosphorus by Colourimetry (0.02 mg/L)	E372	1055613	1	13	7.6	5.0	✔
TSS by Gravimetry	E160	1052409	1	17	5.8	5.0	✔
Laboratory Control Samples (LCS)							
Ammonia in Water by Colour	E303	1053441	2	30	6.6	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	1050767	1	19	5.2	5.0	✔
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1050760	1	20	5.0	5.0	✔
BTEX by Headspace GC-MS	E611A	1054184	1	6	16.6	5.0	✔
CCME PHC - F1 by Headspace GC-FID	E581.F1	1054185	1	6	16.6	5.0	✔
CCME PHCs - F2-F4 by GC-FID	E601	1053262	1	6	16.6	5.0	✔
Chloride in Water by IC	E235.Cl	1050590	1	8	12.5	5.0	✔
Conductivity in Water	E100	1052822	1	16	6.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1058797	2	40	5.0	5.0	✔
Mineral Oil & Grease by Gravimetry	E567SG	1058311	1	4	25.0	5.0	✔
Nitrate in Water by IC	E235.NO3	1050587	1	8	12.5	5.0	✔
Nitrite in Water by IC	E235.NO2	1050588	1	8	12.5	5.0	✔
Oil & Grease by Gravimetry	E567	1058310	1	19	5.2	5.0	✔
PAHs by Hexane LVI GC-MS	E641A	1057263	1	8	12.5	5.0	✔
pH by Meter	E108	1052823	1	20	5.0	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1057226	1	19	5.2	5.0	✔



Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Control Samples (LCS) - Continued							
Sulfate in Water by IC	E235.SO4	1050586	1	18	5.5	5.0	✔
Total metals in Water by CRC ICPMS	E420	1056284	1	18	5.5	5.0	✔
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1051168	2	37	5.4	5.0	✔
Total Phosphorus by Colourimetry (0.02 mg/L)	E372	1055613	1	13	7.6	5.0	✔
TSS by Gravimetry	E160	1052409	1	17	5.8	5.0	✔
Method Blanks (MB)							
Ammonia in Water by Colour	E303	1053441	2	30	6.6	5.0	✔
Biochemical Oxygen Demand - 5 day	E550	1050767	1	19	5.2	5.0	✔
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1050760	1	20	5.0	5.0	✔
BTEX by Headspace GC-MS	E611A	1054184	1	6	16.6	5.0	✔
CCME PHC - F1 by Headspace GC-FID	E581.F1	1054185	1	6	16.6	5.0	✔
CCME PHCs - F2-F4 by GC-FID	E601	1053262	1	6	16.6	5.0	✔
Chloride in Water by IC	E235.Cl	1050590	1	8	12.5	5.0	✔
Conductivity in Water	E100	1052822	1	16	6.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1058797	2	40	5.0	5.0	✔
Mineral Oil & Grease by Gravimetry	E567SG	1058311	1	4	25.0	5.0	✔
Nitrate in Water by IC	E235.NO3	1050587	1	8	12.5	5.0	✔
Nitrite in Water by IC	E235.NO2	1050588	1	8	12.5	5.0	✔
Oil & Grease by Gravimetry	E567	1058310	1	19	5.2	5.0	✔
PAHs by Hexane LVI GC-MS	E641A	1057263	1	8	12.5	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1057226	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	1050586	1	18	5.5	5.0	✔
Thermotolerant (Fecal) Coliform (Enzyme Substrate) 1:10	E010.FC-H	1050786	1	8	12.5	5.0	✔
Total Coliforms and E. coli (Enzyme Substrate)- 1:10	E010-H	1050779	1	7	14.2	5.0	✔
Total metals in Water by CRC ICPMS	E420	1056284	1	18	5.5	5.0	✔
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1051168	2	37	5.4	5.0	✔
Total Phosphorus by Colourimetry (0.02 mg/L)	E372	1055613	1	13	7.6	5.0	✔
TSS by Gravimetry	E160	1052409	1	17	5.8	5.0	✔
Matrix Spikes (MS)							
Ammonia in Water by Colour	E303	1053441	2	30	6.6	5.0	✔
BTEX by Headspace GC-MS	E611A	1054184	0	6	0.0	5.0	✖
CCME PHC - F1 by Headspace GC-FID	E581.F1	1054185	1	6	16.6	5.0	✔
Chloride in Water by IC	E235.Cl	1050590	1	8	12.5	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1058797	2	40	5.0	5.0	✔
Nitrate in Water by IC	E235.NO3	1050587	1	8	12.5	5.0	✔
Nitrite in Water by IC	E235.NO2	1050588	1	8	12.5	5.0	✔
Phenols (4AAP) in Water by Colorimetry	E562	1057226	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	1050586	1	18	5.5	5.0	✔
Total metals in Water by CRC ICPMS	E420	1056284	0	18	0.0	5.0	✖

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Matrix: **Water**

Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Matrix Spikes (MS) - Continued							
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1051168	2	37	5.4	5.0	✔
Total Phosphorus by Colourimetry (0.02 mg/L)	E372	1055613	1	13	7.6	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Thermotolerant (Fecal) Coliform (Enzyme Substrate) 1:10	E010.FC-H ALS Environmental - Winnipeg	Water	APHA 9223 (mod)	The enzyme substrate test detects Thermotolerant Coliforms in a 100 mL sample after an 18 hour incubation at 44.5 ±0.2°C. Sample dilution performed.
Total Coliforms and E. coli (Enzyme Substrate) - 1:10	E010-H ALS Environmental - Winnipeg	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at 35.0 ±0.5°C for either 18 or 24 hours (dependent on reagent used). Sample dilution performed.
Conductivity in Water	E100 ALS Environmental - Winnipeg	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Winnipeg	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
TSS by Gravimetry	E160 ALS Environmental - Winnipeg	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 ALS Environmental - Winnipeg	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia in Water by Colour	E303 ALS Environmental - Winnipeg	Water	APHA 4500 NH3-NITROGEN (AMMONIA)	This analysis is carried out using procedures adapted from APHA Method 4500 NH3 "NITROGEN (AMMONIA)". Ammonia is determined using the automated phenate colourimetric method.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L ALS Environmental - Winnipeg	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Total Phosphorus by Colourimetry (0.02 mg/L)	E372 ALS Environmental - Winnipeg	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total metals in Water by CRC ICPMS	E420 ALS Environmental - Winnipeg	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509 ALS Environmental - Winnipeg	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Biochemical Oxygen Demand - 5 day	E550 ALS Environmental - Winnipeg	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555 ALS Environmental - Winnipeg	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Nitrification inhibitor is added to samples to prevent nitrogenous compounds from consuming oxygen resulting in only carbonaceous oxygen demand being reported by this method. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Phenols (4AAP) in Water by Colorimetry	E562 ALS Environmental - Waterloo	Water	EPA 9066	This automated method is based on the distillation of phenol and subsequent reaction of the distillate with alkaline ferricyanide (K3Fe(CN)6) and 4-amino-antipyrine (4-AAP) to form a red complex which is measured colorimetrically.



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Oil & Grease by Gravimetry	E567 ALS Environmental - Winnipeg	Water	BC MOE Lab Manual (Oil & Grease) (mod)	The entire water sample is extracted with hexane and the extract is evaporated to dryness. The residue is then weighed to determine Oil and Grease.
Mineral Oil & Grease by Gravimetry	E567SG ALS Environmental - Winnipeg	Water	BC MOE Lab Manual (Oil & Grease) (mod)	The entire water sample is extracted with hexane, followed by silica gel treatment after which the extract is evaporated to dryness. The residue is then weighed to determine Mineral Oil and Grease.
CCME PHC - F1 by Headspace GC-FID	E581.F1 ALS Environmental - Winnipeg	Water	CCME PHC in Soil - Tier 1	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law. Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
CCME PHCs - F2-F4 by GC-FID	E601 ALS Environmental - Winnipeg	Water	CCME PHC in Soil - Tier 1	Sample extracts are analyzed by GC-FID for CCME hydrocarbon fractions (F2-F4). Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
BTEX by Headspace GC-MS	E611A ALS Environmental - Winnipeg	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A ALS Environmental - Waterloo	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Winnipeg	Water	APHA 2340B	"Hardness (as CaCO ₃), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Winnipeg	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Animal & Vegetable Oil & Grease by Gravimetry	EC567A.SG ALS Environmental - Winnipeg	Water	APHA 5520 (mod)	Animal & vegetable oil and grease is calculated as follows: Oil & Grease (gravimetric) minus Mineral Oil & Grease (gravimetric)
F1-BTEX	EC580 ALS Environmental - Winnipeg	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Winnipeg	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Total Organic Carbon by Combustion	EP355 ALS Environmental - Winnipeg	Water		Preparation for Total Organic Carbon by Combustion
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Winnipeg	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Dissolved Mercury Water Filtration	EP509 ALS Environmental - Winnipeg	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
Oil & Grease Extraction for Gravimetry	EP567 ALS Environmental - Winnipeg	Water	BC MOE Lab Manual (Oil & Grease) (mod)	The entire water sample is extracted with hexane by liquid-liquid extraction.
VOCs Preparation for Headspace Analysis	EP581 ALS Environmental - Winnipeg	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 ALS Environmental - Winnipeg	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: WP2316436	Page	: 1 of 14
Client	: Hamlet of Arviat	Laboratory	: ALS Environmental - Winnipeg
Contact	: Steve England	Account Manager	: Craig Riddell
Address	: PO Box 150 Arviat NU Canada X0C 0E0	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	:	Telephone	: +1 204 255 9720
Project	: ----	Date Samples Received	: 21-Jul-2023 13:51
PO	: ----	Date Analysis Commenced	: 21-Jul-2023
C-O-C number	: ----	Issue Date	: 28-Jul-2023 14:47
Sampler	: ---- 867 857 2841		
Site	: ----		
Quote number	: Analytical Testing 01		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Ana Srzic		Winnipeg Organics, Winnipeg, Manitoba
Gerry Vera	Analyst	Winnipeg Organics, Winnipeg, Manitoba
Jeremy Gingras	Team Leader - Semi-Volatile Instrumentation	Waterloo Organics, Waterloo, Ontario
Jon Fisher	Production Manager, Environmental	Waterloo Inorganics, Waterloo, Ontario
Lee McTavish		Winnipeg Inorganics, Winnipeg, Manitoba
Lee McTavish		Winnipeg Metals, Winnipeg, Manitoba
Leila Conyard	Lab Assistant	Winnipeg Metals, Winnipeg, Manitoba
Livia Ciolan	Analyst	Winnipeg Organics, Winnipeg, Manitoba
Michelle Michalchuk	Analyst	Winnipeg Organics, Winnipeg, Manitoba
William Lake	Analyst	Winnipeg Microbiology, Winnipeg, Manitoba



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Page : 3 of 14
 Work Order : WP2316436
 Client : Hamlet of Arviat
 Project : ----



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1052409)											
WP2316399-001	Anonymous	Solids, total suspended [TSS]	----	E160	3.0	mg/L	9.4	9.6	0.2	Diff <2x LOR	----
Physical Tests (QC Lot: 1052822)											
WP2316402-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	837	837	0.00%	10%	----
Physical Tests (QC Lot: 1052823)											
WP2316402-001	Anonymous	pH	----	E108	0.10	pH units	8.03	8.05	0.249%	4%	----
Anions and Nutrients (QC Lot: 1050586)											
WP2316328-005	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	25.7	25.9	0.743%	20%	----
Anions and Nutrients (QC Lot: 1050587)											
WP2316328-005	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1050588)											
WP2316328-005	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1050590)											
WP2316328-005	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	77.2	77.7	0.650%	20%	----
Anions and Nutrients (QC Lot: 1053441)											
WP2316604-001	Anonymous	Ammonia, total (as N)	7664-41-7	E303	0.100	mg/L	0.967	0.982	0.015	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1055555)											
WP2316649-001	Anonymous	Ammonia, total (as N)	7664-41-7	E303	0.010	mg/L	0.038	0.042	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1055613)											
WP2316436-001	ARV-2	Phosphorus, total	7723-14-0	E372	0.400	mg/L	0.484	0.482	0.001	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1051168)											
WP2315725-008	Anonymous	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	12.9	12.4	3.69%	20%	----
Organic / Inorganic Carbon (QC Lot: 1054544)											
WP2316195-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	15.3	16.0	4.78%	20%	----
Microbiological Tests (QC Lot: 1050779)											
WP2316411-002	Anonymous	Coliforms, Escherichia coli [E. coli]	----	E010-H	10	MPN/100mL	<10	<10	0	Diff <2x LOR	----
		Coliforms, total	----	E010-H	10	MPN/100mL	<10	<10	0	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1050786)											
WP2316411-002	Anonymous	Coliforms, thermotolerant [fecal]	----	E010.FC-H	10	MPN/100mL	<10	<10	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1058797)											
WP2316183-001	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 1060862)											
WP2316436-004	ARV-6	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1050760)											
WP2316274-001	Anonymous	Carbonaceous biochemical oxygen demand [CBOD]	----	E555	2.0	mg/L	3.3	2.5	27.6%	30%	----
Aggregate Organics (QC Lot: 1050767)											
WP2316330-001	Anonymous	Biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
Aggregate Organics (QC Lot: 1057226)											
TY2307081-002	Anonymous	Phenols, total (4AAP)	----	E562	0.0010	mg/L	0.0019	0.0013	0.0006	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 1054184)											
WP2316414-003	Anonymous	Benzene	71-43-2	E611A	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.00040 mg/L	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611A	0.30	µg/L	<0.00030 mg/L	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 1054185)											
WP2316414-003	Anonymous	F1 (C6-C10)	----	E581.F1	100	µg/L	<0.10 mg/L	<100	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1052409)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 1052822)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Anions and Nutrients (QCLot: 1050586)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1050587)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1050588)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1050590)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1053441)						
Ammonia, total (as N)	7664-41-7	E303	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1055555)						
Ammonia, total (as N)	7664-41-7	E303	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1055613)						
Phosphorus, total	7723-14-0	E372	0.02	mg/L	<0.020	----
Organic / Inorganic Carbon (QCLot: 1051168)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 1054544)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Microbiological Tests (QCLot: 1050779)						
Coliforms, Escherichia coli [E. coli]	----	E010-H	10	MPN/100mL	<10	----
Coliforms, total	----	E010-H	10	MPN/100mL	<10	----
Microbiological Tests (QCLot: 1050786)						
Coliforms, thermotolerant [fecal]	----	E010.FC-H	10	MPN/100mL	<10	----
Total Metals (QCLot: 1056284)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1056284) - continued						
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 1058797)						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1058797) - continued						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 1060862)						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 1050760)						
Carbonaceous biochemical oxygen demand [CBOD]	----	E555	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 1050767)						
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 1057226)						
Phenols, total (4AAP)	----	E562	0.001	mg/L	<0.0010	----
Aggregate Organics (QCLot: 1058310)						
Oil & grease (gravimetric)	----	E567	5	mg/L	<5.0	----
Aggregate Organics (QCLot: 1058311)						
Oil & grease, mineral (gravimetric)	----	E567SG	5	mg/L	<5.0	----
Volatile Organic Compounds (QCLot: 1054184)						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 1053262)						
F2 (C10-C16)	----	E601	100	µg/L	<100	----
F3 (C16-C34)	----	E601	250	µg/L	<250	----
F4 (C34-C50)	----	E601	250	µg/L	<250	----
Hydrocarbons (QCLot: 1054185)						
F1 (C6-C10)	----	E581.F1	100	µg/L	<100	----
Polycyclic Aromatic Hydrocarbons (QCLot: 1057263)						
Acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----
Acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	----
Acridine	260-94-6	E641A	0.01	µg/L	<0.010	----
Anthracene	120-12-7	E641A	0.01	µg/L	<0.010	----
Benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	----
Benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
Benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	<0.010	----
Benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	----
Benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 1057263) - continued						
Chrysene	218-01-9	E641A	0.01	µg/L	<0.010	----
Dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	----
Fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	----
Fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
Methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
Methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
Naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
Phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
Pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
Quinoline	91-22-5	E641A	0.05	µg/L	<0.050	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1052409)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	92.6	85.0	115	----
Physical Tests (QCLot: 1052822)									
Conductivity	----	E100	1	µS/cm	1412 µS/cm	99.9	90.0	110	----
Physical Tests (QCLot: 1052823)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Anions and Nutrients (QCLot: 1050586)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1050587)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	98.6	90.0	110	----
Anions and Nutrients (QCLot: 1050588)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	98.9	90.0	110	----
Anions and Nutrients (QCLot: 1050590)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.6	90.0	110	----
Anions and Nutrients (QCLot: 1053441)									
Ammonia, total (as N)	7664-41-7	E303	0.01	mg/L	0.25 mg/L	98.9	85.0	115	----
Anions and Nutrients (QCLot: 1055555)									
Ammonia, total (as N)	7664-41-7	E303	0.01	mg/L	0.25 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 1055613)									
Phosphorus, total	7723-14-0	E372	0.02	mg/L	0.5 mg/L	93.4	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1051168)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	102	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1054544)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	107	80.0	120	----
Total Metals (QCLot: 1056284)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	111	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	103	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	103	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	112	80.0	120	----



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1056284) - continued									
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	108	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	106	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	103	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	105	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	103	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	105	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	103	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	105	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	118	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	109	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	104	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	114	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	109	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	104	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	99.8	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	90.0	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	97.0	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	109	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	99.9	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	108	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	98.8	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	106	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	103	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	101	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	104	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	101	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	104	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	103	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	93.6	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	99.3	80.0	120	----



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1060862) - continued									
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	99.4	80.0	120	----
Aggregate Organics (QCLot: 1050760)									
Carbonaceous biochemical oxygen demand [CBOD]	----	E555	2	mg/L	198 mg/L	104	85.0	115	----
Aggregate Organics (QCLot: 1050767)									
Biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	107	85.0	115	----
Aggregate Organics (QCLot: 1057226)									
Phenols, total (4AAP)	----	E562	0.001	mg/L	0.02 mg/L	97.9	85.0	115	----
Aggregate Organics (QCLot: 1058310)									
Oil & grease (gravimetric)	----	E567	5	mg/L	100 mg/L	95.3	70.0	130	----
Aggregate Organics (QCLot: 1058311)									
Oil & grease, mineral (gravimetric)	----	E567SG	5	mg/L	50 mg/L	89.8	70.0	130	----
Volatile Organic Compounds (QCLot: 1054184)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	93.7	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	90.8	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	87.4	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	96.9	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	90.8	70.0	130	----
Hydrocarbons (QCLot: 1053262)									
F2 (C10-C16)	----	E601	100	µg/L	3404 µg/L	106	70.0	130	----
F3 (C16-C34)	----	E601	250	µg/L	6777 µg/L	89.8	70.0	130	----
F4 (C34-C50)	----	E601	250	µg/L	5835 µg/L	99.8	70.0	130	----
Hydrocarbons (QCLot: 1054185)									
F1 (C6-C10)	----	E581.F1	100	µg/L	5390 µg/L	116	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 1057263)									
Acenaphthene	83-32-9	E641A	0.01	µg/L	0.5263 µg/L	95.8	50.0	140	----
Acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5263 µg/L	98.3	50.0	140	----
Acridine	260-94-6	E641A	0.01	µg/L	0.5263 µg/L	85.5	50.0	140	----
Anthracene	120-12-7	E641A	0.01	µg/L	0.5263 µg/L	98.7	50.0	140	----
Benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5263 µg/L	119	50.0	140	----
Benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5263 µg/L	106	50.0	140	----
Benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	0.5263 µg/L	115	50.0	140	----
Benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5263 µg/L	112	50.0	140	----



Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Analyte	CAS Number	Method	LOR	Unit					
Polycyclic Aromatic Hydrocarbons (QCLot: 1057263) - continued									
Benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5263 µg/L	108	50.0	140	----
Chrysene	218-01-9	E641A	0.01	µg/L	0.5263 µg/L	117	50.0	140	----
Dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5263 µg/L	130	50.0	140	----
Fluoranthene	206-44-0	E641A	0.01	µg/L	0.5263 µg/L	103	50.0	140	----
Fluorene	86-73-7	E641A	0.01	µg/L	0.5263 µg/L	98.4	50.0	140	----
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5263 µg/L	112	50.0	140	----
Methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5263 µg/L	91.6	50.0	140	----
Methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5263 µg/L	89.9	50.0	140	----
Naphthalene	91-20-3	E641A	0.05	µg/L	0.5263 µg/L	92.5	50.0	140	----
Phenanthrene	85-01-8	E641A	0.02	µg/L	0.5263 µg/L	98.9	50.0	140	----
Pyrene	129-00-0	E641A	0.01	µg/L	0.5263 µg/L	104	50.0	140	----
Quinoline	91-22-5	E641A	0.05	µg/L	0.5263 µg/L	96.9	50.0	140	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: Water					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1050586)										
WP2316328-005	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	95.6 mg/L	100 mg/L	95.6	75.0	125	----
Anions and Nutrients (QCLot: 1050587)										
WP2316328-005	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.45 mg/L	2.5 mg/L	97.9	75.0	125	----
Anions and Nutrients (QCLot: 1050588)										
WP2316328-005	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.494 mg/L	0.5 mg/L	98.8	75.0	125	----
Anions and Nutrients (QCLot: 1050590)										
WP2316328-005	Anonymous	Chloride	16887-00-6	E235.Cl	97.0 mg/L	100 mg/L	97.0	75.0	125	----
Anions and Nutrients (QCLot: 1053441)										
WP2316604-001	Anonymous	Ammonia, total (as N)	7664-41-7	E303	ND mg/L	0.25 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 1055555)										
WP2316649-001	Anonymous	Ammonia, total (as N)	7664-41-7	E303	0.236 mg/L	0.25 mg/L	94.6	75.0	125	----
Anions and Nutrients (QCLot: 1055613)										
WP2316439-001	Anonymous	Phosphorus, total	7723-14-0	E372	ND mg/L	0.25 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1051168)										
WP2316192-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1054544)										
WP2316192-005	Anonymous	Carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 1058797)										
WP2316183-002	Anonymous	Mercury, dissolved	7439-97-6	E509	0.000104 mg/L	0.0001 mg/L	104	70.0	130	----
Dissolved Metals (QCLot: 1060862)										
WP2316466-001	Anonymous	Mercury, dissolved	7439-97-6	E509	0.000100 mg/L	0.0001 mg/L	100	70.0	130	----
Aggregate Organics (QCLot: 1057226)										
TY2307081-002	Anonymous	Phenols, total (4AAP)	----	E562	0.0189 mg/L	0.02 mg/L	94.3	75.0	125	----
Hydrocarbons (QCLot: 1054185)										
WP2316414-003	Anonymous	F1 (C6-C10)	----	E581.F1	4100 µg/L	5390 µg/L	76.1	60.0	140	----





Canada Toll Free: 1 800 668 9878

Any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Appendix C: Notice to CIRNAC to Decant Sewage Lagoon – April 3, 2023



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Building *Nunavut* Together
Nunavut iuqatigiingniq
Bâtir le *Nunavut* ensemble

Atuat Shouldice
Crown-Indigenous Relations and Northern Affairs
Kivalliq Regional Office
Ikingutigiit Center Suite 1, PO Box 129
Rankin Inlet, NU X0C 0G0

April 3, 2023
RE: 3AM-ARV2232 Arviat Sewage Lagoon Emergency Decant

Dear Atuat,

As per Part E, Item 4 of the Arviat Water Licence No. 3AM-ARV2232, this is notification of plans to discharge from the sewage lagoon. An emergency decant of the sewage lagoon is needed to maintain freeboard and protect berm stability. An emergency decant has taken place each spring since 2018.

The sewage lagoon is designed with an exfiltration berm on the south side that releases effluent once the berm thaws over the course of the summer. To prevent catastrophic failing of the berm, an emergency decant to below 1 m from the top of the berm (minimum freeboard as per Part E, Item 3 of the Licence) needs to occur. Samples will be taken during the decant for comparison to effluent criteria set out in Part E, Item 2 of Water Licence No. 3AM-ARV2232, and reported to Crown-Indigenous Relations and Northern Affairs.

The Government of Nunavut, Department of Community and Government Services has identified that the Municipality of Arviat sewage lagoon is undersized. The project to upgrade and expand the wastewater infrastructure has been approved by NIRB, and the water licence amendment is complete. The project is currently in the detailed design phase, with construction anticipated to begin in 2025.

Your prompt response to this letter is appreciated. Thank you for your consideration.

Regards,

Elan Chalmers
Manager, Municipal Works
Government of Nunavut
Community and Government Services
Email: echalmers@gov.nu.ca

**ANNUAL REPORT
FOR THE MUNICIPALITY OF ARVIAT**

Appendix D: Resupply Pumping Data

Wolf Creek Resupply Pumping Data

Date	Volume (m ³)	
10-Jul-23	1579.7	
11-Jul-23	1999.9	
12-Jul-23	1781.3	
13-Jul-23	1425.9	
14-Jul-23	1425.9	
15-Jul-23	1636.2	
16-Jul-23	1763.8	
17-Jul-23	1835.2	
18-Jul-23	1558.1	
19-Jul-23	0.0	
20-Jul-23	0.0	
21-Jul-23	0.0	
22-Jul-23	0.0	
23-Jul-23	1114.2	
24-Jul-23	1212.2	
25-Jul-23	1808.5	
26-Jul-23	1391.2	
27-Jul-23	1586.5	
28-Jul-23	1826.9	
29-Jul-23	1828.9	
30-Jul-23	0.0	
31-Jul-23	0.0	
July Total		25774.4
01-Aug-23	0.0	
02-Aug-23	1311.3	
03-Aug-23	1311.3	
04-Aug-23	1727.6	
05-Aug-23	1520.2	
06-Aug-23	1883.4	
August Total		7753.7
TOTAL	33528.2	