



CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

<p>Work Order : WP2413487</p> <p>Client : Manitoba Conservation & Climate</p> <p>Contact : Amrith Kumar</p> <p>Address : 14 Fultz Boulevard Winnipeg MB Canada R3Y 0L6</p> <p>Telephone : 204 945 5776</p> <p>Project : Headingley Regional - PWS 89.40</p> <p>PO : ----</p> <p>C-O-C number : ----</p> <p>Sampler : ----</p> <p>Site : Headingley Regional - PWS 89.40 Op ID: 57047</p> <p>Quote number : 2024 WTP Chemistry</p> <p>No. of samples received : 3</p> <p>No. of samples analysed : 3</p>	<p>Page : 1 of 9</p> <p>Laboratory : ALS Environmental - Winnipeg</p> <p>Account Manager : Sheriza Rajack-Ahamed</p> <p>Address : 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4</p> <p>Telephone : +1 204 255 9720</p> <p>Date Samples Received : 28-May-2024 16:07</p> <p>Date Analysis Commenced : 29-May-2024</p> <p>Issue Date : 04-Jun-2024 13:14</p>
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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
- Guideline Comparison

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.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Julie Truong	Analyst	Metals, Winnipeg, Manitoba
Lee McTavish		Inorganics, Winnipeg, Manitoba
Lee McTavish		Metals, Winnipeg, Manitoba
Rhovee Guevarra		Inorganics, Winnipeg, Manitoba



Summary of Guideline Breaches by Sample

SampleID/Client ID	Matrix	Analyte	Analyte Summary	Guideline	Category	Result	Limit
HEADINGLEY REGIONAL 1 - RAW	Water	Colour, true	May interfere with disinfection; removal is important to ensure effective treatment.	CDWG	AO	28.8 CU	15 CU
	Water	Turbidity	For systems that use groundwater, turbidity should generally be below 1.0 NTU. Filtration systems should be designed and operated to reduce turbidity levels as low as reasonably achievable and strive to achieve a treated water turbidity target from individual filters of less than 0.1 NTU.	CDWG	AO	64.5 NTU	1 NTU
	Water	Iron, total	Based on taste and staining of laundry and plumbing fixtures; no evidence exists of dietary iron toxicity in the general population.	CDWG	AO	1670 µg/L	300 µg/L
	Water	Manganese, total	Based on taste and staining of laundry and plumbing fixtures.	CDWG	AO	134 µg/L	20 µg/L
	Water	Manganese, total	Health Basis of MAC: Effects on neurological development and behaviour; deficits in memory, attention, and motor skills. Other: Formula-fed infants (where water containing manganese at levels above the MAC is used to prepare formula) may be especially at risk.	CDWG	MAC	134 µg/L	120 µg/L
	Water	Aluminum, total	The OG value is established to minimize the potential for the distribution system and to avoid other operational and aesthetic issues. It takes treatment achievability into consideration.	CDWG	OG	778 µg/L	100 µg/L

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.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).



<i>Unit</i>	<i>Description</i>
-	no units
%	percent
% T/cm	% transmittance per centimetre
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
AU/cm	absorbance units per centimetre
CU	colour units (1 cu = 1 mg/l pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

>: greater than.

<: less than.

Red shading is applied where the result or the LOR is greater than the Guideline Upper Limit (or lower than the Guideline Lower Limit, if applicable).

For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.



Analytical Results Evaluation

Matrix: Drinking Water				Client sample ID	HEADINGLEY REGIONAL 1 - RAW	HEADINGLEY REGIONAL 2 - TREATED	HEADINGLEY REGIONAL 3 - DIST @ GI RES. INCOMING	----	----	----	----
Sampling date/time				28-May-2024 10:20	28-May-2024 09:30	28-May-2024 11:35	----	----	----	----	
Sub-Matrix				Drinking Water	Drinking Water	Drinking Water	----	----	----	----	
Analyte	CAS Number	Method/Lab	Unit	WP2413487-001	WP2413487-002	WP2413487-003	-----	-----	-----	-----	
Physical Tests											
Absorbance, UV (@ 254nm)	----	E404/WP	AU/cm	0.292	0.0230	----	----	----	----	----	----
Alkalinity, bicarbonate (as CaCO3)	----	E290/WP	mg/L	222	35.7	----	----	----	----	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/WP	mg/L	11.0	<1.0	----	----	----	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/WP	mg/L	<1.0	<1.0	----	----	----	----	----	----
Alkalinity, total (as CaCO3)	----	E290/WP	mg/L	233	35.7	----	----	----	----	----	----
Colour, true	----	E329/WP	CU	28.8	5.3	----	----	----	----	----	----
Conductivity	----	E100/WP	µS/cm	752	115	----	----	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/WP	mg/L	336	27.6	----	----	----	----	----	----
Langelier index (@ 4°C)	----	EC105A/WP	-	0.858	-1.69	----	----	----	----	----	----
Langelier index (@ 60°C)	----	EC105A/WP	-	1.61	-0.918	----	----	----	----	----	----
pH	----	E108/WP	pH units	8.36	7.57	----	----	----	----	----	----
Solids, total dissolved [TDS]	----	E162-L/WP	mg/L	485	66.3	----	----	----	----	----	----
Turbidity	----	E121/WP	NTU	64.5	0.11	----	----	----	----	----	----
Transmittance, UV (@ 254nm)	----	E404/WP	% T/cm	51.0	94.8	----	----	----	----	----	----
Anions and Nutrients											
Ammonia, total (as N)	7664-41-7	E298/WP	mg/L	0.0668	0.0575	----	----	----	----	----	----
Bromide	24959-67-9	E235.Br-T/WP	mg/L	0.028	<0.010	----	----	----	----	----	----
Chloride	16887-00-6	E235.Cl-L/WP	mg/L	18.3	5.08	----	----	----	----	----	----
Fluoride	16984-48-8	E235.F/WP	mg/L	0.139	<0.020	----	----	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/WP	mg/L	0.467	0.0806	----	----	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/WP	mg/L	0.0074	<0.0010	----	----	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/WP	mg/L	168	13.5	----	----	----	----	----	----
Organic / Inorganic Carbon											
Carbon, dissolved organic [DOC]	----	E358-L/WP	mg/L	12.6	2.14	----	----	----	----	----	----
Carbon, total organic [TOC]	----	E355-L/WP	mg/L	12.8	1.31	----	----	----	----	----	----
Ion Balance											



Analytical Results Evaluation

Matrix: Drinking Water

				Client sample ID							
				HEADINGLEY REGIONAL 1 - RAW	HEADINGLEY REGIONAL 2 - TREATED	HEADINGLEY REGIONAL 3 - DIST @ GI RES. INCOMING	----	----	----	----	
				Sampling date/time							
				28-May-2024 10:20	28-May-2024 09:30	28-May-2024 11:35	----	----	----	----	
				Sub-Matrix							
				Drinking Water	Drinking Water	Drinking Water	----	----	----	----	
Analyte	CAS Number	Method/Lab	Unit	WP2413487-001	WP2413487-002	WP2413487-003	-----	-----	-----	-----	
Ion Balance											
Anion sum	----	EC101A/WP	meq/L	8.71	1.14	----	----	----	----	----	
Cation sum (total)	----	EC101A/WP	meq/L	8.96	1.15	----	----	----	----	----	
Ion balance (cations/anions)	----	EC101A/WP	%	103	101	----	----	----	----	----	
Ion balance (APHA)	----	EC101A/WP	%	1.41	0.437	----	----	----	----	----	
Total Metals											
Aluminum, total	7429-90-5	E420/WP	µg/L	778	3.2	<3.0	----	----	----	----	
Antimony, total	7440-36-0	E420/WP	µg/L	0.22	<0.10	<0.10	----	----	----	----	
Arsenic, total	7440-38-2	E420/WP	µg/L	4.98	0.32	0.46	----	----	----	----	
Barium, total	7440-39-3	E420/WP	µg/L	73.8	4.88	8.10	----	----	----	----	
Beryllium, total	7440-41-7	E420/WP	µg/L	0.064	<0.020	<0.020	----	----	----	----	
Bismuth, total	7440-69-9	E420/WP	µg/L	<0.050	<0.050	<0.050	----	----	----	----	
Boron, total	7440-42-8	E420/WP	µg/L	89	71	82	----	----	----	----	
Cadmium, total	7440-43-9	E420/WP	µg/L	0.0492	<0.0050	0.0098	----	----	----	----	
Calcium, total	7440-70-2	E420/WP	µg/L	71100	5730	8950	----	----	----	----	
Cesium, total	7440-46-2	E420/WP	µg/L	0.146	<0.010	<0.010	----	----	----	----	
Chromium, total	7440-47-3	E420/WP	µg/L	1.52	Not Detected	<0.50	----	----	----	----	
Cobalt, total	7440-48-4	E420/WP	µg/L	0.99	<0.10	<0.10	----	----	----	----	
Copper, total	7440-50-8	E420/WP	µg/L	4.02	13.8	13.0	----	----	----	----	
Iron, total	7439-89-6	E420/WP	µg/L	1670	Not Detected	<10	----	----	----	----	
Lead, total	7439-92-1	E420/WP	µg/L	1.20	<0.050	0.111	----	----	----	----	
Lithium, total	7439-93-2	E420/WP	µg/L	49.6	7.9	12.8	----	----	----	----	
Magnesium, total	7439-95-4	E420/WP	µg/L	38500	3230	5670	----	----	----	----	
Manganese, total	7439-96-5	E420/WP	µg/L	134	10.6	5.26	----	----	----	----	
Molybdenum, total	7439-98-7	E420/WP	µg/L	2.26	0.204	0.355	----	----	----	----	
Nickel, total	7440-02-0	E420/WP	µg/L	5.13	<0.50	0.51	----	----	----	----	
Phosphorus, total	7723-14-0	E420/WP	µg/L	196	<50	368	----	----	----	----	
Potassium, total	7440-09-7	E420/WP	µg/L	10900	1890	3280	----	----	----	----	



Analytical Results Evaluation

Matrix: Drinking Water

				<i>Client sample ID</i>							
				HEADINGLEY REGIONAL 1 - RAW	HEADINGLEY REGIONAL 2 - TREATED	HEADINGLEY REGIONAL 3 - DIST @ GI RES. INCOMING	----	----	----	----	
				<i>Sampling date/time</i>							
				28-May-2024 10:20	28-May-2024 09:30	28-May-2024 11:35	----	----	----	----	
				<i>Sub-Matrix</i>							
				Drinking Water	Drinking Water	Drinking Water	----	----	----	----	
<i>Analyte</i>	<i>CAS Number</i>	<i>Method/Lab</i>	<i>Unit</i>	WP2413487-001	WP2413487-002	WP2413487-003	-----	-----	-----	-----	
Total Metals											
Rubidium, total	7440-17-7	E420/WP	µg/L	3.55	0.38	0.51	----	----	----	----	
Selenium, total	7782-49-2	E420/WP	µg/L	0.698	<0.050	0.116	----	----	----	----	
Silicon, total	7440-21-3	E420/WP	µg/L	8150	1110	1390	----	----	----	----	
Silver, total	7440-22-4	E420/WP	µg/L	<0.010	Not Detected	<0.010	----	----	----	----	
Sodium, total	7440-23-5	E420/WP	µg/L	41600	12600	24800	----	----	----	----	
Strontium, total	7440-24-6	E420/WP	µg/L	277	23.3	41.1	----	----	----	----	
Sulfur, total	7704-34-9	E420/WP	µg/L	59100	4870	10500	----	----	----	----	
Tellurium, total	13494-80-9	E420/WP	µg/L	<0.20	Not Detected	Not Detected	----	----	----	----	
Thallium, total	7440-28-0	E420/WP	µg/L	0.031	Not Detected	<0.010	----	----	----	----	
Thorium, total	7440-29-1	E420/WP	µg/L	0.27	Not Detected	Not Detected	----	----	----	----	
Tin, total	7440-31-5	E420/WP	µg/L	0.60	<0.10	0.11	----	----	----	----	
Titanium, total	7440-32-6	E420/WP	µg/L	20.0	Not Detected	Not Detected	----	----	----	----	
Tungsten, total	7440-33-7	E420/WP	µg/L	Not Detected	Not Detected	Not Detected	----	----	----	----	
Uranium, total	7440-61-1	E420/WP	µg/L	3.56	0.241	0.278	----	----	----	----	
Vanadium, total	7440-62-2	E420/WP	µg/L	4.81	<0.50	<0.50	----	----	----	----	
Zinc, total	7440-66-6	E420/WP	µg/L	8.1	<3.0	39.3	----	----	----	----	
Zirconium, total	7440-67-7	E420/WP	µg/L	1.27	Not Detected	<0.20	----	----	----	----	

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.



Summary of Guideline Limits

Analyte	CAS Number	Unit	CDWG AO	CDWG MAC	CDWG OG				
Physical Tests									
Absorbance, UV (@ 254nm)	----	AU/cm	--	--	--				
Alkalinity, bicarbonate (as CaCO3)	----	mg/L	--	--	--				
Alkalinity, carbonate (as CaCO3)	----	mg/L	--	--	--				
Alkalinity, hydroxide (as CaCO3)	----	mg/L	--	--	--				
Alkalinity, total (as CaCO3)	----	mg/L	--	--	--				
Colour, true	----	CU	15 CU	--	--				
Conductivity	----	µS/cm	--	--	--				
Hardness (as CaCO3), from total Ca/Mg	----	mg/L	--	--	--				
Langelier index (@ 4°C)	----	-	--	--	--				
Langelier index (@ 60°C)	----	-	--	--	--				
pH	----	pH units	--	--	7 - 10.5 pH units				
Solids, total dissolved [TDS]	----	mg/L	500 mg/L	--	--				
Transmittance, UV (@ 254nm)	----	% T/cm	--	--	--				
Turbidity	----	NTU	1 NTU	--	--				
Anions and Nutrients									
Ammonia, total (as N)	7664-41-7	mg/L	--	--	--				
Bromide	24959-67-9	mg/L	--	--	--				
Chloride	16887-00-6	mg/L	250 mg/L	--	--				
Fluoride	16984-48-8	mg/L	--	1.5 mg/L	--				
Nitrate (as N)	14797-55-8	mg/L	--	10 mg/L	--				
Nitrite (as N)	14797-65-0	mg/L	--	1 mg/L	--				
Sulfate (as SO4)	14808-79-8	mg/L	500 mg/L	--	--				
Organic / Inorganic Carbon									
Carbon, dissolved organic [DOC]	----	mg/L	--	--	--				
Carbon, total organic [TOC]	----	mg/L	--	--	--				
Ion Balance									
Anion sum	----	meq/L	--	--	--				
Cation sum (total)	----	meq/L	--	--	--				
Ion balance (APHA)	----	%	--	--	--				
Ion balance (cations/anions)	----	%	--	--	--				
Total Metals									
Aluminum, total	7429-90-5	µg/L	--	2900 µg/L	100 µg/L				
Antimony, total	7440-36-0	µg/L	--	6 µg/L	--				
Arsenic, total	7440-38-2	µg/L	--	10 µg/L	--				
Barium, total	7440-39-3	µg/L	--	2000 µg/L	--				
Beryllium, total	7440-41-7	µg/L	--	--	--				



Analyte	CAS Number	Unit	CDWG AO	CDWG MAC	CDWG OG				
Total Metals - Continued									
Bismuth, total	7440-69-9	µg/L	--	--	--				
Boron, total	7440-42-8	µg/L	--	5000 µg/L	--				
Cadmium, total	7440-43-9	µg/L	--	7 µg/L	--				
Calcium, total	7440-70-2	µg/L	--	--	--				
Cesium, total	7440-46-2	µg/L	--	--	--				
Chromium, total	7440-47-3	µg/L	--	50 µg/L	--				
Cobalt, total	7440-48-4	µg/L	--	--	--				
Copper, total	7440-50-8	µg/L	1000 µg/L	2000 µg/L	--				
Iron, total	7439-89-6	µg/L	300 µg/L	--	--				
Lead, total	7439-92-1	µg/L	--	5 µg/L	--				
Lithium, total	7439-93-2	µg/L	--	--	--				
Magnesium, total	7439-95-4	µg/L	--	--	--				
Manganese, total	7439-96-5	µg/L	20 µg/L	120 µg/L	--				
Molybdenum, total	7439-98-7	µg/L	--	--	--				
Nickel, total	7440-02-0	µg/L	--	--	--				
Phosphorus, total	7723-14-0	µg/L	--	--	--				
Potassium, total	7440-09-7	µg/L	--	--	--				
Rubidium, total	7440-17-7	µg/L	--	--	--				
Selenium, total	7782-49-2	µg/L	--	50 µg/L	--				
Silicon, total	7440-21-3	µg/L	--	--	--				
Silver, total	7440-22-4	µg/L	--	--	--				
Sodium, total	7440-23-5	µg/L	200000 µg/L	--	--				
Strontium, total	7440-24-6	µg/L	--	7000 µg/L	--				
Sulfur, total	7704-34-9	µg/L	--	--	--				
Tellurium, total	13494-80-9	µg/L	--	--	--				
Thallium, total	7440-28-0	µg/L	--	--	--				
Thorium, total	7440-29-1	µg/L	--	--	--				
Tin, total	7440-31-5	µg/L	--	--	--				
Titanium, total	7440-32-6	µg/L	--	--	--				
Tungsten, total	7440-33-7	µg/L	--	--	--				
Uranium, total	7440-61-1	µg/L	--	20 µg/L	--				
Vanadium, total	7440-62-2	µg/L	--	--	--				
Zinc, total	7440-66-6	µg/L	5000 µg/L	--	--				
Zirconium, total	7440-67-7	µg/L	--	--	--				

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



Key:

CDWG	Canada Guidelines for Canadian Drinking Water Quality (JAN, 2023)
AO	Aesthetic Objective
MAC	Maximum Acceptable Concentrations
OG	Operational Guidance



QUALITY CONTROL INTERPRETIVE REPORT

<p>Work Order : WP2413487</p> <p>Client : Manitoba Conservation & Climate</p> <p>Contact : Amrith Kumar</p> <p>Address : 14 Fultz Boulevard Winnipeg MB Canada R3Y 0L6</p> <p>Telephone : 204 340 3423</p> <p>Project : Headingley Regional - PWS 89.40</p> <p>PO : ----</p> <p>C-O-C number : ----</p> <p>Sampler : ----</p> <p>Site : Headingley Regional - PWS 89.40 Op ID: 57047</p> <p>Quote number : 2024 WTP Chemistry</p> <p>No. of samples received : 3</p> <p>No. of samples analysed : 3</p>	<p>Page : 1 of 12</p> <p>Laboratory : ALS Environmental - Winnipeg</p> <p>Account Manager : Sheriza Rajack-Ahamed</p> <p>Address : 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4</p> <p>Telephone : +1 204 255 9720</p> <p>Date Samples Received : 28-May-2024 16:07</p> <p>Issue Date : 04-Jun-2024 13:14</p>
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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

- No Quality Control Sample Frequency Outliers occur.



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 : Analytical Method 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	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) HEADINGLEY REGIONAL 1 - RAW	E298	28-May-2024	29-May-2024	28 days	1 days	✔	29-May-2024	28 days	1 days	✔
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) HEADINGLEY REGIONAL 2 - TREATED	E298	28-May-2024	29-May-2024	28 days	1 days	✔	29-May-2024	28 days	1 days	✔
Anions and Nutrients : Bromide in Water by IC (Trace level)										
HDPE HEADINGLEY REGIONAL 1 - RAW	E235.Br-T	28-May-2024	29-May-2024	28 days	1 days	✔	29-May-2024	28 days	1 days	✔
Anions and Nutrients : Bromide in Water by IC (Trace level)										
HDPE HEADINGLEY REGIONAL 2 - TREATED	E235.Br-T	28-May-2024	29-May-2024	28 days	1 days	✔	29-May-2024	28 days	1 days	✔
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE HEADINGLEY REGIONAL 1 - RAW	E235.Cl-L	28-May-2024	29-May-2024	28 days	1 days	✔	29-May-2024	28 days	1 days	✔
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE HEADINGLEY REGIONAL 2 - TREATED	E235.Cl-L	28-May-2024	29-May-2024	28 days	1 days	✔	29-May-2024	28 days	1 days	✔
Anions and Nutrients : Fluoride in Water by IC										
HDPE HEADINGLEY REGIONAL 1 - RAW	E235.F	28-May-2024	29-May-2024	28 days	1 days	✔	29-May-2024	28 days	1 days	✔



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

Analyte Group : Analytical Method 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		
Anions and Nutrients : Fluoride in Water by IC											
HDPE HEADINGLEY REGIONAL 2 - TREATED	E235.F	28-May-2024	29-May-2024	28 days	1 days	✔	29-May-2024	28 days	1 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE HEADINGLEY REGIONAL 1 - RAW	E235.NO3-L	28-May-2024	29-May-2024	3 days	1 days	✔	29-May-2024	3 days	1 days	✔	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE HEADINGLEY REGIONAL 2 - TREATED	E235.NO3-L	28-May-2024	29-May-2024	3 days	1 days	✔	29-May-2024	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE HEADINGLEY REGIONAL 1 - RAW	E235.NO2-L	28-May-2024	29-May-2024	3 days	1 days	✔	29-May-2024	3 days	1 days	✔	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE HEADINGLEY REGIONAL 2 - TREATED	E235.NO2-L	28-May-2024	29-May-2024	3 days	1 days	✔	29-May-2024	3 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE HEADINGLEY REGIONAL 1 - RAW	E235.SO4	28-May-2024	29-May-2024	28 days	1 days	✔	29-May-2024	28 days	1 days	✔	
Anions and Nutrients : Sulfate in Water by IC											
HDPE HEADINGLEY REGIONAL 2 - TREATED	E235.SO4	28-May-2024	29-May-2024	28 days	1 days	✔	29-May-2024	28 days	1 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (lab preserved) HEADINGLEY REGIONAL 1 - RAW	E358-L	28-May-2024	29-May-2024	3 days	1 days	✔	29-May-2024	28 days	0 days	✔	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)											
Amber glass dissolved (lab preserved) HEADINGLEY REGIONAL 2 - TREATED	E358-L	28-May-2024	29-May-2024	3 days	1 days	✔	29-May-2024	28 days	0 days	✔	



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

Analyte Group : Analytical Method 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	
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) HEADINGLEY REGIONAL 1 - RAW	E355-L	28-May-2024	29-May-2024	28 days	1 days	✓	29-May-2024	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) HEADINGLEY REGIONAL 2 - TREATED	E355-L	28-May-2024	29-May-2024	28 days	1 days	✓	29-May-2024	28 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE HEADINGLEY REGIONAL 1 - RAW	E290	28-May-2024	29-May-2024	14 days	1 days	✓	29-May-2024	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE HEADINGLEY REGIONAL 2 - TREATED	E290	28-May-2024	29-May-2024	14 days	1 days	✓	29-May-2024	14 days	1 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE HEADINGLEY REGIONAL 1 - RAW	E329	28-May-2024	31-May-2024	3 days	3 days	✓	31-May-2024	3 days	3 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE HEADINGLEY REGIONAL 2 - TREATED	E329	28-May-2024	31-May-2024	3 days	3 days	✓	31-May-2024	3 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE HEADINGLEY REGIONAL 1 - RAW	E100	28-May-2024	29-May-2024	28 days	1 days	✓	29-May-2024	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE HEADINGLEY REGIONAL 2 - TREATED	E100	28-May-2024	29-May-2024	28 days	1 days	✓	29-May-2024	28 days	1 days	✓
Physical Tests : pH by Meter										
HDPE HEADINGLEY REGIONAL 1 - RAW	E108	28-May-2024	29-May-2024	0.25 hrs	22 hrs	* EHTR-FM	29-May-2024	0.25 hrs	34 hrs	* EHTR-FM



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

Analyte Group : Analytical Method 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 HEADINGLEY REGIONAL 2 - TREATED	E108	28-May-2024	29-May-2024	0.25 hrs	23 hrs	* EHTR-FM	29-May-2024	0.25 hrs	35 hrs	* EHTR-FM	
Physical Tests : TDS by Gravimetry (Low Level)											
HDPE HEADINGLEY REGIONAL 1 - RAW	E162-L	28-May-2024	----	----	----		30-May-2024	7 days	2 days	✓	
Physical Tests : TDS by Gravimetry (Low Level)											
HDPE HEADINGLEY REGIONAL 2 - TREATED	E162-L	28-May-2024	----	----	----		30-May-2024	7 days	2 days	✓	
Physical Tests : Turbidity by Nephelometry											
HDPE HEADINGLEY REGIONAL 1 - RAW	E121	28-May-2024	----	----	----		29-May-2024	3 days	1 days	✓	
Physical Tests : Turbidity by Nephelometry											
HDPE HEADINGLEY REGIONAL 2 - TREATED	E121	28-May-2024	----	----	----		29-May-2024	3 days	1 days	✓	
Physical Tests : UV Absorbance and Transmittance by Spectrometry											
HDPE HEADINGLEY REGIONAL 1 - RAW	E404	28-May-2024	----	----	----		30-May-2024	3 days	2 days	✓	
Physical Tests : UV Absorbance and Transmittance by Spectrometry											
HDPE HEADINGLEY REGIONAL 2 - TREATED	E404	28-May-2024	----	----	----		30-May-2024	3 days	2 days	✓	
Total Metals : Total Metals in Water by CRC ICMS											
HDPE total (nitric acid) HEADINGLEY REGIONAL 1 - RAW	E420	28-May-2024	31-May-2024	180 days	3 days	✓	31-May-2024	180 days	3 days	✓	
Total Metals : Total Metals in Water by CRC ICMS											
HDPE total (nitric acid) HEADINGLEY REGIONAL 2 - TREATED	E420	28-May-2024	31-May-2024	180 days	3 days	✓	31-May-2024	180 days	3 days	✓	



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

Analyte Group : Analytical Method 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) HEADINGLEY REGIONAL 3 - DIST @ GI RES. INCOMING	E420	28-May-2024	31-May-2024	180 days	3 days	✔	31-May-2024	180 days	3 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).



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	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1466427	1	14	7.1	5.0	✔
Ammonia by Fluorescence	E298	1464851	1	20	5.0	5.0	✔
Bromide in Water by IC (Trace level)	E235.Br-T	1464882	1	2	50.0	5.0	✔
Chloride in Water by IC (Low Level)	E235.Cl-L	1464875	1	9	11.1	5.0	✔
Colour (True) by Spectrometer (5 CU)	E329	1470079	1	20	5.0	5.0	✔
Conductivity in Water	E100	1466426	1	15	6.6	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1464659	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	1464874	1	7	14.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1464876	1	9	11.1	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1464877	1	9	11.1	5.0	✔
pH by Meter	E108	1466428	1	18	5.5	5.0	✔
Sulfate in Water by IC	E235.SO4	1464878	1	12	8.3	5.0	✔
TDS by Gravimetry (Low Level)	E162-L	1465322	2	37	5.4	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1469615	1	20	5.0	5.0	✔
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1464241	1	18	5.5	5.0	✔
Turbidity by Nephelometry	E121	1464784	1	7	14.2	5.0	✔
UV Absorbance and Transmittance by Spectrometry	E404	1467792	1	15	6.6	5.0	✔
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1466427	1	14	7.1	5.0	✔
Ammonia by Fluorescence	E298	1464851	1	20	5.0	5.0	✔
Bromide in Water by IC (Trace level)	E235.Br-T	1464882	1	2	50.0	5.0	✔
Chloride in Water by IC (Low Level)	E235.Cl-L	1464875	1	9	11.1	5.0	✔
Colour (True) by Spectrometer (5 CU)	E329	1470079	1	20	5.0	5.0	✔
Conductivity in Water	E100	1466426	1	15	6.6	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1464659	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	1464874	1	7	14.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1464876	1	9	11.1	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1464877	1	9	11.1	5.0	✔
pH by Meter	E108	1466428	1	18	5.5	5.0	✔
Sulfate in Water by IC	E235.SO4	1464878	1	12	8.3	5.0	✔
TDS by Gravimetry (Low Level)	E162-L	1465322	2	37	5.4	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1469615	1	20	5.0	5.0	✔
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1464241	1	18	5.5	5.0	✔
Turbidity by Nephelometry	E121	1464784	1	7	14.2	5.0	✔
UV Absorbance and Transmittance by Spectrometry	E404	1467792	1	15	6.6	5.0	✔



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

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
Analytical Methods							
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1466427	1	14	7.1	5.0	✔
Ammonia by Fluorescence	E298	1464851	1	20	5.0	5.0	✔
Bromide in Water by IC (Trace level)	E235.Br-T	1464882	1	2	50.0	5.0	✔
Chloride in Water by IC (Low Level)	E235.Cl-L	1464875	1	9	11.1	5.0	✔
Colour (True) by Spectrometer (5 CU)	E329	1470079	1	20	5.0	5.0	✔
Conductivity in Water	E100	1466426	1	15	6.6	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1464659	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	1464874	1	7	14.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1464876	1	9	11.1	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1464877	1	9	11.1	5.0	✔
Sulfate in Water by IC	E235.SO4	1464878	1	12	8.3	5.0	✔
TDS by Gravimetry (Low Level)	E162-L	1465322	2	37	5.4	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1469615	1	20	5.0	5.0	✔
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1464241	1	18	5.5	5.0	✔
Turbidity by Nephelometry	E121	1464784	1	7	14.2	5.0	✔
UV Absorbance and Transmittance by Spectrometry	E404	1467792	1	15	6.6	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1464851	1	20	5.0	5.0	✔
Bromide in Water by IC (Trace level)	E235.Br-T	1464882	1	2	50.0	5.0	✔
Chloride in Water by IC (Low Level)	E235.Cl-L	1464875	1	9	11.1	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1464659	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	1464874	1	7	14.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1464876	1	9	11.1	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1464877	1	9	11.1	5.0	✔
Sulfate in Water by IC	E235.SO4	1464878	1	12	8.3	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1469615	1	20	5.0	5.0	✔
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1464241	1	18	5.5	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
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.
Turbidity by Nephelometry	E121 ALS Environmental - Winnipeg	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry (Low Level)	E162-L ALS Environmental - Winnipeg	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Bromide in Water by IC (Trace level)	E235.Br-T ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC (Low Level)	E235.Cl-L ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F 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 (Low Level)	E235.NO2-L 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 (Low Level)	E235.NO3-L 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 by Fluorescence	E298 ALS Environmental - Winnipeg	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Colour (True) by Spectrometer (5 CU)	E329 ALS Environmental - Winnipeg	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
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 CO ₂ . 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).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Winnipeg	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO ₂ . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
UV Absorbance and Transmittance by Spectrometry	E404 ALS Environmental - Winnipeg	Water	APHA 5910 B (mod)	UV Absorbance is determined by first filtering a sample through a 0.45 micron filter, followed by UV absorbance measurement in a quartz cell at 254 nm. The analysis is carried out without pH adjustment.
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.
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.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Ion Balance using Total Metals	EC101A ALS Environmental - Winnipeg	Water	APHA 1030E	Cation Sum (using total metals), Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Saturation Index using Laboratory pH (Ca-T)	EC105A ALS Environmental - Winnipeg	Water	APHA 2330B	Langelier Index provides an indication of scale formation potential at a given pH and temperature, and is calculated as per APHA 2330B Saturation Index. Positive values indicate oversaturation with respect to CaCO ₃ . Negative values indicate undersaturation of CaCO ₃ . This calculation uses laboratory pH measurements and provides estimates of Langelier Index at temperatures of 4, 15, 20, 25, 66, and 77°C. Ryznar Stability Index is an alternative index used for scale formation and corrosion potential.

<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
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
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Winnipeg	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon

QUALITY CONTROL REPORT

Work Order	: WP2413487	Page	: 1 of 13
Client	: Manitoba Conservation & Climate	Laboratory	: ALS Environmental - Winnipeg
Contact	: Amrith Kumar	Account Manager	: Sheriza Rajack-Ahamed
Address	: 89.40 - Headingley Regional - PWS 6000 Portage Avenue Headingley MB Canada R4H 1E8	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	: 204 340 3423	Telephone	: +1 204 255 9720
Project	: Headingley Regional - PWS 89.40	Date Samples Received	: 28-May-2024 16:07
PO	: ----	Date Analysis Commenced	: 29-May-2024
C-O-C number	: ----	Issue Date	: 04-Jun-2024 13:14
Sampler	: ----		
Site	: Headingley Regional - PWS 89.40 Op ID: 57047		
Quote number	: 2024 WTP Chemistry		
No. of samples received	: 3		
No. of samples analysed	: 3		

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>
Julie Truong	Analyst	Winnipeg Metals, Winnipeg, Manitoba
Lee McTavish		Winnipeg Inorganics, Winnipeg, Manitoba
Lee McTavish		Winnipeg Metals, Winnipeg, Manitoba
Rhovee Guevarra		Winnipeg Inorganics, 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.



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: 1464784)											
WP2413487-001	HEADINGLEY REGIONAL 1 - RAW	Turbidity	----	E121	0.10	NTU	64.5	66.7	3.29%	15%	----
Physical Tests (QC Lot: 1465322)											
WP2413323-002	Anonymous	Solids, total dissolved [TDS]	----	E162-L	15.0	mg/L	808	834	3.11%	20%	----
Physical Tests (QC Lot: 1465323)											
WP2413487-002	HEADINGLEY REGIONAL 2 - TREATED	Solids, total dissolved [TDS]	----	E162-L	10.0	mg/L	66.3	64.0	2.3	Diff <2x LOR	----
Physical Tests (QC Lot: 1466426)											
WP2413487-002	HEADINGLEY REGIONAL 2 - TREATED	Conductivity	----	E100	2.0	µS/cm	115	116	0.693%	10%	----
Physical Tests (QC Lot: 1466427)											
WP2413487-002	HEADINGLEY REGIONAL 2 - TREATED	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	35.7	35.7	0.00%	20%	----
Physical Tests (QC Lot: 1466428)											
WP2413487-002	HEADINGLEY REGIONAL 2 - TREATED	pH	----	E108	0.10	pH units	7.57	7.57	0.00%	4%	----
Physical Tests (QC Lot: 1467792)											
WP2413356-001	Anonymous	Absorbance, UV (@ 254nm)	----	E404	0.0050	AU/cm	0.0280	0.0290	0.0010	Diff <2x LOR	----
Physical Tests (QC Lot: 1470079)											
WP2413487-001	HEADINGLEY REGIONAL 1 - RAW	Colour, true	----	E329	5.0	CU	28.8	26.4	2.5	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1464851)											
WP2413448-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.378	0.410	8.14%	20%	----
Anions and Nutrients (QC Lot: 1464874)											
WP2413487-001	HEADINGLEY REGIONAL 1 - RAW	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.139	0.139	0.0004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1464875)											
WP2413487-001	HEADINGLEY REGIONAL 1 - RAW	Chloride	16887-00-6	E235.Cl-L	0.10	mg/L	18.3	18.9	3.19%	20%	----
Anions and Nutrients (QC Lot: 1464876)											
WP2413487-001	HEADINGLEY REGIONAL 1 - RAW	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.467	0.467	0.00471%	20%	----
Anions and Nutrients (QC Lot: 1464877)											
WP2413487-001	HEADINGLEY REGIONAL 1 - RAW	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0074	0.0077	0.0003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1464878)											



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
Anions and Nutrients (QC Lot: 1464878) - continued											
WP2413487-001	HEADINGLEY REGIONAL 1 - RAW	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	168	166	0.917%	20%	----
Anions and Nutrients (QC Lot: 1464882)											
WP2413487-001	HEADINGLEY REGIONAL 1 - RAW	Bromide	24959-67-9	E235.Br-T	0.010	mg/L	0.028	0.029	0.0006	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1464241)											
WP2413356-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.71	1.70	0.008	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1464659)											
WP2413300-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	20.6	20.9	1.68%	20%	----
Total Metals (QC Lot: 1469615)											
WP2413406-026	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0092	0.0082	0.0010	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00022	0.00022	0.000008	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0146	0.0142	2.46%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	21.1	21.4	1.26%	20%	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00082	0.00081	0.000006	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.0179	0.0178	0.840%	20%	----
		Iron, total	7439-89-6	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0026	0.0026	0.00004	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	6.34	6.30	0.717%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.00117	0.00116	1.62%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000192	0.000192	0.00000006	Diff <2x LOR	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00286	0.00284	0.00003	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	0.582	0.566	2.81%	20%	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	1.15	1.13	1.73%	20%	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00163	0.00154	0.00009	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	1.36	1.39	2.21%	20%	----



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
Total Metals (QC Lot: 1469615) - continued											
WP2413406-026	Anonymous	Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	28.0	27.5	1.90%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.0408	0.0400	2.11%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	23.5	22.9	2.95%	20%	----
		Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	0.0271	0.0267	0.0004	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	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: 1464784)						
Turbidity	---	E121	0.1	NTU	<0.10	---
Physical Tests (QCLot: 1465322)						
Solids, total dissolved [TDS]	---	E162-L	3	mg/L	<3.0	---
Physical Tests (QCLot: 1465323)						
Solids, total dissolved [TDS]	---	E162-L	3	mg/L	<3.0	---
Physical Tests (QCLot: 1466426)						
Conductivity	---	E100	1	µS/cm	<1.0	---
Physical Tests (QCLot: 1466427)						
Alkalinity, total (as CaCO ₃)	---	E290	1	mg/L	<1.0	---
Physical Tests (QCLot: 1467792)						
Absorbance, UV (@ 254nm)	---	E404	0.005	AU/cm	<0.0050	---
Physical Tests (QCLot: 1470079)						
Colour, true	---	E329	5	CU	<5.0	---
Anions and Nutrients (QCLot: 1464851)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
Anions and Nutrients (QCLot: 1464874)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
Anions and Nutrients (QCLot: 1464875)						
Chloride	16887-00-6	E235.Cl-L	0.1	mg/L	<0.10	---
Anions and Nutrients (QCLot: 1464876)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
Anions and Nutrients (QCLot: 1464877)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
Anions and Nutrients (QCLot: 1464878)						
Sulfate (as SO ₄)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
Anions and Nutrients (QCLot: 1464882)						
Bromide	24959-67-9	E235.Br-T	0.01	mg/L	<0.010	---
Organic / Inorganic Carbon (QCLot: 1464241)						
Carbon, total organic [TOC]	---	E355-L	0.5	mg/L	<0.50	---
Organic / Inorganic Carbon (QCLot: 1464659)						
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
Total Metals (QCLot: 1469615)						



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1469615) - continued						
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	---
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	---



Sub-Matrix: **Water**

<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Qualifier</i>
Total Metals (QCLot: 1469615) - continued						
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	----



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	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1464784)									
Turbidity	---	E121	0.1	NTU	200 NTU	90.0	85.0	115	---
Physical Tests (QCLot: 1465322)									
Solids, total dissolved [TDS]	---	E162-L	3	mg/L	1000 mg/L	93.2	85.0	115	---
Physical Tests (QCLot: 1465323)									
Solids, total dissolved [TDS]	---	E162-L	3	mg/L	1000 mg/L	95.8	85.0	115	---
Physical Tests (QCLot: 1466426)									
Conductivity	---	E100	1	µS/cm	1410 µS/cm	99.3	90.0	110	---
Physical Tests (QCLot: 1466427)									
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	100 mg/L	100	85.0	115	---
Physical Tests (QCLot: 1466428)									
pH	---	E108	---	pH units	7 pH units	100	98.0	102	---
Physical Tests (QCLot: 1467792)									
Absorbance, UV (@ 254nm)	---	E404	0.005	AU/cm	0.582 AU/cm	102	85.0	115	---
Physical Tests (QCLot: 1470079)									
Colour, true	---	E329	5	CU	250 CU	103	85.0	115	---
Anions and Nutrients (QCLot: 1464851)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	94.8	85.0	115	---
Anions and Nutrients (QCLot: 1464874)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	---
Anions and Nutrients (QCLot: 1464875)									
Chloride	16887-00-6	E235.Cl-L	0.1	mg/L	100 mg/L	98.8	90.0	110	---
Anions and Nutrients (QCLot: 1464876)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.5	90.0	110	---
Anions and Nutrients (QCLot: 1464877)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	---
Anions and Nutrients (QCLot: 1464878)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	99.5	90.0	110	---
Anions and Nutrients (QCLot: 1464882)									
Bromide	24959-67-9	E235.Br-T	0.01	mg/L	0.5 mg/L	96.1	85.0	115	---
Organic / Inorganic Carbon (QCLot: 1464241)									



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Organic / Inorganic Carbon (QCLot: 1464241) - continued									
Carbon, total organic [TOC]	---	E355-L	0.5	mg/L	8.57 mg/L	103	80.0	120	---
Organic / Inorganic Carbon (QCLot: 1464659)									
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	8.57 mg/L	110	80.0	120	---
Total Metals (QCLot: 1469615)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	98.4	80.0	120	---
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	99.7	80.0	120	---
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	98.7	80.0	120	---
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	96.8	80.0	120	---
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	111	80.0	120	---
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	104	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	98.6	80.0	120	---
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	102	80.0	120	---
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	99.1	80.0	120	---
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	97.1	80.0	120	---
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	97.8	80.0	120	---
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	98.2	80.0	120	---
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	95.5	80.0	120	---
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	102	80.0	120	---
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	115	80.0	120	---
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	105	80.0	120	---
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	97.2	80.0	120	---
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	97.7	80.0	120	---
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	97.8	80.0	120	---
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	99.8	80.0	120	---
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	94.3	80.0	120	---
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	94.6	80.0	120	---
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	100	80.0	120	---
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	96.3	80.0	120	---
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	92.1	80.0	120	---
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	100	80.0	120	---
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	100	80.0	120	---
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	96.6	80.0	120	---
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	95.3	80.0	120	---
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	101	80.0	120	---



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1469615) - continued									
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	97.8	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	96.0	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	98.3	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	103	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	97.8	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	99.7	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	95.9	80.0	120	----



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: 1464851)										
WP2413448-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1464874)										
WP2413487-001	HEADINGLEY REGIONAL 1 - RAW	Fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1464875)										
WP2413487-001	HEADINGLEY REGIONAL 1 - RAW	Chloride	16887-00-6	E235.Cl-L	100 mg/L	100 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1464876)										
WP2413487-001	HEADINGLEY REGIONAL 1 - RAW	Nitrate (as N)	14797-55-8	E235.NO3-L	2.49 mg/L	2.5 mg/L	99.7	75.0	125	----
Anions and Nutrients (QCLot: 1464877)										
WP2413487-001	HEADINGLEY REGIONAL 1 - RAW	Nitrite (as N)	14797-65-0	E235.NO2-L	0.498 mg/L	0.5 mg/L	99.7	75.0	125	----
Anions and Nutrients (QCLot: 1464878)										
WP2413487-001	HEADINGLEY REGIONAL 1 - RAW	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1464882)										
WP2413487-001	HEADINGLEY REGIONAL 1 - RAW	Bromide	24959-67-9	E235.Br-T	0.473 mg/L	0.5 mg/L	94.5	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1464241)										
WP2413356-002	Anonymous	Carbon, total organic [TOC]	----	E355-L	5.34 mg/L	5 mg/L	107	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1464659)										
WP2413300-002	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	----	ND	70.0	130	----
Total Metals (QCLot: 1469615)										
WP2413406-026	Anonymous	Aluminum, total	7429-90-5	E420	0.190 mg/L	0.2 mg/L	95.0	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0186 mg/L	0.02 mg/L	93.2	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0201 mg/L	0.02 mg/L	101	70.0	130	----
		Barium, total	7440-39-3	E420	0.0186 mg/L	0.02 mg/L	93.2	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0410 mg/L	0.04 mg/L	103	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0103 mg/L	0.01 mg/L	103	70.0	130	----
		Boron, total	7440-42-8	E420	0.096 mg/L	0.1 mg/L	96.2	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00392 mg/L	0.004 mg/L	98.0	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.00994 mg/L	0.01 mg/L	99.4	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0391 mg/L	0.04 mg/L	97.7	70.0	130	----



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
Total Metals (QCLot: 1469615) - continued										
WP2413406-026	Anonymous	Cobalt, total	7440-48-4	E420	0.0195 mg/L	0.02 mg/L	97.5	70.0	130	----
		Copper, total	7440-50-8	E420	0.0188 mg/L	0.02 mg/L	93.9	70.0	130	----
		Iron, total	7439-89-6	E420	1.98 mg/L	2 mg/L	99.2	70.0	130	----
		Lead, total	7439-92-1	E420	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		Lithium, total	7439-93-2	E420	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	0.0194 mg/L	0.02 mg/L	96.8	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0182 mg/L	0.02 mg/L	91.0	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0382 mg/L	0.04 mg/L	95.5	70.0	130	----
		Phosphorus, total	7723-14-0	E420	9.68 mg/L	10 mg/L	96.8	70.0	130	----
		Potassium, total	7440-09-7	E420	3.90 mg/L	4 mg/L	97.4	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.0192 mg/L	0.02 mg/L	96.2	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0434 mg/L	0.04 mg/L	109	70.0	130	----
		Silicon, total	7440-21-3	E420	8.96 mg/L	10 mg/L	89.6	70.0	130	----
		Silver, total	7440-22-4	E420	0.00377 mg/L	0.004 mg/L	94.2	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	----	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	----	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.0364 mg/L	0.04 mg/L	91.0	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00396 mg/L	0.004 mg/L	99.1	70.0	130	----
		Thorium, total	7440-29-1	E420	0.0214 mg/L	0.02 mg/L	107	70.0	130	----
		Tin, total	7440-31-5	E420	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0363 mg/L	0.04 mg/L	90.8	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.0191 mg/L	0.02 mg/L	95.5	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00412 mg/L	0.004 mg/L	103	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0986 mg/L	0.1 mg/L	98.6	70.0	130	----
		Zinc, total	7440-66-6	E420	0.385 mg/L	0.4 mg/L	96.3	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0377 mg/L	0.04 mg/L	94.3	70.0	130	----



**Chain of Custody (COC)
Manitoba Drinking Water Systems**

Office of Drinking Water
14 Fultz Boulevard, Winnipeg, Manitoba,
Canada R3Y 0L6

Regular Service (default):	<input checked="" type="checkbox"/> Regular Service (is 5-7 Days):
Unless otherwise requested	<input checked="" type="checkbox"/> 1 Day, rush / priority
	<input checked="" type="checkbox"/> 2 Day, rush / priority
	<input checked="" type="checkbox"/> 3 Day, rush / priority

Report to Operator (email PDF):		Report to Owner (email PDF):		Email PDF copy to:	
Contact: David Epler	Address: 6000 Portage Ave, Headingley, MB R4H 1E8	Phone: (204) 832-2555	Email: headingleywtp@crwc.ca; Tyler.Foxton2@gov.mb.ca	Contact: Chris Fulsher	Address: 6000 Portage Avenue, Headingley, MB R4H 1E8
DWO: Amrith Kumar		DWO Address: 14 Fultz Boulevard, Winnipeg, MB R3Y0L6		DWO Phone: (204) 340-3423	
DWO Email: Amrith.Kumar@gov.mb.ca		Additional Email: Joern.Muenster@gov.mb.ca; Marc.Balcaen@gov.mb.ca;			

If an update in Owner or Operator contact information is required, please contact your Drinking Water Officer

Client / Project Information:	Lab:	Account:	Agency Code: 382	Report Type: EMS (Lab-MWS)	Project: DWQ-C
Operation Name: HEADINGLEY REGIONAL - PWS	Operation Code: 89.40	Operation ID: 57047	Expected Sample Time:	May-2024	
Sampled by: <i>Pamela Jensen</i>					

**Please record Free & Total Chlorine
DO NOT COPY or RE-USE this form
and**

Environmental Division
Winnipeg
Work Order Reference
WP2413487



Telephone : + 1 204 255 9720

**Distribution By-product Sampling
Technique to the Office of Drinking Water
Drinking Water Officer.**

Sample Number	Station Number	Sample Identification	Free Chlorine (mg/L)	Total Chlorine (mg/L)	Sample Date dd-mmm-yyyy	Sample Time hh:mm	Sample Matrix	Sample Type	MB-CH-PWS-V2013	MB-MET-T-CMS	# of Containers
2405AK5021	MB05MJD481	Headingley Regional 1 - Raw	<i>1.78</i>	<i>1.89</i>	<i>28-MAY-2024</i>	<i>10:20</i>	6	1	X		4
2405AK5022	MB05MJD482	Headingley Regional 2 - Treated	<i>0.96</i>	<i>1.13</i>	<i>28-MAY-2024</i>	<i>11:35</i>	9	1		X	1
2405AK5023	MB05MJD483	Headingley Regional 3 - Distribution	<i>G.I. RES. INCOMING</i>		<i>28-MAY-2024</i>	<i>11:35</i>					

Failure to complete all portions of this form may delay analysis.			Sample Matrix: 6-Raw Water, 9-Distributed Water, 10-Treated Water		
Please fill in this form LEGIBLY.			Sample Type: 1-Grab Sample		
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified by the Laboratory.					
For ALL other testing, please use Laboratory specific forms.					
Relinquished By: <i>[Signature]</i>	Date & Time: <i>May 28/2024 @ 3:24pm</i>	Validated By (lab use only): <i>[Signature]</i>	Date & Time: <i>5/28/24 4:07p</i>	Sample Condition (lab use only):	
Received By: (lab use only)	Date & Time: (lab use only)	Temperature: <i>18.3°C</i>	Samples Received in Good Condition? <i>(Y)N</i>		

Sample Intake				
Client: <u>H. Reg.</u>				
Cheque Enclosed with CoC	Yes	<input checked="" type="radio"/> No		
Priority/Emergency Required (circle one)	Yes	<input checked="" type="radio"/> No		
Time Sensitive Hold Time (circle one)	Yes	<input checked="" type="radio"/> No		
Matrix (circle one)	<input checked="" type="radio"/> Water	<input type="radio"/> Soil/solid	<input type="radio"/> Air	<input type="radio"/> Biota
# of Bottles received:				
Green/White	<u>2 x 1 litre</u>	Yellow/Black		
Purple/White	<u>2 x 100ml</u>	Light blue/White		
Warm red/White	<u>3 x 100ml</u>	Orange/Black		
Dark Green/White		Dark Blue/White	<u>2 x 125ml</u>	
Grey/black		Black/white		
Other:				
Additional Comments:				

Login Check	Check yes if you have verified the following:	
	Yes	N/A
Received date/time		
Project/PO/LSD		
Quote/Office match CoC		
Sample IDs/Description		
Sample Date/time		
Sales Items as per CoC		
Express Due Dates		
Client due date matches ALS Due date		
Client recipient emails		
Guidelines/thresholds added		
Billing/payment recorded		
Field data entered		
Sub-contracting Forms Printed		
SUBCO/Chromatograph added to client contacts for required analysis		
Are sub-samples required?		
Has a SIF been submitted for this WO?		
Has the SIF been resolved?		