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CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **WP2301432**	Page	: 1 of 12
Amendment	: **1**		
Client	: **Penn-Co Construction Canada (2003) Ltd.**	Laboratory	: Winnipeg - Environmental
Contact	: Ron Rosset	Account Manager	: Victoria Nazarkiewicz
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Project	: NIVERVILLE WTP 2021-78	Date Samples Received	: 08-Feb-2023 12:00
PO	: 78230206-1RR	Date Analysis Commenced	: 08-Feb-2023
C-O-C number	: ----	Issue Date	: 16-Feb-2023 16:15
Sampler	: ----		
Site	: ----		
Quote number	: Drinking Water - TC,EC-QT51		
No. of samples received	: 8		
No. of samples analysed	: 8		

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.

Signatories	*Position*	*Laboratory Department*
Oleksandr Busel		Inorganics, Winnipeg, Manitoba
Oleksandr Busel		Metals, Winnipeg, Manitoba
Zandrea Grabinski		Inorganics, Winnipeg, Manitoba

Summary of Guideline Breaches by Sample

SampleID/Client ID	Matrix	Analyte	Analyte Summary	Guideline	Category	Result	Limit
1 RAW WATER	Water	Solids, total dissolved [TDS]	Based on taste; TDS above 500 mg/L results in excessive scaling in water pipes, water heaters, boilers and appliances; TDS is composed of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, chloride, sulphate and nitrate.	CDWG	AO/OG	603 mg/L	500 mg/L
	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/OG	1.65 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/OG	0.327 mg/L	0.3 mg/L
2 BIO FILTER #1	Water	Solids, total dissolved [TDS]	Based on taste; TDS above 500 mg/L results in excessive scaling in water pipes, water heaters, boilers and appliances; TDS is composed of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, chloride, sulphate and nitrate.	CDWG	AO/OG	594 mg/L	500 mg/L
3 BIO FILTER #2	Water	Solids, total dissolved [TDS]	Based on taste; TDS above 500 mg/L results in excessive scaling in water pipes, water heaters, boilers and appliances; TDS is composed of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, chloride, sulphate and nitrate.	CDWG	AO/OG	618 mg/L	500 mg/L
4 BIO FILTER #3	Water	Solids, total dissolved [TDS]	Based on taste; TDS above 500 mg/L results in excessive scaling in water pipes, water heaters, boilers and appliances; TDS is composed of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, chloride, sulphate and nitrate.	CDWG	AO/OG	604 mg/L	500 mg/L
5 MTU #1	Water	pH	The control of pH is important to maximize treatment effectiveness, control corrosion and reduce leaching from distribution system and plumbing components.	CDWG	AO/OG	6.72 pH units	7-10.5 pH units
6 MTU #2	Water	pH	The control of pH is important to maximize treatment effectiveness, control corrosion and reduce leaching from distribution system and plumbing components.	CDWG	AO/OG	6.69 pH units	7-10.5 pH units
8 BLENDED MTU #2	Water	Solids, total dissolved [TDS]	Based on taste; TDS above 500 mg/L results in excessive scaling in water pipes, water heaters, boilers and appliances; TDS is composed of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, chloride, sulphate and nitrate.	CDWG	AO/OG	612 mg/L	500 mg/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).

Unit	*Description*
-	no units
%	percent
% T/cm	% transmittance per centimetre
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 is greater than the Guideline Upper Limit or the result is lower than the Guideline Lower Limit.
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.

Qualifiers

Qualifier	*Description*
DLM	*Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).*
RRV	*Reported result verified by repeat analysis.*

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID	1 RAW WATER	2 BIO FILTER #1	3 BIO FILTER #2	4 BIO FILTER #3	5 MTU #1	6 MTU #2	7 BLENDED MTU #1
			Sampling date/time	08-Feb-2023	08-Feb-2023	08-Feb-2023	08-Feb-2023	08-Feb-2023	08-Feb-2023	08-Feb-2023
			Sub-Matrix	Water	Water	Water	Water	Water	Water	Water
				WP2301432-001	WP2301432-002	WP2301432-003	WP2301432-004	WP2301432-005	WP2301432-006	WP2301432-007
Physical Tests										
Absorbance, UV (@ 254nm)	----	AU/cm		0.0290	0.0280	0.0270	0.0270	<0.0050	<0.0050	0.0180
Alkalinity, bicarbonate (as CaCO3)	----	mg/L		265	264	270	271	14.3	13.6	142
Alkalinity, carbonate (as CaCO3)	----	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, hydroxide (as CaCO3)	----	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	----	mg/L		265	264	270	271	14.3	13.6	142
Colour, true	----	CU		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity	----	µS/cm		1160	1160	1160	1160	168	167	667
Hardness (as CaCO3), from total Ca/Mg	----	mg/L		161	158	160	160	2.34	2.13	80.2
Langelier index (@ 4°C)	----	-		0.090	0.119	0.101	0.188	-4.01	-4.11	-0.626
Langelier index (@ 60°C)	----	-		0.847	0.875	0.858	0.944	-3.23	-3.33	0.139
pH	----	pH units		7.89	7.92	7.89	7.98	6.72	6.69	7.68
Solids, total dissolved [TDS]	----	mg/L		603	594	618	604	87.7	86.3	347
Turbidity	----	NTU		1.65	<0.10	0.39	0.45	<0.10	<0.10	0.31
pH, saturation (@ 4°C)	----	pH units		7.80	7.80	7.79	7.79	10.7	10.8	8.31
Transmittance, UV (@ 254nm)	----	% T/cm		93.5	93.8	94.0	94.0	100	100	95.9
pH, saturation (@ 60°C)	----	pH units		7.04	7.04	7.03	7.04	9.95	10.0	7.54
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	mg/L		0.697	0.601	0.588	0.656	0.198	0.175	0.302
Bromide	24959-67-9	mg/L		0.19	0.19	0.18	0.19	<0.10	<0.10	0.12
Chloride	16887-00-6	mg/L		178	178	178	178	38.8	38.7	108
Fluoride	16984-48-8	mg/L		0.899	0.893	0.891	0.888	0.045	0.044	0.472
Nitrate (as N)	14797-55-8	mg/L		0.0109	0.0500	0.0472	0.0223	<0.0050	<0.0050	0.0204
Nitrite (as N)	14797-65-0	mg/L		0.0107	0.0290	0.0248	0.0146	<0.0010	<0.0010	0.0020
Sulfate (as SO4)	14808-79-8	mg/L		35.7	35.9	36.0	35.9	<0.30	<0.30	17.8
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	mg/L		2.58 RRV	1.65	1.48	1.46	<0.50	<0.50	0.84
Carbon, total organic [TOC]	----	mg/L		1.25 RRV	1.25	1.33	1.32	<0.50	<0.50	0.90
Ion Balance										

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID	1 RAW WATER	2 BIO FILTER #1	3 BIO FILTER #2	4 BIO FILTER #3	5 MTU #1	6 MTU #2	7 BLENDED MTU #1
			Sampling date/time	08-Feb-2023	08-Feb-2023	08-Feb-2023	08-Feb-2023	08-Feb-2023	08-Feb-2023	08-Feb-2023
			Sub-Matrix	Water	Water	Water	Water	Water	Water	Water
				WP2301432-001	WP2301432-002	WP2301432-003	WP2301432-004	WP2301432-005	WP2301432-006	WP2301432-007
Ion Balance										
Anion sum	----	meq/L		11.1	11.1	11.2	11.2	1.38	1.36	6.28
Cation sum (total)	----	meq/L		11.3	11.1	11.2	11.3	1.38	1.37	6.25
Ion balance (cations/anions)	----	%		102	100	100	101	100	101	99.5
Ion balance (APHA)	----	%		0.893	<0.010	<0.010	0.444	<0.010	0.366	-0.239
Total Metals										
Aluminum, total	7429-90-5	mg/L		<0.0030	<0.0030	0.0042	0.0073	<0.0030	<0.0030	0.0066
Antimony, total	7440-36-0	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	mg/L		0.00332	0.00148	0.00162	0.00214	0.00182	0.00186	0.00196
Barium, total	7440-39-3	mg/L		0.0465	0.0443	0.0455	0.0459	0.00064	0.00072	0.0235
Beryllium, total	7440-41-7	mg/L		0.000028	0.000032	0.000031	0.000031	0.000022	0.000025	0.000027
Bismuth, total	7440-69-9	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, total	7440-42-8	mg/L		0.511	0.484	0.516	0.513	0.476	0.476	0.508
Cadmium, total	7440-43-9	mg/L		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium, total	7440-70-2	mg/L		32.9	32.8	33.3	32.8	0.502	0.452	16.8
Cesium, total	7440-46-2	mg/L		<0.000010	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium, total	7440-47-3	mg/L		<0.00050	<0.00050	0.00067	0.00079	<0.00050	<0.00050	<0.00050
Cobalt, total	7440-48-4	mg/L		0.00013	0.00036	0.00129	0.00027	<0.00010	<0.00010	0.00046
Copper, total	7440-50-8	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron, total	7439-89-6	mg/L		0.327	0.029	0.025	0.042	<0.010	<0.010	0.024
Lead, total	7439-92-1	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, total	7439-93-2	mg/L		0.0491	0.0475	0.0480	0.0488	0.0079	0.0077	0.0285
Magnesium, total	7439-95-4	mg/L		19.2	18.4	18.7	19.0	0.265	0.244	9.30
Manganese, total	7439-96-5	mg/L		0.00790	0.00748	0.0105	0.00850	0.00012	0.00012	0.00466
Molybdenum, total	7439-98-7	mg/L		0.00381	0.00384	0.00416	0.00393	<0.000050	<0.000050	0.00197
Nickel, total	7440-02-0	mg/L		0.00086	0.00138	0.00559	0.00174	<0.00050	<0.00050	0.00198
Phosphorus, total	7723-14-0	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, total	7440-09-7	mg/L		10.4	10.2	10.5	10.6	1.58	1.59	5.77
Rubidium, total	7440-17-7	mg/L		0.00496	0.00502	0.00500	0.00496	0.00077	0.00080	0.00290
Selenium, total	7782-49-2	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon, total	7440-21-3	mg/L		5.51	5.61	5.45	5.55	0.68	0.65	2.99

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID	1 RAW WATER	2 BIO FILTER #1	3 BIO FILTER #2	4 BIO FILTER #3	5 MTU #1	6 MTU #2	7 BLENDED MTU #1
			Sampling date/time	08-Feb-2023	08-Feb-2023	08-Feb-2023	08-Feb-2023	08-Feb-2023	08-Feb-2023	08-Feb-2023
			Sub-Matrix	Water	Water	Water	Water	Water	Water	Water
				WP2301432-001	WP2301432-002	WP2301432-003	WP2301432-004	WP2301432-005	WP2301432-006	WP2301432-007
Total Metals										
Silver, total	7440-22-4	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5	mg/L		179	176	178	178	29.5	29.4	103
Strontium, total	7440-24-6	mg/L		0.490	0.489	0.500	0.501	0.00730	0.00664	0.251
Sulfur, total	7704-34-9	mg/L		12.9	14.0	13.1	13.6	<0.50	<0.50	6.61
Tellurium, total	13494-80-9	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium, total	7440-29-1	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5	mg/L		0.00037	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, total	7440-32-6	mg/L		<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten, total	7440-33-7	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, total	7440-61-1	mg/L		0.000229	0.000235	0.000257	0.000236	<0.000010	<0.000010	0.000125
Vanadium, total	7440-62-2	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6	mg/L		<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium, total	7440-67-7	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID						
			8 BLENDED MTU #2	----	----	----	----	----	----
		Sampling date/time	08-Feb-2023	----	----	----	----	----	----
		Sub-Matrix	Water	----	----	----	----	----	----
			WP2301432-008	--------	--------	--------	--------	--------	--------
Physical Tests									
Absorbance, UV (@ 254nm)	----	AU/cm	0.0360	----	----	----	----	----	----
Alkalinity, bicarbonate (as CaCO3)	----	mg/L	270	----	----	----	----	----	----
Alkalinity, carbonate (as CaCO3)	----	mg/L	<1.0	----	----	----	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	mg/L	<1.0	----	----	----	----	----	----
Alkalinity, total (as CaCO3)	----	mg/L	270	----	----	----	----	----	----
Colour, true	----	CU	<5.0	----	----	----	----	----	----
Conductivity	----	µS/cm	1150	----	----	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	mg/L	161	----	----	----	----	----	----
Langelier index (@ 4°C)	----	-	0.215	----	----	----	----	----	----
Langelier index (@ 60°C)	----	-	0.970	----	----	----	----	----	----
pH	----	pH units	8.01	----	----	----	----	----	----
Solids, total dissolved [TDS]	----	mg/L	612	----	----	----	----	----	----
Turbidity	----	NTU	0.55	----	----	----	----	----	----
pH, saturation (@ 4°C)	----	pH units	7.80	----	----	----	----	----	----
Transmittance, UV (@ 254nm)	----	% T/cm	92.0	----	----	----	----	----	----
pH, saturation (@ 60°C)	----	pH units	7.04	----	----	----	----	----	----
Anions and Nutrients									
Ammonia, total (as N)	7664-41-7	mg/L	0.410	----	----	----	----	----	----
Bromide	24959-67-9	mg/L	<0.20 DLM	----	----	----	----	----	----
Chloride	16887-00-6	mg/L	178	----	----	----	----	----	----
Fluoride	16984-48-8	mg/L	0.876	----	----	----	----	----	----
Nitrate (as N)	14797-55-8	mg/L	0.0589	----	----	----	----	----	----
Nitrite (as N)	14797-65-0	mg/L	0.0110	----	----	----	----	----	----
Sulfate (as SO4)	14808-79-8	mg/L	35.4	----	----	----	----	----	----
Organic / Inorganic Carbon									
Carbon, dissolved organic [DOC]	----	mg/L	1.58	----	----	----	----	----	----
Carbon, total organic [TOC]	----	mg/L	1.26	----	----	----	----	----	----
Ion Balance									
Anion sum	----	meq/L	11.2	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID	8 BLENDED MTU #2	----	----	----	----	----	----
			Sampling date/time	08-Feb-2023	----	----	----	----	----	----
			Sub-Matrix	Water	----	----	----	----	----	----
				WP2301432-008	--------	--------	--------	--------	--------	--------
Ion Balance										
Cation sum (total)	----	meq/L		11.4	----	----	----	----	----	----
Ion balance (cations/anions)	----	%		102	----	----	----	----	----	----
Ion balance (APHA)	----	%		0.885	----	----	----	----	----	----
Total Metals										
Aluminum, total	7429-90-5	mg/L		0.0072	----	----	----	----	----	----
Antimony, total	7440-36-0	mg/L		<0.00010	----	----	----	----	----	----
Arsenic, total	7440-38-2	mg/L		0.00182	----	----	----	----	----	----
Barium, total	7440-39-3	mg/L		0.0452	----	----	----	----	----	----
Beryllium, total	7440-41-7	mg/L		0.000028	----	----	----	----	----	----
Bismuth, total	7440-69-9	mg/L		<0.000050	----	----	----	----	----	----
Boron, total	7440-42-8	mg/L		0.528	----	----	----	----	----	----
Cadmium, total	7440-43-9	mg/L		<0.0000050	----	----	----	----	----	----
Calcium, total	7440-70-2	mg/L		32.8	----	----	----	----	----	----
Cesium, total	7440-46-2	mg/L		0.000011	----	----	----	----	----	----
Chromium, total	7440-47-3	mg/L		<0.00050	----	----	----	----	----	----
Cobalt, total	7440-48-4	mg/L		0.00108	----	----	----	----	----	----
Copper, total	7440-50-8	mg/L		<0.00050	----	----	----	----	----	----
Iron, total	7439-89-6	mg/L		0.042	----	----	----	----	----	----
Lead, total	7439-92-1	mg/L		<0.000050	----	----	----	----	----	----
Lithium, total	7439-93-2	mg/L		0.0505	----	----	----	----	----	----
Magnesium, total	7439-95-4	mg/L		19.3	----	----	----	----	----	----
Manganese, total	7439-96-5	mg/L		0.00930	----	----	----	----	----	----
Molybdenum, total	7439-98-7	mg/L		0.00409	----	----	----	----	----	----
Nickel, total	7440-02-0	mg/L		0.00489	----	----	----	----	----	----
Phosphorus, total	7723-14-0	mg/L		<0.050	----	----	----	----	----	----
Potassium, total	7440-09-7	mg/L		10.7	----	----	----	----	----	----
Rubidium, total	7440-17-7	mg/L		0.00505	----	----	----	----	----	----
Selenium, total	7782-49-2	mg/L		<0.000050	----	----	----	----	----	----
Silicon, total	7440-21-3	mg/L		5.37	----	----	----	----	----	----
Silver, total	7440-22-4	mg/L		<0.000010	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID	----	----	----	----	----	----
			8 BLENDED MTU #2	----	----	----	----	----	----
		Sampling date/time	08-Feb-2023	----	----	----	----	----	----
		Sub-Matrix	Water	----	----	----	----	----	----
			WP2301432-008	--------	--------	--------	--------	--------	--------
Total Metals									
Sodium, total	7440-23-5	mg/L	181	----	----	----	----	----	----
Strontium, total	7440-24-6	mg/L	0.496	----	----	----	----	----	----
Sulfur, total	7704-34-9	mg/L	13.0	----	----	----	----	----	----
Tellurium, total	13494-80-9	mg/L	<0.00020	----	----	----	----	----	----
Thallium, total	7440-28-0	mg/L	<0.000010	----	----	----	----	----	----
Thorium, total	7440-29-1	mg/L	<0.00010	----	----	----	----	----	----
Tin, total	7440-31-5	mg/L	<0.00010	----	----	----	----	----	----
Titanium, total	7440-32-6	mg/L	<0.00030	----	----	----	----	----	----
Tungsten, total	7440-33-7	mg/L	<0.00010	----	----	----	----	----	----
Uranium, total	7440-61-1	mg/L	0.000247	----	----	----	----	----	----
Vanadium, total	7440-62-2	mg/L	<0.00050	----	----	----	----	----	----
Zinc, total	7440-66-6	mg/L	<0.0030	----	----	----	----	----	----
Zirconium, total	7440-67-7	mg/L	<0.00020	----	----	----	----	----	----

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

Summary of Guideline Limits

Analyte	CAS Number	Unit	CDWG AO/OG	CDWG MAC					
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, saturation (@ 4°C)	----	pH units							
pH, saturation (@ 60°C)	----	pH units							
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							
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	mg/L	**0.1 mg/L**	**2.9 mg/L**					
Antimony, total	7440-36-0	mg/L		**0.006 mg/L**					
Arsenic, total	7440-38-2	mg/L		**0.01 mg/L**					

Analyte	CAS Number	Unit	CDWG AO/OG	CDWG MAC					
Total Metals - Continued									
Barium, total	7440-39-3	mg/L		**2 mg/L**					
Beryllium, total	7440-41-7	mg/L							
Bismuth, total	7440-69-9	mg/L							
Boron, total	7440-42-8	mg/L		**5 mg/L**					
Cadmium, total	7440-43-9	mg/L		**0.007 mg/L**					
Calcium, total	7440-70-2	mg/L							
Cesium, total	7440-46-2	mg/L							
Chromium, total	7440-47-3	mg/L		**0.05 mg/L**					
Cobalt, total	7440-48-4	mg/L							
Copper, total	7440-50-8	mg/L	**1 mg/L**	**2 mg/L**					
Iron, total	7439-89-6	mg/L	**0.3 mg/L**						
Lead, total	7439-92-1	mg/L		**0.005 mg/L**					
Lithium, total	7439-93-2	mg/L							
Magnesium, total	7439-95-4	mg/L							
Manganese, total	7439-96-5	mg/L	**0.02 mg/L**	**0.12 mg/L**					
Molybdenum, total	7439-98-7	mg/L							
Nickel, total	7440-02-0	mg/L							
Phosphorus, total	7723-14-0	mg/L							
Potassium, total	7440-09-7	mg/L							
Rubidium, total	7440-17-7	mg/L							
Selenium, total	7782-49-2	mg/L		**0.05 mg/L**					
Silicon, total	7440-21-3	mg/L							
Silver, total	7440-22-4	mg/L							
Sodium, total	7440-23-5	mg/L	**200 mg/L**						
Strontium, total	7440-24-6	mg/L		**7 mg/L**					
Sulfur, total	7704-34-9	mg/L							
Tellurium, total	13494-80-9	mg/L							
Thallium, total	7440-28-0	mg/L							
Thorium, total	7440-29-1	mg/L							
Tin, total	7440-31-5	mg/L							
Titanium, total	7440-32-6	mg/L							
Tungsten, total	7440-33-7	mg/L							
Uranium, total	7440-61-1	mg/L		**0.02 mg/L**					
Vanadium, total	7440-62-2	mg/L							
Zinc, total	7440-66-6	mg/L	**5 mg/L**						
Zirconium, total	7440-67-7	mg/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/OG	Aesthetic Objective/Operational Guideline
	MAC	Maximum Acceptable Concentrations

CERTIFICATE OF ANALYSIS

Work Order	: **WP2301432**	Page	: 1 of 8
Amendment	: **1**		
Client	: **Penn-Co Construction Canada (2003) Ltd.**	Laboratory	: Winnipeg - Environmental
Contact	: Ron Rosset	Account Manager	: Victoria Nazarkiewicz
Address	: PO Box 60 25 Penner Drive Blumenort MB Canada R0A 0C0	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg MB Canada R2J 3T4
Telephone	: 204 346 5062	Telephone	: +1 204 255 9720
Project	: NIVERVILLE WTP 2021-78	Date Samples Received	: 08-Feb-2023 12:00
PO	: 78230206-1RR	Date Analysis Commenced	: 08-Feb-2023
C-O-C number	: ----	Issue Date	: 16-Feb-2023 16:14
Sampler	: ----		
Site	: ----		
Quote number	: Drinking Water - TC,EC-QT51		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

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*
Oleksandr Busel		Inorganics, Winnipeg, Manitoba
Oleksandr Busel		Metals, Winnipeg, Manitoba
Zandrea Grabinski		Inorganics, 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
%	percent
% T/cm	% transmittance per centimetre
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

<: 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).*
RRV	*Reported result verified by repeat analysis.*

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	1 RAW WATER	2 BIO FILTER #1	3 BIO FILTER #2	4 BIO FILTER #3	5 MTU #1
					Client sampling date / time	08-Feb-2023	08-Feb-2023	08-Feb-2023	08-Feb-2023	08-Feb-2023
						WP2301432-001	WP2301432-002	WP2301432-003	WP2301432-004	WP2301432-005
						Result	Result	Result	Result	Result
Physical Tests										
Absorbance, UV (@ 254nm)	----	E404	0.0050	AU/cm		0.0290	0.0280	0.0270	0.0270	<0.0050
Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L		265	264	270	271	14.3
Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		265	264	270	271	14.3
Colour, true	----	E329	5.0	CU		<5.0	<5.0	<5.0	<5.0	<5.0
Conductivity	----	E100	2.0	µS/cm		1160	1160	1160	1160	168
Hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L		161	158	160	160	2.34
Langelier index (@ 4°C)	----	EC105A	0.010	-		0.090	0.119	0.101	0.188	-4.01
Langelier index (@ 60°C)	----	EC105A	0.010	-		0.847	0.875	0.858	0.944	-3.23
pH	----	E108	0.10	pH units		7.89	7.92	7.89	7.98	6.72
Solids, total dissolved [TDS]	----	E162-L	3.0	mg/L		603	594	618	604	87.7
Turbidity	----	E121	0.10	NTU		1.65	<0.10	0.39	0.45	<0.10
pH, saturation (@ 4°C)	----	EC105A	0.010	pH units		7.80	7.80	7.79	7.79	10.7
Transmittance, UV (@ 254nm)	----	E404	1.0	% T/cm		93.5	93.8	94.0	94.0	100
pH, saturation (@ 60°C)	----	EC105A	0.010	pH units		7.04	7.04	7.03	7.04	9.95
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E303	0.010	mg/L		0.697	0.601	0.588	0.656	0.198
Bromide	24959-67-9	E235.Br	0.10	mg/L		0.19	0.19	0.18	0.19	<0.10
Chloride	16887-00-6	E235.Cl-L	0.10	mg/L		178	178	178	178	38.8
Fluoride	16984-48-8	E235.F	0.020	mg/L		0.899	0.893	0.891	0.888	0.045
Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		0.0109	0.0500	0.0472	0.0223	<0.0050
Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		0.0107	0.0290	0.0248	0.0146	<0.0010
Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		35.7	35.9	36.0	35.9	<0.30
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L		2.58 RRV	1.65	1.48	1.46	<0.50
Carbon, total organic [TOC]	----	E355-L	0.50	mg/L		1.25 RRV	1.25	1.33	1.32	<0.50
Ion Balance										
Anion sum	----	EC101A	0.10	meq/L		11.1	11.1	11.2	11.2	1.38
Cation sum (total)	----	EC101A	0.10	meq/L		11.3	11.1	11.2	11.3	1.38

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	1 RAW WATER	2 BIO FILTER #1	3 BIO FILTER #2	4 BIO FILTER #3	5 MTU #1
					Client sampling date / time	08-Feb-2023	08-Feb-2023	08-Feb-2023	08-Feb-2023	08-Feb-2023
						WP2301432-001	WP2301432-002	WP2301432-003	WP2301432-004	WP2301432-005
						Result	Result	Result	Result	Result
Ion Balance										
Ion balance (cations/anions)	----	EC101A	0.01	%		102	100	100	101	100
Ion balance (APHA)	----	EC101A	0.010	%		0.893	<0.010	<0.010	0.444	<0.010
Total Metals										
Aluminum, total	7429-90-5	E420	0.0030	mg/L		<0.0030	<0.0030	0.0042	0.0073	<0.0030
Antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00332	0.00148	0.00162	0.00214	0.00182
Barium, total	7440-39-3	E420	0.00010	mg/L		0.0465	0.0443	0.0455	0.0459	0.00064
Beryllium, total	7440-41-7	E420	0.000020	mg/L		0.000028	0.000032	0.000031	0.000031	0.000022
Bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, total	7440-42-8	E420	0.010	mg/L		0.511	0.484	0.516	0.513	0.476
Cadmium, total	7440-43-9	E420	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium, total	7440-70-2	E420	0.050	mg/L		32.9	32.8	33.3	32.8	0.502
Cesium, total	7440-46-2	E420	0.000010	mg/L		<0.000010	0.000010	<0.000010	<0.000010	<0.000010
Chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	<0.00050	0.00067	0.00079	<0.00050
Cobalt, total	7440-48-4	E420	0.00010	mg/L		0.00013	0.00036	0.00129	0.00027	<0.00010
Copper, total	7440-50-8	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron, total	7439-89-6	E420	0.010	mg/L		0.327	0.029	0.025	0.042	<0.010
Lead, total	7439-92-1	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, total	7439-93-2	E420	0.0010	mg/L		0.0491	0.0475	0.0480	0.0488	0.0079
Magnesium, total	7439-95-4	E420	0.0050	mg/L		19.2	18.4	18.7	19.0	0.265
Manganese, total	7439-96-5	E420	0.00010	mg/L		0.00790	0.00748	0.0105	0.00850	0.00012
Molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.00381	0.00384	0.00416	0.00393	<0.000050
Nickel, total	7440-02-0	E420	0.00050	mg/L		0.00086	0.00138	0.00559	0.00174	<0.00050
Phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, total	7440-09-7	E420	0.050	mg/L		10.4	10.2	10.5	10.6	1.58
Rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00496	0.00502	0.00500	0.00496	0.00077
Selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon, total	7440-21-3	E420	0.10	mg/L		5.51	5.61	5.45	5.55	0.68
Silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5	E420	0.050	mg/L		179	176	178	178	29.5

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	1 RAW WATER	2 BIO FILTER #1	3 BIO FILTER #2	4 BIO FILTER #3	5 MTU #1
					Client sampling date / time	08-Feb-2023	08-Feb-2023	08-Feb-2023	08-Feb-2023	08-Feb-2023
Analyte	CAS Number	Method	LOR	Unit		WP2301432-001	WP2301432-002	WP2301432-003	WP2301432-004	WP2301432-005
						Result	Result	Result	Result	Result
Total Metals										
Strontium, total	7440-24-6	E420	0.00020	mg/L		0.490	0.489	0.500	0.501	0.00730
Sulfur, total	7704-34-9	E420	0.50	mg/L		12.9	14.0	13.1	13.6	<0.50
Tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5	E420	0.00010	mg/L		0.00037	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, total	7440-32-6	E420	0.00030	mg/L		<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium, total	7440-61-1	E420	0.000010	mg/L		0.000229	0.000235	0.000257	0.000236	<0.000010
Vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6	E420	0.0030	mg/L		<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020

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

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	6 MTU #2	7 BLENDED MTU #1	8 BLENDED MTU #2	----	----
					Client sampling date / time	08-Feb-2023	08-Feb-2023	08-Feb-2023	----	----
						WP2301432-006	WP2301432-007	WP2301432-008	--------	--------
						Result	Result	Result	----	----
Physical Tests										
Absorbance, UV (@ 254nm)	----	E404	0.0050	AU/cm		<0.0050	0.0180	0.0360	----	----
Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L		13.6	142	270	----	----
Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L		<1.0	<1.0	<1.0	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L		<1.0	<1.0	<1.0	----	----
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		13.6	142	270	----	----
Colour, true	----	E329	5.0	CU		<5.0	<5.0	<5.0	----	----
Conductivity	----	E100	2.0	µS/cm		167	667	1150	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.50	mg/L		2.13	80.2	161	----	----
Langelier index (@ 4°C)	----	EC105A	0.010	-		-4.11	-0.626	0.215	----	----
Langelier index (@ 60°C)	----	EC105A	0.010	-		-3.33	0.139	0.970	----	----
pH	----	E108	0.10	pH units		6.69	7.68	8.01	----	----
Solids, total dissolved [TDS]	----	E162-L	3.0	mg/L		86.3	347	612	----	----
Turbidity	----	E121	0.10	NTU		<0.10	0.31	0.55	----	----
pH, saturation (@ 4°C)	----	EC105A	0.010	pH units		10.8	8.31	7.80	----	----
Transmittance, UV (@ 254nm)	----	E404	1.0	% T/cm		100	95.9	92.0	----	----
pH, saturation (@ 60°C)	----	EC105A	0.010	pH units		10.0	7.54	7.04	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E303	0.010	mg/L		0.175	0.302	0.410	----	----
Bromide	24959-67-9	E235.Br	0.10	mg/L		<0.10	0.12	<0.20 DLM	----	----
Chloride	16887-00-6	E235.Cl-L	0.10	mg/L		38.7	108	178	----	----
Fluoride	16984-48-8	E235.F	0.020	mg/L		0.044	0.472	0.876	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		<0.0050	0.0204	0.0589	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		<0.0010	0.0020	0.0110	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		<0.30	17.8	35.4	----	----
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L		<0.50	0.84	1.58	----	----
Carbon, total organic [TOC]	----	E355-L	0.50	mg/L		<0.50	0.90	1.26	----	----
Ion Balance										
Anion sum	----	EC101A	0.10	meq/L		1.36	6.28	11.2	----	----
Cation sum (total)	----	EC101A	0.10	meq/L		1.37	6.25	11.4	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	6 MTU #2	7 BLENDED MTU #1	8 BLENDED MTU #2	----	----
					Client sampling date / time	08-Feb-2023	08-Feb-2023	08-Feb-2023	----	----
Analyte	CAS Number	Method	LOR	Unit		WP2301432-006	WP2301432-007	WP2301432-008	--------	--------
						Result	Result	Result	----	----
Ion Balance										
Ion balance (cations/anions)	----	EC101A	0.01	%		101	99.5	102	----	----
Ion balance (APHA)	----	EC101A	0.010	%		0.366	-0.239	0.885	----	----
Total Metals										
Aluminum, total	7429-90-5	E420	0.0030	mg/L		<0.0030	0.0066	0.0072	----	----
Antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00186	0.00196	0.00182	----	----
Barium, total	7440-39-3	E420	0.00010	mg/L		0.00072	0.0235	0.0452	----	----
Beryllium, total	7440-41-7	E420	0.000020	mg/L		0.000025	0.000027	0.000028	----	----
Bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----
Boron, total	7440-42-8	E420	0.010	mg/L		0.476	0.508	0.528	----	----
Cadmium, total	7440-43-9	E420	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	----	----
Calcium, total	7440-70-2	E420	0.050	mg/L		0.452	16.8	32.8	----	----
Cesium, total	7440-46-2	E420	0.000010	mg/L		<0.000010	<0.000010	0.000011	----	----
Chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
Cobalt, total	7440-48-4	E420	0.00010	mg/L		<0.00010	0.00046	0.00108	----	----
Copper, total	7440-50-8	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
Iron, total	7439-89-6	E420	0.010	mg/L		<0.010	0.024	0.042	----	----
Lead, total	7439-92-1	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----
Lithium, total	7439-93-2	E420	0.0010	mg/L		0.0077	0.0285	0.0505	----	----
Magnesium, total	7439-95-4	E420	0.0050	mg/L		0.244	9.30	19.3	----	----
Manganese, total	7439-96-5	E420	0.00010	mg/L		0.00012	0.00466	0.00930	----	----
Molybdenum, total	7439-98-7	E420	0.000050	mg/L		<0.000050	0.00197	0.00409	----	----
Nickel, total	7440-02-0	E420	0.00050	mg/L		<0.00050	0.00198	0.00489	----	----
Phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	<0.050	----	----
Potassium, total	7440-09-7	E420	0.050	mg/L		1.59	5.77	10.7	----	----
Rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00080	0.00290	0.00505	----	----
Selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----
Silicon, total	7440-21-3	E420	0.10	mg/L		0.65	2.99	5.37	----	----
Silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
Sodium, total	7440-23-5	E420	0.050	mg/L		29.4	103	181	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	6 MTU #2	7 BLENDED MTU #1	8 BLENDED MTU #2	----	----
					Client sampling date / time	08-Feb-2023	08-Feb-2023	08-Feb-2023	----	----
Analyte	CAS Number	Method	LOR	Unit		WP2301432-006	WP2301432-007	WP2301432-008	--------	--------
						Result	Result	Result	----	----
Total Metals										
Strontium, total	7440-24-6	E420	0.00020	mg/L		0.00664	0.251	0.496	----	----
Sulfur, total	7704-34-9	E420	0.50	mg/L		<0.50	6.61	13.0	----	----
Tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	----	----
Thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
Thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Titanium, total	7440-32-6	E420	0.00030	mg/L		<0.00030	<0.00030	<0.00030	----	----
Tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Uranium, total	7440-61-1	E420	0.000010	mg/L		<0.000010	0.000125	0.000247	----	----
Vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
Zinc, total	7440-66-6	E420	0.0030	mg/L		<0.0030	<0.0030	<0.0030	----	----
Zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	----	----

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

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **WP2301432**	Page	: 1 of 23
Amendment	: 1		
Client	: **Penn-Co Construction Canada (2003) Ltd.**	Laboratory	: Winnipeg - Environmental
Contact	: Ron Rosset	Account Manager	: Victoria Nazarkiewicz
Address	: PO Box 60 25 Penner Drive Blumenort MB Canada R0A 0C0	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	: 204 346 5062	Telephone	: +1 204 255 9720
Project	: NIVERVILLE WTP 2021-78	Date Samples Received	: 08-Feb-2023 12:00
PO	: 78230206-1RR	Issue Date	: 16-Feb-2023 16:15
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Drinking Water - TC,EC-QT51		
No. of samples received	: 8		
No. of samples analysed	: 8		

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 / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia in Water by Colour										
Amber glass total (sulfuric acid)										
1 RAW WATER	E303	08-Feb-2023	08-Feb-2023	----	----		08-Feb-2023	28 days	1 days	✓
Anions and Nutrients : Ammonia in Water by Colour										
Amber glass total (sulfuric acid)										
2 BIO FILTER #1	E303	08-Feb-2023	08-Feb-2023	----	----		08-Feb-2023	28 days	1 days	✓
Anions and Nutrients : Ammonia in Water by Colour										
Amber glass total (sulfuric acid)										
3 BIO FILTER #2	E303	08-Feb-2023	08-Feb-2023	----	----		08-Feb-2023	28 days	1 days	✓
Anions and Nutrients : Ammonia in Water by Colour										
Amber glass total (sulfuric acid)										
4 BIO FILTER #3	E303	08-Feb-2023	08-Feb-2023	----	----		08-Feb-2023	28 days	1 days	✓
Anions and Nutrients : Ammonia in Water by Colour										
Amber glass total (sulfuric acid)										
5 MTU #1	E303	08-Feb-2023	08-Feb-2023	----	----		08-Feb-2023	28 days	1 days	✓
Anions and Nutrients : Ammonia in Water by Colour										
Amber glass total (sulfuric acid)										
6 MTU #2	E303	08-Feb-2023	08-Feb-2023	----	----		08-Feb-2023	28 days	1 days	✓
Anions and Nutrients : Ammonia in Water by Colour										
Amber glass total (sulfuric acid)										
7 BLENDED MTU #1	E303	08-Feb-2023	08-Feb-2023	----	----		08-Feb-2023	28 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia in Water by Colour										
Amber glass total (sulfuric acid)										
8 BLENDED MTU #2	E303	08-Feb-2023	08-Feb-2023	----	----		08-Feb-2023	28 days	1 days	✓
Anions and Nutrients : Bromide in Water by IC										
HDPE										
1 RAW WATER	E235.Br	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC										
HDPE										
2 BIO FILTER #1	E235.Br	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC										
HDPE										
3 BIO FILTER #2	E235.Br	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC										
HDPE										
4 BIO FILTER #3	E235.Br	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC										
HDPE										
5 MTU #1	E235.Br	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC										
HDPE										
6 MTU #2	E235.Br	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC										
HDPE										
7 BLENDED MTU #1	E235.Br	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC										
HDPE										
8 BLENDED MTU #2	E235.Br	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
1 RAW WATER	E235.Cl-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
2 BIO FILTER #1	E235.Cl-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
3 BIO FILTER #2	E235.Cl-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
4 BIO FILTER #3	E235.Cl-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
5 MTU #1	E235.Cl-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
6 MTU #2	E235.Cl-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
7 BLENDED MTU #1	E235.Cl-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE										
8 BLENDED MTU #2	E235.Cl-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
1 RAW WATER	E235.F	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
2 BIO FILTER #1	E235.F	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
3 BIO FILTER #2	E235.F	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
4 BIO FILTER #3	E235.F	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
5 MTU #1	E235.F	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
6 MTU #2	E235.F	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
7 BLENDED MTU #1	E235.F	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
8 BLENDED MTU #2	E235.F	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
1 RAW WATER	E235.NO3-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
2 BIO FILTER #1	E235.NO3-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
3 BIO FILTER #2	E235.NO3-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
4 BIO FILTER #3	E235.NO3-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
5 MTU #1	E235.NO3-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
6 MTU #2	E235.NO3-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
7 BLENDED MTU #1	E235.NO3-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
8 BLENDED MTU #2	E235.NO3-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
1 RAW WATER	E235.NO2-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
2 BIO FILTER #1	E235.NO2-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
3 BIO FILTER #2	E235.NO2-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
4 BIO FILTER #3	E235.NO2-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
5 MTU #1	E235.NO2-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
6 MTU #2	E235.NO2-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
7 BLENDED MTU #1	E235.NO2-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
8 BLENDED MTU #2	E235.NO2-L	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
1 RAW WATER	E235.SO4	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
2 BIO FILTER #1	E235.SO4	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
3 BIO FILTER #2	E235.SO4	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
4 BIO FILTER #3	E235.SO4	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
5 MTU #1	E235.SO4	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
6 MTU #2	E235.SO4	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
7 BLENDED MTU #1	E235.SO4	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
8 BLENDED MTU #2	E235.SO4	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	28 days	2 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass/Teflon lined cap - LCMS										
1 RAW WATER	E358-L	08-Feb-2023	10-Feb-2023	3 days	2 days	✓	10-Feb-2023	28 days	0 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass/Teflon lined cap - LCMS										
2 BIO FILTER #1	E358-L	08-Feb-2023	10-Feb-2023	3 days	2 days	✓	10-Feb-2023	28 days	0 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass/Teflon lined cap - LCMS										
3 BIO FILTER #2	E358-L	08-Feb-2023	10-Feb-2023	3 days	2 days	✓	10-Feb-2023	28 days	0 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass/Teflon lined cap - LCMS										
4 BIO FILTER #3	E358-L	08-Feb-2023	10-Feb-2023	3 days	2 days	✓	10-Feb-2023	28 days	0 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass/Teflon lined cap - LCMS										
5 MTU #1	E358-L	08-Feb-2023	10-Feb-2023	3 days	2 days	✓	10-Feb-2023	28 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass/Teflon lined cap - LCMS										
6 MTU #2	E358-L	08-Feb-2023	10-Feb-2023	3 days	2 days	✓	10-Feb-2023	28 days	0 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass/Teflon lined cap - LCMS										
7 BLENDED MTU #1	E358-L	08-Feb-2023	10-Feb-2023	3 days	2 days	✓	10-Feb-2023	28 days	0 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass/Teflon lined cap - LCMS										
8 BLENDED MTU #2	E358-L	08-Feb-2023	10-Feb-2023	3 days	2 days	✓	10-Feb-2023	28 days	0 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
1 RAW WATER	E355-L	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	28 days	2 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
2 BIO FILTER #1	E355-L	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	28 days	2 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
3 BIO FILTER #2	E355-L	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	28 days	2 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
4 BIO FILTER #3	E355-L	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	28 days	2 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
5 MTU #1	E355-L	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	28 days	2 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
6 MTU #2	E355-L	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	28 days	2 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
7 BLENDED MTU #1	E355-L	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	28 days	2 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
8 BLENDED MTU #2	E355-L	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	28 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
1 RAW WATER	E290	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
2 BIO FILTER #1	E290	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
3 BIO FILTER #2	E290	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
4 BIO FILTER #3	E290	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
5 MTU #1	E290	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
6 MTU #2	E290	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
7 BLENDED MTU #1	E290	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	14 days	2 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE										
8 BLENDED MTU #2	E290	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	14 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE										
1 RAW WATER	E329	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE										
2 BIO FILTER #1	E329	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE										
3 BIO FILTER #2	E329	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE										
4 BIO FILTER #3	E329	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE										
5 MTU #1	E329	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE										
6 MTU #2	E329	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE										
7 BLENDED MTU #1	E329	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE										
8 BLENDED MTU #2	E329	08-Feb-2023	09-Feb-2023	----	----		09-Feb-2023	3 days	2 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE										
1 RAW WATER	E100	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE										
2 BIO FILTER #1	E100	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE										
3 BIO FILTER #2	E100	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE										
4 BIO FILTER #3	E100	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE										
5 MTU #1	E100	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE										
6 MTU #2	E100	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE										
7 BLENDED MTU #1	E100	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE										
8 BLENDED MTU #2	E100	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	28 days	2 days	✓
Physical Tests : pH by Meter										
HDPE										
1 RAW WATER	E108	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	0.25 hrs	0.26 hrs	× EHTR-FM

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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE 2 BIO FILTER #1	E108	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE 3 BIO FILTER #2	E108	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE 4 BIO FILTER #3	E108	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE 5 MTU #1	E108	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE 6 MTU #2	E108	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE 7 BLENDED MTU #1	E108	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE 8 BLENDED MTU #2	E108	08-Feb-2023	10-Feb-2023	----	----		10-Feb-2023	0.25 hrs	0.26 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry (Low Level)										
HDPE 1 RAW WATER	E162-L	08-Feb-2023	----	----	----		09-Feb-2023	7 days	2 days	✓
Physical Tests : TDS by Gravimetry (Low Level)										
HDPE 2 BIO FILTER #1	E162-L	08-Feb-2023	----	----	----		09-Feb-2023	7 days	2 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TDS by Gravimetry (Low Level)										
HDPE										
3 BIO FILTER #2	E162-L	08-Feb-2023	----	----	----		09-Feb-2023	7 days	2 days	✓
Physical Tests : TDS by Gravimetry (Low Level)										
HDPE										
4 BIO FILTER #3	E162-L	08-Feb-2023	----	----	----		09-Feb-2023	7 days	2 days	✓
Physical Tests : TDS by Gravimetry (Low Level)										
HDPE										
5 MTU #1	E162-L	08-Feb-2023	----	----	----		09-Feb-2023	7 days	2 days	✓
Physical Tests : TDS by Gravimetry (Low Level)										
HDPE										
6 MTU #2	E162-L	08-Feb-2023	----	----	----		09-Feb-2023	7 days	2 days	✓
Physical Tests : TDS by Gravimetry (Low Level)										
HDPE										
7 BLENDED MTU #1	E162-L	08-Feb-2023	----	----	----		09-Feb-2023	7 days	2 days	✓
Physical Tests : TDS by Gravimetry (Low Level)										
HDPE										
8 BLENDED MTU #2	E162-L	08-Feb-2023	----	----	----		09-Feb-2023	7 days	2 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
1 RAW WATER	E121	08-Feb-2023	----	----	----		09-Feb-2023	3 days	2 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
2 BIO FILTER #1	E121	08-Feb-2023	----	----	----		09-Feb-2023	3 days	2 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
3 BIO FILTER #2	E121	08-Feb-2023	----	----	----		09-Feb-2023	3 days	2 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Turbidity by Nephelometry										
HDPE										
4 BIO FILTER #3	E121	08-Feb-2023	----	----	----		09-Feb-2023	3 days	2 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
5 MTU #1	E121	08-Feb-2023	----	----	----		09-Feb-2023	3 days	2 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
6 MTU #2	E121	08-Feb-2023	----	----	----		09-Feb-2023	3 days	2 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
7 BLENDED MTU #1	E121	08-Feb-2023	----	----	----		09-Feb-2023	3 days	2 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
8 BLENDED MTU #2	E121	08-Feb-2023	----	----	----		09-Feb-2023	3 days	2 days	✓
Physical Tests : UV Absorbance and Transmittance by Spectrometry										
HDPE										
1 RAW WATER	E404	08-Feb-2023	----	----	----		09-Feb-2023	3 days	1 days	✓
Physical Tests : UV Absorbance and Transmittance by Spectrometry										
HDPE										
2 BIO FILTER #1	E404	08-Feb-2023	----	----	----		09-Feb-2023	3 days	1 days	✓
Physical Tests : UV Absorbance and Transmittance by Spectrometry										
HDPE										
3 BIO FILTER #2	E404	08-Feb-2023	----	----	----		09-Feb-2023	3 days	1 days	✓
Physical Tests : UV Absorbance and Transmittance by Spectrometry										
HDPE										
4 BIO FILTER #3	E404	08-Feb-2023	----	----	----		09-Feb-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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : UV Absorbance and Transmittance by Spectrometry										
HDPE										
5 MTU #1	E404	08-Feb-2023	----	----	----		09-Feb-2023	3 days	1 days	✓
Physical Tests : UV Absorbance and Transmittance by Spectrometry										
HDPE										
6 MTU #2	E404	08-Feb-2023	----	----	----		09-Feb-2023	3 days	1 days	✓
Physical Tests : UV Absorbance and Transmittance by Spectrometry										
HDPE										
7 BLENDED MTU #1	E404	08-Feb-2023	----	----	----		09-Feb-2023	3 days	1 days	✓
Physical Tests : UV Absorbance and Transmittance by Spectrometry										
HDPE										
8 BLENDED MTU #2	E404	08-Feb-2023	----	----	----		09-Feb-2023	3 days	1 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
1 RAW WATER	E420	08-Feb-2023	10-Feb-2023	----	----		14-Feb-2023	180 days	6 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
2 BIO FILTER #1	E420	08-Feb-2023	10-Feb-2023	----	----		14-Feb-2023	180 days	6 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
3 BIO FILTER #2	E420	08-Feb-2023	10-Feb-2023	----	----		14-Feb-2023	180 days	6 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
4 BIO FILTER #3	E420	08-Feb-2023	10-Feb-2023	----	----		14-Feb-2023	180 days	6 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
5 MTU #1	E420	08-Feb-2023	10-Feb-2023	----	----		14-Feb-2023	180 days	6 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
6 MTU #2	E420	08-Feb-2023	10-Feb-2023	----	----		14-Feb-2023	180 days	6 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
7 BLENDED MTU #1	E420	08-Feb-2023	10-Feb-2023	----	----		14-Feb-2023	180 days	6 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
8 BLENDED MTU #2	E420	08-Feb-2023	10-Feb-2023	----	----		14-Feb-2023	180 days	6 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			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	830305	1	10	10.0	5.0	✓
Ammonia in Water by Colour	E303	828327	1	18	5.5	5.0	✓
Bromide in Water by IC	E235.Br	829511	1	8	12.5	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	829507	1	8	12.5	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	829565	1	8	12.5	5.0	✓
Conductivity in Water	E100	830303	1	13	7.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	830314	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	829503	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	829508	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	829509	1	8	12.5	5.0	✓
pH by Meter	E108	830304	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	829510	1	8	12.5	5.0	✓
TDS by Gravimetry (Low Level)	E162-L	828260	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	830376	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	830453	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	829991	1	14	7.1	5.0	✓
UV Absorbance and Transmittance by Spectrometry	E404	829254	1	8	12.5	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	830305	1	10	10.0	5.0	✓
Ammonia in Water by Colour	E303	828327	1	18	5.5	5.0	✓
Bromide in Water by IC	E235.Br	829511	1	8	12.5	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	829507	1	8	12.5	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	829565	1	8	12.5	5.0	✓
Conductivity in Water	E100	830303	1	13	7.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	830314	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	829503	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	829508	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	829509	1	8	12.5	5.0	✓
pH by Meter	E108	830304	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	829510	1	8	12.5	5.0	✓
TDS by Gravimetry (Low Level)	E162-L	828260	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	830376	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	830453	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	829991	1	14	7.1	5.0	✓
UV Absorbance and Transmittance by Spectrometry	E404	829254	1	8	12.5	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*
Method Blanks (MB)							
Alkalinity Species by Titration	E290	830305	1	10	10.0	5.0	✓
Ammonia in Water by Colour	E303	828327	1	18	5.5	5.0	✓
Bromide in Water by IC	E235.Br	829511	1	8	12.5	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	829507	1	8	12.5	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	829565	1	8	12.5	5.0	✓
Conductivity in Water	E100	830303	1	13	7.6	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	830314	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	829503	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	829508	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	829509	1	8	12.5	5.0	✓
Sulfate in Water by IC	E235.SO4	829510	1	8	12.5	5.0	✓
TDS by Gravimetry (Low Level)	E162-L	828260	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	830376	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	830453	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	829991	1	14	7.1	5.0	✓
UV Absorbance and Transmittance by Spectrometry	E404	829254	1	8	12.5	5.0	✓
Matrix Spikes (MS)							
Ammonia in Water by Colour	E303	828327	1	18	5.5	5.0	✓
Bromide in Water by IC	E235.Br	829511	1	8	12.5	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	829507	1	8	12.5	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	830314	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	829503	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	829508	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	829509	1	8	12.5	5.0	✓
Sulfate in Water by IC	E235.SO4	829510	1	8	12.5	5.0	✓
Total metals in Water by CRC ICPMS	E420	830376	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	830453	1	20	5.0	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 Winnipeg - Environmental	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 Winnipeg - Environmental	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 Winnipeg - Environmental	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 Winnipeg - Environmental	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	E235.Br Winnipeg - Environmental	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 Winnipeg - Environmental	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 Winnipeg - Environmental	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 Winnipeg - Environmental	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 Winnipeg - Environmental	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 Winnipeg - Environmental	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 Winnipeg - Environmental	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 Winnipeg - Environmental	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.
Colour (True) by Spectrometer (5 CU)	E329 Winnipeg - Environmental	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 Winnipeg - Environmental	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 Winnipeg - Environmental	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 Winnipeg - Environmental	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 Winnipeg - Environmental	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 Winnipeg - Environmental	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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ion Balance using Total Metals	EC101A Winnipeg - Environmental	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).
Langelier Index using Laboratory pH (Ca-T)	EC105A Winnipeg - Environmental	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 CaCO3. Negative values indicate undersaturation of CaCO3. This calculation uses laboratory pH measurements and provides estimates of Langelier Index at temperatures of 4, 15, 20, 25, 66, and 77°C.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Winnipeg - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Total Organic Carbon by Combustion	EP355 Winnipeg - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 Winnipeg - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon

QUALITY CONTROL REPORT

Work Order	: **WP2301432**	Page	: 1 of 13
Amendment	: **1**		
Client	: Penn-Co Construction Canada (2003) Ltd.	Laboratory	: Winnipeg - Environmental
Contact	: Ron Rosset	Account Manager	: Victoria Nazarkiewicz
Address	: PO Box 60 25 Penner Drive Blumenort MB Canada R0A 0C0	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	:	Telephone	: +1 204 255 9720
Project	: NIVERVILLE WTP 2021-78	Date Samples Received	: 08-Feb-2023 12:00
PO	: 78230206-1RR	Date Analysis Commenced	: 08-Feb-2023
C-O-C number	: ----	Issue Date	: 16-Feb-2023 16:15
Sampler	: ---- 204 346 5062		
Site	: ----		
Quote number	: Drinking Water - TC,EC-QT51		
No. of samples received	: 8		
No. of samples analysed	: 8		

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.

Signatories	*Position*	*Laboratory Department*
Oleksandr Busel		Winnipeg Inorganics, Winnipeg, Manitoba
Oleksandr Busel		Winnipeg Metals, Winnipeg, Manitoba
Zandrea Grabinski		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: 828260)											
WP2301323-002	Anonymous	Solids, total dissolved [TDS]	----	E162-L	15.0	mg/L	1010	972	3.93%	20%	----
Physical Tests (QC Lot: 829254)											
WP2301432-001	1 RAW WATER	Absorbance, UV (@ 254nm)	----	E404	0.0050	AU/cm	0.0290	0.0300	0.0010	Diff <2x LOR	----
Physical Tests (QC Lot: 829565)											
WP2301432-001	1 RAW WATER	Colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 829991)											
WP2301421-001	Anonymous	Turbidity	----	E121	0.10	NTU	0.15	0.15	0.008	Diff <2x LOR	----
Physical Tests (QC Lot: 830303)											
WP2301432-001	1 RAW WATER	Conductivity	----	E100	2.0	µS/cm	1160	1150	0.173%	10%	----
Physical Tests (QC Lot: 830304)											
WP2301432-001	1 RAW WATER	pH	----	E108	0.10	pH units	7.89	7.89	0.00%	4%	----
Physical Tests (QC Lot: 830305)											
WP2301432-001	1 RAW WATER	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	265	265	0.0377%	20%	----
Anions and Nutrients (QC Lot: 828327)											
WP2301403-001	Anonymous	Ammonia, total (as N)	7664-41-7	E303	0.010	mg/L	0.174	0.175	0.842%	20%	----
Anions and Nutrients (QC Lot: 829503)											
WP2301432-007	7 BLENDED MTU #1	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.472	0.468	0.892%	20%	----
Anions and Nutrients (QC Lot: 829507)											
WP2301432-007	7 BLENDED MTU #1	Chloride	16887-00-6	E235.Cl-L	0.10	mg/L	108	108	0.0812%	20%	----
Anions and Nutrients (QC Lot: 829508)											
WP2301432-007	7 BLENDED MTU #1	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0204	0.0203	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 829509)											
WP2301432-007	7 BLENDED MTU #1	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0020	0.0022	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 829510)											
WP2301432-007	7 BLENDED MTU #1	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	17.8	17.9	0.134%	20%	----
Anions and Nutrients (QC Lot: 829511)											
WP2301432-007	7 BLENDED MTU #1	Bromide	24959-67-9	E235.Br	0.10	mg/L	0.12	0.11	0.003	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 830314)											
WP2301262-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	11.4	12.0	5.49%	20%	----
Organic / Inorganic Carbon (QC Lot: 830453)											

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*
Organic / Inorganic Carbon (QC Lot: 830453) - continued											
WP2301262-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	11.6	11.7	0.109%	20%	----
Total Metals (QC Lot: 830376)											
WP2301365-004	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0195	0.0196	0.00008	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	0.00100	0.00097	0.00002	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0134	0.0132	1.09%	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	0.013	0.013	0.0001	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	19.1	19.1	0.395%	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	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00102	0.00104	0.00002	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.017	0.018	0.001	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	0.0030	0.0030	0.00001	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	9.56	9.63	0.736%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.00108	0.00100	7.48%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000115	0.000111	0.000004	Diff <2x LOR	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	0.00057	0.00007	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	1.38	1.38	0.250%	20%	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00106	0.00103	0.00003	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000145	0.000113	0.000032	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	0.75	0.74	0.006	Diff <2x LOR	----
		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	4.19	4.21	0.343%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.0554	0.0563	1.72%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	2.40	2.40	0.004	Diff <2x LOR	----
		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	----

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: 830376) - continued											
WP2301365-004	Anonymous	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	0.00036	0.00035	0.00002	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	0.000056	0.000055	0.0000008	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	0.0056	0.0056	0.000004	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: 828260)						
Solids, total dissolved [TDS]	----	E162-L	3	mg/L	<3.0	----
Physical Tests (QCLot: 829254)						
Absorbance, UV (@ 254nm)	----	E404	0.005	AU/cm	<0.0050	----
Physical Tests (QCLot: 829565)						
Colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 829991)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 830303)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 830305)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 828327)						
Ammonia, total (as N)	7664-41-7	E303	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 829503)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 829507)						
Chloride	16887-00-6	E235.Cl-L	0.1	mg/L	<0.10	----
Anions and Nutrients (QCLot: 829508)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 829509)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 829510)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 829511)						
Bromide	24959-67-9	E235.Br	0.1	mg/L	<0.10	----
Organic / Inorganic Carbon (QCLot: 830314)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 830453)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 830376)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 830376) - continued						
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	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 830376) - continued						
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	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 828260)									
Solids, total dissolved [TDS]	----	E162-L	3	mg/L	1000 mg/L	92.8	85.0	115	----
Physical Tests (QCLot: 829254)									
Absorbance, UV (@ 254nm)	----	E404	0.005	AU/cm	0.235 AU/cm	104	85.0	115	----
Physical Tests (QCLot: 829565)									
Colour, true	----	E329	5	CU	250 CU	100	85.0	115	----
Physical Tests (QCLot: 829991)									
Turbidity	----	E121	0.1	NTU	200 NTU	98.5	85.0	115	----
Physical Tests (QCLot: 830303)									
Conductivity	----	E100	1	µS/cm	1412 µS/cm	100	90.0	110	----
Physical Tests (QCLot: 830304)									
pH	----	E108	----	pH units	7 pH units	99.7	98.0	102	----
Physical Tests (QCLot: 830305)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	100 mg/L	99.1	85.0	115	----
Anions and Nutrients (QCLot: 828327)									
Ammonia, total (as N)	7664-41-7	E303	0.01	mg/L	0.25 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 829503)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 829507)									
Chloride	16887-00-6	E235.Cl-L	0.1	mg/L	100 mg/L	98.5	90.0	110	----
Anions and Nutrients (QCLot: 829508)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 829509)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.7	90.0	110	----
Anions and Nutrients (QCLot: 829510)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100.0	90.0	110	----
Anions and Nutrients (QCLot: 829511)									
Bromide	24959-67-9	E235.Br	0.1	mg/L	0.5 mg/L	99.9	85.0	115	----
Organic / Inorganic Carbon (QCLot: 830314)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	91.1	80.0	120	----
Organic / Inorganic Carbon (QCLot: 830453)									

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Organic / Inorganic Carbon (QCLot: 830453) - continued									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	91.0	80.0	120	----
Total Metals (QCLot: 830376)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	105	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	102	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	98.1	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	102	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	100	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	95.9	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	102	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	104	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	100	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	100	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	106	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	100	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	108	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	106	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	104	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	103	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	105	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	109	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	95.4	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	100	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	98.0	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	99.8	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 830376) - continued									
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	101	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	98.1	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	98.8	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	101	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	93.1	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: 828327)										
WP2301403-001	Anonymous	Ammonia, total (as N)	7664-41-7	E303	0.269 mg/L	0.25 mg/L	108	75.0	125	----
Anions and Nutrients (QCLot: 829503)										
WP2301432-007	7 BLENDED MTU #1	Fluoride	16984-48-8	E235.F	1.03 mg/L	1 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 829507)										
WP2301432-007	7 BLENDED MTU #1	Chloride	16887-00-6	E235.Cl-L	ND mg/L	100 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 829508)										
WP2301432-007	7 BLENDED MTU #1	Nitrate (as N)	14797-55-8	E235.NO3-L	2.60 mg/L	2.5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 829509)										
WP2301432-007	7 BLENDED MTU #1	Nitrite (as N)	14797-65-0	E235.NO2-L	0.456 mg/L	0.5 mg/L	91.2	75.0	125	----
Anions and Nutrients (QCLot: 829510)										
WP2301432-007	7 BLENDED MTU #1	Sulfate (as SO4)	14808-79-8	E235.SO4	101 mg/L	100 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 829511)										
WP2301432-007	7 BLENDED MTU #1	Bromide	24959-67-9	E235.Br	0.50 mg/L	0.5 mg/L	100	75.0	125	----
Organic / Inorganic Carbon (QCLot: 830314)										
WP2301262-002	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	4.17 mg/L	5 mg/L	83.4	70.0	130	----
Organic / Inorganic Carbon (QCLot: 830453)										
WP2301262-002	Anonymous	Carbon, total organic [TOC]	----	E355-L	4.62 mg/L	5 mg/L	92.4	70.0	130	----
Total Metals (QCLot: 830376)										
WP2301365-004	Anonymous	Aluminum, total	7429-90-5	E420	0.198 mg/L	0.2 mg/L	99.1	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0194 mg/L	0.02 mg/L	97.2	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0199 mg/L	0.02 mg/L	99.3	70.0	130	----
		Barium, total	7440-39-3	E420	0.0193 mg/L	0.02 mg/L	96.3	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0394 mg/L	0.04 mg/L	98.6	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0110 mg/L	0.01 mg/L	110	70.0	130	----
		Boron, total	7440-42-8	E420	0.105 mg/L	0.1 mg/L	105	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00393 mg/L	0.004 mg/L	98.2	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.00986 mg/L	0.01 mg/L	98.6	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0409 mg/L	0.04 mg/L	102	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: 830376) - continued										
WP2301365-004	Anonymous	Cobalt, total	7440-48-4	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		Copper, total	7440-50-8	E420	0.0197 mg/L	0.02 mg/L	98.6	70.0	130	----
		Iron, total	7439-89-6	E420	2.04 mg/L	2 mg/L	102	70.0	130	----
		Lead, total	7439-92-1	E420	0.0196 mg/L	0.02 mg/L	98.1	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0982 mg/L	0.1 mg/L	98.2	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	0.0199 mg/L	0.02 mg/L	99.7	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0192 mg/L	0.02 mg/L	96.0	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0395 mg/L	0.04 mg/L	98.8	70.0	130	----
		Phosphorus, total	7723-14-0	E420	10.2 mg/L	10 mg/L	102	70.0	130	----
		Potassium, total	7440-09-7	E420	4.00 mg/L	4 mg/L	100	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0422 mg/L	0.04 mg/L	105	70.0	130	----
		Silicon, total	7440-21-3	E420	10.0 mg/L	10 mg/L	100	70.0	130	----
		Silver, total	7440-22-4	E420	0.00393 mg/L	0.004 mg/L	98.3	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	20.2 mg/L	20 mg/L	101	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.0383 mg/L	0.04 mg/L	95.8	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00389 mg/L	0.004 mg/L	97.2	70.0	130	----
		Thorium, total	7440-29-1	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		Tin, total	7440-31-5	E420	0.0190 mg/L	0.02 mg/L	94.9	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0406 mg/L	0.04 mg/L	102	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.0197 mg/L	0.02 mg/L	98.4	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00399 mg/L	0.004 mg/L	99.7	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		Zinc, total	7440-66-6	E420	0.383 mg/L	0.4 mg/L	95.8	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0385 mg/L	0.04 mg/L	96.3	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number:

Page of

Report To	Contact and company name below will appear on the final report
Company:	Penn-co Construction Canada (2003) LTD.
Contact:	Ron Rosset (ron.rosset@penn-co.com)
Phone:	204-750-2999
	Company address below will appear on the final report
Street:	25 Penner Drive
City/Province:	Blumenort, MB
Postal Code:	R0A 0C0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Penn-co Construction Canada (2003) LTD.
Contact:	Account Payable (ap@penn-co.com)

Report Format / Distribution

Select Report Format: ☑ PDF ☐ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: johny.bartsch@penn-co.com

Email 2: ron.rosset@penn-co.com

Email 3: brad.degraeve@gov.mb.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: ap@penn-co.com

Email 2: ron.rosset@penn-co.com

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☑ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 - 200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	Niverville WTP 2021-78	Major/Minor Code:	Routing Code:
PO / AFE:	78230206-1RR	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact:	Sampler: Johny Bartsch

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

NUMBER OF CONTAINERS

SAMPLES ON HOLD

SUSPECTED HAZARD (see Special Instructions)

RU S-8194, ULINE

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type
	~~MB-ESA-PWS testing for the following samples~~			
	1- Raw Water	02/08/23	10:00	Water
	2 - Bio Filter #1	02/08/23	9:30	"
	3 - Bio Filter #2	02/08/23	10:15	"
	4 - Bio Filter #3	02/08/23	10:15	"
	5 - MTU #1	02/08/23	10:00	"
	6 - MTU #2	02/08/23	11:00	"
	7 - Blended MTU #1	02/08/23	10:15	"
	8 - Blended MTU #2	02/08/23	11:15	"

Environmental Division Winnipeg

Work Order Reference

WP2301432

Telephone : +1 204 255 9720

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☑ YES ☐ NO

Are samples for human consumption/ use? ☑ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Manitoba Drinking Water Quality Standards Regulation 41/2007 (FEB, 2007)

*** Testing for MB-CH-PWS-WP

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				12.2			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	FEB 8/23	12:01	SC	FEB 08 2023	12:00			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCT 2018 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

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

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