western water
ASSOCIATES LTD
Consultants in Hydrogeology and Water Resources Management

January 25, 2024 23-119-01PG

Ministry of Water, Land and Resource Stewardship
2501-14th Avenue
Vernon, B.C.
V1T 8Z1

Attn: David Thomson M.Sc., P.Geo., Regional Hydrogeologist

Re: Hullcar Monitoring and Well Sampling: November 2023.

Western Water Associates Ltd. (WWAL) is pleased to provide this report documenting the results of a groundwater monitoring and sampling program conducted on behalf of the Ministry of Water, Land and Resource Stewardship (WLRS).

Six wells were monitored and five were sampled, as one was dry, November 8th, 2023. All sampling was conducted following methodology recommended in the BC Environmental Laboratory Manual (2023). All samples were submitted to CARO Labs in Kelowna B.C. following standard chain of custody procedures. Sampling was conducted by Junior Hydrogeologists Avi Bains, GIT, and Haley Malish GIT. under the supervision of Hydrogeologist Warren Grafton, P.Geo. Field measurements and analytical results compared to applicable standards are included for reference, and raw datalogger and compensated excel files will be provided separately.

We trust that the information provided in this document are sufficient for your current requirements. Should you have any questions, or if we can be of further assistance in this matter, please contact the undersigned.

WESTERN WATER ASSOCIATES LTD.
(EGBC Permit to Practice number 1001419)

Report by:

Warren Grafton, P.Geo.
Hydrogeologist

Scope of Services

WWAL completed the following work program as outlined in the email Invitation to Quote (ITQ) email request from the Ministry of Forests dated September 19th, 2023:

1. Reviewed monitoring well construction and developed a sampling plan including purge volumes and static water depths.
2. Completed a site-specific health and safety plan including safe work procedures.
3. Collected depth to water measurements utilizing an electric well sounder and removed/downloaded dataloggers from each well prior to purging.
4. Installed a temporary submersible pump and purged until parameter stabilization within 10% occurred. Standard field water quality parameters including pH, temperature, and electrical conductivity were monitored throughout the purging process using calibrated instruments (ENV, 2023).
5. Samples were collected in laboratory supplied bottles and submitted to CARO Labs in Kelowna B.C. following standard chain of custody procedures. Analysis was requested for the analytes described in the ITQ plus HCO_3. One blind field duplicated (BFD) was submitted for QA/QC purposes.
6. Prepared this brief memorandum summarizing the sampling program.

Field Methods

Monitoring Well Sampling Program

All monitoring wells were sampled and purged utilizing a submersible pump and Waterra tubing. Table 1 below summarizes purge methodology and field observations collected from each well prior to sampling. A hydrograph depicting water level elevations for March 2022-November 2023 is included in Appendix A. As the barrologger installed at the site was found to be non-functioning, transducer data was manually compensated for barometric effects using atmospheric pressures reported by Environment Canada's Salmon Arm CS station (Environment Canada, 2023). The station is located approximately 20 km north of site at an elevation of 350 masl (~200 m lower in elevation).

Table 1: Summary of Field Observations.

Well ID	Date	Purge Methodology	Volume Purged (L)	Depth to Water (mbtoc)	Temperature (˚C)	pH	Conductivity (µs)
MW-19-1A-R	11/08/2023	Parameter Stabilization	45	10.37	8.6	7.22	1247
MW-19-2A	11/08/2023	DRY	N/A	N/A	N/A	N/A	N/A
MW-19-3A	11/08/2023	Parameter Stabilization	50	4.72	11.7	7.21	932

Well ID	Date	Purge Methodology	Volume Purged (L)	Depth to Water (mbtoc)	Temperature (°C)	pH	Conductivity (µs)
MW-20-1B	11/08/2023	Parameter Stabilization	45	10.24	8.6	7.33	1077
MW-20-2B	11/08/2023	Parameter Stabilization	210	10.87	11.7	7.49	875
MW-20-4A	11/08/2023	Parameter Stabilization	115	18.79	9.9	7.30	987

Analytical Results

Analytical summary tables were produced utilizing Wireless Water and compared to B.C. Contaminated Sites Regulation Numerical Standards in Water (Schedule 3.2) (ENV, 2021). Without making any determination on applicable standards, the summary tables compare results to aquatic life (AW), irrigation (IW), livestock watering (LW) and drinking water (DL) standards. Summary tables and laboratory certificates of analysis are included as an attachment for reference.

The results of stable isotopes of water analysis are presented in Table 2, below.

Table 2: Summary of Isotope Results.

Radiological Analyte	MW-19-1A-R	MW-19-3A	MW-20-1B	MW-20-2B	MW-20-2B (Duplicate)	MW-20-4A
δ -2-H	-126.7	-130.2	-132.8	-135.1	-135.4	-137.4
δ-18-O	-16.15	-16.71	-17.14	-17.26	-17.31	-17.81

Quality Assurance / Quality Control (QA/QC)

Laboratory Qualifications

CARO is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. CARO is fully accredited to analyze and report on the analyses completed for this project.

To validate the reproducibility of the laboratory analyses and confirm that standard field sampling techniques utilized by WWAL personnel are capable of yielding reproducible results, blind field duplicates (BFD's) were submitted to the laboratory and analyzed for select parameters. One water sample duplicate was submitted for analysis of total metals. The field duplicate was compared to its corresponding sample and the Relative Percent Difference (RPD) were calculated. RPD is defined as the difference of the absolute value of the duplicate result divided by the average of the duplicate results, expressed as a percentage. Analytical error increases near the method detection limit (MDL) and as such, the RPD

calculation should not be performed unless the concentrations of both samples are greater than 5 times the MDL. Duplicate acceptance criteria for water is +/- 20% (Province of British Columbia, 2013). Calculated RPDs for the duplicate sample were typically low (~<5%) with occasionally higher differences noted in analytes detected in relatively low concentrations. Phosphorous was the sole analyte to exceed the 20% criteria and it attributed to relatively low concentrations. As such, the sample duplicate variation is considered acceptable. Duplicate RPD calculations are included for reference as an attachment.

As an internal quality control, samples submitted to CARO were subjected to one or more of six laboratory QA/QC procedures (method blanks, lab duplicates, matrix spike recoveries, surrogate recovery, reference material comparison and/or laboratory control samples), which were documented on the laboratory certificates provided. A summary of the lab QA/QC attached to each laboratory report is included as an attachment. The Laboratory QA/QC results were reviewed by WWAL staff and determined to be acceptable to industry standards.

List of Attachments

- Hydrograph March 2022-November 2023
- Groundwater Analytical Summary Tables
- Duplicate Sample RPD Calculations
- Laboratory Certificates of Analysis
- Field Sheets from Nov. 8th, 2023
- Chain of Custody Forms

REFERENCES

ENV. (2021, January 26). *Contaminated Sites Regulation.* Retrieved from Environmental Managment Act: https://www.bclaws.gov.bc.ca/civix/document/id/lc/statreg/375_96_08

ENV. (2023). B.C. Field Sampling Manual. B.C. Retrieved from https://www2.gov.bc.ca/assets/gov/environment/research-monitoring-and-reporting/monitoring/emre/bc_field_sampling_manual_complete.pdf

Environment Canada. (2023). Salmon Arm Cs. *Climate ID 116FRMN*. BC, Canada.

Province of British Columbia. (2013). BC Field Sampling Manual. Victoria, BC, Canada.

Appendix A

Hydrograph March 2022-November 2023

Hullcar Fall 2023 Groundwater Sampling
Ministry of Environment and Climate Change Strategy
WWAL Ref: 23-119-01PG

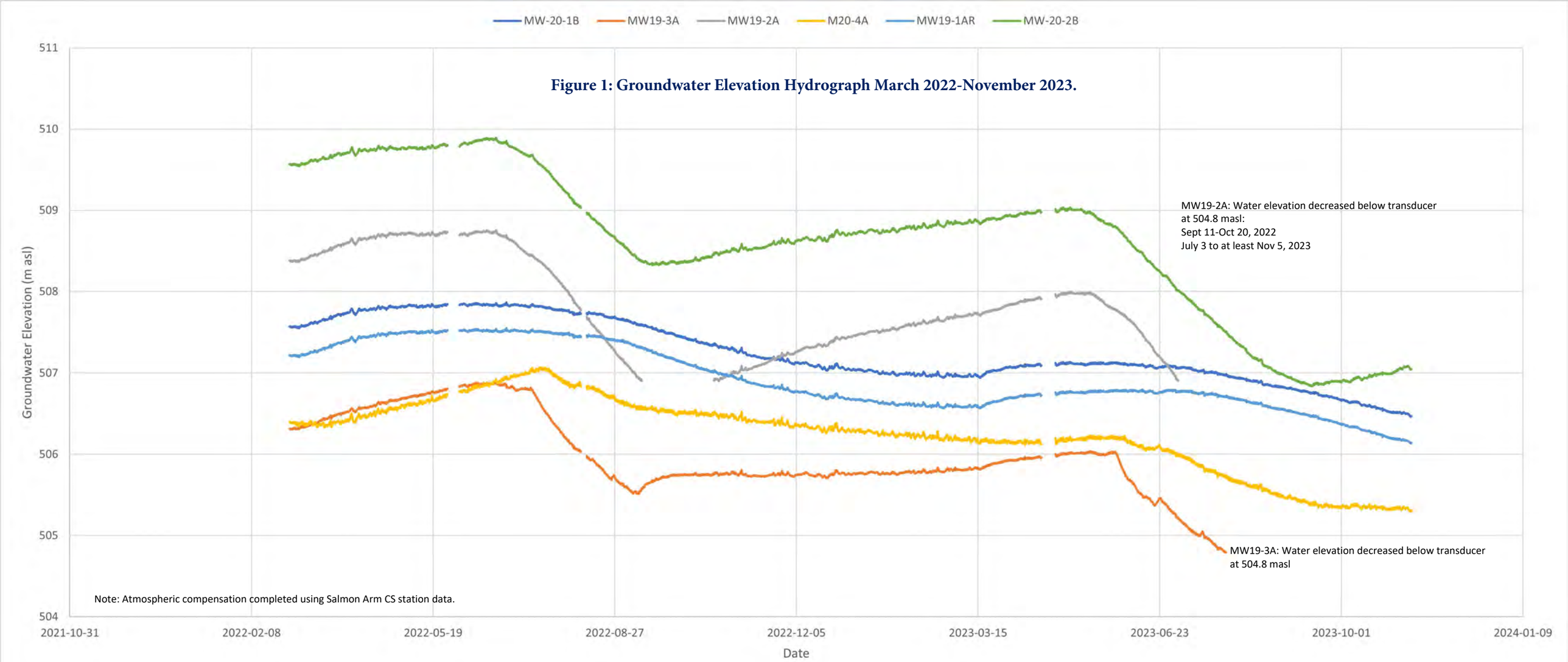

Figure 1: Groundwater Elevation Hydrograph March 2022-November 2023.

Appendix B

Groundwater Analytical Summary Table

Hullcar Fall 2023 Groundwater Sampling
Ministry of Environment and Climate Change Strategy
WWAL Ref: 23-119-01PG

Analyte	Unit	Guideline				Sampling Location	MW19-1AR	MW19-3A	MW20-1B	MW20-2B	MW20-2B	MW20-4A
						Date Sampled	08-Nov-23	08-Nov-23	08-Nov-23	08-Nov-23	08-Nov-23	08-Nov-23
						Lab Sample ID	23K1363-02	23K1363-04	23K1363-01	23K1363-06	23K1363-03	23K1363-05
						Sample Type					Duplicate	
		CSR AW	CSR IW	CSR LW	CSR DW							
Field Parameters												
Temperature	(˚C)						8.5	11.1	8.72	11.4	x	10
pH							7.22	7.22	7.34	7.47	x	7.35
EC	(µS/cm)						1238	929	1055	898	x	997
TDS	(mg/L)						879	658	749	637	x	706
DO	(mg/L)						9.19	3.56	4.48	2.44	x	2.66
ORP	(mV)						192	155	197	-67	x	197
Turbidity (NTU)							10.57	5.34	2.81	0.23	x	1.49
		CSR AW	CSR IW	CSR LW	CSR DW							
Lab Results												
Anions and Cations in meq/L unit												
Aluminum (meq/L) (calculated)	meq/L	NG	NG	NG	NG		<0.00056	<0.00056	<0.00056	<0.00056	<0.00056	<0.00056
Barium (meq/L) (calculated)	meq/L	NG	NG	NG	NG		0.00151	0.000839	0.000910	0.000926	0.000923	0.00165
Boron (meq/L) (calculated)	meq/L	NG	NG	NG	NG		<0.0139	<0.0139	<0.0139	<0.0139	<0.0139	<0.0139
Calcium (meq/L) (calculated)	meq/L	NG	NG	NG	NG		12.3	9.53	9.58	7.98	7.88	6.54
Calcium (total, meq/L) (calculated)	meq/L	NG	NG	NG	NG		11.1	8.58	8.88	7.44	7.48	6.14
Chloride (meq/L) (calculated)	meq/L	NG	NG	NG	NG		0.987	0.691	0.855	0.891	0.894	1.52
Chromium (meq/L) (calculated)	meq/L	NG	NG	NG	NG		0.0000796	<0.000029	<0.000029	<0.000029	<0.000029	<0.000029
Copper (meq/L) (calculated)	meq/L	NG	NG	NG	NG		0.0000412	0.0000324	0.0000491	<0.000013	<0.000013	0.000024
Lead (meq/L) (calculated)	meq/L	NG	NG	NG	NG		<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019	<0.0000019
Lithium (meq/L) (calculated)	meq/L	NG	NG	NG	NG		0.00111	0.000839	0.000953	0.00186	0.00183	0.00314
Magnesium (meq/L) (calculated)	meq/L	NG	NG	NG	NG		3.04	1.61	2.44	2.13	2.16	4.53
Magnesium (total, meq/L) (calculated)	meq/L	NG	NG	NG	NG		3.01	1.62	2.37	2.11	2.14	4.47
Potassium (meq/L) (calculated)	meq/L	NG	NG	NG	NG		0.195	0.204	0.180	0.216	0.219	0.184
Potassium (total, meq/L) (calculated)	meq/L	NG	NG	NG	NG		0.183	0.197	0.173	0.211	0.210	0.178
Sodium (meq/L) (calculated)	meq/L	NG	NG	NG	NG		0.744	0.566	1.02	1.13	1.15	1.44
Sodium (total, meq/L) (calculated)	meq/L	NG	NG	NG	NG		0.731	0.570	1.02	1.12	1.14	1.5
Strontium (meq/L) (calculated)	meq/L	NG	NG	NG	NG		0.0329	0.0322	0.0310	0.0338	0.0342	0.0479
Sulfate (meq/L) (calculated)	meq/L	NG	NG	NG	NG		7.85	4.48	6.83	5.35	5.39	3.02
Zinc (meq/L) (calculated)	meq/L	NG	NG	NG	NG		<0.00012	<0.00012	<0.00012	<0.00012	<0.00012	<0.00012
Dissolved Metals												
Aluminum (dissolved)	µg/L	NG	5000	5000	9500 [4.1]		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Antimony (dissolved)	µg/L	90	NG	NG	6		<0.20	0.43	<0.20	<0.20	<0.20	<0.20
Arsenic (dissolved)	µg/L	50	100	25	10		0.69	<0.50	1.00	0.75	0.76	<0.50
Barium (dissolved)	µg/L	10000	NG	NG	1000		104	57.6	62.5	63.6	63.4	113
Beryllium (dissolved)	µg/L	1.5	100	100	8		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Bismuth (dissolved)	µg/L	NG	NG	NG	NG		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Boron (dissolved)	µg/L	12000	500 [2.1]	5000	5000		<50.0	<50.0	<50.0	<50.0	<50.0	<50.0
Cadmium (dissolved)	µg/L	Calc [1.1]	5	80	5		0.021	0.092	0.014	<0.010	<0.010	0.019
Calcium (dissolved)	mg/L	NG	NG	1000	NG		246	191	192	160	158	131
Chromium (dissolved)	µg/L	10 [1.2]	5 [2.2]	50 [3.1]	50 [4.2]		1.38	<0.50	<0.50	<0.50	<0.50	<0.50
Cobalt (dissolved)	µg/L	40	50	1000	1		0.13	0.41	<0.10	0.15	0.15	<0.10
Copper (dissolved)	µg/L	Calc [1.3]	200	300	1500 [4.3]		1.31	1.03	1.56	<0.40	<0.40	0.76
Hardness (as CaCO3), dissolved	mg/L	NG	NG	NG	NG		768	559	601	507	503	554
Iron (dissolved)	µg/L	NG	5000 [2.3]	NG	6500 [4.4]		<10	<10	<10	1490	1610	<10
Lead (dissolved)	µg/L	Calc [1.4]	200	100	10		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Lithium (dissolved)	µg/L	NG	2500 [2.4]	5000	8		7.67	5.82	6.61	12.9	12.7	21.8
Magnesium (dissolved)	mg/L	NG	NG	NG	NG		37.0	19.6	29.6	25.9	26.2	55.1
Manganese (dissolved)	µg/L	NG	200 [2.5]	NG	1500 [4.5]		0.21	16.9	0.50	80.5	81.9	6.59
Mercury (dissolved)	µg/L	0.25	1	2	1		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

Analyte	Unit	Guideline				Sampling Location	MW19-1AR	MW19-3A	MW20-1B	MW20-2B	MW20-2B	MW20-4A
						Date Sampled	08-Nov-23	08-Nov-23	08-Nov-23	08-Nov-23	08-Nov-23	08-Nov-23
						Lab Sample ID	23K1363-02	23K1363-04	23K1363-01	23K1363-06	23K1363-03	23K1363-05
						Sample Type					Duplicate	
		CSR AW	CSR IW	CSR LW	CSR DW							
Molybdenum (dissolved)	µg/L	10000	10 [2.6]	50	250		0.88	2.06	3.39	3.88	3.88	0.96
Nickel (dissolved)	µg/L	Calc [1.5]	200	1000	80		1.31	3.66	0.79	0.41	0.42	1.07
Phosphorus (dissolved, by ICPMS/ICPOES)	µg/L	NG	NG	NG	NG		<50	<50	<50	<50	<50	<50
Phosphorus (dissolved, APHA 4500-P)	µg/L	NG	NG	NG	NG		15.1	10.4	27.1	8.8	13.2	<5.0
Potassium (dissolved)	µg/L	NG	NG	NG	NG		7620	7960	7020	8460	8570	7180
Selenium (dissolved)	µg/L	20	20 [2.7]	30	10		5.19	2.55	8.39	<0.50	<0.50	4.64
Silicon (dissolved, as Si)	µg/L	NG	NG	NG	NG		13500	8100	11700	11400	11500	10800
Silver (dissolved)	µg/L	Calc [1.6]	NG	NG	20		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Sodium (dissolved)	mg/L	NG	NG	NG	200 [4.6]		17.1	13.0	23.4	26.0	26.5	33.1
Strontium (dissolved)	µg/L	NG	NG	NG	2500		1440	1410	1360	1480	1500	2100
Sulphur (dissolved)	µg/L	NG	NG	NG	NG		132000	73900	110000	87100	86800	51000
Tellurium (dissolved)	µg/L	NG	NG	NG	NG		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Thallium (dissolved)	µg/L	3	NG	NG	NG		<0.020	0.040	<0.020	<0.020	<0.020	<0.020
Thorium (dissolved)	µg/L	NG	NG	NG	NG		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (dissolved)	µg/L	NG	NG	NG	2500		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Titanium (dissolved)	µg/L	1000	NG	NG	NG		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Tungsten (dissolved)	µg/L	NG	NG	NG	3		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Uranium (dissolved)	µg/L	85	10	200	20		4.90	33.3	6.25	3.21	3.21	12.6
Vanadium (dissolved)	µg/L	NG	100	100	20		<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Zinc (dissolved)	µg/L	Calc [1.7]	1000 [2.8]	2000	3000 [4.7]		<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Zirconium (dissolved)	µg/L	NG	NG	NG	NG		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
General and Inorganic Parameters												
Alkalinity (bicarbonate, as CaCO3)	mg/L	NG	NG	NG	NG		310	316	256	267	269	385
Alkalinity (carbonate, as CaCO3)	mg/L	NG	NG	NG	NG		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity (hydroxide, as CaCO3)	mg/L	NG	NG	NG	NG		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity (phenolphthalein, as CaCO3)	mg/L	NG	NG	NG	NG		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity (total, as CaCO3)	mg/L	NG	NG	NG	NG		310	316	256	267	269	385
Ammonia (total, as N)	µg/L	Calc [1.8]	NG	NG	NG		<50	<50	<50	<50	<50	<50
Total organic carbon	mg/L	NG	NG	NG	NG		3.73	2.28	2.66	1.03	0.93	1.54
Chloride ion	mg/L	1500	100 [2.9]	600	250 [4.8]		35.0	24.5	30.3	31.6	31.7	54.0
Nitrate (as N)	mg/L	400 [1.9]	NG	100 [3.2]	10 [4.9]		13.4	3.66	5.10	<0.010	<0.010	0.858
Nitrate + Nitrite (as N) (calculated)	mg/L	400 [1.10]	NG	100 [3.3]	10 [4.10]		13.4	3.83	5.10	<0.014	<0.014	0.858
Nitrite (as N)	µg/L	Calc [1.11]	NG	10000	1000		<10	172	<10	<10	<10	<10
Dissolved kjeldahl nitrogen	µg/L	NG	NG	NG	NG		656	350	413	168	199	132
Total suspended solids	mg/L	NG	NG	NG	NG		6.6	9.4	5.0	4.2	<4.0	<2.0
Sulphate	mg/L	Calc [1.12]	NG	1000	500 [4.11]		377	215	328	257	259	145
Radiological												
delta-2-H	per mil	NG	NG	NG	NG		-126.7	-130.2	-132.8	-135.1	-135.4	-137.4
delta-18-O	per mil	NG	NG	NG	NG		-16.15	-16.71	-17.14	-17.26	-17.31	-17.81
Total Metals												
Aluminum (total)	µg/L	NG	5000	5000	9500 [4.12]		119	106	23.2	5.0	5.3	15.5
Antimony (total)	µg/L	90	NG	NG	6		<0.20	0.37	<0.20	<0.20	<0.20	<0.20
Arsenic (total)	µg/L	50	100	25	10		0.83	0.53	1.20	0.80	0.80	<0.50
Barium (total)	µg/L	10000	NG	NG	1000		100	56.6	59.1	61.5	62.3	107
Beryllium (total)	µg/L	1.5	100	100	8		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Bismuth (total)	µg/L	NG	NG	NG	NG		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Boron (total)	µg/L	12000	500 [2.10]	5000	5000		<50.0	<50.0	<50.0	<50.0	<50.0	<50.0
Cadmium (total)	µg/L	Calc [1.13]	5	80	5		0.024	0.106	0.021	<0.010	<0.010	0.017
Calcium (total)	mg/L	NG	NG	1000	NG		223	172	178	149	150	123
Chromium (total)	µg/L	10 [1.14]	5 [2.11]	50 [3.4]	50 [4.13]		1.72	<0.50	0.59	<0.50	<0.50	<0.50

					Sampling Location	MW19-1AR	MW19-3A	MW20-1B	MW20-2B	MW20-2B	MW20-4A
					Date Sampled	08-Nov-23	08-Nov-23	08-Nov-23	08-Nov-23	08-Nov-23	08-Nov-23
					Lab Sample ID	23K1363-02	23K1363-04	23K1363-01	23K1363-06	23K1363-03	23K1363-05
					Sample Type					Duplicate	
Analyte	**Unit**	**Guideline**									
		CSR AW	CSR IW	CSR LW	CSR DW						
Cobalt (total)	µg/L	40	50	1000	1	0.35	0.69	0.21	0.15	0.16	<0.10
Copper (total)	µg/L	Calc [1.15]	200	300	1500 [4.14]	2.30	3.17	1.64	<0.40	<0.40	0.90
Hardness (as CaCO3), from total Ca/Mg	mg/L	NG	NG	NG	NG	708	512	562	478	482	531
Iron (total)	µg/L	NG	5000 [2.12]	NG	6500 [4.15]	384	311	122	1680	1710	34
Lead (total)	µg/L	Calc [1.16]	200	100	10	0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Lithium (total)	µg/L	NG	2500 [2.13]	5000	8	7.03	5.33	6.07	11.5	12.0	19.6
Magnesium (total)	mg/L	NG	NG	NG	NG	36.6	19.7	28.8	25.7	26.0	54.3
Manganese (total)	µg/L	NG	200 [2.14]	NG	1500 [4.16]	6.92	26.1	81.3	81.5	82.6	7.16
Mercury (total)	µg/L	0.25	1	2	1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Molybdenum (total)	µg/L	10000	10 [2.15]	50	250	0.89	2.08	3.60	4.00	4.02	1.00
Nickel (total)	µg/L	Calc [1.17]	200	1000	80	1.96	4.28	1.20	0.44	0.51	1.21
Phosphorus (total, by ICPMS/ICPOES)	µg/L	NG	NG	NG	NG	58	<50	<50	<50	<50	<50
Potassium (total)	µg/L	NG	NG	NG	NG	7150	7700	6750	8230	8190	6960
Selenium (total)	µg/L	20	20 [2.16]	30	10	4.92	2.64	8.11	<0.50	<0.50	4.45
Silicon (total, as Si)	µg/L	NG	NG	NG	NG	13200	8400	11800	11400	12000	11200
Silver (total)	µg/L	Calc [1.18]	NG	NG	20	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Sodium (total)	mg/L	NG	NG	NG	200 [4.17]	16.8	13.1	23.4	25.8	26.3	34.4
Strontium (total)	µg/L	NG	NG	NG	2500	1380	1370	1300	1430	1440	2020
Sulphur (total)	µg/L	NG	NG	NG	NG	133000	76900	115000	87100	93300	53500
Tellurium (total)	µg/L	NG	NG	NG	NG	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Thallium (total)	µg/L	3	NG	NG	NG	<0.020	0.048	<0.020	<0.020	<0.020	<0.020
Thorium (total)	µg/L	NG	NG	NG	NG	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tin (total)	µg/L	NG	NG	NG	2500	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Titanium (total)	µg/L	1000	NG	NG	NG	7.3	<5.0	<5.0	<5.0	<5.0	<5.0
Tungsten (total)	µg/L	NG	NG	NG	3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Uranium (total)	µg/L	85	10	200	20	4.95	34.1	6.19	3.16	3.28	12.8
Vanadium (total)	µg/L	NG	100	100	20	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Zinc (total)	µg/L	Calc [1.19]	1000 [2.17]	2000	3000 [4.18]	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Zirconium (total)	µg/L	NG	NG	NG	NG	0.16	0.10	<0.10	<0.10	<0.10	<0.10

Sampling Location	Guideline	Exceedances
MW19-1AR	CSR DW	Nitrate (as N), Nitrate + Nitrite (as N) (calculated)
MW19-3A	CSR IW	Uranium (dissolved)
	CSR DW	Uranium (dissolved), Uranium (total)
MW20-2B	CSR DW	Lithium (dissolved), Lithium (total)
MW20-4A	CSR IW	Uranium (dissolved)
	CSR DW	Lithium (dissolved), Lithium (total)

	MW19-1AR	MW19-3A	MW20-2B	MW20-4A
Lab Results				
Dissolved Metals				
Lithium (dissolved)			X	X
Uranium (dissolved)		X		X
General and Inorganic Parameters				
Nitrate (as N)	X			
Nitrate + Nitrite (as N) (calculated)	X			
Total Metals				
Lithium (total)			X	X
Uranium (total)		X		

Guideline Notes for Reports for 23-119-01PG (21-124-01PG) Hullcar Groundwater Monitoring Water Quality Results

1. Notes for BC CSR Generic Numerical Water Standards for Freshwater Aquatic Life (CSR AW)

General Notes:

BC Contaminated Sites Regulation, Generic Numerical Water Standards, Schedule 3.2; includes amendments up to B.C. Reg. 13/2019, January 24, 2019.

Aquatic life standards assume minimum 1:10 dilution available.

Standards for all organic substances are for total substance concentrations. Any water sample to be analyzed for organic substances should not be filtered.

Standards for surface water samples to be analyzed for heavy metals, metalloids and inorganic ions are total substance concentrations. In addition, it is recommended that surface water samples being analyzed for heavy metals, metalloids and inorganic ions should also be analyzed for dissolved substance concentrations.

Standards for groundwater samples for heavy metals, metalloids and inorganic ions are for dissolved substance concentrations. In addition, it is recommended that groundwater samples being analyzed for heavy metals, metalloids and inorganic ions should also be analyzed for total substance concentrations. / The standard to protect freshwater aquatic life was used when separate aquatic life standards are provided for freshwater aquatic life and marine aquatic life.

Note 1.1 for Cadmium (dissolved):

The standard for cadmium is as follows:

0.5 µg/L @ H < 30

1.5 µg/L @ H 30 - < 90

2.5 µg/L @ H 90 - < 150

3.5 µg/L @ H 150 - < 210

4 µg/L @ H ≥ 210

Where H means water hardness in mg/L as $CaCO_3$.

Note 1.2 for Chromium (dissolved):

Analytical results for chromium (all species) in water may be used to demonstrate compliance with the standards. Where the standards cannot be met based on analytical results for chromium (all species), chromium speciation may be necessary.

Standard is 10 µg/L for chromium, hexavalent. Standard is 90 µg/L for chromium, trivalent. The standard of 10 µg/L was used to identify exceedances for dissolved chromium in order to demonstrate compliance with the standards.

Note 1.3 for Copper (dissolved):

The standard for copper is as follows:

20 µg/L @ H < 50

30 µg/L @ H 50 - < 75

40 µg/L @ H 75 - < 100

50 µg/L @ H 100 - < 125

60 µg/L @ H 125 - < 150

70 µg/L @ H 150 - < 175

80 µg/L @ H 175 - < 200

90 µg/L @ H ≥ 200

Where H means water hardness in mg/L as $CaCO_3$.

Note 1.4 for Lead (dissolved):
The standard for lead is as follows:
40 µg/L @ H < 50
50 µg/L @ H 50 - < 100
60 µg/L @ H 100 - < 200
110 µg/L @ H 200 - < 300
160 µg/L @ ≥ 300
Where H means water hardness in mg/L as CaCO3.
Note 1.5 for Nickel (dissolved):
The standard for nickel is as follows:
250 µg/L @ H < 60
650 µg/L @ H 60 - < 120
1,100 µg/L @ H 120 - < 180
1,500 µg/L @ H ≥ 180
Where H means water hardness in mg/L as CaCO3.
Note 1.6 for Silver (dissolved):
The standard for silver is:
0.5 µg/L @ H ≤ 100
15 µg/L @ H > 100
Where H means water hardness in mg/L as CaCO3.
Note 1.7 for Zinc (dissolved):
The standard for zinc is as follows:
75 µg/L @ H < 90
150 µg/L @ H = 90 - < 100
900 µg/L @ H = 100 - < 200
1,650 µg/L @ H = 200 - < 300
2,400 µg/L @ H = 300 - < 400
3,150 µg/L @ H = 400 - < 500
If H ≥ 500 then use following formula:
Standard (µg/L) = 10 x [7.5 +{(0.75)(H – 90)}]
Where H means water hardness in mg/L as CaCO3.
There are special ministry approval and data reporting requirements for water hardness values ≥ 500 mg/L as CaCO3.
Reference is Schedule 3.2 and Protocol 10.
Note 1.8 for Ammonia (total, as N):
Standard varies with pH and temperature. 10 degrees C is assumed. Consult a director for further advice.
The standard for ammonia, total (as N) is:
1,310 µg/L @ pH ≥ to 8.5
3,700 µg/L @ pH 8.0 - < 8.5
11,300 µg/L @ pH 7.5 - < 8.0
18,500 µg/L @ pH 7.0 - < 7.5
18,400 µg/L @ pH < 7.0
Note 1.9 for Nitrate (as N):
Standard may not protect all amphibians. Consult director for further advice.

Note 1.10 for Nitrate + Nitrite (as N) (calculated):
Standard may not protect all amphibians. Consult director for further advice.
Note 1.11 for Nitrite (as N):
Standard varies with chloride concentration. Consult a director for further advice.
The standard for nitrite (as N) is:
200 µg/L (Cl < 2 mg/L)
400 µg/L (Cl 2 - < 4 mg/L)
600 µg/L (Cl 4 - < 6 mg/L)
800 µg/L (Cl 6 - < 8 mg/L)
1,000 µg/L (Cl 8 - < 10 mg/L)
2,000 µg/L (Cl ≥ 10 mg/L)
Note 1.12 for Sulphate:
The standard for sulfate is:
1280 mg/L @ H ≤ 30
2180 mg/L @ H 31 - 75
3090 mg/L @ H 76 - 180
4290 mg/L @ H > 180
Where H means water hardness in mg/L as CaCO3.
Note 1.13 for Cadmium (total):
The standard for cadmium is as follows:
0.5 µg/L @ H < 30
1.5 µg/L @ H 30 - < 90
2.5 µg/L @ H 90 - < 150
3.5 µg/L @ H 150 - < 210
4 µg/L @ H ≥ 210
Where H means water hardness in mg/L as CaCO3.
Note 1.14 for Chromium (total):
Analytical results for chromium (all species) in water may be used to demonstrate compliance with the standards. Where the standards cannot be met based on analytical results for chromium (all species), chromium speciation may be necessary.
Standard is 10 µg/L for chromium, hexavalent. Standard is 90 µg/L for chromium, trivalent. The standard of 10 µg/L was used to identify exceedances for total chromium in order to demonstrate compliance with the standards.
Note 1.15 for Copper (total):
The standard for copper is as follows:
20 µg/L @ H < 50
30 µg/L @ H 50 - < 75
40 µg/L @ H 75 - < 100
50 µg/L @ H 100 - < 125
60 µg/L @ H 125 - < 150
70 µg/L @ H 150 - < 175
80 µg/L @ H 175 - < 200
90 µg/L @ H ≥ 200
Where H means water hardness in mg/L as CaCO3.

Note 1.16 for Lead (total):
The standard for lead is as follows:
40 µg/L @ H < 50
50 µg/L @ H 50 - < 100
60 µg/L @ H 100 - < 200
110 µg/L @ H 200 - < 300
160 µg/L @ ≥ 300
Where H means water hardness in mg/L as CaCO3.
Note 1.17 for Nickel (total):
The standard for nickel is as follows:
250 µg/L @ H < 60
650 µg/L @ H 60 - < 120
1,100 µg/L @ H 120 - < 180
1,500 µg/L @ H ≥ 180
Where H means water hardness in mg/L as CaCO3.
Note 1.18 for Silver (total):
The standard for silver is:
0.5 µg/L @ H ≤ 100
15 µg/L @ H > 100
Where H means water hardness in mg/L as CaCO3.
Note 1.19 for Zinc (total):
The standard for zinc is as follows:
75 µg/L @ H < 90
150 µg/L @ H = 90 - < 100
900 µg/L @ H = 100 - < 200
1,650 µg/L @ H = 200 - < 300
2,400 µg/L @ H = 300 - < 400
3,150 µg/L @ H = 400 - < 500
If H ≥ 500 then use following formula:
Standard (µg/L) = 10 x [7.5 +{(0.75)(H – 90)}]
Where H means water hardness in mg/L as CaCO3.
There are special ministry approval and data reporting requirements for water hardness values ≥ 500 mg/L as CaCO3.
Reference is Schedule 3.2 and Protocol 10.
2. Notes for BC CSR Generic Numerical Water Standards for Irrigation (CSR IW)
General Notes:

BC Contaminated Sites Regulation, Generic Numerical Water Standards, Schedule 3.2; includes amendments up to B.C. Reg. 13/2019, January 24, 2019.
Standards for all organic substances are for total substance concentrations. Any water sample to be analyzed for organic substances should not be filtered.
Standards for surface water samples to be analyzed for heavy metals, metalloids and inorganic ions are total substance concentrations. In addition, it is recommended that surface water samples being analyzed for heavy metals, metalloids and inorganic ions should also be analyzed for dissolved substance concentrations.
Standards for groundwater samples for heavy metals, metalloids and inorganic ions are for dissolved substance concentrations. In addition, it is recommended that groundwater samples being analyzed for heavy metals, metalloids and inorganic ions should also be analyzed for total substance concentrations.
Standards apply to irrigation of all soil types, unless otherwise indicated. / There are several different standards for site-specific factors for some analytes. The most stringent standards were used for this criteria set.

Note 2.1 for Boron (dissolved):

Standard varies depending on crop. This standard is for blackberry crop.

Note 2.2 for Chromium (dissolved):

Analytical results for chromium (all species) in water may be used to demonstrate compliance with the standards. Where the standards cannot be met based on analytical results for chromium (all species), chromium speciation may be necessary.
Standard is 8 µg/L for chromium, hexavalent. Standard is 5 µg/L for chromium, trivalent. The standard of 5 µg/L was used to identify exceedances for dissolved chromium in order to demonstrate compliance with the standards.

Note 2.3 for Iron (dissolved):

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as
(a) item A6, A7, A8 or A11
(b) item C1, C2, C3, C4 or C6,
(c) item D2, D3, D5, or D6
(d) item E4, or
(e) item H14.
Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.

Note 2.4 for Lithium (dissolved):

Standard to protect all types of crops.

Note 2.5 for Manganese (dissolved):

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as
(a) item B1
(b) item C1, C3 or C4
(c) item D2, D3, D5, or D6
(d) item E4, or
(e) item H3 or H14.
Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.

Note 2.6 for Molybdenum (dissolved):

Standard varies with crop, soil drainage and Mo:Cu ratio. Standard is 10 – 30 µg/L. Consult a director for further advice. The most stringent standard of 10 µg/L has been used.

Note 2.7 for Selenium (dissolved):

Standard varies with type of application; continuous or intermittent. This standard is for continuous applications on crops.

Note 2.8 for Zinc (dissolved):

The standard varies (from 1000 to 5000 µg/L) with soil pH. This standard (which is the most stringent) is for soil pH less than 6.0

Note 2.9 for Chloride ion:

Standard to protect all types of crops.

Note 2.10 for Boron (total):

Standard varies depending on crop. This standard is for blackberry crop.

Note 2.11 for Chromium (total):

Analytical results for chromium (all species) in water may be used to demonstrate compliance with the standards. Where the standards cannot be met based on analytical results for chromium (all species), chromium speciation may be necessary.

Standard is 8 µg/L for chromium, hexavalent. Standard is 5 µg/L for chromium, trivalent. The standard of 5 µg/L was used to identify exceedances for total chromium in order to demonstrate compliance with the standards.

Note 2.12 for Iron (total):

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as
(a) item A6, A7, A8 or A11
(b) item C1, C2, C3, C4 or C6,
(c) item D2, D3, D5, or D6
(d) item E4, or
(e) item H14.

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.

Note 2.13 for Lithium (total):

Standard to protect all types of crops.

Note 2.14 for Manganese (total):

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as
(a) item B1
(b) item C1, C3 or C4
(c) item D2, D3, D5, or D6
(d) item E4, or
(e) item H3 or H14.

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.

Note 2.15 for Molybdenum (total):

Standard varies with crop, soil drainage and Mo:Cu ratio. Standard is 10 – 30 µg/L. Consult a director for further advice. The most stringent standard of 10 µg/L has been used.

Note 2.16 for Selenium (total):
Standard varies with type of application; continuous or intermittent. This standard is for continuous applications on crops.

Note 2.17 for Zinc (total):
The standard varies (from 1000 to 5000 µg/L) with soil pH. This standard (which is the most stringent) is for soil pH less than 6.0

3. Notes for BC CSR Generic Numerical Water Standards for Livestock (CSR LW)

General Notes:
BC Contaminated Sites Regulation, Generic Numerical Water Standards, Schedule 3.2; includes amendments up to B.C. Reg. 13/2019, January 24, 2019.
Standards for all organic substances are for total substance concentrations. Any water sample to be analyzed for organic substances should not be filtered.
Standards for surface water samples to be analyzed for heavy metals, metalloids and inorganic ions are total substance concentrations. In addition, it is recommended that surface water samples being analyzed for heavy metals, metalloids and inorganic ions should also be analyzed for dissolved substance concentrations.
Standards for groundwater samples for heavy metals, metalloids and inorganic ions are for dissolved substance concentrations. In addition, it is recommended that groundwater samples being analyzed for heavy metals, metalloids and inorganic ions should also be analyzed for total substance concentrations.

Note 3.1 for Chromium (dissolved):
Analytical results for chromium (all species) in water may be used to demonstrate compliance with the standards. Where the standards cannot be met based on analytical results for chromium (all species), chromium speciation may be necessary.
Standard is 50 µg/L for chromium, hexavalent. Standard is 50 µg/L for chromium, trivalent. The standard of 50 µg/L was used to identify exceedances for dissolved chromium in order to demonstrate compliance with the standards.

Note 3.2 for Nitrate (as N):
Where nitrate and nitrite are present, total nitrate plus nitrite-nitrogen should not exceed this value.

Note 3.3 for Nitrate + Nitrite (as N) (calculated):
Where nitrate and nitrite are present, total nitrate plus nitrite-nitrogen should not exceed this value.

Note 3.4 for Chromium (total):
Analytical results for chromium (all species) in water may be used to demonstrate compliance with the standards. Where the standards cannot be met based on analytical results for chromium (all species), chromium speciation may be necessary.
Standard is 50 µg/L for chromium, hexavalent. Standard is 50 µg/L for chromium, trivalent. The standard of 50 µg/L was used to identify exceedances for total chromium in order to demonstrate compliance with the standards.

4. Notes for BC CSR Generic Numerical Water Standards for Drinking Water (CSR DW)

General Notes:
BC Contaminated Sites Regulation, Generic Numerical Water Standards, Schedule 3.2; includes amendments up to B.C. Reg. 13/2019, January 24, 2019.
Drinking water standards are for unfiltered samples obtained at the point of consumption. Heavy metals, metalloids and inorganic ions are expressed as total substance concentrations unless otherwise indicated.

Note 4.1 for Aluminum (dissolved):

Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.
Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 4.2 for Chromium (dissolved):

Analytical results for chromium (all species) in water may be used to demonstrate compliance with the standards. Where the standards cannot be met based on analytical results for chromium (all species), chromium speciation may be necessary.
Standard is 50 µg/L for chromium, hexavalent. Standard is 6000 µg/L for chromium, trivalent. The standard of 50 µg/L was used to identify exceedances for dissolved chromium in order to demonstrate compliance with the standards.

Note 4.3 for Copper (dissolved):

Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.
Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 4.4 for Iron (dissolved):

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as
(a) item A6, A7, A8 or A11
(b) item C1, C2, C3, C4 or C6,
(c) item D2, D3, D5, or D6
(d) item E4, or
(e) item H14.
Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.
Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups. Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 4.5 for Manganese (dissolved):

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as
(a) item B1
(b) item C1, C3 or C4
(c) item D2, D3, D5, or D6
(d) item E4, or
(e) item H3 or H14.
Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.
Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.
Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 4.6 for Sodium (dissolved):

Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.

Note 4.7 for Zinc (dissolved):

Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.

Note 4.8 for Chloride ion:

Standard to protect against taste and odour concerns.

Note 4.9 for Nitrate (as N):

Where nitrate and nitrite are present, total nitrate plus nitrite-nitrogen should not exceed this value.

Note 4.10 for Nitrate + Nitrite (as N) (calculated):

Where nitrate and nitrite are present, total nitrate plus nitrite-nitrogen should not exceed this value.

Note 4.11 for Sulphate:

Standard to protect against taste and odour concerns.

Note 4.12 for Aluminum (total):

Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.

Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 4.13 for Chromium (total):

Analytical results for chromium (all species) in water may be used to demonstrate compliance with the standards. Where the standards cannot be met based on analytical results for chromium (all species), chromium speciation may be necessary.

Standard is 50 µg/L for chromium, hexavalent. Standard is 6000 µg/L for chromium, trivalent. The standard of 50 µg/L was used to identify exceedances for total chromium in order to demonstrate compliance with the standards.

Note 4.14 for Copper (total):

Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.

Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 4.15 for Iron (total):

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as
(a) item A6, A7, A8 or A11
(b) item C1, C2, C3, C4 or C6,
(c) item D2, D3, D5, or D6
(d) item E4, or
(e) item H14.

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.

Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.

Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 4.16 for Manganese (total):
Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as
(a) item B1
(b) item C1, C3 or C4
(c) item D2, D3, D5, or D6
(d) item E4, or
(e) item H3 or H14.
Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.
Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.
Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.
Note 4.17 for Sodium (total):
Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.
Note 4.18 for Zinc (total):
Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.

Legend for Reports for 23-119-01PG (21-124-01PG) Hullcar Groundwater Monitoring Water Quality Results

<	Less than reported detection limit
>	Greater than reported upper detection limit
>=	Greater than or equal to
A	Absent
Calc	Calculated guideline or standard. The guideline or standard is dependent on the value of one or more other analytes, and is calculated from a formula or table.
CSR AW	BC CSR Generic Numerical Water Standards for Freshwater Aquatic Life
CSR DW	BC CSR Generic Numerical Water Standards for Drinking Water
CSR IW	BC CSR Generic Numerical Water Standards for Irrigation
CSR LW	BC CSR Generic Numerical Water Standards for Livestock
L	Laboratory reading type (Lab result)
m asl	metres above sea level
N	Narrative type of guideline or standard, or Result Note.
ND	Non-detect. Result is less than lower detection limit.
NG	No Guideline
NR	No Result
NS	No Standard
NT	Not Tested
OG	Overgrown
P	Present
PR	Presumptive
TK	Test kit reading type (Field result)
TNTC	Too numerous to count
	Highlighted value has a lower detection limit that is greater than the guideline/standard maximum and/or the guideline/standard minimum, or has an upper detection limit that is less than the guideline/standard maximum and/or the guideline/standard minimum.
100	The maximum guideline/standard value cannot be determined because either a result for a dependent analyte is not available for the sample, or the guideline/standard is based on a formula or lookup table that has more than 2 dependent analytes and is not currently calculated in this software application.
CSR AW	Highlighted value exceeds CSR AW
CSR DW	Highlighted value exceeds CSR DW
CSR IW	Highlighted value exceeds CSR IW
CSR LW	Highlighted value exceeds CSR LW
SL Criteria Override	Highlighted value exceeds sampling location criteria override

						Sampling Location	MW20-2B	MW20-2B	
						Date Sampled	08-Nov-23	08-Nov-23	
						Lab Sample ID	23K1363-06	23K1363-03	
						Sample Type	Normal	Duplicate	RDP
Analyte	**Unit**	**Guideline**							
		CSR AW	CSR IW	CSR LW	CSR DW				
Lab Results									
Anions and Cations in meq/L unit									
Aluminum (meq/L) (calculated)	meq/L	NG	NG	NG	NG		<0.00056	<0.00056	
Barium (meq/L) (calculated)	meq/L	NG	NG	NG	NG		0.000926	0.000923	0.3
Boron (meq/L) (calculated)	meq/L	NG	NG	NG	NG		<0.0139	<0.0139	
Calcium (meq/L) (calculated)	meq/L	NG	NG	NG	NG		7.98	7.88	1.3
Calcium (total, meq/L) (calculated)	meq/L	NG	NG	NG	NG		7.44	7.48	0.5
Chloride (meq/L) (calculated)	meq/L	NG	NG	NG	NG		0.891	0.894	0.3
Chromium (meq/L) (calculated)	meq/L	NG	NG	NG	NG		<0.000029	<0.000029	
Copper (meq/L) (calculated)	meq/L	NG	NG	NG	NG		<0.000013	<0.000013	
Lead (meq/L) (calculated)	meq/L	NG	NG	NG	NG		<0.0000019	<0.0000019	
Lithium (meq/L) (calculated)	meq/L	NG	NG	NG	NG		0.00186	0.00183	1.6
Magnesium (meq/L) (calculated)	meq/L	NG	NG	NG	NG		2.13	2.16	1.4
Magnesium (total, meq/L) (calculated)	meq/L	NG	NG	NG	NG		2.11	2.14	1.4
Potassium (meq/L) (calculated)	meq/L	NG	NG	NG	NG		0.216	0.219	1.4
Potassium (total, meq/L) (calculated)	meq/L	NG	NG	NG	NG		0.211	0.210	0.5
Sodium (meq/L) (calculated)	meq/L	NG	NG	NG	NG		1.13	1.15	1.8
Sodium (total, meq/L) (calculated)	meq/L	NG	NG	NG	NG		1.12	1.14	1.8
Strontium (meq/L) (calculated)	meq/L	NG	NG	NG	NG		0.0338	0.0342	1.2
Sulfate (meq/L) (calculated)	meq/L	NG	NG	NG	NG		5.35	5.39	0.7
Zinc (meq/L) (calculated)	meq/L	NG	NG	NG	NG		<0.00012	<0.00012	
Dissolved Metals									
Aluminum (dissolved)	µg/L	NG	5000	5000	9500 [4.1]		<5.0	<5.0	
Antimony (dissolved)	µg/L	90	NG	NG	6		<0.20	<0.20	
Arsenic (dissolved)	µg/L	50	100	25	10		0.75	0.76	1.3
Barium (dissolved)	µg/L	10000	NG	NG	1000		63.6	63.4	0.3
Beryllium (dissolved)	µg/L	1.5	100	100	8		<0.10	<0.10	
Bismuth (dissolved)	µg/L	NG	NG	NG	NG		<0.10	<0.10	
Boron (dissolved)	µg/L	12000	500 [2.1]	5000	5000		<50.0	<50.0	
Cadmium (dissolved)	µg/L	Calc [1.1]	5	80	5		<0.010	<0.010	
Calcium (dissolved)	mg/L	NG	NG	1000	NG		160	158	1.3
Chromium (dissolved)	µg/L	10 [1.2]	5 [2.2]	50 [3.1]	50 [4.2]		<0.50	<0.50	
Cobalt (dissolved)	µg/L	40	50	1000	1		0.15	0.15	0.0
Copper (dissolved)	µg/L	Calc [1.3]	200	300	1500 [4.3]		<0.40	<0.40	
Hardness (as CaCO3), dissolved	mg/L	NG	NG	NG	NG		507	503	0.8
Iron (dissolved)	µg/L	NG	5000 [2.3]	NG	6500 [4.4]		1490	1610	7.7
Lead (dissolved)	µg/L	Calc [1.4]	200	100	10		<0.20	<0.20	
Lithium (dissolved)	µg/L	NG	2500 [2.4]	5000	8		12.9	12.7	1.6
Magnesium (dissolved)	mg/L	NG	NG	NG	NG		25.9	26.2	1.2
Manganese (dissolved)	µg/L	NG	200 [2.5]	NG	1500 [4.5]		80.5	81.9	1.7
Mercury (dissolved)	µg/L	0.25	1	2	1		<0.010	<0.010	
Molybdenum (dissolved)	µg/L	10000	10 [2.6]	50	250		3.88	3.88	0.0
Nickel (dissolved)	µg/L	Calc [1.5]	200	1000	80		0.41	0.42	2.4
Phosphorus (dissolved, by ICPMS/ICPOES)	µg/L	NG	NG	NG	NG		<50	<50	
Phosphorus (dissolved, APHA 4500-P)	µg/L	NG	NG	NG	NG		8.8	13.2	40.0

					Sampling Location	MW20-2B	MW20-2B	
					Date Sampled	08-Nov-23	08-Nov-23	
					Lab Sample ID	23K1363-06	23K1363-03	
					Sample Type	Normal	Duplicate	RDP
Analyte	**Unit**	**Guideline**						
		CSR AW	CSR IW	CSR LW	CSR DW			
Potassium (dissolved)	µg/L	NG	NG	NG	NG	8460	8570	1.3
Selenium (dissolved)	µg/L	20	20 [2.7]	30	10	<0.50	<0.50	
Silicon (dissolved, as Si)	µg/L	NG	NG	NG	NG	11400	11500	0.9
Silver (dissolved)	µg/L	Calc [1.6]	NG	NG	20	<0.050	<0.050	
Sodium (dissolved)	mg/L	NG	NG	NG	200 [4.6]	26.0	26.5	1.9
Strontium (dissolved)	µg/L	NG	NG	NG	2500	1480	1500	1.3
Sulphur (dissolved)	µg/L	NG	NG	NG	NG	87100	86800	0.3
Tellurium (dissolved)	µg/L	NG	NG	NG	NG	<0.50	<0.50	
Thallium (dissolved)	µg/L	3	NG	NG	NG	<0.020	<0.020	
Thorium (dissolved)	µg/L	NG	NG	NG	NG	<0.10	<0.10	
Tin (dissolved)	µg/L	NG	NG	NG	2500	<0.20	<0.20	
Titanium (dissolved)	µg/L	1000	NG	NG	NG	<5.0	<5.0	
Tungsten (dissolved)	µg/L	NG	NG	NG	3	<1.0	<1.0	
Uranium (dissolved)	µg/L	85	10	200	20	3.21	3.21	0.0
Vanadium (dissolved)	µg/L	NG	100	100	20	<5.0	<5.0	
Zinc (dissolved)	µg/L	Calc [1.7]	1000 [2.8]	2000	3000 [4.7]	<4.0	<4.0	
Zirconium (dissolved)	µg/L	NG	NG	NG	NG	<0.10	<0.10	
General and Inorganic Parameters								
Alkalinity (bicarbonate, as CaCO3)	mg/L	NG	NG	NG	NG	267	269	0.7
Alkalinity (carbonate, as CaCO3)	mg/L	NG	NG	NG	NG	<1.0	<1.0	
Alkalinity (hydroxide, as CaCO3)	mg/L	NG	NG	NG	NG	<1.0	<1.0	
Alkalinity (phenolphthalein, as CaCO3)	mg/L	NG	NG	NG	NG	<1.0	<1.0	
Alkalinity (total, as CaCO3)	mg/L	NG	NG	NG	NG	267	269	0.7
Ammonia (total, as N)	µg/L	Calc [1.8]	NG	NG	NG	<50	<50	
Total organic carbon	mg/L	NG	NG	NG	NG	1.03	0.93	10.2
Chloride ion	mg/L	1500	100 [2.9]	600	250 [4.8]	31.6	31.7	0.3
Nitrate (as N)	mg/L	400 [1.9]	NG	100 [3.2]	10 [4.9]	<0.010	<0.010	
Nitrate + Nitrite (as N) (calculated)	mg/L	400 [1.10]	NG	100 [3.3]	10 [4.10]	<0.014	<0.014	
Nitrite (as N)	µg/L	Calc [1.11]	NG	10000	1000	<10	<10	
Dissolved kjeldahl nitrogen	µg/L	NG	NG	NG	NG	168	199	16.9
Total suspended solids	mg/L	NG	NG	NG	NG	4.2	<4.0	
Sulphate	mg/L	Calc [1.12]	NG	1000	500 [4.11]	257	259	0.8
Radiological								
delta-2-H	per mil	NG	NG	NG	NG	-135.1	-135.4	0.2
delta-18-O	per mil	NG	NG	NG	NG	-17.26	-17.31	0.3
Total Metals								
Aluminum (total)	µg/L	NG	5000	5000	9500 [4.12]	5.0	5.3	5.8
Antimony (total)	µg/L	90	NG	NG	6	<0.20	<0.20	
Arsenic (total)	µg/L	50	100	25	10	0.80	0.80	0.0
Barium (total)	µg/L	10000	NG	NG	1000	61.5	62.3	1.3
Beryllium (total)	µg/L	1.5	100	100	8	<0.10	<0.10	
Bismuth (total)	µg/L	NG	NG	NG	NG	<0.10	<0.10	
Boron (total)	µg/L	12000	500 [2.10]	5000	5000	<50.0	<50.0	

					Sampling Location	MW20-2B	MW20-2B	
					Date Sampled	08-Nov-23	08-Nov-23	
					Lab Sample ID	23K1363-06	23K1363-03	
					Sample Type	Normal	Duplicate	RDP
Analyte	**Unit**	**Guideline**						
		CSR AW	CSR IW	CSR LW	CSR DW			
Cadmium (total)	µg/L	Calc [1.13]	5	80	5	<0.010	<0.010	
Calcium (total)	mg/L	NG	NG	1000	NG	149	150	0.7
Chromium (total)	µg/L	10 [1.14]	5 [2.11]	50 [3.4]	50 [4.13]	<0.50	<0.50	
Cobalt (total)	µg/L	40	50	1000	1	0.15	0.16	6.5
Copper (total)	µg/L	Calc [1.15]	200	300	1500 [4.14]	<0.40	<0.40	
Hardness (as CaCO3), from total Ca/Mg	mg/L	NG	NG	NG	NG	478	482	0.8
Iron (total)	µg/L	NG	5000 [2.12]	NG	6500 [4.15]	1680	1710	1.8
Lead (total)	µg/L	Calc [1.16]	200	100	10	<0.20	<0.20	
Lithium (total)	µg/L	NG	2500 [2.13]	5000	8	11.5	12.0	4.3
Magnesium (total)	mg/L	NG	NG	NG	NG	25.7	26.0	1.2
Manganese (total)	µg/L	NG	200 [2.14]	NG	1500 [4.16]	81.5	82.6	1.3
Mercury (total)	µg/L	0.25	1	2	1	<0.010	<0.010	
Molybdenum (total)	µg/L	10000	10 [2.15]	50	250	4.00	4.02	0.5
Nickel (total)	µg/L	Calc [1.17]	200	1000	80	0.44	0.51	14.7
Phosphorus (total, by ICPMS/ICPOES)	µg/L	NG	NG	NG	NG	<50	<50	
Potassium (total)	µg/L	NG	NG	NG	NG	8230	8190	0.5
Selenium (total)	µg/L	20	20 [2.16]	30	10	<0.50	<0.50	
Silicon (total, as Si)	µg/L	NG	NG	NG	NG	11400	12000	5.1
Silver (total)	µg/L	Calc [1.18]	NG	NG	20	<0.050	<0.050	
Sodium (total)	mg/L	NG	NG	NG	200 [4.17]	25.8	26.3	1.9
Strontium (total)	µg/L	NG	NG	NG	2500	1430	1440	0.7
Sulphur (total)	µg/L	NG	NG	NG	NG	87100	93300	6.9
Tellurium (total)	µg/L	NG	NG	NG	NG	<0.50	<0.50	
Thallium (total)	µg/L	3	NG	NG	NG	<0.020	<0.020	
Thorium (total)	µg/L	NG	NG	NG	NG	<0.10	<0.10	
Tin (total)	µg/L	NG	NG	NG	2500	<0.20	<0.20	
Titanium (total)	µg/L	1000	NG	NG	NG	<5.0	<5.0	
Tungsten (total)	µg/L	NG	NG	NG	3	<1.0	<1.0	
Uranium (total)	µg/L	85	10	200	20	3.16	3.28	3.7
Vanadium (total)	µg/L	NG	100	100	20	<5.0	<5.0	
Zinc (total)	µg/L	Calc [1.19]	1000 [2.17]	2000	3000 [4.18]	<4.0	<4.0	
Zirconium (total)	µg/L	NG	NG	NG	NG	<0.10	<0.10	

WIRELESS WATER

Appendix C

Laboratory Reports

Hullcar Fall 2023 Groundwater Sampling
Ministry of Environment and Climate Change Strategy
WWAL Ref: 23-119-01PG

CERTIFICATE OF ANALYSIS

REPORTED TO	Western Water Associates Ltd 1003 Kalamalka Lake Vernon, BC V1T6V4		
ATTENTION	Warren Grafton	**WORK ORDER**	23K1363
PO NUMBER		**RECEIVED / TEMP**	2023-11-09 15:02 / 8.4°C
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17
PROJECT INFO	Hullcar Fall GW Sampling 2023	**COC NUMBER**	No Number

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

By engaging our services, you are agreeing to CARO Analytical Service's Standard Terms and Conditions outlined here: https://www.caro.ca/terms-conditions

If you have any questions or concerns, please contact me at bwhitehead@caro.ca

Authorized By:

Brent Whitehead
Account Manager

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-20-1B (23K1363-01) | Matrix: Water | Sampled: 2023-11-08 18:30						
Anions						
Chloride	**30.3**	AO ≤ 250	0.10	mg/L	2023-11-11	
Nitrate (as N)	**5.10**	MAC = 10	0.010	mg/L	2023-11-11	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2023-11-11	
Sulfate	**328**	AO ≤ 500	1.0	mg/L	2023-11-11	
Calculated Parameters						
Hardness, Dissolved (as CaCO3)	**601**	N/A	0.500	mg/L	N/A	
Dissolved Metals						
Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Antimony, dissolved	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Arsenic, dissolved	**0.00100**	N/A	0.00050	mg/L	2023-11-15	
Barium, dissolved	**0.0625**	N/A	0.0050	mg/L	2023-11-15	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Boron, dissolved	< 0.0500	N/A	0.0500	mg/L	2023-11-15	
Cadmium, dissolved	**0.000014**	N/A	0.000010	mg/L	2023-11-15	
Calcium, dissolved	**192**	N/A	0.20	mg/L	2023-11-15	
Chromium, dissolved	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Cobalt, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Copper, dissolved	**0.00156**	N/A	0.00040	mg/L	2023-11-15	
Iron, dissolved	< 0.010	N/A	0.010	mg/L	2023-11-15	
Lead, dissolved	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Lithium, dissolved	**0.00661**	N/A	0.00010	mg/L	2023-11-15	
Magnesium, dissolved	**29.6**	N/A	0.010	mg/L	2023-11-15	
Manganese, dissolved	**0.00050**	N/A	0.00020	mg/L	2023-11-15	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2023-11-15	
Molybdenum, dissolved	**0.00339**	N/A	0.00010	mg/L	2023-11-15	
Nickel, dissolved	**0.00079**	N/A	0.00040	mg/L	2023-11-15	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2023-11-15	
Potassium, dissolved	**7.02**	N/A	0.10	mg/L	2023-11-15	
Selenium, dissolved	**0.00839**	N/A	0.00050	mg/L	2023-11-15	
Silicon, dissolved	**11.7**	N/A	1.0	mg/L	2023-11-15	
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	2023-11-15	
Sodium, dissolved	**23.4**	N/A	0.10	mg/L	2023-11-15	
Strontium, dissolved	**1.36**	N/A	0.0010	mg/L	2023-11-15	
Sulfur, dissolved	**110**	N/A	3.0	mg/L	2023-11-15	
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2023-11-15	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2023-11-15	
Uranium, dissolved	**0.00625**	N/A	0.000020	mg/L	2023-11-15	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-20-1B (23K1363-01) | Matrix: Water | Sampled: 2023-11-08 18:30, Continued						
Dissolved Metals, Continued						
Vanadium, dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Zinc, dissolved	< 0.0040	N/A	0.0040	mg/L	2023-11-15	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
General Parameters						
Alkalinity, Total (as CaCO3)	**256**	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Bicarbonate (as CaCO3)	**256**	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-11-16	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2023-11-14	
Carbon, Total Organic	**2.66**	N/A	0.50	mg/L	2023-11-14	
Nitrogen, Dissolved Kjeldahl	**0.413**	N/A	0.050	mg/L	2023-11-16	
Phosphorus, Total Dissolved	**0.0271**	N/A	0.0050	mg/L	2023-11-15	
Solids, Total Suspended	**5.0**	N/A	2.0	mg/L	2023-11-14	
Miscellaneous Subcontracted Parameters						
delta-18-O	**-17.14**	N/A		per mil	2023-11-20	
delta-2-H	**-132.8**	N/A		per mil	2023-11-20	
Total Metals						
Aluminum, total	**0.0232**	OG < 0.1	0.0050	mg/L	2023-11-15	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2023-11-15	
Arsenic, total	**0.00120**	MAC = 0.01	0.00050	mg/L	2023-11-15	
Barium, total	**0.0591**	MAC = 2	0.0050	mg/L	2023-11-15	
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2023-11-15	
Cadmium, total	**0.000021**	MAC = 0.007	0.000010	mg/L	2023-11-15	
Calcium, total	**178**	None Required	0.20	mg/L	2023-11-15	
Chromium, total	**0.00059**	MAC = 0.05	0.00050	mg/L	2023-11-15	
Cobalt, total	**0.00021**	N/A	0.00010	mg/L	2023-11-15	
Copper, total	**0.00164**	MAC = 2	0.00040	mg/L	2023-11-15	
Iron, total	**0.122**	AO ≤ 0.3	0.010	mg/L	2023-11-15	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2023-11-15	
Lithium, total	**0.00607**	N/A	0.00010	mg/L	2023-11-15	
Magnesium, total	**28.8**	None Required	0.010	mg/L	2023-11-15	
Manganese, total	**0.0813**	MAC = 0.12	0.00020	mg/L	2023-11-15	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2023-11-15	
Molybdenum, total	**0.00360**	N/A	0.00010	mg/L	2023-11-15	
Nickel, total	**0.00120**	N/A	0.00040	mg/L	2023-11-15	
Phosphorus, total	< 0.050	N/A	0.050	mg/L	2023-11-15	
Potassium, total	**6.75**	N/A	0.10	mg/L	2023-11-15	
Selenium, total	**0.00811**	MAC = 0.05	0.00050	mg/L	2023-11-15	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-20-1B (23K1363-01) | Matrix: Water | Sampled: 2023-11-08 18:30, Continued						
Total Metals, Continued						
Silicon, total	**11.8**	N/A	1.0	mg/L	2023-11-15	
Silver, total	< 0.000050	None Required	0.000050	mg/L	2023-11-15	
Sodium, total	**23.4**	AO ≤ 200	0.10	mg/L	2023-11-15	
Strontium, total	**1.30**	MAC = 7	0.0010	mg/L	2023-11-15	
Sulfur, total	**115**	N/A	3.0	mg/L	2023-11-15	
Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Thallium, total	< 0.000020	N/A	0.000020	mg/L	2023-11-15	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Tungsten, total	< 0.0010	N/A	0.0010	mg/L	2023-11-15	
Uranium, total	**0.00619**	MAC = 0.02	0.000020	mg/L	2023-11-15	
Vanadium, total	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2023-11-15	
Zirconium, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
MW-19-1A-R (23K1363-02) | Matrix: Water | Sampled: 2023-11-08 17:40						
Anions						
Chloride	**35.0**	AO ≤ 250	0.10	mg/L	2023-11-11	
Nitrate (as N)	**13.4**	MAC = 10	0.010	mg/L	2023-11-11	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2023-11-11	
Sulfate	**377**	AO ≤ 500	1.0	mg/L	2023-11-11	
Calculated Parameters						
Hardness, Dissolved (as CaCO3)	**768**	N/A	0.500	mg/L	N/A	
Dissolved Metals						
Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Antimony, dissolved	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Arsenic, dissolved	**0.00069**	N/A	0.00050	mg/L	2023-11-15	
Barium, dissolved	**0.104**	N/A	0.0050	mg/L	2023-11-15	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Boron, dissolved	< 0.0500	N/A	0.0500	mg/L	2023-11-15	
Cadmium, dissolved	**0.000021**	N/A	0.000010	mg/L	2023-11-15	
Calcium, dissolved	**246**	N/A	0.20	mg/L	2023-11-15	
Chromium, dissolved	**0.00138**	N/A	0.00050	mg/L	2023-11-15	
Cobalt, dissolved	**0.00013**	N/A	0.00010	mg/L	2023-11-15	
Copper, dissolved	**0.00131**	N/A	0.00040	mg/L	2023-11-15	
Iron, dissolved	< 0.010	N/A	0.010	mg/L	2023-11-15	
Lead, dissolved	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Lithium, dissolved	**0.00767**	N/A	0.00010	mg/L	2023-11-15	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-19-1A-R (23K1363-02) | Matrix: Water | Sampled: 2023-11-08 17:40, Continued						
Dissolved Metals, Continued						
Magnesium, dissolved	**37.0**	N/A	0.010	mg/L	2023-11-15	
Manganese, dissolved	**0.00021**	N/A	0.00020	mg/L	2023-11-15	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2023-11-15	
Molybdenum, dissolved	**0.00088**	N/A	0.00010	mg/L	2023-11-15	
Nickel, dissolved	**0.00131**	N/A	0.00040	mg/L	2023-11-15	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2023-11-15	
Potassium, dissolved	**7.62**	N/A	0.10	mg/L	2023-11-15	
Selenium, dissolved	**0.00519**	N/A	0.00050	mg/L	2023-11-15	
Silicon, dissolved	**13.5**	N/A	1.0	mg/L	2023-11-15	
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	2023-11-15	
Sodium, dissolved	**17.1**	N/A	0.10	mg/L	2023-11-15	
Strontium, dissolved	**1.44**	N/A	0.0010	mg/L	2023-11-15	
Sulfur, dissolved	**132**	N/A	3.0	mg/L	2023-11-15	
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2023-11-15	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2023-11-15	
Uranium, dissolved	**0.00490**	N/A	0.000020	mg/L	2023-11-15	
Vanadium, dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Zinc, dissolved	< 0.0040	N/A	0.0040	mg/L	2023-11-15	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
General Parameters						
Alkalinity, Total (as CaCO3)	**310**	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Bicarbonate (as CaCO3)	**310**	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-11-16	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2023-11-14	
Carbon, Total Organic	**3.73**	N/A	0.50	mg/L	2023-11-14	
Nitrogen, Dissolved Kjeldahl	**0.656**	N/A	0.050	mg/L	2023-11-16	
Phosphorus, Total Dissolved	**0.0151**	N/A	0.0050	mg/L	2023-11-15	
Solids, Total Suspended	**6.6**	N/A	2.0	mg/L	2023-11-14	
Miscellaneous Subcontracted Parameters						
delta-18-O	**-16.15**	N/A		per mil	2023-11-20	
delta-2-H	**-126.7**	N/A		per mil	2023-11-20	
Total Metals						
Aluminum, total	**0.119**	OG < 0.1	0.0050	mg/L	2023-11-15	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2023-11-15	
Arsenic, total	**0.00083**	MAC = 0.01	0.00050	mg/L	2023-11-15	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-19-1A-R (23K1363-02) | Matrix: Water | Sampled: 2023-11-08 17:40, Continued						
Total Metals, Continued						
Barium, total	**0.100**	MAC = 2	0.0050	mg/L	2023-11-15	
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2023-11-15	
Cadmium, total	**0.000024**	MAC = 0.007	0.000010	mg/L	2023-11-15	
Calcium, total	**223**	None Required	0.20	mg/L	2023-11-15	
Chromium, total	**0.00172**	MAC = 0.05	0.00050	mg/L	2023-11-15	
Cobalt, total	**0.00035**	N/A	0.00010	mg/L	2023-11-15	
Copper, total	**0.00230**	MAC = 2	0.00040	mg/L	2023-11-15	
Iron, total	**0.384**	AO ≤ 0.3	0.010	mg/L	2023-11-15	
Lead, total	**0.00020**	MAC = 0.005	0.00020	mg/L	2023-11-15	
Lithium, total	**0.00703**	N/A	0.00010	mg/L	2023-11-15	
Magnesium, total	**36.6**	None Required	0.010	mg/L	2023-11-15	
Manganese, total	**0.00692**	MAC = 0.12	0.00020	mg/L	2023-11-15	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2023-11-15	
Molybdenum, total	**0.00089**	N/A	0.00010	mg/L	2023-11-15	
Nickel, total	**0.00196**	N/A	0.00040	mg/L	2023-11-15	
Phosphorus, total	**0.058**	N/A	0.050	mg/L	2023-11-15	
Potassium, total	**7.15**	N/A	0.10	mg/L	2023-11-15	
Selenium, total	**0.00492**	MAC = 0.05	0.00050	mg/L	2023-11-15	
Silicon, total	**13.2**	N/A	1.0	mg/L	2023-11-15	
Silver, total	< 0.000050	None Required	0.000050	mg/L	2023-11-15	
Sodium, total	**16.8**	AO ≤ 200	0.10	mg/L	2023-11-15	
Strontium, total	**1.38**	MAC = 7	0.0010	mg/L	2023-11-15	
Sulfur, total	**133**	N/A	3.0	mg/L	2023-11-15	
Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Thallium, total	< 0.000020	N/A	0.000020	mg/L	2023-11-15	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Titanium, total	**0.0073**	N/A	0.0050	mg/L	2023-11-15	
Tungsten, total	< 0.0010	N/A	0.0010	mg/L	2023-11-15	
Uranium, total	**0.00495**	MAC = 0.02	0.000020	mg/L	2023-11-15	
Vanadium, total	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2023-11-15	
Zirconium, total	**0.00016**	N/A	0.00010	mg/L	2023-11-15	
MW-20-2B (23K1363-03) | Matrix: Water | Sampled: 2023-11-08 14:00						
Anions						
Chloride	**31.7**	AO ≤ 250	0.10	mg/L	2023-11-11	
Nitrate (as N)	< 0.010	MAC = 10	0.010	mg/L	2023-11-11	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2023-11-11	
Sulfate	**259**	AO ≤ 500	1.0	mg/L	2023-11-11	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-20-2B (23K1363-03) | Matrix: Water | Sampled: 2023-11-08 14:00, Continued						
Calculated Parameters						
Hardness, Dissolved (as CaCO3)	**503**	N/A	0.500	mg/L	N/A	
Dissolved Metals						
Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Antimony, dissolved	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Arsenic, dissolved	**0.00076**	N/A	0.00050	mg/L	2023-11-15	
Barium, dissolved	**0.0634**	N/A	0.0050	mg/L	2023-11-15	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Boron, dissolved	< 0.0500	N/A	0.0500	mg/L	2023-11-15	
Cadmium, dissolved	< 0.000010	N/A	0.000010	mg/L	2023-11-15	
Calcium, dissolved	**158**	N/A	0.20	mg/L	2023-11-15	
Chromium, dissolved	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Cobalt, dissolved	**0.00015**	N/A	0.00010	mg/L	2023-11-15	
Copper, dissolved	< 0.00040	N/A	0.00040	mg/L	2023-11-15	
Iron, dissolved	**1.61**	N/A	0.010	mg/L	2023-11-15	
Lead, dissolved	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Lithium, dissolved	**0.0127**	N/A	0.00010	mg/L	2023-11-15	
Magnesium, dissolved	**26.2**	N/A	0.010	mg/L	2023-11-15	
Manganese, dissolved	**0.0819**	N/A	0.00020	mg/L	2023-11-15	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2023-11-15	
Molybdenum, dissolved	**0.00388**	N/A	0.00010	mg/L	2023-11-15	
Nickel, dissolved	**0.00042**	N/A	0.00040	mg/L	2023-11-15	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2023-11-15	
Potassium, dissolved	**8.57**	N/A	0.10	mg/L	2023-11-15	
Selenium, dissolved	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Silicon, dissolved	**11.5**	N/A	1.0	mg/L	2023-11-15	
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	2023-11-15	
Sodium, dissolved	**26.5**	N/A	0.10	mg/L	2023-11-15	
Strontium, dissolved	**1.50**	N/A	0.0010	mg/L	2023-11-15	
Sulfur, dissolved	**86.8**	N/A	3.0	mg/L	2023-11-15	
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2023-11-15	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2023-11-15	
Uranium, dissolved	**0.00321**	N/A	0.000020	mg/L	2023-11-15	
Vanadium, dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Zinc, dissolved	< 0.0040	N/A	0.0040	mg/L	2023-11-15	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
General Parameters						
Alkalinity, Total (as CaCO3)	**269**	N/A	1.0	mg/L	2023-11-16	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-20-2B (23K1363-03) | Matrix: Water | Sampled: 2023-11-08 14:00, Continued						
General Parameters, Continued						
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Bicarbonate (as CaCO3)	**269**	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-11-16	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2023-11-14	
Carbon, Total Organic	**0.93**	N/A	0.50	mg/L	2023-11-14	
Nitrogen, Dissolved Kjeldahl	**0.199**	N/A	0.050	mg/L	2023-11-16	
Phosphorus, Total Dissolved	**0.0132**	N/A	0.0050	mg/L	2023-11-15	
Solids, Total Suspended	< 4.0	N/A	2.0	mg/L	2023-11-15	
Miscellaneous Subcontracted Parameters						
delta-18-O	**-17.31**	N/A		per mil	2023-11-20	
delta-2-H	**-135.4**	N/A		per mil	2023-11-20	
Total Metals						
Aluminum, total	**0.0053**	OG < 0.1	0.0050	mg/L	2023-11-15	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2023-11-15	
Arsenic, total	**0.00080**	MAC = 0.01	0.00050	mg/L	2023-11-15	
Barium, total	**0.0623**	MAC = 2	0.0050	mg/L	2023-11-15	
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2023-11-15	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010	mg/L	2023-11-15	
Calcium, total	**150**	None Required	0.20	mg/L	2023-11-15	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2023-11-15	
Cobalt, total	**0.00016**	N/A	0.00010	mg/L	2023-11-15	
Copper, total	< 0.00040	MAC = 2	0.00040	mg/L	2023-11-15	
Iron, total	**1.71**	AO ≤ 0.3	0.010	mg/L	2023-11-15	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2023-11-15	
Lithium, total	**0.0120**	N/A	0.00010	mg/L	2023-11-15	
Magnesium, total	**26.0**	None Required	0.010	mg/L	2023-11-15	
Manganese, total	**0.0826**	MAC = 0.12	0.00020	mg/L	2023-11-15	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2023-11-15	
Molybdenum, total	**0.00402**	N/A	0.00010	mg/L	2023-11-15	
Nickel, total	**0.00051**	N/A	0.00040	mg/L	2023-11-15	
Phosphorus, total	< 0.050	N/A	0.050	mg/L	2023-11-15	
Potassium, total	**8.19**	N/A	0.10	mg/L	2023-11-15	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2023-11-15	
Silicon, total	**12.0**	N/A	1.0	mg/L	2023-11-15	
Silver, total	< 0.000050	None Required	0.000050	mg/L	2023-11-15	
Sodium, total	**26.3**	AO ≤ 200	0.10	mg/L	2023-11-15	
Strontium, total	**1.44**	MAC = 7	0.0010	mg/L	2023-11-15	
Sulfur, total	**93.3**	N/A	3.0	mg/L	2023-11-15	
Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2023-11-15	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-20-2B (23K1363-03) | Matrix: Water | Sampled: 2023-11-08 14:00, Continued						
Total Metals, Continued						
Thallium, total	< 0.000020	N/A	0.000020	mg/L	2023-11-15	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Tungsten, total	< 0.0010	N/A	0.0010	mg/L	2023-11-15	
Uranium, total	**0.00328**	MAC = 0.02	0.000020	mg/L	2023-11-15	
Vanadium, total	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2023-11-15	
Zirconium, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
MW-19-3A (23K1363-04) | Matrix: Water | Sampled: 2023-11-08 15:35						
Anions						
Chloride	**24.5**	AO ≤ 250	0.10	mg/L	2023-11-11	
Nitrate (as N)	**3.66**	MAC = 10	0.010	mg/L	2023-11-11	
Nitrite (as N)	**0.172**	MAC = 1	0.010	mg/L	2023-11-11	
Sulfate	**215**	AO ≤ 500	1.0	mg/L	2023-11-11	
Calculated Parameters						
Hardness, Dissolved (as CaCO3)	**559**	N/A	0.500	mg/L	N/A	
Dissolved Metals						
Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Antimony, dissolved	**0.00043**	N/A	0.00020	mg/L	2023-11-15	
Arsenic, dissolved	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Barium, dissolved	**0.0576**	N/A	0.0050	mg/L	2023-11-15	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Boron, dissolved	< 0.0500	N/A	0.0500	mg/L	2023-11-15	
Cadmium, dissolved	**0.000092**	N/A	0.000010	mg/L	2023-11-15	
Calcium, dissolved	**191**	N/A	0.20	mg/L	2023-11-15	
Chromium, dissolved	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Cobalt, dissolved	**0.00041**	N/A	0.00010	mg/L	2023-11-15	
Copper, dissolved	**0.00103**	N/A	0.00040	mg/L	2023-11-15	
Iron, dissolved	< 0.010	N/A	0.010	mg/L	2023-11-15	
Lead, dissolved	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Lithium, dissolved	**0.00582**	N/A	0.00010	mg/L	2023-11-15	
Magnesium, dissolved	**19.6**	N/A	0.010	mg/L	2023-11-15	
Manganese, dissolved	**0.0169**	N/A	0.00020	mg/L	2023-11-15	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2023-11-15	
Molybdenum, dissolved	**0.00206**	N/A	0.00010	mg/L	2023-11-15	
Nickel, dissolved	**0.00366**	N/A	0.00040	mg/L	2023-11-15	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2023-11-15	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-19-3A (23K1363-04) | Matrix: Water | Sampled: 2023-11-08 15:35, Continued						
Dissolved Metals, Continued						
Potassium, dissolved	**7.96**	N/A	0.10	mg/L	2023-11-15	
Selenium, dissolved	**0.00255**	N/A	0.00050	mg/L	2023-11-15	
Silicon, dissolved	**8.1**	N/A	1.0	mg/L	2023-11-15	
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	2023-11-15	
Sodium, dissolved	**13.0**	N/A	0.10	mg/L	2023-11-15	
Strontium, dissolved	**1.41**	N/A	0.0010	mg/L	2023-11-15	
Sulfur, dissolved	**73.9**	N/A	3.0	mg/L	2023-11-15	
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Thallium, dissolved	**0.000040**	N/A	0.000020	mg/L	2023-11-15	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2023-11-15	
Uranium, dissolved	**0.0333**	N/A	0.000020	mg/L	2023-11-15	
Vanadium, dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Zinc, dissolved	< 0.0040	N/A	0.0040	mg/L	2023-11-15	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
General Parameters						
Alkalinity, Total (as CaCO3)	**316**	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Bicarbonate (as CaCO3)	**316**	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-11-16	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2023-11-14	
Carbon, Total Organic	**2.28**	N/A	0.50	mg/L	2023-11-14	
Nitrogen, Dissolved Kjeldahl	**0.350**	N/A	0.050	mg/L	2023-11-16	
Phosphorus, Total Dissolved	**0.0104**	N/A	0.0050	mg/L	2023-11-15	
Solids, Total Suspended	**9.4**	N/A	2.0	mg/L	2023-11-15	
Miscellaneous Subcontracted Parameters						
delta-18-O	**-16.71**	N/A		per mil	2023-11-20	
delta-2-H	**-130.2**	N/A		per mil	2023-11-20	
Total Metals						
Aluminum, total	**0.106**	OG < 0.1	0.0050	mg/L	2023-11-15	
Antimony, total	**0.00037**	MAC = 0.006	0.00020	mg/L	2023-11-15	
Arsenic, total	**0.00053**	MAC = 0.01	0.00050	mg/L	2023-11-15	
Barium, total	**0.0566**	MAC = 2	0.0050	mg/L	2023-11-15	
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2023-11-15	
Cadmium, total	**0.000106**	MAC = 0.007	0.000010	mg/L	2023-11-15	
Calcium, total	**172**	None Required	0.20	mg/L	2023-11-15	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-19-3A (23K1363-04) | Matrix: Water | Sampled: 2023-11-08 15:35, Continued						
Total Metals, Continued						
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2023-11-15	
Cobalt, total	**0.00069**	N/A	0.00010	mg/L	2023-11-15	
Copper, total	**0.00317**	MAC = 2	0.00040	mg/L	2023-11-15	
Iron, total	**0.311**	AO ≤ 0.3	0.010	mg/L	2023-11-15	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2023-11-15	
Lithium, total	**0.00533**	N/A	0.00010	mg/L	2023-11-15	
Magnesium, total	**19.7**	None Required	0.010	mg/L	2023-11-15	
Manganese, total	**0.0261**	MAC = 0.12	0.00020	mg/L	2023-11-15	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2023-11-15	
Molybdenum, total	**0.00208**	N/A	0.00010	mg/L	2023-11-15	
Nickel, total	**0.00428**	N/A	0.00040	mg/L	2023-11-15	
Phosphorus, total	< 0.050	N/A	0.050	mg/L	2023-11-15	
Potassium, total	**7.70**	N/A	0.10	mg/L	2023-11-15	
Selenium, total	**0.00264**	MAC = 0.05	0.00050	mg/L	2023-11-15	
Silicon, total	**8.4**	N/A	1.0	mg/L	2023-11-15	
Silver, total	< 0.000050	None Required	0.000050	mg/L	2023-11-15	
Sodium, total	**13.1**	AO ≤ 200	0.10	mg/L	2023-11-15	
Strontium, total	**1.37**	MAC = 7	0.0010	mg/L	2023-11-15	
Sulfur, total	**76.9**	N/A	3.0	mg/L	2023-11-15	
Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Thallium, total	**0.000048**	N/A	0.000020	mg/L	2023-11-15	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Tungsten, total	< 0.0010	N/A	0.0010	mg/L	2023-11-15	
Uranium, total	**0.0341**	MAC = 0.02	0.000020	mg/L	2023-11-15	
Vanadium, total	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2023-11-15	
Zirconium, total	**0.00010**	N/A	0.00010	mg/L	2023-11-15	
MW-20-4A (23K1363-05) | Matrix: Water | Sampled: 2023-11-08 11:10						
Anions						
Chloride	**54.0**	AO ≤ 250	0.10	mg/L	2023-11-11	
Nitrate (as N)	**0.858**	MAC = 10	0.010	mg/L	2023-11-11	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2023-11-11	
Sulfate	**145**	AO ≤ 500	1.0	mg/L	2023-11-11	
Calculated Parameters						
Hardness, Dissolved (as CaCO3)	**554**	N/A	0.500	mg/L	N/A	
Dissolved Metals						
Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-20-4A (23K1363-05) | Matrix: Water | Sampled: 2023-11-08 11:10, Continued						
Dissolved Metals, Continued						
Antimony, dissolved	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Arsenic, dissolved	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Barium, dissolved	**0.113**	N/A	0.0050	mg/L	2023-11-15	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Boron, dissolved	< 0.0500	N/A	0.0500	mg/L	2023-11-15	
Cadmium, dissolved	**0.000019**	N/A	0.000010	mg/L	2023-11-15	
Calcium, dissolved	**131**	N/A	0.20	mg/L	2023-11-15	
Chromium, dissolved	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Cobalt, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Copper, dissolved	**0.00076**	N/A	0.00040	mg/L	2023-11-15	
Iron, dissolved	< 0.010	N/A	0.010	mg/L	2023-11-15	
Lead, dissolved	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Lithium, dissolved	**0.0218**	N/A	0.00010	mg/L	2023-11-15	
Magnesium, dissolved	**55.1**	N/A	0.010	mg/L	2023-11-15	
Manganese, dissolved	**0.00659**	N/A	0.00020	mg/L	2023-11-15	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2023-11-15	
Molybdenum, dissolved	**0.00096**	N/A	0.00010	mg/L	2023-11-15	
Nickel, dissolved	**0.00107**	N/A	0.00040	mg/L	2023-11-15	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2023-11-15	
Potassium, dissolved	**7.18**	N/A	0.10	mg/L	2023-11-15	
Selenium, dissolved	**0.00464**	N/A	0.00050	mg/L	2023-11-15	
Silicon, dissolved	**10.8**	N/A	1.0	mg/L	2023-11-15	
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	2023-11-15	
Sodium, dissolved	**33.1**	N/A	0.10	mg/L	2023-11-15	
Strontium, dissolved	**2.10**	N/A	0.0010	mg/L	2023-11-15	
Sulfur, dissolved	**51.0**	N/A	3.0	mg/L	2023-11-15	
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2023-11-15	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2023-11-15	
Uranium, dissolved	**0.0126**	N/A	0.000020	mg/L	2023-11-15	
Vanadium, dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Zinc, dissolved	< 0.0040	N/A	0.0040	mg/L	2023-11-15	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
General Parameters						
Alkalinity, Total (as CaCO3)	**385**	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Bicarbonate (as CaCO3)	**385**	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-11-16	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-20-4A (23K1363-05) | Matrix: Water | Sampled: 2023-11-08 11:10, Continued						
General Parameters, Continued						
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-11-16	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2023-11-14	
Carbon, Total Organic	**1.54**	N/A	0.50	mg/L	2023-11-14	
Nitrogen, Dissolved Kjeldahl	**0.132**	N/A	0.050	mg/L	2023-11-16	
Phosphorus, Total Dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Solids, Total Suspended	< 2.0	N/A	2.0	mg/L	2023-11-15	
Miscellaneous Subcontracted Parameters						
delta-18-O	**-17.81**	N/A		per mil	2023-11-20	
delta-2-H	**-137.4**	N/A		per mil	2023-11-20	
Total Metals						
Aluminum, total	**0.0155**	OG < 0.1	0.0050	mg/L	2023-11-15	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2023-11-15	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050	mg/L	2023-11-15	
Barium, total	**0.107**	MAC = 2	0.0050	mg/L	2023-11-15	
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2023-11-15	
Cadmium, total	**0.000017**	MAC = 0.007	0.000010	mg/L	2023-11-15	
Calcium, total	**123**	None Required	0.20	mg/L	2023-11-15	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2023-11-15	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Copper, total	**0.00090**	MAC = 2	0.00040	mg/L	2023-11-15	
Iron, total	**0.034**	AO ≤ 0.3	0.010	mg/L	2023-11-15	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2023-11-15	
Lithium, total	**0.0196**	N/A	0.00010	mg/L	2023-11-15	
Magnesium, total	**54.3**	None Required	0.010	mg/L	2023-11-15	
Manganese, total	**0.00716**	MAC = 0.12	0.00020	mg/L	2023-11-15	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2023-11-15	
Molybdenum, total	**0.00100**	N/A	0.00010	mg/L	2023-11-15	
Nickel, total	**0.00121**	N/A	0.00040	mg/L	2023-11-15	
Phosphorus, total	< 0.050	N/A	0.050	mg/L	2023-11-15	
Potassium, total	**6.96**	N/A	0.10	mg/L	2023-11-15	
Selenium, total	**0.00445**	MAC = 0.05	0.00050	mg/L	2023-11-15	
Silicon, total	**11.2**	N/A	1.0	mg/L	2023-11-15	
Silver, total	< 0.000050	None Required	0.000050	mg/L	2023-11-15	
Sodium, total	**34.4**	AO ≤ 200	0.10	mg/L	2023-11-15	
Strontium, total	**2.02**	MAC = 7	0.0010	mg/L	2023-11-15	
Sulfur, total	**53.5**	N/A	3.0	mg/L	2023-11-15	
Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Thallium, total	< 0.000020	N/A	0.000020	mg/L	2023-11-15	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2023-11-15	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-20-4A (23K1363-05) | Matrix: Water | Sampled: 2023-11-08 11:10, Continued						
Total Metals, Continued						
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Tungsten, total	< 0.0010	N/A	0.0010	mg/L	2023-11-15	
Uranium, total	**0.0128**	MAC = 0.02	0.000020	mg/L	2023-11-15	
Vanadium, total	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2023-11-15	
Zirconium, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Dupe23A (23K1363-06) | Matrix: Water | Sampled: 2023-11-08 12:30						
Anions						
Chloride	**31.6**	AO ≤ 250	0.10	mg/L	2023-11-11	
Nitrate (as N)	< 0.010	MAC = 10	0.010	mg/L	2023-11-11	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2023-11-11	
Sulfate	**257**	AO ≤ 500	1.0	mg/L	2023-11-11	
Calculated Parameters						
Hardness, Dissolved (as CaCO3)	**507**	N/A	0.500	mg/L	N/A	
Dissolved Metals						
Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Antimony, dissolved	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Arsenic, dissolved	**0.00075**	N/A	0.00050	mg/L	2023-11-15	
Barium, dissolved	**0.0636**	N/A	0.0050	mg/L	2023-11-15	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Boron, dissolved	< 0.0500	N/A	0.0500	mg/L	2023-11-15	
Cadmium, dissolved	< 0.000010	N/A	0.000010	mg/L	2023-11-15	
Calcium, dissolved	**160**	N/A	0.20	mg/L	2023-11-15	
Chromium, dissolved	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Cobalt, dissolved	**0.00015**	N/A	0.00010	mg/L	2023-11-15	
Copper, dissolved	< 0.00040	N/A	0.00040	mg/L	2023-11-15	
Iron, dissolved	**1.49**	N/A	0.010	mg/L	2023-11-15	
Lead, dissolved	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Lithium, dissolved	**0.0129**	N/A	0.00010	mg/L	2023-11-15	
Magnesium, dissolved	**25.9**	N/A	0.010	mg/L	2023-11-15	
Manganese, dissolved	**0.0805**	N/A	0.00020	mg/L	2023-11-15	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2023-11-15	
Molybdenum, dissolved	**0.00388**	N/A	0.00010	mg/L	2023-11-15	
Nickel, dissolved	**0.00041**	N/A	0.00040	mg/L	2023-11-15	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2023-11-15	
Potassium, dissolved	**8.46**	N/A	0.10	mg/L	2023-11-15	
Selenium, dissolved	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Silicon, dissolved	**11.4**	N/A	1.0	mg/L	2023-11-15	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Dupe23A (23K1363-06) | Matrix: Water | Sampled: 2023-11-08 12:30, Continued						
Dissolved Metals, Continued						
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	2023-11-15	
Sodium, dissolved	**26.0**	N/A	0.10	mg/L	2023-11-15	
Strontium, dissolved	**1.48**	N/A	0.0010	mg/L	2023-11-15	
Sulfur, dissolved	**87.1**	N/A	3.0	mg/L	2023-11-15	
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2023-11-15	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2023-11-15	
Uranium, dissolved	**0.00321**	N/A	0.000020	mg/L	2023-11-15	
Vanadium, dissolved	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Zinc, dissolved	< 0.0040	N/A	0.0040	mg/L	2023-11-15	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
General Parameters						
Alkalinity, Total (as CaCO3)	**267**	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Bicarbonate (as CaCO3)	**267**	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-11-16	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2023-11-16	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2023-11-14	
Carbon, Total Organic	**1.03**	N/A	0.50	mg/L	2023-11-14	
Nitrogen, Dissolved Kjeldahl	**0.168**	N/A	0.050	mg/L	2023-11-16	
Phosphorus, Total Dissolved	**0.0088**	N/A	0.0050	mg/L	2023-11-15	
Solids, Total Suspended	**4.2**	N/A	2.0	mg/L	2023-11-14	
Miscellaneous Subcontracted Parameters						
delta-18-O	**-17.26**	N/A		per mil	2023-11-20	
delta-2-H	**-135.1**	N/A		per mil	2023-11-20	
Total Metals						
Aluminum, total	**0.0050**	OG < 0.1	0.0050	mg/L	2023-11-15	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2023-11-15	
Arsenic, total	**0.00080**	MAC = 0.01	0.00050	mg/L	2023-11-15	
Barium, total	**0.0615**	MAC = 2	0.0050	mg/L	2023-11-15	
Beryllium, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Bismuth, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Boron, total	< 0.0500	MAC = 5	0.0500	mg/L	2023-11-15	
Cadmium, total	< 0.000010	MAC = 0.007	0.000010	mg/L	2023-11-15	
Calcium, total	**149**	None Required	0.20	mg/L	2023-11-15	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2023-11-15	
Cobalt, total	**0.00015**	N/A	0.00010	mg/L	2023-11-15	
Copper, total	< 0.00040	MAC = 2	0.00040	mg/L	2023-11-15	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Dupe23A (23K1363-06) | Matrix: Water | Sampled: 2023-11-08 12:30, Continued						
Total Metals, Continued						
Iron, total	**1.68**	AO ≤ 0.3	0.010	mg/L	2023-11-15	
Lead, total	< 0.00020	MAC = 0.005	0.00020	mg/L	2023-11-15	
Lithium, total	**0.0115**	N/A	0.00010	mg/L	2023-11-15	
Magnesium, total	**25.7**	None Required	0.010	mg/L	2023-11-15	
Manganese, total	**0.0815**	MAC = 0.12	0.00020	mg/L	2023-11-15	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2023-11-15	
Molybdenum, total	**0.00400**	N/A	0.00010	mg/L	2023-11-15	
Nickel, total	**0.00044**	N/A	0.00040	mg/L	2023-11-15	
Phosphorus, total	< 0.050	N/A	0.050	mg/L	2023-11-15	
Potassium, total	**8.23**	N/A	0.10	mg/L	2023-11-15	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2023-11-15	
Silicon, total	**11.4**	N/A	1.0	mg/L	2023-11-15	
Silver, total	< 0.000050	None Required	0.000050	mg/L	2023-11-15	
Sodium, total	**25.8**	AO ≤ 200	0.10	mg/L	2023-11-15	
Strontium, total	**1.43**	MAC = 7	0.0010	mg/L	2023-11-15	
Sulfur, total	**87.1**	N/A	3.0	mg/L	2023-11-15	
Tellurium, total	< 0.00050	N/A	0.00050	mg/L	2023-11-15	
Thallium, total	< 0.000020	N/A	0.000020	mg/L	2023-11-15	
Thorium, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	
Tin, total	< 0.00020	N/A	0.00020	mg/L	2023-11-15	
Titanium, total	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Tungsten, total	< 0.0010	N/A	0.0010	mg/L	2023-11-15	
Uranium, total	**0.00316**	MAC = 0.02	0.000020	mg/L	2023-11-15	
Vanadium, total	< 0.0050	N/A	0.0050	mg/L	2023-11-15	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2023-11-15	
Zirconium, total	< 0.00010	N/A	0.00010	mg/L	2023-11-15	

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analysis Description	Method Ref.	Technique	Accredited	Location
2H and 18O Isotope Ratios in Water	Stable Isotopes	CRDS		Sublet
Alkalinity in Water	SM 2320 B* (2021)	Titration with H2SO4	✓	Kelowna
Ammonia, Total in Water	SM 4500-NH3 G* (2021)	Automated Colorimetry (Phenate)	✓	Kelowna
Anions in Water	SM 4110 B (2020)	Ion Chromatography	✓	Kelowna
Carbon, Total Organic in Water	SM 5310 B (2022)	Combustion, Infrared CO2 Detection	✓	Kelowna
Dissolved Metals in Water	EPA 200.8 / EPA 6020B	0.45 µm Filtration / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond
Hardness in Water	SM 2340 B (2021)	Calculation: 2.497 [diss Ca] + 4.118 [diss Mg]	✓	N/A
Mercury, dissolved in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	✓	Richmond
Mercury, total in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	✓	Richmond
Nitrogen, Dissolved Kjeldahl in Water	SM 4500-Norg D* (2021)	Block Digestion and Flow Injection Analysis	✓	Kelowna
Phosphorus, Total Dissolved in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2021)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	✓	Kelowna
Solids, Total Suspended in Water	Solids in Water, Filtered / SM 2540 D* (2020)	Solids in Water, Filtered / Gravimetry (Dried at 103-105C)	✓	Kelowna
Total Metals in Water	EPA 200.2 / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
AO	Aesthetic Objective
MAC	Maximum Acceptable Concentration (health based)
mg/L	Milligrams per litre
OG	Operational Guideline (treated water)
per mil	Parts per thousand
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

Guidelines Referenced in this Report:

Guidelines for Canadian Drinking Water Quality (Health Canada, September 2022)

Note: In some cases, the values displayed on the report represent the lowest guideline and are to be verified by the end user

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
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General Comments:

The results in this report apply to the received samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Caro will dispose of all samples within 30 days of sample receipt, unless otherwise agreed.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager:bwhitehead@caro.ca

Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline(s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
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The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk)**: A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup)**: An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS)**: A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS)**: A second aliquot of sample is fortified with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B3K1224										
Blank (B3K1224-BLK1)				Prepared: 2023-11-11, Analyzed: 2023-11-11						
Chloride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
LCS (B3K1224-BS1)				Prepared: 2023-11-11, Analyzed: 2023-11-11						
Chloride	16.0	0.10	mg/L	16.0		100	90-110			
Nitrate (as N)	4.01	0.010	mg/L	4.00		100	90-110			
Nitrite (as N)	2.03	0.010	mg/L	2.00		101	85-115			
Sulfate	16.0	1.0	mg/L	16.0		100	90-110			
Dissolved Metals, Batch B3K1345										
Blank (B3K1345-BLK2)				Prepared: 2023-11-15, Analyzed: 2023-11-15						
Aluminum, dissolved	< 0.0050	0.0050	mg/L							
Antimony, dissolved	< 0.00020	0.00020	mg/L							
Arsenic, dissolved	< 0.00050	0.00050	mg/L							
Barium, dissolved	< 0.0050	0.0050	mg/L							
Beryllium, dissolved	< 0.00010	0.00010	mg/L							
Bismuth, dissolved	< 0.00010	0.00010	mg/L							
Boron, dissolved	< 0.0500	0.0500	mg/L							
Cadmium, dissolved	< 0.000010	0.000010	mg/L							
Calcium, dissolved	< 0.20	0.20	mg/L							
Chromium, dissolved	< 0.00050	0.00050	mg/L							
Cobalt, dissolved	< 0.00010	0.00010	mg/L							
Copper, dissolved	< 0.00040	0.00040	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Lead, dissolved	< 0.00020	0.00020	mg/L							
Lithium, dissolved	< 0.00010	0.00010	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Molybdenum, dissolved	< 0.00010	0.00010	mg/L							
Nickel, dissolved	< 0.00040	0.00040	mg/L							
Phosphorus, dissolved	< 0.050	0.050	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Selenium, dissolved	< 0.00050	0.00050	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
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Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B3K1345, Continued										
Blank (B3K1345-BLK2), Continued				Prepared: 2023-11-15, Analyzed: 2023-11-15						
Silicon, dissolved	< 1.0	1.0	mg/L							
Silver, dissolved	< 0.000050	0.000050	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
Strontium, dissolved	< 0.0010	0.0010	mg/L							
Sulfur, dissolved	< 3.0	3.0	mg/L							
Tellurium, dissolved	< 0.00050	0.00050	mg/L							
Thallium, dissolved	< 0.000020	0.000020	mg/L							
Thorium, dissolved	< 0.00010	0.00010	mg/L							
Tin, dissolved	< 0.00020	0.00020	mg/L							
Titanium, dissolved	< 0.0050	0.0050	mg/L							
Tungsten, dissolved	< 0.0010	0.0010	mg/L							
Uranium, dissolved	< 0.000020	0.000020	mg/L							
Vanadium, dissolved	< 0.0050	0.0050	mg/L							
Zinc, dissolved	< 0.0040	0.0040	mg/L							
Zirconium, dissolved	< 0.00010	0.00010	mg/L							
LCS (B3K1345-BS2)				Prepared: 2023-11-15, Analyzed: 2023-11-15						
Aluminum, dissolved	4.02	0.0050	mg/L	4.00		100	80-120			
Antimony, dissolved	0.0407	0.00020	mg/L	0.0400		102	80-120			
Arsenic, dissolved	0.403	0.00050	mg/L	0.400		101	80-120			
Barium, dissolved	0.0405	0.0050	mg/L	0.0400		101	80-120			
Beryllium, dissolved	0.0376	0.00010	mg/L	0.0400		94	80-120			
Bismuth, dissolved	0.0400	0.00010	mg/L	0.0400		100	80-120			
Boron, dissolved	0.374	0.0500	mg/L	0.400		93	80-120			
Cadmium, dissolved	0.0412	0.000010	mg/L	0.0400		103	80-120			
Calcium, dissolved	3.85	0.20	mg/L	4.00		96	80-120			
Chromium, dissolved	0.0403	0.00050	mg/L	0.0400		101	80-120			
Cobalt, dissolved	0.0406	0.00010	mg/L	0.0400		102	80-120			
Copper, dissolved	0.0406	0.00040	mg/L	0.0400		102	80-120			
Iron, dissolved	4.01	0.010	mg/L	4.00		100	80-120			
Lead, dissolved	0.0406	0.00020	mg/L	0.0400		102	80-120			
Lithium, dissolved	0.0382	0.00010	mg/L	0.0400		95	80-120			
Magnesium, dissolved	4.13	0.010	mg/L	4.00		103	80-120			
Manganese, dissolved	0.0405	0.00020	mg/L	0.0400		101	80-120			
Molybdenum, dissolved	0.0403	0.00010	mg/L	0.0400		101	80-120			
Nickel, dissolved	0.0407	0.00040	mg/L	0.0400		102	80-120			
Phosphorus, dissolved	4.01	0.050	mg/L	4.00		100	80-120			
Potassium, dissolved	4.11	0.10	mg/L	4.00		103	80-120			
Selenium, dissolved	0.416	0.00050	mg/L	0.400		104	80-120			
Silicon, dissolved	4.0	1.0	mg/L	4.00		101	80-120			
Silver, dissolved	0.0411	0.000050	mg/L	0.0400		103	80-120			
Sodium, dissolved	4.04	0.10	mg/L	4.00		101	80-120			
Strontium, dissolved	0.0397	0.0010	mg/L	0.0400		99	80-120			
Sulfur, dissolved	41.3	3.0	mg/L	40.0		103	80-120			
Tellurium, dissolved	0.0388	0.00050	mg/L	0.0400		97	80-120			
Thallium, dissolved	0.0406	0.000020	mg/L	0.0400		101	80-120			
Thorium, dissolved	0.0405	0.00010	mg/L	0.0400		101	80-120			
Tin, dissolved	0.0412	0.00020	mg/L	0.0400		103	80-120			
Titanium, dissolved	0.0391	0.0050	mg/L	0.0400		98	80-120			
Tungsten, dissolved	0.0404	0.0010	mg/L	0.0400		101	80-120			
Uranium, dissolved	0.0413	0.000020	mg/L	0.0400		103	80-120			
Vanadium, dissolved	0.0404	0.0050	mg/L	0.0400		101	80-120			
Zinc, dissolved	0.410	0.0040	mg/L	0.400		103	80-120			
Zirconium, dissolved	0.0402	0.00010	mg/L	0.0400		100	80-120			

Dissolved Metals, Batch B3K1450

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B3K1450, Continued										
Blank (B3K1450-BLK2)				Prepared: 2023-11-15, Analyzed: 2023-11-15						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
Blank (B3K1450-BLK3)				Prepared: 2023-11-15, Analyzed: 2023-11-15						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
LCS (B3K1450-BS2)				Prepared: 2023-11-15, Analyzed: 2023-11-15						
Mercury, dissolved	0.000210	0.000010	mg/L	0.000250		84	80-120			
LCS (B3K1450-BS3)				Prepared: 2023-11-15, Analyzed: 2023-11-15						
Mercury, dissolved	0.000257	0.000010	mg/L	0.000250		103	80-120			
Matrix Spike (B3K1450-MS3)		**Source: 23K1363-06**		Prepared: 2023-11-15, Analyzed: 2023-11-15						
Mercury, dissolved	0.000224	0.000010	mg/L	0.000250	< 0.000010	90	70-130			
General Parameters, Batch B3K0758										
Blank (B3K0758-BLK1)				Prepared: 2023-11-10, Analyzed: 2023-11-14						
Carbon, Total Organic	< 0.50	0.50	mg/L							
Blank (B3K0758-BLK2)				Prepared: 2023-11-11, Analyzed: 2023-11-14						
Carbon, Total Organic	< 0.50	0.50	mg/L							
Blank (B3K0758-BLK3)				Prepared: 2023-11-11, Analyzed: 2023-11-14						
Carbon, Total Organic	< 0.50	0.50	mg/L							
LCS (B3K0758-BS2)				Prepared: 2023-11-11, Analyzed: 2023-11-14						
Carbon, Total Organic	10.4	0.50	mg/L	10.0		104	78-116			
LCS (B3K0758-BS3)				Prepared: 2023-11-11, Analyzed: 2023-11-14						
Carbon, Total Organic	10.7	0.50	mg/L	10.0		107	78-116			
General Parameters, Batch B3K1300										
Blank (B3K1300-BLK1)				Prepared: 2023-11-14, Analyzed: 2023-11-14						
Ammonia, Total (as N)	< 0.010	0.010	mg/L							
Blank (B3K1300-BLK2)				Prepared: 2023-11-14, Analyzed: 2023-11-14						
Ammonia, Total (as N)	< 0.010	0.010	mg/L							
Blank (B3K1300-BLK3)				Prepared: 2023-11-14, Analyzed: 2023-11-14						
Ammonia, Total (as N)	< 0.010	0.010	mg/L							
Blank (B3K1300-BLK4)				Prepared: 2023-11-14, Analyzed: 2023-11-14						
Ammonia, Total (as N)	< 0.010	0.010	mg/L							
Blank (B3K1300-BLK5)				Prepared: 2023-11-14, Analyzed: 2023-11-14						
Ammonia, Total (as N)	< 0.010	0.010	mg/L							
Blank (B3K1300-BLK6)				Prepared: 2023-11-14, Analyzed: 2023-11-14						
Ammonia, Total (as N)	< 0.010	0.010	mg/L							
LCS (B3K1300-BS1)				Prepared: 2023-11-14, Analyzed: 2023-11-14						
Ammonia, Total (as N)	0.979	0.010	mg/L	1.00		98	85-115			
LCS (B3K1300-BS2)				Prepared: 2023-11-14, Analyzed: 2023-11-14						
Ammonia, Total (as N)	0.981	0.010	mg/L	1.00		98	85-115			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B3K1300, Continued										
LCS (B3K1300-BS3)				Prepared: 2023-11-14, Analyzed: 2023-11-14						
Ammonia, Total (as N)	0.978	0.010	mg/L	1.00		98	85-115			
LCS (B3K1300-BS4)				Prepared: 2023-11-14, Analyzed: 2023-11-14						
Ammonia, Total (as N)	0.982	0.010	mg/L	1.00		98	85-115			
LCS (B3K1300-BS5)				Prepared: 2023-11-14, Analyzed: 2023-11-14						
Ammonia, Total (as N)	1.02	0.010	mg/L	1.00		102	85-115			
LCS (B3K1300-BS6)				Prepared: 2023-11-14, Analyzed: 2023-11-14						
Ammonia, Total (as N)	1.00	0.010	mg/L	1.00		100	85-115			
Duplicate (B3K1300-DUP5)		**Source: 23K1363-01**		Prepared: 2023-11-14, Analyzed: 2023-11-14						
Ammonia, Total (as N)	< 0.010	0.050	mg/L		< 0.050				15	
Matrix Spike (B3K1300-MS5)		**Source: 23K1363-01**		Prepared: 2023-11-14, Analyzed: 2023-11-14						
Ammonia, Total (as N)	0.235	0.010	mg/L	0.204	< 0.050	115	75-125			
General Parameters, Batch B3K1371										
Blank (B3K1371-BLK1)				Prepared: 2023-11-14, Analyzed: 2023-11-14						
Solids, Total Suspended	< 2.0	2.0	mg/L							
LCS (B3K1371-BS1)				Prepared: 2023-11-14, Analyzed: 2023-11-14						
Solids, Total Suspended	88.0	10.0	mg/L	100		88	85-115			
General Parameters, Batch B3K1377										
Blank (B3K1377-BLK1)				Prepared: 2023-11-14, Analyzed: 2023-11-15						
Phosphorus, Total Dissolved	< 0.0050	0.0050	mg/L							
Blank (B3K1377-BLK2)				Prepared: 2023-11-14, Analyzed: 2023-11-15						
Phosphorus, Total Dissolved	< 0.0050	0.0050	mg/L							
LCS (B3K1377-BS1)				Prepared: 2023-11-14, Analyzed: 2023-11-15						
Phosphorus, Total Dissolved	0.110	0.0050	mg/L	0.100		110	85-115			
LCS (B3K1377-BS2)				Prepared: 2023-11-14, Analyzed: 2023-11-15						
Phosphorus, Total Dissolved	0.111	0.0050	mg/L	0.100		111	85-115			
Duplicate (B3K1377-DUP2)		**Source: 23K1363-03**		Prepared: 2023-11-14, Analyzed: 2023-11-15						
Phosphorus, Total Dissolved	0.0122	0.0050	mg/L		0.0132				15	
Matrix Spike (B3K1377-MS2)		**Source: 23K1363-03**		Prepared: 2023-11-14, Analyzed: 2023-11-15						
Phosphorus, Total Dissolved	0.118	0.0050	mg/L	0.102	0.0132	103	70-125			
General Parameters, Batch B3K1460										
Blank (B3K1460-BLK2)				Prepared: 2023-11-15, Analyzed: 2023-11-16						
Nitrogen, Dissolved Kjeldahl	< 0.050	0.050	mg/L							
LCS (B3K1460-BS2)				Prepared: 2023-11-15, Analyzed: 2023-11-16						
Nitrogen, Dissolved Kjeldahl	0.953	0.050	mg/L	1.00		95	85-115			
Duplicate (B3K1460-DUP2)		**Source: 23K1363-02**		Prepared: 2023-11-15, Analyzed: 2023-11-16						
Nitrogen, Dissolved Kjeldahl	0.645	0.050	mg/L		0.656			2	15	

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B3K1460, Continued										
Matrix Spike (B3K1460-MS2)	**Source: 23K1363-02**			Prepared: 2023-11-15, Analyzed: 2023-11-16						
Nitrogen, Dissolved Kjeldahl	1.61	0.050	mg/L	1.00	0.656	95	65-135			
General Parameters, Batch B3K1491										
Blank (B3K1491-BLK1)				Prepared: 2023-11-15, Analyzed: 2023-11-15						
Solids, Total Suspended	< 2.0	2.0	mg/L							
LCS (B3K1491-BS1)				Prepared: 2023-11-15, Analyzed: 2023-11-15						
Solids, Total Suspended	88.0	10.0	mg/L	100		88	85-115			
Duplicate (B3K1491-DUP1)	**Source: 23K1363-03**			Prepared: 2023-11-15, Analyzed: 2023-11-15						
Solids, Total Suspended	5.6	2.0	mg/L		< 4.0				20	
General Parameters, Batch B3K1664										
Blank (B3K1664-BLK1)				Prepared: 2023-11-16, Analyzed: 2023-11-16						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Blank (B3K1664-BLK2)				Prepared: 2023-11-16, Analyzed: 2023-11-16						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Blank (B3K1664-BLK3)				Prepared: 2023-11-16, Analyzed: 2023-11-16						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
LCS (B3K1664-BS1)				Prepared: 2023-11-16, Analyzed: 2023-11-16						
Alkalinity, Total (as CaCO3)	108	1.0	mg/L	100		108	80-120			
Alkalinity, Phenolphthalein (as CaCO3)	31.4	1.0	mg/L	50.0		63	0-200			
LCS (B3K1664-BS2)				Prepared: 2023-11-16, Analyzed: 2023-11-16						
Alkalinity, Total (as CaCO3)	108	1.0	mg/L	100		108	80-120			
Alkalinity, Phenolphthalein (as CaCO3)	32.8	1.0	mg/L	50.0		66	0-200			
LCS (B3K1664-BS3)				Prepared: 2023-11-16, Analyzed: 2023-11-16						
Alkalinity, Total (as CaCO3)	90.8	1.0	mg/L	100		91	80-120			
Alkalinity, Phenolphthalein (as CaCO3)	4.7	1.0	mg/L	50.0		9	0-200			
Total Metals, Batch B3K1395										
Blank (B3K1395-BLK1)				Prepared: 2023-11-14, Analyzed: 2023-11-15						
Aluminum, total	< 0.0050	0.0050	mg/L							
Antimony, total	< 0.00020	0.00020	mg/L							
Arsenic, total	< 0.00050	0.00050	mg/L							
Barium, total	< 0.0050	0.0050	mg/L							
Beryllium, total	< 0.00010	0.00010	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B3K1395, Continued										
Blank (B3K1395-BLK1), Continued				Prepared: 2023-11-14, Analyzed: 2023-11-15						
Bismuth, total	< 0.00010	0.00010	mg/L							
Boron, total	< 0.0500	0.0500	mg/L							
Cadmium, total	< 0.000010	0.000010	mg/L							
Calcium, total	< 0.20	0.20	mg/L							
Chromium, total	< 0.00050	0.00050	mg/L							
Cobalt, total	< 0.00010	0.00010	mg/L							
Copper, total	< 0.00040	0.00040	mg/L							
Iron, total	< 0.010	0.010	mg/L							
Lead, total	< 0.00020	0.00020	mg/L							
Lithium, total	< 0.00010	0.00010	mg/L							
Magnesium, total	< 0.010	0.010	mg/L							
Manganese, total	< 0.00020	0.00020	mg/L							
Molybdenum, total	< 0.00010	0.00010	mg/L							
Nickel, total	< 0.00040	0.00040	mg/L							
Phosphorus, total	< 0.050	0.050	mg/L							
Potassium, total	< 0.10	0.10	mg/L							
Selenium, total	< 0.00050	0.00050	mg/L							
Silicon, total	< 1.0	1.0	mg/L							
Silver, total	< 0.000050	0.000050	mg/L							
Sodium, total	< 0.10	0.10	mg/L							
Strontium, total	< 0.0010	0.0010	mg/L							
Sulfur, total	< 3.0	3.0	mg/L							
Tellurium, total	< 0.00050	0.00050	mg/L							
Thallium, total	< 0.000020	0.000020	mg/L							
Thorium, total	< 0.00010	0.00010	mg/L							
Tin, total	< 0.00020	0.00020	mg/L							
Titanium, total	< 0.0050	0.0050	mg/L							
Tungsten, total	< 0.0010	0.0010	mg/L							
Uranium, total	< 0.000020	0.000020	mg/L							
Vanadium, total	< 0.0050	0.0050	mg/L							
Zinc, total	< 0.0040	0.0040	mg/L							
Zirconium, total	< 0.00010	0.00010	mg/L							
LCS (B3K1395-BS1)				Prepared: 2023-11-14, Analyzed: 2023-11-15						
Aluminum, total	3.95	0.0050	mg/L	4.00		99	80-120			
Antimony, total	0.0386	0.00020	mg/L	0.0400		96	80-120			
Arsenic, total	0.394	0.00050	mg/L	0.400		98	80-120			
Barium, total	0.0391	0.0050	mg/L	0.0400		98	80-120			
Beryllium, total	0.0364	0.00010	mg/L	0.0400		91	80-120			
Bismuth, total	0.0381	0.00010	mg/L	0.0400		95	80-120			
Boron, total	0.376	0.0500	mg/L	0.400		94	80-120			
Cadmium, total	0.0393	0.000010	mg/L	0.0400		98	80-120			
Calcium, total	3.65	0.20	mg/L	4.00		91	80-120			
Chromium, total	0.0405	0.00050	mg/L	0.0400		101	80-120			
Cobalt, total	0.0404	0.00010	mg/L	0.0400		101	80-120			
Copper, total	0.0399	0.00040	mg/L	0.0400		100	80-120			
Iron, total	4.06	0.010	mg/L	4.00		102	80-120			
Lead, total	0.0393	0.00020	mg/L	0.0400		98	80-120			
Lithium, total	0.0367	0.00010	mg/L	0.0400		92	80-120			
Magnesium, total	4.14	0.010	mg/L	4.00		103	80-120			
Manganese, total	0.0400	0.00020	mg/L	0.0400		100	80-120			
Molybdenum, total	0.0395	0.00010	mg/L	0.0400		99	80-120			
Nickel, total	0.0393	0.00040	mg/L	0.0400		98	80-120			
Phosphorus, total	3.95	0.050	mg/L	4.00		99	80-120			
Potassium, total	3.89	0.10	mg/L	4.00		97	80-120			
Selenium, total	0.407	0.00050	mg/L	0.400		102	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B3K1395, Continued										
LCS (B3K1395-BS1), Continued				Prepared: 2023-11-14, Analyzed: 2023-11-15						
Silicon, total	3.9	1.0	mg/L	4.00		98	80-120			
Silver, total	0.0403	0.000050	mg/L	0.0400		101	80-120			
Sodium, total	4.04	0.10	mg/L	4.00		101	80-120			
Strontium, total	0.0386	0.0010	mg/L	0.0400		96	80-120			
Sulfur, total	40.0	3.0	mg/L	40.0		100	80-120			
Tellurium, total	0.0368	0.00050	mg/L	0.0400		92	80-120			
Thallium, total	0.0391	0.000020	mg/L	0.0400		98	80-120			
Thorium, total	0.0391	0.00010	mg/L	0.0400		98	80-120			
Tin, total	0.0397	0.00020	mg/L	0.0400		99	80-120			
Titanium, total	0.0387	0.0050	mg/L	0.0400		97	80-120			
Tungsten, total	0.0391	0.0010	mg/L	0.0400		98	80-120			
Uranium, total	0.0408	0.000020	mg/L	0.0400		102	80-120			
Vanadium, total	0.0399	0.0050	mg/L	0.0400		100	80-120			
Zinc, total	0.392	0.0040	mg/L	0.400		98	80-120			
Zirconium, total	0.0391	0.00010	mg/L	0.0400		98	80-120			
Total Metals, Batch B3K1396										
Blank (B3K1396-BLK1)				Prepared: 2023-11-14, Analyzed: 2023-11-15						
Aluminum, total	< 0.0050	0.0050	mg/L							
Antimony, total	< 0.00020	0.00020	mg/L							
Arsenic, total	< 0.00050	0.00050	mg/L							
Barium, total	< 0.0050	0.0050	mg/L							
Beryllium, total	< 0.00010	0.00010	mg/L							
Bismuth, total	< 0.00010	0.00010	mg/L							
Boron, total	< 0.0500	0.0500	mg/L							
Cadmium, total	< 0.000010	0.000010	mg/L							
Calcium, total	< 0.20	0.20	mg/L							
Chromium, total	< 0.00050	0.00050	mg/L							
Cobalt, total	< 0.00010	0.00010	mg/L							
Copper, total	< 0.00040	0.00040	mg/L							
Iron, total	< 0.010	0.010	mg/L							
Lead, total	< 0.00020	0.00020	mg/L							
Lithium, total	< 0.00010	0.00010	mg/L							
Magnesium, total	< 0.010	0.010	mg/L							
Manganese, total	< 0.00020	0.00020	mg/L							
Molybdenum, total	< 0.00010	0.00010	mg/L							
Nickel, total	< 0.00040	0.00040	mg/L							
Phosphorus, total	< 0.050	0.050	mg/L							
Potassium, total	< 0.10	0.10	mg/L							
Selenium, total	< 0.00050	0.00050	mg/L							
Silicon, total	< 1.0	1.0	mg/L							
Silver, total	< 0.000050	0.000050	mg/L							
Sodium, total	< 0.10	0.10	mg/L							
Strontium, total	< 0.0010	0.0010	mg/L							
Sulfur, total	< 3.0	3.0	mg/L							
Tellurium, total	< 0.00050	0.00050	mg/L							
Thallium, total	< 0.000020	0.000020	mg/L							
Thorium, total	< 0.00010	0.00010	mg/L							
Tin, total	< 0.00020	0.00020	mg/L							
Titanium, total	< 0.0050	0.0050	mg/L							
Tungsten, total	< 0.0010	0.0010	mg/L							
Uranium, total	< 0.000020	0.000020	mg/L							
Vanadium, total	< 0.0050	0.0050	mg/L							
Zinc, total	< 0.0040	0.0040	mg/L							
Zirconium, total	< 0.00010	0.00010	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	23K1363
PROJECT	23-119-01PG	**REPORTED**	2023-11-21 13:17

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B3K1396, Continued										
LCS (B3K1396-BS1)				Prepared: 2023-11-14, Analyzed: 2023-11-15						
Aluminum, total	3.90	0.0050	mg/L	4.00		97	80-120			
Antimony, total	0.0378	0.00020	mg/L	0.0400		94	80-120			
Arsenic, total	0.389	0.00050	mg/L	0.400		97	80-120			
Barium, total	0.0389	0.0050	mg/L	0.0400		97	80-120			
Beryllium, total	0.0361	0.00010	mg/L	0.0400		90	80-120			
Bismuth, total	0.0379	0.00010	mg/L	0.0400		95	80-120			
Boron, total	0.377	0.0500	mg/L	0.400		94	80-120			
Cadmium, total	0.0388	0.000010	mg/L	0.0400		97	80-120			
Calcium, total	3.76	0.20	mg/L	4.00		94	80-120			
Chromium, total	0.0400	0.00050	mg/L	0.0400		100	80-120			
Cobalt, total	0.0398	0.00010	mg/L	0.0400		99	80-120			
Copper, total	0.0403	0.00040	mg/L	0.0400		101	80-120			
Iron, total	4.00	0.010	mg/L	4.00		100	80-120			
Lead, total	0.0389	0.00020	mg/L	0.0400		97	80-120			
Lithium, total	0.0356	0.00010	mg/L	0.0400		89	80-120			
Magnesium, total	4.02	0.010	mg/L	4.00		100	80-120			
Manganese, total	0.0398	0.00020	mg/L	0.0400		99	80-120			
Molybdenum, total	0.0390	0.00010	mg/L	0.0400		97	80-120			
Nickel, total	0.0394	0.00040	mg/L	0.0400		99	80-120			
Phosphorus, total	3.87	0.050	mg/L	4.00		97	80-120			
Potassium, total	3.94	0.10	mg/L	4.00		99	80-120			
Selenium, total	0.405	0.00050	mg/L	0.400		101	80-120			
Silicon, total	3.9	1.0	mg/L	4.00		98	80-120			
Silver, total	0.0397	0.000050	mg/L	0.0400		99	80-120			
Sodium, total	3.98	0.10	mg/L	4.00		100	80-120			
Strontium, total	0.0390	0.0010	mg/L	0.0400		98	80-120			
Sulfur, total	39.9	3.0	mg/L	40.0		100	80-120			
Tellurium, total	0.0363	0.00050	mg/L	0.0400		91	80-120			
Thallium, total	0.0383	0.000020	mg/L	0.0400		96	80-120			
Thorium, total	0.0382	0.00010	mg/L	0.0400		96	80-120			
Tin, total	0.0385	0.00020	mg/L	0.0400		96	80-120			
Titanium, total	0.0382	0.0050	mg/L	0.0400		95	80-120			
Tungsten, total	0.0387	0.0010	mg/L	0.0400		97	80-120			
Uranium, total	0.0392	0.000020	mg/L	0.0400		98	80-120			
Vanadium, total	0.0393	0.0050	mg/L	0.0400		98	80-120			
Zinc, total	0.386	0.0040	mg/L	0.400		97	80-120			
Zirconium, total	0.0388	0.00010	mg/L	0.0400		97	80-120			
Total Metals, Batch B3K1440										
Blank (B3K1440-BLK1)				Prepared: 2023-11-15, Analyzed: 2023-11-15						
Mercury, total	< 0.000010	0.000010	mg/L							
Blank (B3K1440-BLK2)				Prepared: 2023-11-15, Analyzed: 2023-11-15						
Mercury, total	< 0.000010	0.000010	mg/L							
LCS (B3K1440-BS1)				Prepared: 2023-11-15, Analyzed: 2023-11-15						
Mercury, total	0.000260	0.000010	mg/L	0.000250		104	80-120			
LCS (B3K1440-BS2)				Prepared: 2023-11-15, Analyzed: 2023-11-15						
Mercury, total	0.000247	0.000010	mg/L	0.000250		99	80-120			

LOGIN NOTICE CONFIRMATION (Work Order 23K1363)

THIS IS NOT A REPORT

Need help reading your Login Notice? Check out this handy article:
https://www.caro.ca/quick-guide-to-your-login-notice-how-to-review-your-sample-submission/

CLIENT	Western Water Associates Ltd		
PO NUMBER		**QUOTATION ID**	Western Water Master Bid
PROJECT	23-119-01PG	**SUBMITTED BY**	
PROJECT INFO	Hullcar Fall GW Sampling 2023	**COC NO.**	No Number

Receipt Details:

12/9/2023 12:00:00AM

RECEIVED	2023-11-09 15:02	**SAMPLES LOGGED IN**	6
LOCATION	Kelowna Lab	**LOGGED IN**	2023-11-10 12:40
DISPOSAL DATE	12/9/2023	**ACCOUNT MGR**	Brent Whitehead

Sample Condition Summary:

Quantity of Transport Vessels Received: 1

Receipt Temperature = 8.4°C

Broken Container(s)	No	Sampling Date(s) Missing	No	Incorrect Cont./Pres.	No	Custody Seals Intact	
Cooling Initiated	Yes	Sample(s) Frozen	No	Missing/Extra Samples	No	Documentation Issue	No
Environmental Sample(s) >10°C	No	Microbiological Sample(s) >8°C	No				

Note: *Sample transport temperatures of less than 8°C for microbiological parameters and less than or equal to 10°C for environmental parameters is recommended. Samples that exceed these values will still be processed. However, please note that the analytical results may be affected, especially for samples collected prior to the day of receipt.*

REPORT TO
Warren Grafton
Western Water Associates Ltd
1003 Kalamalka Lake
Vernon, BC V1T6V4
Tel: (250) 541-1030

INCLUDE QC	Yes
INCLUDE COC	No
EXTRAS	Guidelines

INVOICE TO
Warren Grafton
Western Water Associates Ltd
1003 Kalamalka Lake
Vernon, BC V1T6V4
Tel: (250) 541-1030

FREQUENCY	With Report
GST EXEMPT	No
PAYMENT TERMS	Upon Receipt
MIN AMOUNT	N/A

Delivery Plan:

REPORT DUE 2023-11-21 17:00 (5-7 day TAT)

Contact Name	Email / Fax / Cellular	Login Notice	Report	Invoice	EDD	EDD Format	CC to	Fax	Text	Mail
Warren Grafton	warren@westernwater.ca	✓	✓		✓	CARO Excel	avi@westernwater.ca			
Warren Grafton	warren@westernwater.ca			✓			amanda@westernwater.ca			

Analysis Schedule:

Analysis / Version	Due	Expires [1]	Status	Comments

LOGIN NOTICE CONFIRMATION (Work Order 23K1363)

THIS IS NOT A REPORT

Need help reading your Login Notice? Check out this handy article:
https://www.caro.ca/quick-guide-to-your-login-notice-how-to-review-your-sample-submission/

Analysis Schedule, Continued:

Analysis / Version	Due	Expires [1]	Status	Comments

MW-20-1B (23K1363-01) | Matrix: Water | Sampled: 2023-11-08 18:30 |

Container(s) Submitted:

A = C11_1 L Plastic (General) | *B = C10_125 mL Plastic (H2SO4)* | *C = S10_125 mL Plastic (H2SO4-F)*
D = C05_125 mL Plastic (Metals) | *E = C06_40 mL Vial (Mercury)* | *F = S05_125 mL Plastic (Metals-F)*
G = S06_40 mL Vial (Mercury-F) | *H = C19_40 mL Vial (General CG)* | *I = C37_40mL vial (TOC with HCl)*
J = C37_40mL vial (TOC with HCl)

2H and 18O Isotope Ratios	2023-11-21	2024-11-07	Subcontracted	Subcontracted
Alkalinity	2023-11-21	2023-11-22	Available	
Ammonia, Total	2023-11-21	2023-12-06	Available	
Anions in Water (4 Anions)	2023-11-21	2023-11-11	Available	
Carbon, Total Organic	2023-11-21	2023-12-06	Batched	
Mercury, dissolved	2023-11-21	2023-12-06	Available	
Mercury, total	2023-11-21	2023-12-06	Available	
Metals in Water, total	2023-11-21	2024-05-06	Available	
Metals, dissolved	2023-11-21	2024-05-06	Available	
Nitrogen, Dissolved Kjeldahl	2023-11-21	2023-12-06	Available	
Phosphorus, Total Dissolved by Colorimetry	2023-11-21	2023-12-06	Available	
Sample Filtration, Nutrients (0.45 um + H2SO4)	2023-11-21	2023-11-11	Available	
Solids, Total Suspended	2023-11-21	2023-11-15	Available	

MW-19-1A-R (23K1363-02) | Matrix: Water | Sampled: 2023-11-08 17:40 |

Container(s) Submitted:

A = C11_1 L Plastic (General) | *B = C10_125 mL Plastic (H2SO4)* | *C = S10_125 mL Plastic (H2SO4-F)*
D = C05_125 mL Plastic (Metals) | *E = C06_40 mL Vial (Mercury)* | *F = S05_125 mL Plastic (Metals-F)*
G = S06_40 mL Vial (Mercury-F) | *H = C19_40 mL Vial (General CG)* | *I = C37_40mL vial (TOC with HCl)*
J = C37_40mL vial (TOC with HCl)

2H and 18O Isotope Ratios	2023-11-21	2024-11-07	Subcontracted	Subcontracted
Alkalinity	2023-11-21	2023-11-22	Available	
Ammonia, Total	2023-11-21	2023-12-06	Available	
Anions in Water (4 Anions)	2023-11-21	2023-11-11	Available	
Carbon, Total Organic	2023-11-21	2023-12-06	Batched	
Mercury, dissolved	2023-11-21	2023-12-06	Available	
Mercury, total	2023-11-21	2023-12-06	Available	
Metals in Water, total	2023-11-21	2024-05-06	Available	
Metals, dissolved	2023-11-21	2024-05-06	Available	
Nitrogen, Dissolved Kjeldahl	2023-11-21	2023-12-06	Available	
Phosphorus, Total Dissolved by Colorimetry	2023-11-21	2023-12-06	Available	
Sample Filtration, Nutrients (0.45 um + H2SO4)	2023-11-21	2023-11-11	Available	
Solids, Total Suspended	2023-11-21	2023-11-15	Available	

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Analysis Schedule, Continued:

Analysis / Version	Due	Expires [1]	Status	Comments

MW-20-2B (23K1363-03) | Matrix: Water | Sampled: 2023-11-08 14:00 |

Container(s) Submitted:

A = C11_1 L Plastic (General) | *B = C10_125 mL Plastic (H2SO4)* | *C = S10_125 mL Plastic (H2SO4-F)*
D = C05_125 mL Plastic (Metals) | *E = C06_40 mL Vial (Mercury)* | *F = S05_125 mL Plastic (Metals-F)*
G = S06_40 mL Vial (Mercury-F) | *H = C19_40 mL Vial (General CG)* | *I = C37_40mL vial (TOC with HCl)*
J = C37_40mL vial (TOC with HCl)

2H and 18O Isotope Ratios	2023-11-21	2024-11-07	Subcontracted	Subcontracted
Alkalinity	2023-11-21	2023-11-22	Available	
Ammonia, Total	2023-11-21	2023-12-06	Available	
Anions in Water (4 Anions)	2023-11-21	2023-11-11	Available	
Carbon, Total Organic	2023-11-21	2023-12-06	Batched	
Mercury, dissolved	2023-11-21	2023-12-06	Available	
Mercury, total	2023-11-21	2023-12-06	Available	
Metals in Water, total	2023-11-21	2024-05-06	Available	
Metals, dissolved	2023-11-21	2024-05-06	Available	
Nitrogen, Dissolved Kjeldahl	2023-11-21	2023-12-06	Available	
Phosphorus, Total Dissolved by Colorimetry	2023-11-21	2023-12-06	Available	
Sample Filtration, Nutrients (0.45 um + H2SO4)	2023-11-21	2023-11-11	Available	
Solids, Total Suspended	2023-11-21	2023-11-15	Available	

MW-19-3A (23K1363-04) | Matrix: Water | Sampled: 2023-11-08 15:35 |

Container(s) Submitted:

A = C11_1 L Plastic (General) | *B = C10_125 mL Plastic (H2SO4)* | *C = S10_125 mL Plastic (H2SO4-F)*
D = C05_125 mL Plastic (Metals) | *E = C06_40 mL Vial (Mercury)* | *F = S05_125 mL Plastic (Metals-F)*
G = S06_40 mL Vial (Mercury-F) | *H = C19_40 mL Vial (General CG)* | *I = C37_40mL vial (TOC with HCl)*
J = C37_40mL vial (TOC with HCl)

2H and 18O Isotope Ratios	2023-11-21	2024-11-07	Subcontracted	Subcontracted
Alkalinity	2023-11-21	2023-11-22	Available	
Ammonia, Total	2023-11-21	2023-12-06	Available	
Anions in Water (4 Anions)	2023-11-21	2023-11-11	Available	
Carbon, Total Organic	2023-11-21	2023-12-06	Batched	
Mercury, dissolved	2023-11-21	2023-12-06	Available	
Mercury, total	2023-11-21	2023-12-06	Available	
Metals in Water, total	2023-11-21	2024-05-06	Available	
Metals, dissolved	2023-11-21	2024-05-06	Available	
Nitrogen, Dissolved Kjeldahl	2023-11-21	2023-12-06	Available	
Phosphorus, Total Dissolved by Colorimetry	2023-11-21	2023-12-06	Available	
Sample Filtration, Nutrients (0.45 um + H2SO4)	2023-11-21	2023-11-11	Available	
Solids, Total Suspended	2023-11-21	2023-11-15	Available	

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Analysis Schedule, Continued:

Analysis / Version	Due	Expires [1]	Status	Comments
MW-20-4A (23K1363-05) | Matrix: Water | Sampled: 2023-11-08 11:10 |				
Container(s) Submitted:				
A = C11_1 L Plastic (General)	*B = C10_125 mL Plastic (H2SO4)*		*C = S10_125 mL Plastic (H2SO4-F)*	
D = C05_125 mL Plastic (Metals)	*E = C06_40 mL Vial (Mercury)*		*F = S05_125 mL Plastic (Metals-F)*	
G = S06_40 mL Vial (Mercury-F)	*H = C19_40 mL Vial (General CG)*		*I = C37_40mL vial (TOC with HCl)*	
J = C37_40mL vial (TOC with HCl)				
2H and 18O Isotope Ratios	2023-11-21	2024-11-07	Subcontracted	Subcontracted
Alkalinity	2023-11-21	2023-11-22	Available	
Ammonia, Total	2023-11-21	2023-12-06	Available	
Anions in Water (4 Anions)	2023-11-21	2023-11-11	Available	
Carbon, Total Organic	2023-11-21	2023-12-06	Batched	
Mercury, dissolved	2023-11-21	2023-12-06	Available	
Mercury, total	2023-11-21	2023-12-06	Available	
Metals in Water, total	2023-11-21	2024-05-06	Available	
Metals, dissolved	2023-11-21	2024-05-06	Available	
Nitrogen, Dissolved Kjeldahl	2023-11-21	2023-12-06	Available	
Phosphorus, Total Dissolved by Colorimetry	2023-11-21	2023-12-06	Available	
Sample Filtration, Nutrients (0.45 um + H2SO4)	2023-11-21	2023-11-11	Available	
Solids, Total Suspended	2023-11-21	2023-11-15	Available	
Dupe23A (23K1363-06) | Matrix: Water | Sampled: 2023-11-08 12:30 |				
Container(s) Submitted:				
A = C11_1 L Plastic (General)	*B = C10_125 mL Plastic (H2SO4)*		*C = S10_125 mL Plastic (H2SO4-F)*	
D = C05_125 mL Plastic (Metals)	*E = C06_40 mL Vial (Mercury)*		*F = S05_125 mL Plastic (Metals-F)*	
G = S06_40 mL Vial (Mercury-F)	*H = C19_40 mL Vial (General CG)*		*I = C37_40mL vial (TOC with HCl)*	
J = C37_40mL vial (TOC with HCl)				
2H and 18O Isotope Ratios	2023-11-21	2024-11-07	Subcontracted	Subcontracted
Alkalinity	2023-11-21	2023-11-22	Available	
Ammonia, Total	2023-11-21	2023-12-06	Available	
Anions in Water (4 Anions)	2023-11-21	2023-11-11	Available	
Carbon, Total Organic	2023-11-21	2023-12-06	Batched	
Mercury, dissolved	2023-11-21	2023-12-06	Available	
Mercury, total	2023-11-21	2023-12-06	Available	
Metals in Water, total	2023-11-21	2024-05-06	Available	
Metals, dissolved	2023-11-21	2024-05-06	Available	
Nitrogen, Dissolved Kjeldahl	2023-11-21	2023-12-06	Available	
Phosphorus, Total Dissolved by Colorimetry	2023-11-21	2023-12-06	Available	
Sample Filtration, Nutrients (0.45 um + H2SO4)	2023-11-21	2023-11-11	Available	
Solids, Total Suspended	2023-11-21	2023-11-15	Available	

1 *Red font indicates that the analysis has already or is about to expire. In order to guarantee that your samples will be analyzed within the recommended holding time, they must be received at least one day prior to the expiry date (3 hours for microbiological testing). Note that all pH in water / Chlorine / Temperature / Dissolved Oxygen results will be automatically be qualified as they should be analyzed in the field for greatest accuracy.*

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Packages and their respective Analyses included in this Work Order:

Anions in Water (4 Anions)

Chloride	Nitrate by IC	Nitrite by IC
Sulfate		

Metals in Water, total

Aluminum, total	Antimony, total	Arsenic, total
Barium, total	Beryllium, total	Bismuth, total
Boron, total	Cadmium, total	Calcium, total
Chromium, total	Cobalt, total	Copper, total
Hardness, Total (as CaCO3) (Calc)	Iron, total	Lead, total
Lithium, total	Magnesium, total	Manganese, total
Molybdenum, total	Nickel, total	Phosphorus, total
Potassium, total	Selenium, total	Silicon, total
Silver, total	Sodium, total	Strontium, total
Sulfur, total	Tellurium, total	Thallium, total
Thorium, total	Tin, total	Titanium, total
Tungsten, total	Uranium, total	Vanadium, total
Zinc, total	Zirconium, total	

Metals, dissolved

Aluminum, dissolved	Antimony, dissolved	Arsenic, dissolved
Barium, dissolved	Beryllium, dissolved	Bismuth, dissolved
Boron, dissolved	Cadmium, dissolved	Calcium, dissolved
Chromium, dissolved	Cobalt, dissolved	Copper, dissolved
Hardness, Dissolved (as CaCO3) (Calc)	Iron, dissolved	Lead, dissolved
Lithium, dissolved	Magnesium, dissolved	Manganese, dissolved
Molybdenum, dissolved	Nickel, dissolved	Phosphorus, dissolved
Potassium, dissolved	Selenium, dissolved	Silicon, dissolved
Silver, dissolved	Sodium, dissolved	Strontium, dissolved
Sulfur, dissolved	Tellurium, dissolved	Thallium, dissolved
Thorium, dissolved	Tin, dissolved	Titanium, dissolved
Tungsten, dissolved	Uranium, dissolved	Vanadium, dissolved
Zinc, dissolved	Zirconium, dissolved	

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Each Analysis includes the following Analytes and their respective Reporting Limits [RLs]:

2H and 18O Isotope Ratios in Water	*Reference Method: Stable Isotopes*		*Units: per mil*
delta-18-O	delta-2-H		
Alkalinity in Water	*Reference Method: SM 2320 B* (2021)*		*Units: mg/L*
Alkalinity, Total (as CaCO3) [1]	Alkalinity, Phenolphthalein (as CaCO3) [1]	Alkalinity, Bicarbonate (as CaCO3) [1]	Alkalinity, Carbonate (as CaCO3) [1]
Alkalinity, Hydroxide (as CaCO3) [1]			
Ammonia, Total in Water	*Reference Method: SM 4500-NH3 G* (2021)*		*Units: mg/L*
Ammonia, Total (as N) [0.05]			
Anions by IC in Water	*Reference Method: SM 4110 B (2020)*		*Units: mg/L*
Nitrate (as N) [0.01]	Nitrite (as N) [0.01]		
Carbon, Total Organic in Water	*Reference Method: SM 5310 B (2022)*		*Units: mg/L*
Carbon, Total Organic [0.5]			
Chloride in Water	*Reference Method: SM 4110 B (2020)*		*Units: mg/L*
Chloride [0.1]			
Dissolved Metals by ICPMS in Water	*Reference Method: EPA 200.8 / EPA 6020B*		*Units: mg/L*
Aluminum, dissolved [0.005]	Antimony, dissolved [0.0002]	Arsenic, dissolved [0.0005]	Barium, dissolved [0.005]
Beryllium, dissolved [0.0001]	Bismuth, dissolved [0.0001]	Boron, dissolved [0.05]	Cadmium, dissolved [1e-005]
Calcium, dissolved [0.2]	Chromium, dissolved [0.0005]	Cobalt, dissolved [0.0001]	Copper, dissolved [0.0004]
Iron, dissolved [0.01]	Lead, dissolved [0.0002]	Lithium, dissolved [0.0001]	Magnesium, dissolved [0.01]
Manganese, dissolved [0.0002]	Molybdenum, dissolved [0.0001]	Nickel, dissolved [0.0004]	Phosphorus, dissolved [0.05]
Potassium, dissolved [0.1]	Selenium, dissolved [0.0005]	Silicon, dissolved [1]	Silver, dissolved [5e-005]
Sodium, dissolved [0.1]	Strontium, dissolved [0.001]	Sulfur, dissolved [3]	Tellurium, dissolved [0.0005]
Thallium, dissolved [2e-005]	Thorium, dissolved [0.0001]	Tin, dissolved [0.0002]	Titanium, dissolved [0.005]
Tungsten, dissolved [0.001]	Uranium, dissolved [2e-005]	Vanadium, dissolved [0.005]	Zinc, dissolved [0.004]
Zirconium, dissolved [0.0001]			
Mercury by CVAFS in Water	*Reference Method: EPA 245.7**		*Units: mg/L*
Mercury, dissolved [1e-005]	Mercury, total [1e-005]		
Nitrogen, Dissolved Kjeldahl in Water	*Reference Method: SM 4500-Norg D* (2021)*		*Units: mg/L*
Nitrogen, Dissolved Kjeldahl [0.05]			
Phosphorus, Total Dissolved by Colorimetry in Water	*Reference Method: SM 4500-P B.5* (2011) / SM 4500-P F (2021)*		*Units: mg/L*
Phosphorus, Total Dissolved [0.005]			

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Solids, Total Suspended in Water	*Reference Method: SM 2540 D* (2020)*	*Units: mg/L*
Solids, Total Suspended [2]		

Sulfate in Water	*Reference Method: SM 4110 B (2020)*	*Units: mg/L*
Sulfate [1]		

Total Metals by ICPMS in Water — *Reference Method: EPA 200.2 / EPA 6020B* — *Units: mg/L*

Aluminum, total [0.005]	Antimony, total [0.0002]	Arsenic, total [0.0005]	Barium, total [0.005]
Beryllium, total [0.0001]	Bismuth, total [0.0001]	Boron, total [0.05]	Cadmium, total [1e-005]
Calcium, total [0.2]	Chromium, total [0.0005]	Cobalt, total [0.0001]	Copper, total [0.0004]
Iron, total [0.01]	Lead, total [0.0002]	Lithium, total [0.0001]	Magnesium, total [0.01]
Manganese, total [0.0002]	Molybdenum, total [0.0001]	Nickel, total [0.0004]	Phosphorus, total [0.05]
Potassium, total [0.1]	Selenium, total [0.0005]	Silicon, total [1]	Silver, total [5e-005]
Sodium, total [0.1]	Strontium, total [0.001]	Sulfur, total [3]	Tellurium, total [0.0005]
Thallium, total [2e-005]	Thorium, total [0.0001]	Tin, total [0.0002]	Titanium, total [0.005]
Tungsten, total [0.001]	Uranium, total [2e-005]	Vanadium, total [0.005]	Zinc, total [0.004]
Zirconium, total [0.0001]			

Note: RLs on Final Report may be higher than expected due to: 1) limited sample volume, 2) high moisture, 3) analytical interferences

Please verify that all of the information included in this Login Notice is correct. If there are any errors, omissions, or concerns, please contact us at 1-888-311-8846.

You can expect to receive the analytical report via email on or after the due date shown above.

Thank you for using CARO!

2 3 K 1 3 6 3

VICES
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Tel: (604) 279-1499 Fax: (604) 279-1599

☒ 102-3677 Highway 97N, Kelowna, BC V1X 5C3
Tel: (250) 765-9646 Fax: (250) 765-3893

☐ 17225 109 Avenue NW, Edmonton, AB T5S 1H7
Tel: (780) 489-9100 Fax: (780) 489-9700

CARO BC COC, Rev 2015-09

CHAIN OF CUSTODY RECORD

COC# _____ PAGE 1 OF 1

RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE: 11/09/23
	TIME:	ACE	TIME: 15:02

PROJECT: Hullcar Fall GW Sampling 2023

PROJECT INFO: 23-119-01PG

REPORT TO:
COMPANY: Western Water Associates Ltd
ADDRESS:
CONTACT: Warren Grafton
TEL/FAX: (250)-614-6645
DELIVERY METHOD: EMAIL ☒ MAIL ☐ OTHER* ☐
DATA FORMAT: EXCEL ☐ WATERTRAX ☐ ESdat ☐ EQuIS ☐ BC EMS ☐ OTHER* ☐
EMAIL 1: warren@westernwater.ca
EMAIL 2: avi@westernwater.ca
EMAIL 3: amanda@westernwater.ca

INVOICE TO: SAME AS REPORT TO ☒
COMPANY:
ADDRESS:
CONTACT:
TEL/FAX:
DELIVERY METHOD: EMAIL ☐ MAIL ☐ OTHER* ☐
EMAIL 1:
EMAIL 2:
EMAIL 3:
PO #:

TURNAROUND TIME REQUESTED:
Routine: (5-7 Days) ☒
Rush: 1 Day* ☐ 2 Day* ☐ 3 Day* ☐
Other* ☐
*Contact Lab To Confirm. Surcharge May Apply

REGULATORY APPLICATION:
Canadian Drinking Water Quality Guidelines ☐
BC Drinking Water Protection Act / Reg. ☒
BC CSR ☒ AB TIER 1 ☐ CCME ☐ OTHER* ☐
AL ☐ PL ☐ RL ☐ CL ☐ IL ☐ AW ☐ IW ☐ LW ☐
Regs on Report? ☐

** NEW ** If you would like to sign up for ClientConnect and/or EnviroChain, CARO's online service offerings, check here: ☐

SAMPLED BY: AB

ANALYSES REQUESTED:

BTEX ☐ VPH ☐ PHC F1 ☐	VOC ☐ VPH ☐	EPH ☐ PHC F2-F4 ☐	PAH ☐ L/HEPH ☐	PHENOLS Chlorinated ☐ Non-Chlor. ☐	PCB ☐ GLYCOLS ☐ HAA ☐	PESTICIDES ☐ ACID HERBICIDES ☐	METALS - WATER TOTAL Hg ☐	METALS - WATER DISSOLVED Hg ☐	METALS - SOIL (SALM) ☐ inc. pH ☐	pH ☐ EC ☐ ALK ☐	TSS ☐ VSS ☐ TDS ☐	BOD ☐ COD ☐	TOG ☐ MOG ☐	FECAL COLIFORMS ☐ HPC ☐	TOTAL COLIFORMS ☐ *E. coli* ☐	ASBESTOS	See attached list	HOLD
																	✓	
																	✓	
																	✓	
																	✓	
																	✓	
																	✓	

	CLIENT SAMPLE ID:	MATRIX: DRINKING WATER	OTHER WATER	SOIL	OTHER	# CONTAINERS	SAMPLING: DATE DD-MMM-YY	TIME HH:MM	COMMENTS: CHLORINATED	FILTERED	PRESERVED	(e.g. flow/volume media ID/notes)
	MW-20-1B		✓					18:30				
	MW19-1A-R		✓					17:40				
	MW-20-2B		✓					14:00				
	MW-19-3A		✓					15:35				
	MW-20-4A		✓					11:10				
	Dupe23A		✓					12:30				

SHIPPING INSTRUCTIONS: Return Cooler(s) ☐
Supplies Needed:

SAMPLE RETENTION INSTRUCTIONS (Discarded 30 days after Report unless otherwise specified):
60 Days ☐ 90 Days ☐ Longer Date (Surcharges will Apply):
* **OTHER INSTRUCTIONS:**

PAYMENT:
CHEQUE ☐
CREDIT ☐
DEBIT ☐
CASH ☐
INVOICE ☐

SAMPLE RECEIPT CONDITION:
COOLER 1 (°C): 8.4 ICE: Y ☐ N ☐
COOLER 2 (°C): _____ ICE: Y ☐ N ☐
COOLER 3 (°C): _____ ICE: Y ☐ N ☐
CUSTODY SEALS INTACT: NA ☐ Y ☐ N ☐

Sample names for Lab report

MW19-1AR PIEZOMETER	E317950
MW19-2A PIEZOMETER	E317972
MW19-3A PIEZOMETER	E317974
MW-20-1B HULLCAR MW	E319191
MW-20-2B HULLCAR MW	E319192
MW20-4A HULLCAR MW	E319193

Please have 7 complete bottle sets for the below

23-119-01PG Analysis for all 7 samples

1. Major anions and cations Cl, NO3, NO2, SO4
    a. Include : NH3, DKN,HCO3
2. Total Hardness as CACO3
3. Dissolved Metals
4. Total Metals
5. Dissolved Phosphorus
6. TSS
7. TOC
8. Isotopes of hydrogen and Oxygen
9. Bicarbinate

Appendix D

Field and Calibration Sheets

Hullcar Fall 2023 Groundwater Sampling
Ministry of Environment and Climate Change Strategy
WWAL Ref: 23-119-01PG

western water ASSOCIATES LTD
Consultants in Hydrogeology and Water Resources Management

Calibration Tracker

Device	Date
● Apera Inst. PC60 (pH, T, EC, TDS, Sal) Tester - SN# T661162063 (Pink)	2023-11-07
● Oakton ORP50 (ORP, T) - SN# 2983395 (Pink)	2023-11-08
● Apera Inst. PC60 (pH, T, EC, TDS, Sal) Tester - SN# T661313034 (Yellow)	2023-11-09
● Apera Inst.ORP60 (ORP) Tester - SN# T641025033 (Yellow)	2023-11-10

Calibration Solution	By
7.00pH,4.00pH, 12.88mS/cm Apera Solution	HM
225mV Sensorex 7.00pH,4.00pH, 12.88mS/cm Apera Solution	HM
ORP Std Apera Solution 222mV	HM

Groundwater Supply Development and Management

Source Water Assessment and Protection

Well Monitoring & Maintenance

Environmental & Water Quality Monitoring

Storm & Wastewater Disposal to Ground

Groundwater Modeling

Aquifer Test Design and Analysis

Geothermal / Geoexchange Systems

Policy and Guideline Development

Applied Research

Rural Subdivision Services

Environmental Assessment & Permitting

| #106 – 5145 26th Street, Vernon, B.C. V1T 8G4 | P:1.250.541.1030 | Prince George | Victoria | www.westernwater.ca |