



Cartier Regional Water Co-op Inc. -  
Headingley  
ATTN: Danielle Vaillant  
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Date Received: 12-SEP-17  
Report Date: 20-SEP-17 10:31 (MT)  
Version: FINAL

Client Phone: 204-353-4055

## Certificate of Analysis

Lab Work Order #: L1990066  
Project P.O. #: NOT SUBMITTED  
Job Reference: HEADINGLEY REGIONAL WATER SYSTEM  
C of C Numbers:  
Legal Site Desc:

Hua Wo  
Chemistry Laboratory Manager

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# ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1990066-1 TRUE RAW SURFACE POND WATER							
Sampled By: David Epler on 12-SEP-17 @ 10:00							
Matrix: Water							
<b>MB Chemistry for PWS</b>							
<b>Alkalinity, Bicarbonate</b>							
Bicarbonate (HCO3)	296		1.2	mg/L		14-SEP-17	
<b>Alkalinity, Carbonate</b>							
Carbonate (CO3)	7.92		0.60	mg/L		14-SEP-17	
<b>Alkalinity, Hydroxide</b>							
Hydroxide (OH)	<0.34		0.34	mg/L		14-SEP-17	
<b>Alkalinity, Total (as CaCO3)</b>							
Alkalinity, Total (as CaCO3)	256		1.0	mg/L		13-SEP-17	R3828433
<b>Ammonia by colour</b>							
Ammonia, Total (as N)	0.145		0.010	mg/L		15-SEP-17	R3830786
<b>Bromide in Water by IC (Low Level)</b>							
Bromide (Br)	0.111		0.010	mg/L		13-SEP-17	R3830086
<b>Chloride in Water by IC (Low Level)</b>							
Chloride (Cl)	35.6		0.10	mg/L		13-SEP-17	R3830086
<b>Colour, True</b>							
Colour, True	15.3		5.0	CU		14-SEP-17	R3829405
<b>Conductivity</b>							
Conductivity	989		1.0	umhos/cm		13-SEP-17	R3828433
<b>Dissolved Organic Carbon by Combustion</b>							
Dissolved Organic Carbon	9.24		0.50	mg/L		14-SEP-17	R3829357
<b>Fluoride in Water by IC</b>							
Fluoride (F)	0.181		0.020	mg/L		13-SEP-17	R3830086
<b>Hardness Calculated</b>							
Hardness (as CaCO3)	419	HTC	0.20	mg/L		15-SEP-17	
<b>Langelier Index 4C</b>							
Langelier Index (4 C)	0.96					18-SEP-17	
<b>Langelier Index 60C</b>							
Langelier Index (60 C)	1.7					18-SEP-17	
<b>Nitrate in Water by IC (Low Level)</b>							
Nitrate (as N)	0.126		0.0050	mg/L		13-SEP-17	R3830086
<b>Nitrite in Water by IC (Low Level)</b>							
Nitrite (as N)	0.0253		0.0010	mg/L		13-SEP-17	R3830086
<b>Sulfate in Water by IC</b>							
Sulfate (SO4)	262		0.30	mg/L		13-SEP-17	R3830086
<b>Total Dissolved Solids (TDS)</b>							
Total Dissolved Solids	704		20	mg/L		14-SEP-17	R3829419
<b>Total Metals in Water by CRC ICPMS</b>							
Aluminum (Al)-Total	0.199		0.0030	mg/L	14-SEP-17	14-SEP-17	R3829093
Antimony (Sb)-Total	0.00043		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Arsenic (As)-Total	0.00636		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Barium (Ba)-Total	0.0628		0.000050	mg/L	14-SEP-17	14-SEP-17	R3829093
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	14-SEP-17	14-SEP-17	R3829093
Boron (B)-Total	0.131		0.010	mg/L	14-SEP-17	14-SEP-17	R3829093
Cadmium (Cd)-Total	0.0000133		0.0000050	mg/L	14-SEP-17	14-SEP-17	R3829093
Calcium (Ca)-Total	73.2		0.050	mg/L	14-SEP-17	14-SEP-17	R3829093
Cesium (Cs)-Total	0.000022		0.000010	mg/L	14-SEP-17	14-SEP-17	R3829093
Chromium (Cr)-Total	0.00032		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Cobalt (Co)-Total	0.00026		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Copper (Cu)-Total	0.0398		0.00050	mg/L	14-SEP-17	14-SEP-17	R3829093
Iron (Fe)-Total	0.185		0.010	mg/L	14-SEP-17	14-SEP-17	R3829093
Lead (Pb)-Total	0.000128		0.000050	mg/L	14-SEP-17	14-SEP-17	R3829093

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

# ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1990066-1 TRUE RAW SURFACE POND WATER Sampled By: David Epler on 12-SEP-17 @ 10:00 Matrix: Water							
<b>Total Metals in Water by CRC ICPMS</b>							
Lithium (Li)-Total	0.0760		0.0010	mg/L	14-SEP-17	14-SEP-17	R3829093
Magnesium (Mg)-Total	57.4		0.0050	mg/L	14-SEP-17	14-SEP-17	R3829093
Manganese (Mn)-Total	0.0385		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Molybdenum (Mo)-Total	0.00523		0.000050	mg/L	14-SEP-17	14-SEP-17	R3829093
Nickel (Ni)-Total	0.00343		0.00050	mg/L	14-SEP-17	14-SEP-17	R3829093
Potassium (K)-Total	12.6		0.050	mg/L	14-SEP-17	14-SEP-17	R3829093
Phosphorus (P)-Total	0.096		0.050	mg/L	14-SEP-17	14-SEP-17	R3829093
Rubidium (Rb)-Total	0.00267		0.00020	mg/L	14-SEP-17	14-SEP-17	R3829093
Selenium (Se)-Total	0.000655		0.000050	mg/L	14-SEP-17	14-SEP-17	R3829093
Silicon (Si)-Total	8.53		0.10	mg/L	14-SEP-17	14-SEP-17	R3829093
Silver (Ag)-Total	<0.000010		0.000010	mg/L	14-SEP-17	14-SEP-17	R3829093
Sodium (Na)-Total	73.0		0.050	mg/L	14-SEP-17	14-SEP-17	R3829093
Strontium (Sr)-Total	0.375		0.00020	mg/L	14-SEP-17	14-SEP-17	R3829093
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	14-SEP-17	14-SEP-17	R3829093
Thallium (Tl)-Total	0.000015		0.000010	mg/L	14-SEP-17	14-SEP-17	R3829093
Thorium (Th)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Tin (Sn)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Titanium (Ti)-Total	0.00789		0.00030	mg/L	14-SEP-17	14-SEP-17	R3829093
Tungsten (W)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Uranium (U)-Total	0.00473		0.000010	mg/L	14-SEP-17	14-SEP-17	R3829093
Vanadium (V)-Total	0.00410		0.00050	mg/L	14-SEP-17	14-SEP-17	R3829093
Zinc (Zn)-Total	0.0049		0.0030	mg/L	14-SEP-17	14-SEP-17	R3829093
Zirconium (Zr)-Total	0.000443		0.000060	mg/L	14-SEP-17	14-SEP-17	R3829093
<b>Total Organic Carbon by Combustion</b>							
Total Organic Carbon	9.07		0.50	mg/L		14-SEP-17	R3829347
<b>Turbidity</b>							
Turbidity	6.11		0.10	NTU		14-SEP-17	R3830623
<b>UV Transmittance (Calculated)</b>							
Transmittance, UV (254 nm)	63.4		1.0	%T/cm		13-SEP-17	R3829013
<b>pH</b>							
pH	8.45		0.10	pH units		13-SEP-17	R3828433
L1990066-2 TREATED BLEND INTO STORAGE CELLS Sampled By: David Epler on 12-SEP-17 @ 10:00 Matrix: Water							
<b>MB Chemistry for PWS</b>							
<b>Alkalinity, Bicarbonate</b>							
Bicarbonate (HCO3)	66.2		1.2	mg/L		14-SEP-17	
<b>Alkalinity, Carbonate</b>							
Carbonate (CO3)	<0.60		0.60	mg/L		14-SEP-17	
<b>Alkalinity, Hydroxide</b>							
Hydroxide (OH)	<0.34		0.34	mg/L		14-SEP-17	
<b>Alkalinity, Total (as CaCO3)</b>							
Alkalinity, Total (as CaCO3)	54.3		1.0	mg/L		13-SEP-17	R3828433
<b>Ammonia by colour</b>							
Ammonia, Total (as N)	<0.010		0.010	mg/L		15-SEP-17	R3830786
<b>Bromide in Water by IC (Low Level)</b>							
Bromide (Br)	<0.010		0.010	mg/L		13-SEP-17	R3830086
<b>Chloride in Water by IC (Low Level)</b>							
Chloride (Cl)	2.53		0.10	mg/L		13-SEP-17	R3830086
<b>Colour, True</b>							
Colour, True	<5.0		5.0	CU		14-SEP-17	R3829405

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

# ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1990066-2 TREATED BLEND INTO STORAGE CELLS							
Sampled By: David Epler on 12-SEP-17 @ 10:00							
Matrix: Water							
<b>Conductivity</b>							
Conductivity	185		1.0	umhos/cm		13-SEP-17	R3828433
<b>Dissolved Organic Carbon by Combustion</b>							
Dissolved Organic Carbon	<0.50		0.50	mg/L		14-SEP-17	R3829357
<b>Fluoride in Water by IC</b>							
Fluoride (F)	<0.020		0.020	mg/L		13-SEP-17	R3830086
<b>Hardness Calculated</b>							
Hardness (as CaCO3)	81.8	HTC	0.20	mg/L		15-SEP-17	
<b>Langelier Index 4C</b>							
Langelier Index (4 C)	-0.89					18-SEP-17	
<b>Langelier Index 60C</b>							
Langelier Index (60 C)	-0.11					18-SEP-17	
<b>Nitrate in Water by IC (Low Level)</b>							
Nitrate (as N)	0.0381		0.0050	mg/L		13-SEP-17	R3830086
<b>Nitrite in Water by IC (Low Level)</b>							
Nitrite (as N)	<0.0010		0.0010	mg/L		13-SEP-17	R3830086
<b>Sulfate in Water by IC</b>							
Sulfate (SO4)	33.3		0.30	mg/L		13-SEP-17	R3830086
<b>Total Dissolved Solids (TDS)</b>							
Total Dissolved Solids	109		13	mg/L		14-SEP-17	R3829419
<b>Total Metals in Water by CRC ICPMS</b>							
Aluminum (Al)-Total	<0.0030		0.0030	mg/L	14-SEP-17	14-SEP-17	R3829093
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Arsenic (As)-Total	0.00014		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Barium (Ba)-Total	0.00233		0.000050	mg/L	14-SEP-17	14-SEP-17	R3829093
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	14-SEP-17	14-SEP-17	R3829093
Boron (B)-Total	0.113		0.010	mg/L	14-SEP-17	14-SEP-17	R3829093
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	14-SEP-17	14-SEP-17	R3829093
Calcium (Ca)-Total	31.8		0.050	mg/L	14-SEP-17	14-SEP-17	R3829093
Cesium (Cs)-Total	<0.000010		0.000010	mg/L	14-SEP-17	14-SEP-17	R3829093
Chromium (Cr)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Copper (Cu)-Total	0.00487		0.00050	mg/L	14-SEP-17	14-SEP-17	R3829093
Iron (Fe)-Total	<0.010		0.010	mg/L	14-SEP-17	14-SEP-17	R3829093
Lead (Pb)-Total	<0.000050		0.000050	mg/L	14-SEP-17	14-SEP-17	R3829093
Lithium (Li)-Total	0.0035		0.0010	mg/L	14-SEP-17	14-SEP-17	R3829093
Magnesium (Mg)-Total	0.561		0.0050	mg/L	14-SEP-17	14-SEP-17	R3829093
Manganese (Mn)-Total	0.00013		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Molybdenum (Mo)-Total	<0.000050		0.000050	mg/L	14-SEP-17	14-SEP-17	R3829093
Nickel (Ni)-Total	<0.00050		0.00050	mg/L	14-SEP-17	14-SEP-17	R3829093
Potassium (K)-Total	0.472		0.050	mg/L	14-SEP-17	14-SEP-17	R3829093
Phosphorus (P)-Total	<0.050		0.050	mg/L	14-SEP-17	14-SEP-17	R3829093
Rubidium (Rb)-Total	<0.00020		0.00020	mg/L	14-SEP-17	14-SEP-17	R3829093
Selenium (Se)-Total	<0.000050		0.000050	mg/L	14-SEP-17	14-SEP-17	R3829093
Silicon (Si)-Total	0.32		0.10	mg/L	14-SEP-17	14-SEP-17	R3829093
Silver (Ag)-Total	<0.000010		0.000010	mg/L	14-SEP-17	14-SEP-17	R3829093
Sodium (Na)-Total	5.05		0.050	mg/L	14-SEP-17	14-SEP-17	R3829093
Strontium (Sr)-Total	0.0725		0.00020	mg/L	14-SEP-17	14-SEP-17	R3829093
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	14-SEP-17	14-SEP-17	R3829093
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	14-SEP-17	14-SEP-17	R3829093
Thorium (Th)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Tin (Sn)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

# ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1990066-2 TREATED BLEND INTO STORAGE CELLS Sampled By: David Epler on 12-SEP-17 @ 10:00 Matrix: Water							
<b>Total Metals in Water by CRC ICPMS</b>							
Titanium (Ti)-Total	<0.00030		0.00030	mg/L	14-SEP-17	14-SEP-17	R3829093
Tungsten (W)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Uranium (U)-Total	0.000015		0.000010	mg/L	14-SEP-17	14-SEP-17	R3829093
Vanadium (V)-Total	<0.00050		0.00050	mg/L	14-SEP-17	14-SEP-17	R3829093
Zinc (Zn)-Total	0.0077		0.0030	mg/L	14-SEP-17	14-SEP-17	R3829093
Zirconium (Zr)-Total	<0.000060		0.000060	mg/L	14-SEP-17	14-SEP-17	R3829093
<b>Total Organic Carbon by Combustion</b>							
Total Organic Carbon	<0.50		0.50	mg/L		14-SEP-17	R3829347
<b>Turbidity</b>							
Turbidity	<0.10		0.10	NTU		14-SEP-17	R3830623
<b>UV Transmittance (Calculated)</b>							
Transmittance, UV (254 nm)	99.5		1.0	%T/cm		13-SEP-17	R3829013
<b>pH</b>							
pH	7.48		0.10	pH units		13-SEP-17	R3828433
L1990066-3 TREATED TAP WATER Sampled By: David Epler on 12-SEP-17 @ 10:00 Matrix: Water							
<b>MB Chemistry for PWS</b>							
<b>Alkalinity, Bicarbonate</b>							
Bicarbonate (HCO3)	69.4		1.2	mg/L		14-SEP-17	
<b>Alkalinity, Carbonate</b>							
Carbonate (CO3)	<0.60		0.60	mg/L		14-SEP-17	
<b>Alkalinity, Hydroxide</b>							
Hydroxide (OH)	<0.34		0.34	mg/L		14-SEP-17	
<b>Alkalinity, Total (as CaCO3)</b>							
Alkalinity, Total (as CaCO3)	56.9		1.0	mg/L		13-SEP-17	R3828433
<b>Ammonia by colour</b>							
Ammonia, Total (as N)	<0.010		0.010	mg/L		15-SEP-17	R3830786
<b>Bromide in Water by IC (Low Level)</b>							
Bromide (Br)	<0.010		0.010	mg/L		13-SEP-17	R3830086
<b>Chloride in Water by IC (Low Level)</b>							
Chloride (Cl)	2.58		0.10	mg/L		13-SEP-17	R3830086
<b>Colour, True</b>							
Colour, True	<5.0		5.0	CU		14-SEP-17	R3829405
<b>Conductivity</b>							
Conductivity	201		1.0	umhos/cm		13-SEP-17	R3828433
<b>Dissolved Organic Carbon by Combustion</b>							
Dissolved Organic Carbon	<0.50		0.50	mg/L		14-SEP-17	R3829357
<b>Fluoride in Water by IC</b>							
Fluoride (F)	<0.020		0.020	mg/L		13-SEP-17	R3830086
<b>Hardness Calculated</b>							
Hardness (as CaCO3)	87.5	HTC	0.20	mg/L		15-SEP-17	
<b>Langelier Index 4C</b>							
Langelier Index (4 C)	-0.77					20-SEP-17	
<b>Langelier Index 60C</b>							
Langelier Index (60 C)	0.0065					20-SEP-17	
<b>Nitrate in Water by IC (Low Level)</b>							
Nitrate (as N)	0.0384		0.0050	mg/L		13-SEP-17	R3830086
<b>Nitrite in Water by IC (Low Level)</b>							
Nitrite (as N)	0.0021	HTD	0.0020	mg/L		16-SEP-17	R3833064
<b>Sulfate in Water by IC</b>							

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

# ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1990066-3 TREATED TAP WATER							
Sampled By: David Epler on 12-SEP-17 @ 10:00							
Matrix: Water							
<b>Sulfate in Water by IC</b>							
Sulfate (SO4)	41.5		0.30	mg/L		13-SEP-17	R3830086
<b>Total Dissolved Solids (TDS)</b>							
Total Dissolved Solids	122		13	mg/L		14-SEP-17	R3829419
<b>Total Metals in Water by CRC ICPMS</b>							
Aluminum (Al)-Total	0.0067		0.0030	mg/L	14-SEP-17	14-SEP-17	R3829093
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Arsenic (As)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Barium (Ba)-Total	0.00157		0.000050	mg/L	14-SEP-17	14-SEP-17	R3829093
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	14-SEP-17	14-SEP-17	R3829093
Boron (B)-Total	0.105		0.010	mg/L	14-SEP-17	14-SEP-17	R3829093
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	14-SEP-17	14-SEP-17	R3829093
Calcium (Ca)-Total	33.7		0.050	mg/L	14-SEP-17	14-SEP-17	R3829093
Cesium (Cs)-Total	<0.000010		0.000010	mg/L	14-SEP-17	14-SEP-17	R3829093
Chromium (Cr)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Copper (Cu)-Total	0.00602		0.00050	mg/L	14-SEP-17	14-SEP-17	R3829093
Iron (Fe)-Total	<0.010		0.010	mg/L	14-SEP-17	14-SEP-17	R3829093
Lead (Pb)-Total	0.000275		0.000050	mg/L	14-SEP-17	14-SEP-17	R3829093
Lithium (Li)-Total	0.0032		0.0010	mg/L	14-SEP-17	14-SEP-17	R3829093
Magnesium (Mg)-Total	0.796		0.0050	mg/L	14-SEP-17	14-SEP-17	R3829093
Manganese (Mn)-Total	0.00038		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Molybdenum (Mo)-Total	0.000051		0.000050	mg/L	14-SEP-17	14-SEP-17	R3829093
Nickel (Ni)-Total	<0.00050		0.00050	mg/L	14-SEP-17	14-SEP-17	R3829093
Potassium (K)-Total	0.464		0.050	mg/L	14-SEP-17	14-SEP-17	R3829093
Phosphorus (P)-Total	<0.050		0.050	mg/L	14-SEP-17	14-SEP-17	R3829093
Rubidium (Rb)-Total	<0.00020		0.00020	mg/L	14-SEP-17	14-SEP-17	R3829093
Selenium (Se)-Total	<0.000050		0.000050	mg/L	14-SEP-17	14-SEP-17	R3829093
Silicon (Si)-Total	0.32		0.10	mg/L	14-SEP-17	14-SEP-17	R3829093
Silver (Ag)-Total	<0.000010		0.000010	mg/L	14-SEP-17	14-SEP-17	R3829093
Sodium (Na)-Total	5.83		0.050	mg/L	14-SEP-17	14-SEP-17	R3829093
Strontium (Sr)-Total	0.0793		0.00020	mg/L	14-SEP-17	14-SEP-17	R3829093
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	14-SEP-17	14-SEP-17	R3829093
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	14-SEP-17	14-SEP-17	R3829093
Thorium (Th)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Tin (Sn)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Titanium (Ti)-Total	<0.00030		0.00030	mg/L	14-SEP-17	14-SEP-17	R3829093
Tungsten (W)-Total	<0.00010		0.00010	mg/L	14-SEP-17	14-SEP-17	R3829093
Uranium (U)-Total	0.000032		0.000010	mg/L	14-SEP-17	14-SEP-17	R3829093
Vanadium (V)-Total	<0.00050		0.00050	mg/L	14-SEP-17	14-SEP-17	R3829093
Zinc (Zn)-Total	0.0091		0.0030	mg/L	14-SEP-17	14-SEP-17	R3829093
Zirconium (Zr)-Total	<0.000060		0.000060	mg/L	14-SEP-17	14-SEP-17	R3829093
<b>Total Organic Carbon by Combustion</b>							
Total Organic Carbon	<0.50		0.50	mg/L		14-SEP-17	R3829347
<b>Turbidity</b>							
Turbidity	<0.10		0.10	NTU		14-SEP-17	R3830623
<b>UV Transmittance (Calculated)</b>							
Transmittance, UV (254 nm)	99.8		1.0	%T/cm		13-SEP-17	R3829013
<b>pH</b>							
pH	7.56		0.10	pH units		13-SEP-17	R3828433

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

# ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1990066-4 TRUE RAW SURFACE POND WATER Sampled By: David Epler on 12-SEP-17 @ 10:00 Matrix: Water <b>Miscellaneous Parameters</b> Total Organic Carbon	8.97		0.50	mg/L		14-SEP-17	R3829347
L1990066-5 UF PERMEATE EFF Sampled By: David Epler on 12-SEP-17 @ 10:00 Matrix: Water <b>Miscellaneous Parameters</b> Total Organic Carbon	8.06		0.50	mg/L		14-SEP-17	R3829347

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

## Reference Information

**Sample Parameter Qualifier Key:**

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

**Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-CO3CO3-CALC-WP	Water	Alkalinity, Carbonate	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by carbonate is calculated and reported as mg CO3 2-/L.			
ALK-HCO3HCO3-CALC-WP	Water	Alkalinity, Bicarbonate	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by bicarbonate is calculated and reported as mg HCO3-/L			
ALK-OHOH-CALC-WP	Water	Alkalinity, Hydroxide	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by hydroxide is calculated and reported as mg OH-/L.			
ALK-TITR-WP	Water	Alkalinity, Total (as CaCO3)	APHA 2320B
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. Total alkalinity is determined by titration with a strong standard mineral acid to the successive HCO3- and H2CO3 endpoints indicated electrometrically.			
BR-L-IC-N-WP	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)-LR
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
C-DOC-HTC-WP	Water	Dissolved Organic Carbon by Combustion	APHA 5310 B-WP
Filtered (0.45 um) sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO2 which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.			
C-TOC-HTC-WP	Water	Total Organic Carbon by Combustion	APHA 5310 B-WP
Sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO2 which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.			
CL-L-IC-N-WP	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
COLOUR-TRUE-WP	Water	Colour, True	APHA 2120C
True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.			
EC-WP	Water	Conductivity	APHA 2510B
Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.			
ETL-LANGELIER-4-WP	Water	Langelier Index 4C	Calculated
ETL-LANGELIER-60-WP	Water	Langelier Index 60C	Calculated
F-IC-N-WP	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
HARDNESS-CALC-WP	Water	Hardness Calculated	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
IONBALANCE-CALC-WP	Water	Ion Balance Calculation	APHA 1030E
Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking			



# Reference Information

**Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**
<p>Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.</p> <p>Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance (as % difference) cannot be calculated accurately for waters with very low electrical conductivity (EC), and is reported as "Low EC" where EC &lt; 100 uS/cm (umhos/cm). Ion Balance is calculated as:</p> <p>Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]</p>			
MET-T-CCMS-WP	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod.)
<p>Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.</p> <p>Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.</p>			
NH3-COL-WP	Water	Ammonia by colour	APHA 4500 NH3 F
<p>Ammonia in water samples forms indophenol when reacted with hypochlorite and phenol. The intensity is amplified by the addition of sodium nitroprusside and measured colourmetrically.</p>			
NO2-L-IC-N-WP	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)
<p>Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.</p>			
NO3-L-IC-N-WP	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)
<p>Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.</p>			
PH-WP	Water	pH	APHA 4500H
<p>The pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.</p>			
SO4-IC-N-WP	Water	Sulfate in Water by IC	EPA 300.1 (mod)
<p>Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.</p>			
TDS-WP	Water	Total Dissolved Solids (TDS)	APHA 2540 SOLIDS C,E
<p>A well-mixed sample is filtered through a glass fiber filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2C. The increase in vial weight represents the total dissolved solids.</p>			
TURBIDITY-WP	Water	Turbidity	APHA 2130B (modified)
<p>Turbidity in aqueous matrices is determined by the nephelometric method.</p>			
UV-%TRANS-WP	Water	UV Transmittance (Calculated)	APHA 5910B
<p>Test method is adapted from APHA Method 5910B. A sample is filtered through a 0.45 um polyethersulfone (PES) filter and its UV Absorbance is measured in a quartz cell at 254 nm. UV Transmittance is calculated from the UV Absorbance result and reported as UV Transmittance per cm. The analysis is carried out without pH adjustment.</p>			

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

**Chain of Custody Numbers:**

# Reference Information

**Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**
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**GLOSSARY OF REPORT TERMS**

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample  
 mg/kg wwt - milligrams per kilogram based on wet weight of sample  
 mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight  
 mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

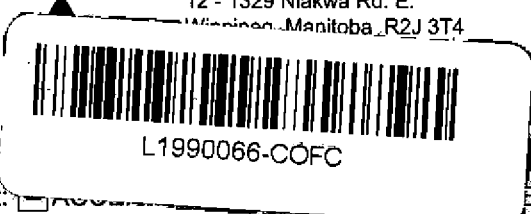
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Environmental Division



WORK ORDER NO: L1990066

**FOR LABORATORY USE ONLY**

Sample Condition Upon Receipt:  None  
 Frozen  Cold  Ambient  Broken  Leakage  Incorrect Sample Container  
 COMMENT: 21 BY: HAL

LAB NO.: \_\_\_\_\_  
 DATE RECEIVED: 12/09/17  
 TIME RECEIVED: 2:10

Date Sampled: SEPT. 12/2017 Time: 10:00 A.M.  P.M.  Date Required: N/A

Location: HEADINGLEY REGIONAL WATER SYSTEM  
 (Town, Community, City) Submitter's Name Printed: DAVID EPLER

Community Code Number: 89.40 Sample Submitted By: [Signature]  
 Rural Municipality/Local Gov: CARTIER REGIONAL WATER COOP

**SAMPLE TYPE**

- DRINKING WATER**
- Untreated Well
  - Treated Well
  - Treated Municipal
  - Non-Treated Municipal
  - Water-Surface-Raw
  - Water-Surface-Treated

**PLEASE PRINT & PRESS FIRMLY**

- NON-DRINKING WATER**
- Sewage/Waste Water
  - Lake/River
  - Swimming Pool
  - Whirl Pool
  - Other

**NOTES & CONDITIONS**

1. Quote number must be provided to insure proper pricing.
2. Failure to properly complete all portions of this form may delay analysis.
3. ALS's liability limited to cost of analysis.

**SERVICE REQUESTED**

- REGULAR  PRIORITY  EMERGENCY  
 (50% SURCHARGE) (100% SURCHARGE)

PURPOSE OF TEST  
 Private  Real Estate  Water Main

LAB NUMBER	SAMPLE IDENTIFICATION	ALS CUSTOMER #:	QUOTE #:
		<u>W1243</u>	<u>N/A</u>
<b>REPORT TO BE SENT TO</b>			
		NAME: <u>DAVID EPLER</u>	
		COMPANY: <u>CARTIER REGIONAL WATER COOP</u>	
		ADDRESS: <u>6000 PORTAGE AVE.</u>	
		CITY/TOWN: <u>HEADINGLEY</u> / PROV.: <u>MB</u>	
		POSTAL CODE: <u>R4H 1E8</u>	
		PHONE: <u>204-832-2225</u>	
		BY: MAIL <input type="checkbox"/> FAX <input type="checkbox"/>	
		PICKUP <input type="checkbox"/> E-MAIL <input checked="" type="checkbox"/> <u>headingleywtp@crwc.ca</u> (FAX NUMBER)	
		<u>dvaillant@crwc.ca</u> (EMAIL ADDRESS)	
		<u>angela.meier@gov.mb.ca</u> (EMAIL ADDRESS)	
		CC NAME: _____	
		ADDRESS: _____	
		CITY/TOWN: _____ / PROV.: _____	
		POSTAL CODE: _____	
		PHONE: _____	
		BY: MAIL <input type="checkbox"/> FAX <input type="checkbox"/>	
		PICKUP <input type="checkbox"/> E-MAIL <input type="checkbox"/> _____ (FAX NUMBER)	
		_____ (EMAIL ADDRESS)	
		<b>BILLING ADDRESS</b> SAME AS REPORT TO <input type="checkbox"/>	
		NAME: <u>ACCOUNT # W1243</u>	
		COMPANY: _____	
		ADDRESS: _____	
		CITY/TOWN: _____ / PROV.: _____	
		POSTAL CODE: _____	
		<b>PAYMENT PARTICULARS</b>	
		<input type="checkbox"/> INVOICE NEEDED / CLIENT'S P.O. NO. _____	
		<input type="checkbox"/> INTERAC	
		<input type="checkbox"/> CASH Subtotal \$ _____	
		<input type="checkbox"/> CHEQUE G.S.T. \$ _____	
		<input type="checkbox"/> VISA / MASTERCARD Total \$ _____	

Analyses required - PWS CHEMISTRY  
(MB-CH-PWS-WP) ON  
SAMPLES # 1, #2, #3  
- T.O.C. ON SAMPLES #4 & #5

**BILLING ADDRESS** SAME AS REPORT TO   
 NAME: ACCOUNT # W1243  
 COMPANY: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_  
 CITY/TOWN: \_\_\_\_\_ / PROV.: \_\_\_\_\_  
 POSTAL CODE: \_\_\_\_\_

**PAYMENT PARTICULARS**

INVOICE NEEDED / CLIENT'S P.O. NO. \_\_\_\_\_

INTERAC

CASH Subtotal \$ \_\_\_\_\_

CHEQUE G.S.T. \$ \_\_\_\_\_

VISA / MASTERCARD Total \$ \_\_\_\_\_

\* OUR POLICY IS NOT TO ACCEPT SAMPLES FROM THE PRIVATE CITIZEN WITHOUT PREPAYMENT

**SAMPLING INSTRUCTIONS ON REVERSE SIDE**

**Manitoba Technology Centre Ltd.**  
 Part of the **ALS Laboratory Group**  
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 A Campbell Brothers Limited Company

**SUBMITTER COPY**

**ENTERED IN LIMS BY:** \_\_\_\_\_