



Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

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## Certificate of Analysis for Sample No. 199572 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

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The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199572  
**Sample Description:** SWQ25-1  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	200 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	200 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	4 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	77.0 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.006343 ± 0.033	mg/L		6/5/2019	COW_ASB
Arsenic (As), total in water	0.002762 ± 0.042	mg/L		6/5/2019	COW_ASB
Barium (Ba), total in water	0.037540 ± 0.057	mg/L		6/5/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/5/2019	COW_ASB
Boron (B), total in water	<0.00208 ± 0.19	mg/L		6/5/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/5/2019	COW_ASB
Calcium (Ca), total in water	42.089 ± 0.071	mg/L		6/5/2019	COW_ASB
Chromium (Cr), total in water	0.00169 ± 0.044	mg/L		6/5/2019	COW_ASB
Copper (Cu), total in water	0.005196 ± 0.035	mg/L		6/5/2019	COW_ASB
Iron (Fe), total in water	0.84863 ± 0.043	mg/L		6/5/2019	COW_ASB
Lead (Pb), total in water	0.000500 ± 0.042	mg/L		6/5/2019	COW_ASB
Magnesium (Mg), total in water	25.285 ± 0.04	mg/L		6/5/2019	COW_ASB
Manganese (Mn), total in water	0.01859 ± 0.041	mg/L		6/5/2019	COW_ASB
Nickel (Ni), total in water	0.003509 ± 0.046	mg/L		6/5/2019	COW_ASB
Phosphorus (P), total in water	0.1458 ± 0.033	mg/L		6/5/2019	COW_ASB
Potassium (K), total in water	11.384 ± 0.1	mg/L		6/5/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		6/5/2019	COW_ASB
Sodium (Na), total in water	13.707 ± 0.082	mg/L		6/5/2019	COW_ASB
Uranium (U), total in water	0.000838 ± 0.044	mg/L		6/5/2019	COW_ASB
Zinc (Zn), total in water	0.01202 ± 0.049	mg/L		6/5/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	105 ± 0.065	mg/L		12/3/2019	COW_ASB
Total Hardness, calculated in water	209	mg/L		12/3/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	368 ± 0.062	mg/L		5/4/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	304 ± 0.065	mg/L		5/4/2019	COW_ASB

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Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	64 ± 8.40%	mg/L		5/4/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	24.1 ± 0.085	mg/L		5/2/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	21.6 ± 0.085	mg/L		5/2/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	0.9 ± 0.15	mg/L		5/2/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	0.9	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.005 ± 0.165	mg/L		12/3/2019	COW_ASB
Nitrate+Nitrite Nitrogen	<0.003 ± 0.078	mg/L		12/3/2019	COW_ASB
Phosphorus, dissolved (0.45um)	0.064 ± 0.075	mg/L		12/3/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.56 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	461 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	19.60 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	29.7 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	13.4	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	4	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	247.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	203.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		5/13/2019	ALS

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Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.03	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	38.6	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	20.4	mg/L		5/13/2019	ALS
Total Dissolved Carbon	58.9	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	20.500	mg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	40	MPN/100mL		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	19.50	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	80	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	1920	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	0.000007	pg/L		5/16/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	0.00073	mg/L		3/4/2020	ALS

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**Sample Description:** SWQ25-1  
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Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0038	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000210	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00308	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0327	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0250	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000016	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	41.6000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00015	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00017	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00140	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	217.1	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0930	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000097	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0391	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	27.5000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0068	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.000603	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00247	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.105	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	13.9000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0008	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000260	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	6.6900	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	16.4000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.1560	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	7.0000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00053	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00038	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.001200	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00380	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0017	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00062	mg/L		3/4/2020	ALS

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Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	<0.0010	mg/L		3/4/2020	ALS

**Reference Information**

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

**Accredited Test Methods Used:**

Test Method

Alkalinity by Titration  
 BOD5 Seeded by Automated Method  
 COD by Closed Reflux Method  
  
 Metals Total in Water by ICP-MS  
 Hardness, Calcium & Total by Calculation  
 Total Solids by Gravimetric Analysis  
 Dissolved Solids by Gravimetric Analysis  
 Total Suspended Solids by Gravimetric Analysis  
 Total Organic Carbon by High Temperature Combustion  
 Dissolved Organic Carbon by High Temperature Combustion  
 Total Nitrogen by High Temperature Combustion  
 Total Kjeldahl Nitrogen Calculated  
 Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis  
 pH in Laboratory by Electrometric Method  
 Conductivity by Electrometric Method  
 Turbidity in Laboratory by Nephelometric Method

Reference Method

Modified from SM 2320 B. Titration Method  
 Modified from SM 5210 B. 5-Day BOD Test  
 Modified from SM 5220 D. Closed Reflux, Colorimetric Method  
  
 Modified from EPA Methods 200.8  
 Modified from EPA Methods 200.8  
 Modified from SM 2540 B. Total Solids Dried at 103-105°C  
 Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C  
 Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C  
 Modified from SM 5310 B. High Temperature Combustion  
 Modified from SM 5310 B. High Temperature Combustion  
 Modified from SM 5310 B. High Temperature Combustion  
 Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis  
 Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
 Modified from SM 4500 H+B (Electrometric Method)  
 Modified from SM 2510 B. Laboratory Measurement  
 Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

**Additional Test Methods Used:**

Test Method

Chloride by Mercuric Thiocyanate Method  
 Sulfate by HACH Method

Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113  
 Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4  
 COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





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Report Date: March 4, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

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## Certificate of Analysis for Sample No. 199573 v1

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**Re-Issue Comments**

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**Sample No.** 199573  
**Sample Description:** SWQ25-12  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	206 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	206 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	<4 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	59.0 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.007097 ± 0.033	mg/L		6/5/2019	COW_ASB
Arsenic (As), total in water	0.002949 ± 0.042	mg/L		6/5/2019	COW_ASB
Barium (Ba), total in water	0.037266 ± 0.057	mg/L		6/5/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/5/2019	COW_ASB
Boron (B), total in water	<0.00208 ± 0.19	mg/L		6/5/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/5/2019	COW_ASB
Calcium (Ca), total in water	44.920 ± 0.071	mg/L		6/5/2019	COW_ASB
Chromium (Cr), total in water	0.00063 ± 0.044	mg/L		6/5/2019	COW_ASB
Copper (Cu), total in water	0.003535 ± 0.035	mg/L		6/5/2019	COW_ASB
Iron (Fe), total in water	0.38234 ± 0.043	mg/L		6/5/2019	COW_ASB
Lead (Pb), total in water	0.000088 ± 0.042	mg/L		6/5/2019	COW_ASB
Magnesium (Mg), total in water	26.494 ± 0.04	mg/L		6/5/2019	COW_ASB
Manganese (Mn), total in water	0.01140 ± 0.041	mg/L		6/5/2019	COW_ASB
Nickel (Ni), total in water	0.003231 ± 0.046	mg/L		6/5/2019	COW_ASB
Phosphorus (P), total in water	0.1487 ± 0.033	mg/L		6/5/2019	COW_ASB
Potassium (K), total in water	11.091 ± 0.1	mg/L		6/5/2019	COW_ASB
Selenium (Se), total in water	0.00033 ± 0.15	mg/L		6/5/2019	COW_ASB
Sodium (Na), total in water	16.642 ± 0.082	mg/L		6/5/2019	COW_ASB
Uranium (U), total in water	0.001800 ± 0.044	mg/L		6/5/2019	COW_ASB
Zinc (Zn), total in water	0.02079 ± 0.049	mg/L		6/5/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	112 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	221	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	340 ± 0.062	mg/L		5/1/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	316 ± 0.065	mg/L		5/1/2019	COW_ASB

**Sample No.** 199573  
**Sample Description:** SWQ25-12  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	24 ± 8.40%	mg/L		5/1/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	21.6 ± 0.085	mg/L		5/2/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	20.5 ± 0.085	mg/L		5/2/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	0.6 ± 0.15	mg/L		5/2/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	0.6	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.065 ± 0.165	mg/L		2/4/2020	COW_ASB
Nitrate+Nitrite Nitrogen	0.007 ± 0.078	mg/L		2/4/2020	COW_ASB
Phosphorus, dissolved (0.45um)	0.104 ± 0.075	mg/L		2/4/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.57 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	495 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	6.52 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	38.7 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	25.9	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	<2	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	294.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	241.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		5/13/2019	ALS

**Sample No.** 199573  
**Sample Description:** SWQ25-12  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.03	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	39.6	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	17.4	mg/L		5/13/2019	ALS
Total Dissolved Carbon	57.0	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	25.100	mg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	<10	MPN/100mL		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	20.80	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	30	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	190	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	0.000005	pg/L		5/16/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	0.00069	mg/L		3/4/2020	ALS

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**Sample Description:** SWQ25-12  
**Sample Date:** April 30, 2019  
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Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0054	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000170	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00308	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0360	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0260	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000011	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	44.5000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00018	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00017	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00137	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	225.2	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.1320	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000064	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0396	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	27.7000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0099	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.000645	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00270	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.165	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	12.2000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0007	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000189	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	5.0200	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	17.9000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.1670	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	7.7300	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00097	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00033	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.002000	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00345	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0043	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00060	mg/L		3/4/2020	ALS

**Sample No.** 199573  
**Sample Description:** SWQ25-12  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	<0.0010	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

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## Certificate of Analysis for Sample No. 199574 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199574  
**Sample Description:** SWQ25-2  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	206 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	45.3	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	251 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	22.6 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	7 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	88.0 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.006458 ± 0.033	mg/L		6/6/2019	COW_ASB
Arsenic (As), total in water	0.005176 ± 0.042	mg/L		6/6/2019	COW_ASB
Barium (Ba), total in water	0.052722 ± 0.057	mg/L		6/6/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/6/2019	COW_ASB
Boron (B), total in water	0.16326 ± 0.19	mg/L		6/6/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/6/2019	COW_ASB
Calcium (Ca), total in water	46.900 ± 0.071	mg/L		6/6/2019	COW_ASB
Chromium (Cr), total in water	0.00080 ± 0.044	mg/L		6/6/2019	COW_ASB
Copper (Cu), total in water	0.020529 ± 0.035	mg/L		6/6/2019	COW_ASB
Iron (Fe), total in water	0.35046 ± 0.043	mg/L		6/6/2019	COW_ASB
Lead (Pb), total in water	0.000175 ± 0.042	mg/L		6/6/2019	COW_ASB
Magnesium (Mg), total in water	53.784 ± 0.04	mg/L		6/6/2019	COW_ASB
Manganese (Mn), total in water	0.04303 ± 0.041	mg/L		6/6/2019	COW_ASB
Nickel (Ni), total in water	0.011506 ± 0.046	mg/L		6/6/2019	COW_ASB
Phosphorus (P), total in water	0.2315 ± 0.033	mg/L		6/6/2019	COW_ASB
Potassium (K), total in water	29.333 ± 0.1	mg/L		6/6/2019	COW_ASB
Selenium (Se), total in water	0.00057 ± 0.15	mg/L		6/6/2019	COW_ASB
Sodium (Na), total in water	57.991 ± 0.082	mg/L		6/6/2019	COW_ASB
Uranium (U), total in water	0.003504 ± 0.044	mg/L		6/6/2019	COW_ASB
Zinc (Zn), total in water	0.01165 ± 0.049	mg/L		6/6/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	117 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	339	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	656 ± 0.062	mg/L		5/4/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	579 ± 0.065	mg/L		5/4/2019	COW_ASB

**Sample No.** 199574  
**Sample Description:** SWQ25-2  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	77 ± 8.40%	mg/L		5/4/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	28.2 ± 0.085	mg/L		5/2/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	25.1 ± 0.085	mg/L		5/2/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	2.2 ± 0.15	mg/L		5/2/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	2.1	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.028 ± 0.165	mg/L		2/4/2020	COW_ASB
Nitrate+Nitrite Nitrogen	0.016 ± 0.078	mg/L		2/4/2020	COW_ASB
Phosphorus, dissolved (0.45um)	<0.013 ± 0.075	mg/L		2/4/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	9.13 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	8710 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	8.07 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	111 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	75.0	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	<6	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	285.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	278.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	26.80	mg/L		5/13/2019	ALS

**Sample No.** 199574  
**Sample Description:** SWQ25-2  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.04	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	50.5	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	21.9	mg/L		5/13/2019	ALS
Total Dissolved Carbon	72.4	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	119.000	mg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	1090	MPN/100mL		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	69.20	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	750	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	1010	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		5/16/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	0.00055	mg/L		3/4/2020	ALS

**Sample No.** 199574  
**Sample Description:** SWQ25-2  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0033	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000280	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00501	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0502	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.1730	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000012	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	46.5000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	0.000016	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00034	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00087	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00257	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	346.7	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0190	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000052	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0818	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	56.0000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0137	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.003330	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00948	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.065	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	27.6000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0015	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000287	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	0.1310	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	60.3000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.2960	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	23.5000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00121	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00047	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.004020	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00415	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0019	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00065	mg/L		3/4/2020	ALS

**Sample No.** 199574  
**Sample Description:** SWQ25-2  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	0.0015	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

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## Certificate of Analysis for Sample No. 199575 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199575  
**Sample Description:** SWQ25-16  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	271 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	271 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	13 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	76.0 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.022001 ± 0.033	mg/L		6/5/2019	COW_ASB
Arsenic (As), total in water	0.003663 ± 0.042	mg/L		6/5/2019	COW_ASB
Barium (Ba), total in water	0.060749 ± 0.057	mg/L		6/5/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/5/2019	COW_ASB
Boron (B), total in water	0.02895 ± 0.19	mg/L		6/5/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/5/2019	COW_ASB
Calcium (Ca), total in water	61.783 ± 0.071	mg/L		6/5/2019	COW_ASB
Chromium (Cr), total in water	0.00127 ± 0.044	mg/L		6/5/2019	COW_ASB
Copper (Cu), total in water	0.005845 ± 0.035	mg/L		6/5/2019	COW_ASB
Iron (Fe), total in water	0.26117 ± 0.043	mg/L		6/5/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		6/5/2019	COW_ASB
Magnesium (Mg), total in water	35.628 ± 0.04	mg/L		6/5/2019	COW_ASB
Manganese (Mn), total in water	0.02233 ± 0.041	mg/L		6/5/2019	COW_ASB
Nickel (Ni), total in water	0.005424 ± 0.046	mg/L		6/5/2019	COW_ASB
Phosphorus (P), total in water	0.1328 ± 0.033	mg/L		6/5/2019	COW_ASB
Potassium (K), total in water	18.008 ± 0.1	mg/L		6/5/2019	COW_ASB
Selenium (Se), total in water	0.00040 ± 0.15	mg/L		6/5/2019	COW_ASB
Sodium (Na), total in water	51.221 ± 0.082	mg/L		6/5/2019	COW_ASB
Uranium (U), total in water	0.002515 ± 0.044	mg/L		6/5/2019	COW_ASB
Zinc (Zn), total in water	0.03413 ± 0.049	mg/L		6/5/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	154 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	301	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	566 ± 0.062	mg/L		5/1/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	501 ± 0.065	mg/L		5/1/2019	COW_ASB

**Sample No.** 199575  
**Sample Description:** SWQ25-16  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	65 ± 8.40%	mg/L		5/1/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	25.9 ± 0.085	mg/L		5/2/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	23.4 ± 0.085	mg/L		5/2/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	1.3 ± 0.15	mg/L		5/2/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	1.3	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.006 ± 0.165	mg/L		2/4/2020	COW_ASB
Nitrate+Nitrite Nitrogen	<0.003 ± 0.078	mg/L		2/4/2020	COW_ASB
Phosphorus, dissolved (0.45um)	0.020 ± 0.075	mg/L		2/4/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.59 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	868 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	6.26 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	49.2 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	274	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	9	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	346.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	283.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		5/13/2019	ALS

**Sample No.** 199575  
**Sample Description:** SWQ25-16  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.06	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	52.1	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	19.5	mg/L		5/13/2019	ALS
Total Dissolved Carbon	71.5	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	104.000	mg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	<10	MPN/100mL		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	24.30	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	<10	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	90	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	0.000006	pg/L		5/16/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	0.00064	mg/L		3/4/2020	ALS

**Sample No.** 199575  
**Sample Description:** SWQ25-16  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0038	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000260	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00395	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0610	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0880	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000006	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	61.9000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	0.000021	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00046	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00030	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00179	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	318.9	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.1130	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.001100	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0477	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	39.9000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0329	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.001410	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00472	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.091	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	17.4000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0015	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000242	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	2.5700	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	55.2000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.2590	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	8.5300	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00098	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	<0.00030	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.003780	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00266	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0046	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00061	mg/L		3/4/2020	ALS

**Sample No.** 199575  
**Sample Description:** SWQ25-16  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	0.0013	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

Solid Waste Services Division  
1120 Waverley Street  
Winnipeg MB R3E 3S8

Phone : 204-986-2384

Email : ckozak@winnipeg.ca

## Certificate of Analysis for Sample No. 199576 v1

Date Authorised: March 4, 2020

Total Number of Pages: 7

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199576  
**Sample Description:** SWQ25-6  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample  
**Sample Comments:** ABSDN

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, total	264 ± 6.8%	mg/L		2/4/2020	COW_ASB
Nitrate+Nitrite Nitrogen	0.081 ± 7.8%	mg/L		2/4/2020	COW_ASB
Phosphorus, dissolved (0.45um)	11.8 ± 7.5%	mg/L		2/4/2020	COW_ASB
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	3220 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	3220 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	NRISD			3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	>5000.0 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.010262 ± 0.033	mg/L		6/6/2019	COW_ASB
Arsenic (As), total in water	0.013310 ± 0.042	mg/L		6/6/2019	COW_ASB
Barium (Ba), total in water	0.18863 ± 0.057	mg/L		6/6/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/6/2019	COW_ASB
Boron (B), total in water	8.0163 ± 0.19	mg/L		6/6/2019	COW_ASB
Cadmium (Cd), total in water	0.000047 ± 0.039	mg/L		6/6/2019	COW_ASB
Calcium (Ca), total in water	451.77 ± 0.071	mg/L		6/6/2019	COW_ASB
Chromium (Cr), total in water	0.11239 ± 0.044	mg/L		6/6/2019	COW_ASB
Copper (Cu), total in water	0.015644 ± 0.035	mg/L		6/6/2019	COW_ASB
Iron (Fe), total in water	3.2163 ± 0.043	mg/L		6/6/2019	COW_ASB
Lead (Pb), total in water	0.002655 ± 0.042	mg/L		6/6/2019	COW_ASB
Magnesium (Mg), total in water	307.42 ± 0.04	mg/L		6/6/2019	COW_ASB
Manganese (Mn), total in water	3.2703 ± 0.041	mg/L		6/6/2019	COW_ASB
Nickel (Ni), total in water	0.24706 ± 0.046	mg/L		6/6/2019	COW_ASB
Phosphorus (P), total in water	13.715 ± 0.033	mg/L		6/6/2019	COW_ASB
Potassium (K), total in water	267.22 ± 0.1	mg/L		6/6/2019	COW_ASB
Selenium (Se), total in water	0.00515 ± 0.15	mg/L		6/6/2019	COW_ASB
Sodium (Na), total in water	906.59 ± 0.082	mg/L		6/6/2019	COW_ASB
Uranium (U), total in water	0.004280 ± 0.044	mg/L		6/6/2019	COW_ASB
Zinc (Zn), total in water	0.11884 ± 0.049	mg/L		6/6/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	1130 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	2390	mg/L		6/6/2019	COW_ASB

**Sample No.** 199576  
**Sample Description:** SWQ25-6  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample  
**Sample Comments:** ABSDN

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	7150 ± 0.062	mg/L		5/4/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	6660 ± 0.065	mg/L		5/4/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	485 ± 8.40%	mg/L		5/4/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	1580 ± 0.085	mg/L		5/3/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	331 ± 0.15	mg/L		5/3/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	330	mg/L		5/3/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.82 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	1550 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	286.40 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	730 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	1470 ± 0.085	mg/L		5/3/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	>2000	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	3650.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	2990.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		5/13/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS

**Sample No.** 199576  
**Sample Description:** SWQ25-6  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample  
**Sample Comments:** ABSDN

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	261.00	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	337.0	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	1690.0	mg/L		5/13/2019	ALS
Total Dissolved Carbon	2030.0	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	926.000	mg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	1790	MPN/100mL		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	54.00	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	650	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	3870	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000025	pg/L		5/16/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	16.0	mg/L		6/13/2019	COW_ASB
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	0.00196	mg/L		3/4/2020	ALS
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.1490	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.003790	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.01430	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.1870	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	0.00015	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	8.3000	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000009	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	422.0000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	0.000120	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.09790	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.01810	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00058	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	2375.6	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.1920	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000106	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.3200	mg/L		3/4/2020	ALS

**Sample No.** 199576  
**Sample Description:** SWQ25-6  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample  
**Sample Comments:** ABSDN

Test Parameters	Result	Units	Comments	Completed	Lab #
Magnesium (Mg), dissolved in water	321.0000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	3.0500	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.001800	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.19100	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	17.000	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	228.0000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0686	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.002470	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	19.3000	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	0.000059	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	886.0000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	2.7400	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	56.9000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	0.00033	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00155	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.04070	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	0.00256	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.004110	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.02700	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0062	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.02910	mg/L		3/4/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	0.0096	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

## Glossary of Terms:

ABSDN : Abnormal sample, appears darker, discoloured or thicker than normal  
 NRISD : No result, insufficient seed/depletion

**Accredited Test Methods Used:**

**Test Method**

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

Dissolved Organic Carbon by High Temperature Combustion

**Reference Method**

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

Modified from SM 5310 B. High Temperature Combustion

**Additional Test Methods Used:**

**Test Method**

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

**Reference Method**

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

**Laboratories:**

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

**Additional Comments:**

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

1120 Waverley Street

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## Certificate of Analysis for Sample No. 199577 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.



**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199577  
**Sample Description:** SWQ25-7  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	136 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	69.3	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	205 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	34.6 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	19 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	206 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.006057 ± 0.033	mg/L		6/6/2019	COW_ASB
Arsenic (As), total in water	0.008128 ± 0.042	mg/L		6/6/2019	COW_ASB
Barium (Ba), total in water	0.044026 ± 0.057	mg/L		6/6/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/6/2019	COW_ASB
Boron (B), total in water	0.09458 ± 0.19	mg/L		6/6/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/6/2019	COW_ASB
Calcium (Ca), total in water	75.539 ± 0.071	mg/L		6/6/2019	COW_ASB
Chromium (Cr), total in water	0.00165 ± 0.044	mg/L		6/6/2019	COW_ASB
Copper (Cu), total in water	0.004637 ± 0.035	mg/L		6/6/2019	COW_ASB
Iron (Fe), total in water	0.69717 ± 0.043	mg/L		6/6/2019	COW_ASB
Lead (Pb), total in water	0.000650 ± 0.042	mg/L		6/6/2019	COW_ASB
Magnesium (Mg), total in water	96.582 ± 0.04	mg/L		6/6/2019	COW_ASB
Manganese (Mn), total in water	0.30736 ± 0.041	mg/L		6/6/2019	COW_ASB
Nickel (Ni), total in water	0.009813 ± 0.046	mg/L		6/6/2019	COW_ASB
Phosphorus (P), total in water	0.5092 ± 0.033	mg/L		6/6/2019	COW_ASB
Potassium (K), total in water	39.612 ± 0.1	mg/L		6/6/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		6/6/2019	COW_ASB
Sodium (Na), total in water	93.782 ± 0.082	mg/L		6/6/2019	COW_ASB
Uranium (U), total in water	0.003226 ± 0.044	mg/L		6/6/2019	COW_ASB
Zinc (Zn), total in water	0.01800 ± 0.049	mg/L		6/6/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	189 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	586	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	1250 ± 0.062	mg/L		5/4/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	1070 ± 0.065	mg/L		5/4/2019	COW_ASB

**Sample No.** 199577  
**Sample Description:** SWQ25-7  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	176 ± 8.40%	mg/L		5/4/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	47.7 ± 0.085	mg/L		5/2/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	37.0 ± 0.085	mg/L		5/2/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	3.9 ± 0.15	mg/L		5/2/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	3.9	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.009 ± 0.165	mg/L		2/4/2020	COW_ASB
Nitrate+Nitrite Nitrogen	0.003 ± 0.078	mg/L		2/4/2020	COW_ASB
Phosphorus, dissolved (0.45um)	0.066 ± 0.075	mg/L		2/4/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	9.48 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	3410 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	27.10 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	148 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	382	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	12	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	162.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	199.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	39.80	mg/L		5/13/2019	ALS

**Sample No.** 199577  
**Sample Description:** SWQ25-7  
**Sample Date:** April 30, 2019  
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**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.08	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	30.9	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	33.9	mg/L		5/13/2019	ALS
Total Dissolved Carbon	64.8	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	203.000	mg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	10	MPN/100mL		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	372.00	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	<10	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	890	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		5/16/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS

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Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0041	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000460	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00740	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0345	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.1040	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000009	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	70.8000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00019	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00087	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00115	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	605.1	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0170	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.1190	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	104.0000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0159	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.003260	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00743	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.150	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	35.1000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0017	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000305	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	0.2230	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	103.0000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.5090	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	131.0000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00041	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00046	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.003480	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00334	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00061	mg/L		3/4/2020	ALS

**Sample No.** 199577  
**Sample Description:** SWQ25-7  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	0.0013	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
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----- **END OF REPORT** -----



Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

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## Certificate of Analysis for Sample No. 199578 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

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The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.



**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199578  
**Sample Description:** SWQ25-8  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	662 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	662 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	7 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	402 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.006307 ± 0.033	mg/L		6/6/2019	COW_ASB
Arsenic (As), total in water	0.015817 ± 0.042	mg/L		6/6/2019	COW_ASB
Barium (Ba), total in water	0.097832 ± 0.057	mg/L		6/6/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/6/2019	COW_ASB
Boron (B), total in water	0.41451 ± 0.19	mg/L		6/6/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/6/2019	COW_ASB
Calcium (Ca), total in water	160.54 ± 0.071	mg/L		6/6/2019	COW_ASB
Chromium (Cr), total in water	0.00291 ± 0.044	mg/L		6/6/2019	COW_ASB
Copper (Cu), total in water	0.011693 ± 0.035	mg/L		6/6/2019	COW_ASB
Iron (Fe), total in water	1.5693 ± 0.043	mg/L		6/6/2019	COW_ASB
Lead (Pb), total in water	0.001050 ± 0.042	mg/L		6/6/2019	COW_ASB
Magnesium (Mg), total in water	166.05 ± 0.04	mg/L		6/6/2019	COW_ASB
Manganese (Mn), total in water	0.68744 ± 0.041	mg/L		6/6/2019	COW_ASB
Nickel (Ni), total in water	0.048326 ± 0.046	mg/L		6/6/2019	COW_ASB
Phosphorus (P), total in water	3.0985 ± 0.033	mg/L		6/6/2019	COW_ASB
Potassium (K), total in water	459.28 ± 0.1	mg/L		6/6/2019	COW_ASB
Selenium (Se), total in water	0.00207 ± 0.15	mg/L		6/6/2019	COW_ASB
Sodium (Na), total in water	98.500 ± 0.082	mg/L		6/6/2019	COW_ASB
Uranium (U), total in water	0.008757 ± 0.044	mg/L		6/6/2019	COW_ASB
Zinc (Zn), total in water	0.02253 ± 0.049	mg/L		6/6/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	401 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	1080	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	2530 ± 0.062	mg/L		5/4/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	2330 ± 0.065	mg/L		5/4/2019	COW_ASB

**Sample No.** 199578  
**Sample Description:** SWQ25-8  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	196 ± 8.40%	mg/L		5/4/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	159.4 ± 0.085	mg/L		5/3/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	17.3 ± 0.15	mg/L		5/3/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	17	mg/L		5/4/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, total	3.66 ± 6.8%	mg/L		2/4/2020	COW_ASB
Nitrate+Nitrite Nitrogen	0.039 ± 7.8%	mg/L		2/4/2020	COW_ASB
Phosphorus, dissolved (0.45um)	2.72 ± 7.5%	mg/L		2/4/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	8.13 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	834 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	39.68 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	438 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	342	mg/L		5/7/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	153 ± 0.085	mg/L		5/3/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	8	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	816.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	669.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		5/13/2019	ALS

**Sample No.** 199578  
**Sample Description:** SWQ25-8  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	3.66	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	122.0	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	131.0	mg/L		5/13/2019	ALS
Total Dissolved Carbon	254.0	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	432.000	mg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	180	MPN/100mL		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	330.00	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	80	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	250	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	0.000006	pg/L		5/16/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	0.00055	mg/L		3/4/2020	ALS

**Sample No.** 199578  
**Sample Description:** SWQ25-8  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0072	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000590	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.01560	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0879	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.3770	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000018	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	142.0000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00101	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00631	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00667	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	1025.8	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.2670	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000183	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.2260	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	163.0000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.7370	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.007110	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.04270	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	3.290	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	400.0000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0235	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.001040	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	10.4000	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	0.000020	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	116.0000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.8760	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	142.0000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00262	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	0.00027	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.009050	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00869	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0055	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00473	mg/L		3/4/2020	ALS

**Sample No.** 199578  
**Sample Description:** SWQ25-8  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	0.0074	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

Dissolved Organic Carbon by High Temperature Combustion

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

Modified from SM 5310 B. High Temperature Combustion

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

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Winnipeg MB R3E 3S8

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## Certificate of Analysis for Sample No. 199579 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.



**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199579  
**Sample Description:** SWQ25-9A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	239 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	239 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	<4 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	62.0 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.004192 ± 0.033	mg/L		6/5/2019	COW_ASB
Arsenic (As), total in water	0.005120 ± 0.042	mg/L		6/5/2019	COW_ASB
Barium (Ba), total in water	0.079088 ± 0.057	mg/L		6/5/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/5/2019	COW_ASB
Boron (B), total in water	0.05374 ± 0.19	mg/L		6/5/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/5/2019	COW_ASB
Calcium (Ca), total in water	60.990 ± 0.071	mg/L		6/5/2019	COW_ASB
Chromium (Cr), total in water	0.00467 ± 0.044	mg/L		6/5/2019	COW_ASB
Copper (Cu), total in water	0.006722 ± 0.035	mg/L		6/5/2019	COW_ASB
Iron (Fe), total in water	2.7540 ± 0.043	mg/L		6/5/2019	COW_ASB
Lead (Pb), total in water	0.001384 ± 0.042	mg/L		6/5/2019	COW_ASB
Magnesium (Mg), total in water	44.535 ± 0.04	mg/L		6/5/2019	COW_ASB
Manganese (Mn), total in water	0.33822 ± 0.041	mg/L		6/5/2019	COW_ASB
Nickel (Ni), total in water	0.010262 ± 0.046	mg/L		6/5/2019	COW_ASB
Phosphorus (P), total in water	0.2059 ± 0.033	mg/L		6/5/2019	COW_ASB
Potassium (K), total in water	18.046 ± 0.1	mg/L		6/5/2019	COW_ASB
Selenium (Se), total in water	0.00091 ± 0.15	mg/L		6/5/2019	COW_ASB
Sodium (Na), total in water	34.524 ± 0.082	mg/L		6/5/2019	COW_ASB
Uranium (U), total in water	0.001797 ± 0.044	mg/L		6/5/2019	COW_ASB
Zinc (Zn), total in water	0.01590 ± 0.049	mg/L		6/5/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	152 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	336	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	652 ± 0.062	mg/L		5/4/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	504 ± 0.065	mg/L		5/4/2019	COW_ASB

**Sample No.** 199579  
**Sample Description:** SWQ25-9A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	148 ± 8.40%	mg/L		5/4/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	17.8 ± 0.085	mg/L		5/2/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	17.3 ± 0.085	mg/L		5/2/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	4.7 ± 0.15	mg/L		5/2/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	4.4	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, total	2.98 ± 6.8%	mg/L		2/4/2020	COW_ASB
Nitrate+Nitrite Nitrogen	0.340 ± 7.8%	mg/L		2/4/2020	COW_ASB
Phosphorus, dissolved (0.45um)	0.076 ± 7.5%	mg/L		2/4/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	8.23 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	940 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	22.84 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	79.0 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	94.9	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	<20	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	288.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	236.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		5/13/2019	ALS

**Sample No.** 199579  
**Sample Description:** SWQ25-9A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	3.10	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	46.1	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	14.7	mg/L		5/13/2019	ALS
Total Dissolved Carbon	60.8	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	86.000	mg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	<10	MPN/100mL		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	75.90	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	<10	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	60	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	0.000007	pg/L		5/16/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS

**Sample No.** 199579  
**Sample Description:** SWQ25-9A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0036	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000200	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00392	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0563	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0690	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000006	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	55.1000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00011	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00096	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00183	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	331.1	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0240	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0693	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	47.0000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.2630	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.002050	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00574	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.098	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	16.5000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0015	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000210	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	7.0100	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	38.4000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.3030	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	25.8000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00066	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00033	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.002110	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00301	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0038	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00049	mg/L		3/4/2020	ALS

**Sample No.** 199579  
**Sample Description:** SWQ25-9A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	0.0013	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

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## Certificate of Analysis for Sample No. 199580 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

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Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.



**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199580  
**Sample Description:** SWQ25-9B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	253 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	6.2	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	260 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	3.1 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	8 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	95.0 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.005390 ± 0.033	mg/L		6/5/2019	COW_ASB
Arsenic (As), total in water	0.008064 ± 0.042	mg/L		6/5/2019	COW_ASB
Barium (Ba), total in water	0.13976 ± 0.057	mg/L		6/5/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/5/2019	COW_ASB
Boron (B), total in water	0.04411 ± 0.19	mg/L		6/5/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/5/2019	COW_ASB
Calcium (Ca), total in water	56.956 ± 0.071	mg/L		6/5/2019	COW_ASB
Chromium (Cr), total in water	0.01002 ± 0.044	mg/L		6/5/2019	COW_ASB
Copper (Cu), total in water	0.016248 ± 0.035	mg/L		6/5/2019	COW_ASB
Iron (Fe), total in water	6.6356 ± 0.043	mg/L		6/5/2019	COW_ASB
Lead (Pb), total in water	0.004022 ± 0.042	mg/L		6/5/2019	COW_ASB
Magnesium (Mg), total in water	42.725 ± 0.04	mg/L		6/5/2019	COW_ASB
Manganese (Mn), total in water	0.41162 ± 0.041	mg/L		6/5/2019	COW_ASB
Nickel (Ni), total in water	0.015894 ± 0.046	mg/L		6/5/2019	COW_ASB
Phosphorus (P), total in water	0.6249 ± 0.033	mg/L		6/5/2019	COW_ASB
Potassium (K), total in water	18.876 ± 0.1	mg/L		6/5/2019	COW_ASB
Selenium (Se), total in water	0.00125 ± 0.15	mg/L		6/5/2019	COW_ASB
Sodium (Na), total in water	31.898 ± 0.082	mg/L		6/5/2019	COW_ASB
Uranium (U), total in water	0.002073 ± 0.044	mg/L		6/5/2019	COW_ASB
Zinc (Zn), total in water	0.02927 ± 0.049	mg/L		6/5/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	142 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	318	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	866 ± 0.062	mg/L		5/4/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	431 ± 0.065	mg/L		5/4/2019	COW_ASB

**Sample No.** 199580  
**Sample Description:** SWQ25-9B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	435 ± 8.40%	mg/L		5/4/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	18.9 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	18.2 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	7.2 ± 0.15	mg/L		5/1/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	6.7	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, total	4.34 ± 6.8%	mg/L		2/4/2020	COW_ASB
Nitrate+Nitrite Nitrogen	0.541 ± 7.8%	mg/L		2/4/2020	COW_ASB
Phosphorus, dissolved (0.45um)	0.275 ± 7.5%	mg/L		2/4/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	8.34 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	772 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	134.00 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	74.4 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	42.9	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	<6	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	364.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	299.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		5/13/2019	ALS

**Sample No.** 199580  
**Sample Description:** SWQ25-9B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	4.59	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	47.1	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	15.7	mg/L		5/13/2019	ALS
Total Dissolved Carbon	62.8	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	72.200	mg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	10	MPN/100mL		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	37.60	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	30	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	210	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	0.000005	pg/L		5/16/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS

**Sample No.** 199580  
**Sample Description:** SWQ25-9B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0036	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000220	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00574	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0576	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0650	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000009	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	45.2000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00064	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00114	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	285.0	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0170	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0621	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	41.8000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.2440	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.001870	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00545	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.348	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	16.6000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0017	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000234	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	7.6900	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	35.4000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.2650	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	12.9000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00099	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00040	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.001890	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00368	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0018	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00037	mg/L		3/4/2020	ALS

**Sample No.** 199580  
**Sample Description:** SWQ25-9B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	0.0012	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

1120 Waverley Street

Winnipeg MB R3E 3S8

Phone : 204-986-2384

Email : ckozak@winnipeg.ca

## Certificate of Analysis for Sample No. 199581 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.



**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199581  
**Sample Description:** SWQ25-11A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	522 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	114	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	635 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	56.9 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	54 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	384 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.004954 ± 0.033	mg/L		6/6/2019	COW_ASB
Arsenic (As), total in water	0.012652 ± 0.042	mg/L		6/6/2019	COW_ASB
Barium (Ba), total in water	0.069884 ± 0.057	mg/L		6/6/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/6/2019	COW_ASB
Boron (B), total in water	1.5556 ± 0.19	mg/L		6/6/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/6/2019	COW_ASB
Calcium (Ca), total in water	58.743 ± 0.071	mg/L		6/6/2019	COW_ASB
Chromium (Cr), total in water	0.00573 ± 0.044	mg/L		6/6/2019	COW_ASB
Copper (Cu), total in water	0.010996 ± 0.035	mg/L		6/6/2019	COW_ASB
Iron (Fe), total in water	0.45095 ± 0.043	mg/L		6/6/2019	COW_ASB
Lead (Pb), total in water	0.000515 ± 0.042	mg/L		6/6/2019	COW_ASB
Magnesium (Mg), total in water	175.38 ± 0.04	mg/L		6/6/2019	COW_ASB
Manganese (Mn), total in water	0.19158 ± 0.041	mg/L		6/6/2019	COW_ASB
Nickel (Ni), total in water	0.069375 ± 0.046	mg/L		6/6/2019	COW_ASB
Phosphorus (P), total in water	0.8762 ± 0.033	mg/L		6/6/2019	COW_ASB
Potassium (K), total in water	112.17 ± 0.1	mg/L		6/6/2019	COW_ASB
Selenium (Se), total in water	0.00185 ± 0.15	mg/L		6/6/2019	COW_ASB
Sodium (Na), total in water	311.93 ± 0.082	mg/L		6/6/2019	COW_ASB
Uranium (U), total in water	0.010700 ± 0.044	mg/L		6/6/2019	COW_ASB
Zinc (Zn), total in water	0.01616 ± 0.049	mg/L		6/6/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	147 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	869	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	2000 ± 0.062	mg/L		5/1/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	1800 ± 0.065	mg/L		5/1/2019	COW_ASB

**Sample No.** 199581  
**Sample Description:** SWQ25-11A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	201 ± 8.40%	mg/L		5/1/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	104.7 ± 0.085	mg/L		5/2/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	86.8 ± 0.085	mg/L		5/2/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	22.1 ± 0.15	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, total	9.67 ± 6.8%	mg/L		2/4/2020	COW_ASB
Nitrate+Nitrite Nitrogen	0.381 ± 7.8%	mg/L		2/4/2020	COW_ASB
Phosphorus, dissolved (0.45um)	0.030 ± 7.5%	mg/L		2/4/2020	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	22	mg/L		5/2/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	9.03 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	2950 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	45.30 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	246 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	254	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	44	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	757.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	678.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	34.40	mg/L		5/13/2019	ALS

**Sample No.** 199581  
**Sample Description:** SWQ25-11A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	9.00	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	114.0	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	81.0	mg/L		5/13/2019	ALS
Total Dissolved Carbon	195.0	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	418.000	mg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	550	MPN/100mL		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	205.00	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	500	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	1550	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	0.000006	pg/L		5/16/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	0.00066	mg/L		3/4/2020	ALS

**Sample No.** 199581  
**Sample Description:** SWQ25-11A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0061	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000800	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.01170	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0606	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	1.5400	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000015	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	53.3000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00432	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00869	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00582	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	808.4	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0470	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000090	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.1900	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	164.0000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0163	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.006720	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.06190	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.122	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	95.5000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0058	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000647	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	4.1000	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	0.000018	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	269.0000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.6910	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	87.0000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00069	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00145	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	0.00064	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.011500	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.01050	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0048	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00579	mg/L		3/4/2020	ALS

**Sample No.** 199581  
**Sample Description:** SWQ25-11A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	0.0045	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

Total Kjeldahl Nitrogen Calculated

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

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## Certificate of Analysis for Sample No. 199582 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.



**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199582  
**Sample Description:** SWQ25-11B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	525 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	89.0	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	614 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	44.5 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	54 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	372 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.006298 ± 0.033	mg/L		6/6/2019	COW_ASB
Arsenic (As), total in water	0.011356 ± 0.042	mg/L		6/6/2019	COW_ASB
Barium (Ba), total in water	0.075662 ± 0.057	mg/L		6/6/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/6/2019	COW_ASB
Boron (B), total in water	1.4097 ± 0.19	mg/L		6/6/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/6/2019	COW_ASB
Calcium (Ca), total in water	63.099 ± 0.071	mg/L		6/6/2019	COW_ASB
Chromium (Cr), total in water	0.00474 ± 0.044	mg/L		6/6/2019	COW_ASB
Copper (Cu), total in water	0.008438 ± 0.035	mg/L		6/6/2019	COW_ASB
Iron (Fe), total in water	0.26656 ± 0.043	mg/L		6/6/2019	COW_ASB
Lead (Pb), total in water	0.000290 ± 0.042	mg/L		6/6/2019	COW_ASB
Magnesium (Mg), total in water	158.46 ± 0.04	mg/L		6/6/2019	COW_ASB
Manganese (Mn), total in water	0.16746 ± 0.041	mg/L		6/6/2019	COW_ASB
Nickel (Ni), total in water	0.063614 ± 0.046	mg/L		6/6/2019	COW_ASB
Phosphorus (P), total in water	0.9200 ± 0.033	mg/L		6/6/2019	COW_ASB
Potassium (K), total in water	105.21 ± 0.1	mg/L		6/6/2019	COW_ASB
Selenium (Se), total in water	0.00158 ± 0.15	mg/L		6/6/2019	COW_ASB
Sodium (Na), total in water	266.86 ± 0.082	mg/L		6/6/2019	COW_ASB
Uranium (U), total in water	0.010339 ± 0.044	mg/L		6/6/2019	COW_ASB
Zinc (Zn), total in water	0.01484 ± 0.049	mg/L		6/6/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	158 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	810	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	1880 ± 0.062	mg/L		5/1/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	1720 ± 0.065	mg/L		5/1/2019	COW_ASB

**Sample No.** 199582  
**Sample Description:** SWQ25-11B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	163 ± 8.40%	mg/L		5/1/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	101.8 ± 0.085	mg/L		5/2/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	84.4 ± 0.085	mg/L		5/2/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	21.5 ± 0.15	mg/L		5/2/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	20	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, total	7.65 ± 6.8%	mg/L		2/4/2020	COW_ASB
Nitrate+Nitrite Nitrogen	1.42 ± 7.8%	mg/L		2/4/2020	COW_ASB
Phosphorus, dissolved (0.45um)	0.020 ± 7.5%	mg/L		2/4/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	8.95 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	2650 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	45.70 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	510 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	256	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	44	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	709.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	620.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	23.40	mg/L		5/13/2019	ALS

**Sample No.** 199582  
**Sample Description:** SWQ25-11B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	9.00	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	111.0	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	74.8	mg/L		5/13/2019	ALS
Total Dissolved Carbon	186.0	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	386.000	mg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	100	MPN/100mL		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	200.00	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	10	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	200	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	0.000005	pg/L		5/16/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	0.00057	mg/L		3/4/2020	ALS

**Sample No.** 199582  
**Sample Description:** SWQ25-11B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0061	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000780	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.01040	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0658	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	1.3900	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000017	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	54.0000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00380	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00758	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00557	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	789.6	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0480	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000085	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.1710	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	159.0000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0083	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.006970	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.05520	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.136	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	93.8000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0059	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000562	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	4.0500	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	0.000025	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	251.0000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.6660	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	86.6000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00128	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00182	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	0.00059	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.010600	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00877	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0047	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00495	mg/L		3/4/2020	ALS

**Sample No.** 199582  
**Sample Description:** SWQ25-11B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	0.0044	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

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## Certificate of Analysis for Sample No. 199583 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

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**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.



**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199583  
**Sample Description:** SWQ25-11C  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	407 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	123	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	530 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	61.7 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	64 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	347 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.006900 ± 0.033	mg/L		6/6/2019	COW_ASB
Arsenic (As), total in water	0.012455 ± 0.042	mg/L		6/6/2019	COW_ASB
Barium (Ba), total in water	0.054317 ± 0.057	mg/L		6/6/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/6/2019	COW_ASB
Boron (B), total in water	1.1395 ± 0.19	mg/L		6/6/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/6/2019	COW_ASB
Calcium (Ca), total in water	50.683 ± 0.071	mg/L		6/6/2019	COW_ASB
Chromium (Cr), total in water	0.00367 ± 0.044	mg/L		6/6/2019	COW_ASB
Copper (Cu), total in water	0.017870 ± 0.035	mg/L		6/6/2019	COW_ASB
Iron (Fe), total in water	0.27431 ± 0.043	mg/L		6/6/2019	COW_ASB
Lead (Pb), total in water	0.000530 ± 0.042	mg/L		6/6/2019	COW_ASB
Magnesium (Mg), total in water	150.13 ± 0.04	mg/L		6/6/2019	COW_ASB
Manganese (Mn), total in water	0.15246 ± 0.041	mg/L		6/6/2019	COW_ASB
Nickel (Ni), total in water	0.052763 ± 0.046	mg/L		6/6/2019	COW_ASB
Phosphorus (P), total in water	0.9668 ± 0.033	mg/L		6/6/2019	COW_ASB
Potassium (K), total in water	107.72 ± 0.1	mg/L		6/6/2019	COW_ASB
Selenium (Se), total in water	0.00181 ± 0.15	mg/L		6/6/2019	COW_ASB
Sodium (Na), total in water	236.18 ± 0.082	mg/L		6/6/2019	COW_ASB
Uranium (U), total in water	0.008869 ± 0.044	mg/L		6/6/2019	COW_ASB
Zinc (Zn), total in water	0.01373 ± 0.049	mg/L		6/6/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	127 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	745	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	1750 ± 0.062	mg/L		5/1/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	1550 ± 0.065	mg/L		5/1/2019	COW_ASB

**Sample No.** 199583  
**Sample Description:** SWQ25-11C  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	202 ± 8.40%	mg/L		5/1/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	102.4 ± 0.085	mg/L		5/2/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	75.4 ± 0.085	mg/L		5/2/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	15.0 ± 0.15	mg/L		5/2/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	14	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, total	2.13 ± 6.8%	mg/L		2/4/2020	COW_ASB
Nitrate+Nitrite Nitrogen	0.657 ± 7.8%	mg/L		2/4/2020	COW_ASB
Phosphorus, dissolved (0.45um)	<0.013 ± 7.5%	mg/L		2/4/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	9.11 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	2350 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	43.90 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	489 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	226	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	<2	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	566.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	532.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	41.20	mg/L		5/13/2019	ALS

**Sample No.** 199583  
**Sample Description:** SWQ25-11C  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	2.30	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	93.8	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	70.6	mg/L		5/13/2019	ALS
Total Dissolved Carbon	164.0	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	363.000	mg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	170	MPN/100mL		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	180.00	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	160	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	480	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	0.000005	pg/L		5/16/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	0.00059	mg/L		3/4/2020	ALS

**Sample No.** 199583  
**Sample Description:** SWQ25-11C  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0074	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000750	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.01160	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0463	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	1.1400	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000011	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	42.5000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00268	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00605	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00538	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	719.7	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0330	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000082	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.1640	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	149.0000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0087	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.007160	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.04640	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.140	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	94.4000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0047	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000635	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	4.6600	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	0.000012	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	227.0000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.5430	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	76.4000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00021	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00176	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	0.00052	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.009400	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00986	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0031	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00345	mg/L		3/4/2020	ALS

**Sample No.** 199583  
**Sample Description:** SWQ25-11C  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	0.0041	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

1120 Waverley Street

Winnipeg MB R3E 3S8

Phone : 204-986-2384

Email : ckozak@winnipeg.ca

## Certificate of Analysis for Sample No. 199584 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.



**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199584  
**Sample Description:** SWQ25-13A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	214 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	214 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	6 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	134 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.004432 ± 0.033	mg/L		6/5/2019	COW_ASB
Arsenic (As), total in water	0.004465 ± 0.042	mg/L		6/5/2019	COW_ASB
Barium (Ba), total in water	0.078696 ± 0.057	mg/L		6/5/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/5/2019	COW_ASB
Boron (B), total in water	0.02842 ± 0.19	mg/L		6/5/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/5/2019	COW_ASB
Calcium (Ca), total in water	61.942 ± 0.071	mg/L		6/5/2019	COW_ASB
Chromium (Cr), total in water	0.00742 ± 0.044	mg/L		6/5/2019	COW_ASB
Copper (Cu), total in water	0.009242 ± 0.035	mg/L		6/5/2019	COW_ASB
Iron (Fe), total in water	4.5610 ± 0.043	mg/L		6/5/2019	COW_ASB
Lead (Pb), total in water	0.003321 ± 0.042	mg/L		6/5/2019	COW_ASB
Magnesium (Mg), total in water	33.238 ± 0.04	mg/L		6/5/2019	COW_ASB
Manganese (Mn), total in water	0.11808 ± 0.041	mg/L		6/5/2019	COW_ASB
Nickel (Ni), total in water	0.010495 ± 0.046	mg/L		6/5/2019	COW_ASB
Phosphorus (P), total in water	0.3520 ± 0.033	mg/L		6/5/2019	COW_ASB
Potassium (K), total in water	12.833 ± 0.1	mg/L		6/5/2019	COW_ASB
Selenium (Se), total in water	0.00068 ± 0.15	mg/L		6/5/2019	COW_ASB
Sodium (Na), total in water	17.588 ± 0.082	mg/L		6/5/2019	COW_ASB
Uranium (U), total in water	0.001998 ± 0.044	mg/L		6/5/2019	COW_ASB
Zinc (Zn), total in water	0.02799 ± 0.049	mg/L		6/5/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	155 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	292	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	658 ± 0.062	mg/L		5/1/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	318 ± 0.065	mg/L		5/1/2019	COW_ASB

**Sample No.** 199584  
**Sample Description:** SWQ25-13A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	340 ± 8.40%	mg/L		5/1/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	21.6 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	19.8 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	0.8 ± 0.15	mg/L		5/1/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	0.8	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.009 ± 0.165	mg/L		5/3/2019	COW_ASB
Nitrate+Nitrite Nitrogen	<0.003 ± 0.078	mg/L		5/3/2019	COW_ASB
Phosphorus, dissolved (0.45um)	0.100 ± 0.075	mg/L		5/3/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.65 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	515 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	104.80 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	35.3 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	24.6	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	4	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	296.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	242.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		5/13/2019	ALS

**Sample No.** 199584  
**Sample Description:** SWQ25-13A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.01	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	39.7	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	17.5	mg/L		5/13/2019	ALS
Total Dissolved Carbon	57.2	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	29.600	mg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	10	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	0.000005	pg/L		5/16/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	24.50	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	<10	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	160	MPN/100mL		5/13/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	0.00083	mg/L		3/4/2020	ALS

**Sample No.** 199584  
**Sample Description:** SWQ25-13A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0038	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000170	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00314	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0367	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0280	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000008	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	45.6000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00014	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00016	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00140	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	227.9	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.1240	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000054	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0402	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	27.7000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0082	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.000675	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00276	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.145	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	11.6000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0007	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000144	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	4.5400	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	18.1000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.1720	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	8.0800	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00103	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00035	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.002030	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00349	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0034	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00060	mg/L		3/4/2020	ALS

**Sample No.** 199584  
**Sample Description:** SWQ25-13A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	<0.0010	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

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## Certificate of Analysis for Sample No. 199585 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

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The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.



**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199585  
**Sample Description:** SWQ25-13B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	229 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	229 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	5 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	149 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.004785 ± 0.033	mg/L		6/6/2019	COW_ASB
Arsenic (As), total in water	0.005678 ± 0.042	mg/L		6/6/2019	COW_ASB
Barium (Ba), total in water	0.094553 ± 0.057	mg/L		6/6/2019	COW_ASB
Beryllium (Be), total in water	0.00007 ± 0.13	mg/L		6/6/2019	COW_ASB
Boron (B), total in water	0.03077 ± 0.19	mg/L		6/6/2019	COW_ASB
Cadmium (Cd), total in water	0.000016 ± 0.039	mg/L		6/6/2019	COW_ASB
Calcium (Ca), total in water	118.71 ± 0.071	mg/L		6/6/2019	COW_ASB
Chromium (Cr), total in water	0.01042 ± 0.044	mg/L		6/6/2019	COW_ASB
Copper (Cu), total in water	0.014048 ± 0.035	mg/L		6/6/2019	COW_ASB
Iron (Fe), total in water	6.7716 ± 0.043	mg/L		6/6/2019	COW_ASB
Lead (Pb), total in water	0.007227 ± 0.042	mg/L		6/6/2019	COW_ASB
Magnesium (Mg), total in water	63.796 ± 0.04	mg/L		6/6/2019	COW_ASB
Manganese (Mn), total in water	0.23412 ± 0.041	mg/L		6/6/2019	COW_ASB
Nickel (Ni), total in water	0.012899 ± 0.046	mg/L		6/6/2019	COW_ASB
Phosphorus (P), total in water	0.6191 ± 0.033	mg/L		6/6/2019	COW_ASB
Potassium (K), total in water	13.123 ± 0.1	mg/L		6/6/2019	COW_ASB
Selenium (Se), total in water	0.00044 ± 0.15	mg/L		6/6/2019	COW_ASB
Sodium (Na), total in water	30.395 ± 0.082	mg/L		6/6/2019	COW_ASB
Uranium (U), total in water	0.002767 ± 0.044	mg/L		6/6/2019	COW_ASB
Zinc (Zn), total in water	1.0800 ± 0.049	mg/L		6/6/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	296 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	559	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	1090 ± 0.062	mg/L		5/1/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	430 ± 0.065	mg/L		5/1/2019	COW_ASB

**Sample No.** 199585  
**Sample Description:** SWQ25-13B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	660 ± 8.40%	mg/L		5/1/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	26.5 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	19.0 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	1.3 ± 0.15	mg/L		5/1/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	1.3	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.007 ± 0.165	mg/L		5/3/2019	COW_ASB
Nitrate+Nitrite Nitrogen	<0.003 ± 0.078	mg/L		5/3/2019	COW_ASB
Phosphorus, dissolved (0.45um)	0.079 ± 0.075	mg/L		5/3/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.65 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	731 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	172.00 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	89.6 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	74.8	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	<6	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	281.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	230.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		5/13/2019	ALS

**Sample No.** 199585  
**Sample Description:** SWQ25-13B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.02	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	44.1	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	17.1	mg/L		5/13/2019	ALS
Total Dissolved Carbon	61.1	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	91.200	mg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	<10	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		5/16/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	83.10	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	10	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	1400	MPN/100mL		5/13/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	0.00064	mg/L		3/4/2020	ALS

**Sample No.** 199585  
**Sample Description:** SWQ25-13B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0148	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000170	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00288	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0486	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0590	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000005	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	59.3000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00021	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00040	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00146	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	309.9	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.1850	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000111	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0553	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	39.3000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0536	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.000816	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00323	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.135	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	11.5000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0008	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000170	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	4.4600	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	32.6000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.2410	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	22.0000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00021	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00042	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.002690	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00334	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0924	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00061	mg/L		3/4/2020	ALS

**Sample No.** 199585  
**Sample Description:** SWQ25-13B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	<0.0010	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
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----- **END OF REPORT** -----



Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

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## Certificate of Analysis for Sample No. 199586 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

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**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199586  
**Sample Description:** SWQ25-14A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	213 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	213 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	8 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	220 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.009756 ± 0.033	mg/L		6/6/2019	COW_ASB
Arsenic (As), total in water	0.008104 ± 0.042	mg/L		6/6/2019	COW_ASB
Barium (Ba), total in water	0.20856 ± 0.057	mg/L		6/6/2019	COW_ASB
Beryllium (Be), total in water	0.00089 ± 0.13	mg/L		6/6/2019	COW_ASB
Boron (B), total in water	0.04645 ± 0.19	mg/L		6/6/2019	COW_ASB
Cadmium (Cd), total in water	0.000146 ± 0.039	mg/L		6/6/2019	COW_ASB
Calcium (Ca), total in water	143.27 ± 0.071	mg/L		6/6/2019	COW_ASB
Chromium (Cr), total in water	0.02893 ± 0.044	mg/L		6/6/2019	COW_ASB
Copper (Cu), total in water	0.035367 ± 0.035	mg/L		6/6/2019	COW_ASB
Iron (Fe), total in water	20.229 ± 0.043	mg/L		6/6/2019	COW_ASB
Lead (Pb), total in water	0.015296 ± 0.042	mg/L		6/6/2019	COW_ASB
Magnesium (Mg), total in water	70.474 ± 0.04	mg/L		6/6/2019	COW_ASB
Manganese (Mn), total in water	0.48349 ± 0.041	mg/L		6/6/2019	COW_ASB
Nickel (Ni), total in water	0.031272 ± 0.046	mg/L		6/6/2019	COW_ASB
Phosphorus (P), total in water	0.8314 ± 0.033	mg/L		6/6/2019	COW_ASB
Potassium (K), total in water	16.233 ± 0.1	mg/L		6/6/2019	COW_ASB
Selenium (Se), total in water	0.00142 ± 0.15	mg/L		6/6/2019	COW_ASB
Sodium (Na), total in water	25.112 ± 0.082	mg/L		6/6/2019	COW_ASB
Uranium (U), total in water	0.003678 ± 0.044	mg/L		6/6/2019	COW_ASB
Zinc (Zn), total in water	0.18456 ± 0.049	mg/L		6/6/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	358 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	648	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	1780 ± 0.062	mg/L		5/1/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	295 ± 0.065	mg/L		5/1/2019	COW_ASB

**Sample No.** 199586  
**Sample Description:** SWQ25-14A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	1490 ± 8.40%	mg/L		5/1/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	23.9 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	18.7 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	1.1 ± 0.15	mg/L		5/1/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	1.1	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.013 ± 0.165	mg/L		5/3/2019	COW_ASB
Nitrate+Nitrite Nitrogen	0.009 ± 0.078	mg/L		5/3/2019	COW_ASB
Phosphorus, dissolved (0.45um)	0.024 ± 0.075	mg/L		5/3/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	8.36 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	715 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	343.00 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	79.2 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	59.4	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	<6	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	268.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	220.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		5/13/2019	ALS

**Sample No.** 199586  
**Sample Description:** SWQ25-14A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.05	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	42.9	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	15.3	mg/L		5/13/2019	ALS
Total Dissolved Carbon	58.2	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	67.400	mg/L		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	49.20	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	720	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	1660	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	670	MPN/100mL		5/13/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	0.00058	mg/L		3/4/2020	ALS

**Sample No.** 199586  
**Sample Description:** SWQ25-14A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0023	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000230	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00263	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0567	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0580	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	<0.000005	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	56.4000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00013	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00040	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00199	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	304.3	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0530	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000107	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0620	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	39.7000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0214	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.001290	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00405	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.047	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	11.6000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0007	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000163	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	2.3400	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	28.0000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.2450	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	17.3000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	<0.00030	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.003340	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00365	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0071	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00064	mg/L		3/4/2020	ALS

**Sample No.** 199586  
**Sample Description:** SWQ25-14A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	<0.0010	mg/L		3/4/2020	ALS

**Reference Information**

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

**Accredited Test Methods Used:**

Test Method

Alkalinity by Titration  
 BOD5 Seeded by Automated Method  
 COD by Closed Reflux Method  
  
 Metals Total in Water by ICP-MS  
 Hardness, Calcium & Total by Calculation  
 Total Solids by Gravimetric Analysis  
 Dissolved Solids by Gravimetric Analysis  
 Total Suspended Solids by Gravimetric Analysis  
 Total Organic Carbon by High Temperature Combustion  
 Dissolved Organic Carbon by High Temperature Combustion  
 Total Nitrogen by High Temperature Combustion  
 Total Kjeldahl Nitrogen Calculated  
 Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis  
 pH in Laboratory by Electrometric Method  
 Conductivity by Electrometric Method  
 Turbidity in Laboratory by Nephelometric Method

Reference Method

Modified from SM 2320 B. Titration Method  
 Modified from SM 5210 B. 5-Day BOD Test  
 Modified from SM 5220 D. Closed Reflux, Colorimetric Method  
  
 Modified from EPA Methods 200.8  
 Modified from EPA Methods 200.8  
 Modified from SM 2540 B. Total Solids Dried at 103-105°C  
 Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C  
 Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C  
 Modified from SM 5310 B. High Temperature Combustion  
 Modified from SM 5310 B. High Temperature Combustion  
 Modified from SM 5310 B. High Temperature Combustion  
 Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis  
 Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
 Modified from SM 4500 H+B (Electrometric Method)  
 Modified from SM 2510 B. Laboratory Measurement  
 Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

**Additional Test Methods Used:**

Test Method

Chloride by Mercuric Thiocyanate Method  
 Sulfate by HACH Method

Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113  
 Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4  
 COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

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## Certificate of Analysis for Sample No. 199587 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.



**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199587  
**Sample Description:** SWQ25-14B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	206 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	14.8	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	221 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	7.4 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	15 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	118 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.004971 ± 0.033	mg/L		6/5/2019	COW_ASB
Arsenic (As), total in water	0.008222 ± 0.042	mg/L		6/5/2019	COW_ASB
Barium (Ba), total in water	0.10991 ± 0.057	mg/L		6/5/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/5/2019	COW_ASB
Boron (B), total in water	0.04403 ± 0.19	mg/L		6/5/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/5/2019	COW_ASB
Calcium (Ca), total in water	55.615 ± 0.071	mg/L		6/5/2019	COW_ASB
Chromium (Cr), total in water	0.00682 ± 0.044	mg/L		6/5/2019	COW_ASB
Copper (Cu), total in water	0.009288 ± 0.035	mg/L		6/5/2019	COW_ASB
Iron (Fe), total in water	4.7869 ± 0.043	mg/L		6/5/2019	COW_ASB
Lead (Pb), total in water	0.002664 ± 0.042	mg/L		6/5/2019	COW_ASB
Magnesium (Mg), total in water	43.227 ± 0.04	mg/L		6/5/2019	COW_ASB
Manganese (Mn), total in water	0.39659 ± 0.041	mg/L		6/5/2019	COW_ASB
Nickel (Ni), total in water	0.012579 ± 0.046	mg/L		6/5/2019	COW_ASB
Phosphorus (P), total in water	0.9863 ± 0.033	mg/L		6/5/2019	COW_ASB
Potassium (K), total in water	18.148 ± 0.1	mg/L		6/5/2019	COW_ASB
Selenium (Se), total in water	0.00114 ± 0.15	mg/L		6/5/2019	COW_ASB
Sodium (Na), total in water	33.046 ± 0.082	mg/L		6/5/2019	COW_ASB
Uranium (U), total in water	0.001886 ± 0.044	mg/L		6/5/2019	COW_ASB
Zinc (Zn), total in water	0.02469 ± 0.049	mg/L		6/5/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	139 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	317	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	696 ± 0.062	mg/L		5/1/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	431 ± 0.065	mg/L		5/1/2019	COW_ASB

**Sample No.** 199587  
**Sample Description:** SWQ25-14B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	265 ± 8.40%	mg/L		5/1/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	21.8 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	18.3 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	7.3 ± 0.15	mg/L		5/1/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	6.7	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, total	3.72 ± 6.8%	mg/L		2/4/2020	COW_ASB
Nitrate+Nitrite Nitrogen	0.528 ± 7.8%	mg/L		2/4/2020	COW_ASB
Phosphorus, dissolved (0.45um)	0.255 ± 7.5%	mg/L		2/4/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	8.74 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	751 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	62.50 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	81.8 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	40.3	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	11	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	334.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	274.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		5/13/2019	ALS

**Sample No.** 199587  
**Sample Description:** SWQ25-14B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	4.10	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	47.1	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	14.4	mg/L		5/13/2019	ALS
Total Dissolved Carbon	61.5	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	72.000	mg/L		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	35.90	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	<10	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	120	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	0.000011	pg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	40	MPN/100mL		5/13/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	0.00053	mg/L		3/4/2020	ALS

**Sample No.** 199587  
**Sample Description:** SWQ25-14B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0226	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000220	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00590	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0560	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0680	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000007	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	46.4000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00011	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00061	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00151	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	285.5	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0300	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000085	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0628	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	41.2000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.2300	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.001830	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00535	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.373	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	16.7000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0016	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000178	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	7.6700	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	35.3000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.2680	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	12.3000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00037	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00044	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.001810	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00368	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0025	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00037	mg/L		3/4/2020	ALS

**Sample No.** 199587  
**Sample Description:** SWQ25-14B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	0.0011	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

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## Certificate of Analysis for Sample No. 199588 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.



**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199588  
**Sample Description:** SWQ25-15A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	159 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	77.3	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	237 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	38.7 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	33 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	139 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.005821 ± 0.033	mg/L		6/5/2019	COW_ASB
Arsenic (As), total in water	0.004544 ± 0.042	mg/L		6/5/2019	COW_ASB
Barium (Ba), total in water	0.057510 ± 0.057	mg/L		6/5/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/5/2019	COW_ASB
Boron (B), total in water	0.03435 ± 0.19	mg/L		6/5/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/5/2019	COW_ASB
Calcium (Ca), total in water	43.712 ± 0.071	mg/L		6/5/2019	COW_ASB
Chromium (Cr), total in water	0.00168 ± 0.044	mg/L		6/5/2019	COW_ASB
Copper (Cu), total in water	0.004850 ± 0.035	mg/L		6/5/2019	COW_ASB
Iron (Fe), total in water	1.0572 ± 0.043	mg/L		6/5/2019	COW_ASB
Lead (Pb), total in water	0.000416 ± 0.042	mg/L		6/5/2019	COW_ASB
Magnesium (Mg), total in water	43.540 ± 0.04	mg/L		6/5/2019	COW_ASB
Manganese (Mn), total in water	0.09805 ± 0.041	mg/L		6/5/2019	COW_ASB
Nickel (Ni), total in water	0.006523 ± 0.046	mg/L		6/5/2019	COW_ASB
Phosphorus (P), total in water	0.6872 ± 0.033	mg/L		6/5/2019	COW_ASB
Potassium (K), total in water	17.504 ± 0.1	mg/L		6/5/2019	COW_ASB
Selenium (Se), total in water	0.00021 ± 0.15	mg/L		6/5/2019	COW_ASB
Sodium (Na), total in water	35.637 ± 0.082	mg/L		6/5/2019	COW_ASB
Uranium (U), total in water	0.002510 ± 0.044	mg/L		6/5/2019	COW_ASB
Zinc (Zn), total in water	0.01397 ± 0.049	mg/L		6/5/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	109 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	288	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	554 ± 0.062	mg/L		5/1/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	426 ± 0.065	mg/L		5/1/2019	COW_ASB

**Sample No.** 199588  
**Sample Description:** SWQ25-15A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	128 ± 8.40%	mg/L		5/1/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	34.3 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	18.7 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	4.3 ± 0.15	mg/L		5/1/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	4.2	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.011 ± 0.165	mg/L		5/3/2019	COW_ASB
Nitrate+Nitrite Nitrogen	0.173 ± 0.078	mg/L		5/3/2019	COW_ASB
Phosphorus, dissolved (0.45um)	<0.013 ± 0.075	mg/L		5/3/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	9.15 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	721 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	52.00 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	76.6 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	44.9	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	32	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	230.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	233.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	26.60	mg/L		5/13/2019	ALS

**Sample No.** 199588  
**Sample Description:** SWQ25-15A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.02	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	42.3	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	15.8	mg/L		5/13/2019	ALS
Total Dissolved Carbon	58.0	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	75.100	mg/L		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	40.20	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	<10	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	20	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	0.000005	pg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	<10	MPN/100mL		5/13/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	0.00057	mg/L		3/4/2020	ALS

**Sample No.** 199588  
**Sample Description:** SWQ25-15A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0140	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000190	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00413	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0423	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0680	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000012	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	41.0000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00016	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00050	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00199	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	292.2	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0200	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0686	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	46.1000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0383	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.002210	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00509	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.058	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	17.0000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0011	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000219	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	0.4150	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	40.1000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.2530	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	14.7000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00030	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00068	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.002800	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00386	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0017	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00040	mg/L		3/4/2020	ALS

**Sample No.** 199588  
**Sample Description:** SWQ25-15A  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	0.0011	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

Solid Waste Services Division  
1120 Waverley Street  
Winnipeg MB R3E 3S8

Phone : 204-986-2384

Email : ckozak@winnipeg.ca

## Certificate of Analysis for Sample No. 199589 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.



**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199589  
**Sample Description:** SWQ25-15B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	209 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	56.5	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	265 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	28.3 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	14 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	141 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.003424 ± 0.033	mg/L		6/6/2019	COW_ASB
Arsenic (As), total in water	0.006778 ± 0.042	mg/L		6/6/2019	COW_ASB
Barium (Ba), total in water	0.081792 ± 0.057	mg/L		6/6/2019	COW_ASB
Beryllium (Be), total in water	0.00006 ± 0.13	mg/L		6/6/2019	COW_ASB
Boron (B), total in water	0.14604 ± 0.19	mg/L		6/6/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/6/2019	COW_ASB
Calcium (Ca), total in water	47.640 ± 0.071	mg/L		6/6/2019	COW_ASB
Chromium (Cr), total in water	0.00651 ± 0.044	mg/L		6/6/2019	COW_ASB
Copper (Cu), total in water	0.008710 ± 0.035	mg/L		6/6/2019	COW_ASB
Iron (Fe), total in water	3.2935 ± 0.043	mg/L		6/6/2019	COW_ASB
Lead (Pb), total in water	0.001994 ± 0.042	mg/L		6/6/2019	COW_ASB
Magnesium (Mg), total in water	56.534 ± 0.04	mg/L		6/6/2019	COW_ASB
Manganese (Mn), total in water	0.28040 ± 0.041	mg/L		6/6/2019	COW_ASB
Nickel (Ni), total in water	0.014358 ± 0.046	mg/L		6/6/2019	COW_ASB
Phosphorus (P), total in water	0.8940 ± 0.033	mg/L		6/6/2019	COW_ASB
Potassium (K), total in water	28.350 ± 0.1	mg/L		6/6/2019	COW_ASB
Selenium (Se), total in water	0.00078 ± 0.15	mg/L		6/6/2019	COW_ASB
Sodium (Na), total in water	53.932 ± 0.082	mg/L		6/6/2019	COW_ASB
Uranium (U), total in water	0.003414 ± 0.044	mg/L		6/6/2019	COW_ASB
Zinc (Zn), total in water	0.02394 ± 0.049	mg/L		6/6/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	119 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	352	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	796 ± 0.062	mg/L		5/1/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	540 ± 0.065	mg/L		5/1/2019	COW_ASB

**Sample No.** 199589  
**Sample Description:** SWQ25-15B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	256 ± 8.40%	mg/L		5/1/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	39.7 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	25.5 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	5.1 ± 0.15	mg/L		5/1/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	4.8	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.017 ± 0.165	mg/L		5/3/2019	COW_ASB
Nitrate+Nitrite Nitrogen	0.302 ± 0.078	mg/L		5/3/2019	COW_ASB
Phosphorus, dissolved (0.45um)	<0.013 ± 0.075	mg/L		5/3/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	9.10 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	924 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	36.10 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	117 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	78.1	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	14	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	323.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	308.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	25.80	mg/L		5/13/2019	ALS

**Sample No.** 199589  
**Sample Description:** SWQ25-15B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.09	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	48.1	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	20.6	mg/L		5/13/2019	ALS
Total Dissolved Carbon	68.8	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	105.000	mg/L		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	52.90	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	10	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	240	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	0.000005	pg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	<10	MPN/100mL		5/13/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	0.00060	mg/L		3/4/2020	ALS

**Sample No.** 199589  
**Sample Description:** SWQ25-15B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0048	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000230	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00477	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0441	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.1490	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000010	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	42.1000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00037	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00090	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00211	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	332.8	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0160	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0775	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	55.3000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0088	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.002670	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00873	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.059	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	24.0000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0015	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000266	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	0.5100	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	56.9000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.2760	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	20.3000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00126	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00051	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.003340	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00426	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0016	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00064	mg/L		3/4/2020	ALS

**Sample No.** 199589  
**Sample Description:** SWQ25-15B  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	0.0014	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

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## Certificate of Analysis for Sample No. 199590 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.



**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199590  
**Sample Description:** SWQ25-100  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	135 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	66.8	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	202 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	33.4 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	18 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	159 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.003950 ± 0.033	mg/L		6/6/2019	COW_ASB
Arsenic (As), total in water	0.008308 ± 0.042	mg/L		6/6/2019	COW_ASB
Barium (Ba), total in water	0.044175 ± 0.057	mg/L		6/6/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/6/2019	COW_ASB
Boron (B), total in water	0.07688 ± 0.19	mg/L		6/6/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/6/2019	COW_ASB
Calcium (Ca), total in water	75.336 ± 0.071	mg/L		6/6/2019	COW_ASB
Chromium (Cr), total in water	0.00170 ± 0.044	mg/L		6/6/2019	COW_ASB
Copper (Cu), total in water	0.005047 ± 0.035	mg/L		6/6/2019	COW_ASB
Iron (Fe), total in water	0.87520 ± 0.043	mg/L		6/6/2019	COW_ASB
Lead (Pb), total in water	0.000767 ± 0.042	mg/L		6/6/2019	COW_ASB
Magnesium (Mg), total in water	110.96 ± 0.04	mg/L		6/6/2019	COW_ASB
Manganese (Mn), total in water	0.33118 ± 0.041	mg/L		6/6/2019	COW_ASB
Nickel (Ni), total in water	0.010375 ± 0.046	mg/L		6/6/2019	COW_ASB
Phosphorus (P), total in water	0.5812 ± 0.033	mg/L		6/6/2019	COW_ASB
Potassium (K), total in water	38.893 ± 0.1	mg/L		6/6/2019	COW_ASB
Selenium (Se), total in water	0.00064 ± 0.15	mg/L		6/6/2019	COW_ASB
Sodium (Na), total in water	98.072 ± 0.082	mg/L		6/6/2019	COW_ASB
Uranium (U), total in water	0.003394 ± 0.044	mg/L		6/6/2019	COW_ASB
Zinc (Zn), total in water	0.01897 ± 0.049	mg/L		6/6/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	188 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	645	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	1280 ± 0.062	mg/L		5/4/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	1070 ± 0.065	mg/L		5/4/2019	COW_ASB

**Sample No.** 199590  
**Sample Description:** SWQ25-100  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	211 ± 8.40%	mg/L		5/4/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	49.6 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	37.8 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	4.3 ± 0.15	mg/L		5/1/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	4.3	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.012 ± 0.165	mg/L		5/3/2019	COW_ASB
Nitrate+Nitrite Nitrogen	<0.003 ± 0.078	mg/L		5/3/2019	COW_ASB
Phosphorus, dissolved (0.45um)	<0.013 ± 0.075	mg/L		5/3/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	9.44 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	1530 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	36.70 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	230 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	363	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	15	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	190.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	223.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	40.30	mg/L		5/13/2019	ALS

**Sample No.** 199590  
**Sample Description:** SWQ25-100  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.07	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	30.2	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	34.1	mg/L		5/13/2019	ALS
Total Dissolved Carbon	64.3	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	203.000	mg/L		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	372.00	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	<10	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	2490	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	0.000007	pg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	50	MPN/100mL		5/13/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS

**Sample No.** 199590  
**Sample Description:** SWQ25-100  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0038	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000440	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00745	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0352	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0900	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000007	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	72.1000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00024	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00090	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00126	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	616.5	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0190	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000056	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.1190	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	106.0000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0166	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.003500	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00759	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.126	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	34.9000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0019	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000239	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	0.2230	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	103.0000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.4960	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	133.0000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00041	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00055	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.003630	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00341	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0010	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00061	mg/L		3/4/2020	ALS

**Sample No.** 199590  
**Sample Description:** SWQ25-100  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	0.0014	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

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## Certificate of Analysis for Sample No. 199591 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.



**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199591  
**Sample Description:** SWQ25-101  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	228 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	44.7	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	273 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	22.4 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	11 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	88.0 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.004276 ± 0.033	mg/L		6/6/2019	COW_ASB
Arsenic (As), total in water	0.005083 ± 0.042	mg/L		6/6/2019	COW_ASB
Barium (Ba), total in water	0.051351 ± 0.057	mg/L		6/6/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/6/2019	COW_ASB
Boron (B), total in water	0.17412 ± 0.19	mg/L		6/6/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/6/2019	COW_ASB
Calcium (Ca), total in water	47.721 ± 0.071	mg/L		6/6/2019	COW_ASB
Chromium (Cr), total in water	0.00065 ± 0.044	mg/L		6/6/2019	COW_ASB
Copper (Cu), total in water	0.006716 ± 0.035	mg/L		6/6/2019	COW_ASB
Iron (Fe), total in water	0.19276 ± 0.043	mg/L		6/6/2019	COW_ASB
Lead (Pb), total in water	0.000065 ± 0.042	mg/L		6/6/2019	COW_ASB
Magnesium (Mg), total in water	56.380 ± 0.04	mg/L		6/6/2019	COW_ASB
Manganese (Mn), total in water	0.03354 ± 0.041	mg/L		6/6/2019	COW_ASB
Nickel (Ni), total in water	0.011186 ± 0.046	mg/L		6/6/2019	COW_ASB
Phosphorus (P), total in water	0.1889 ± 0.033	mg/L		6/6/2019	COW_ASB
Potassium (K), total in water	31.438 ± 0.1	mg/L		6/6/2019	COW_ASB
Selenium (Se), total in water	0.00055 ± 0.15	mg/L		6/6/2019	COW_ASB
Sodium (Na), total in water	62.004 ± 0.082	mg/L		6/6/2019	COW_ASB
Uranium (U), total in water	0.003870 ± 0.044	mg/L		6/6/2019	COW_ASB
Zinc (Zn), total in water	0.01875 ± 0.049	mg/L		6/6/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	119 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	351	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	660 ± 0.062	mg/L		5/4/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	578 ± 0.065	mg/L		5/4/2019	COW_ASB

**Sample No.** 199591  
**Sample Description:** SWQ25-101  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	82 ± 8.40%	mg/L		5/4/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	29.0 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	25.8 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	2.3 ± 0.15	mg/L		5/1/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	2.3	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.059 ± 0.165	mg/L		5/3/2019	COW_ASB
Nitrate+Nitrite Nitrogen	0.005 ± 0.078	mg/L		5/3/2019	COW_ASB
Phosphorus, dissolved (0.45um)	<0.013 ± 0.075	mg/L		5/3/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	9.05 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	956 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	8.11 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	137 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	71.6	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	8	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	288.00	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	280.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	26.20	mg/L		5/13/2019	ALS

**Sample No.** 199591  
**Sample Description:** SWQ25-101  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.03	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	49.1	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	22.1	mg/L		5/13/2019	ALS
Total Dissolved Carbon	71.2	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	114.000	mg/L		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	61.60	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	650	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	1020	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	0.000005	pg/L		5/13/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	640	MPN/100mL		5/13/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	0.00056	mg/L		3/4/2020	ALS

**Sample No.** 199591  
**Sample Description:** SWQ25-101  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0034	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000280	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00509	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0506	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.1800	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000010	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	44.6000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00035	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00092	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00278	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	356.0	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0240	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000062	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0790	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	59.4000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0322	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.003240	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.01000	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.090	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	28.3000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0014	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000260	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	0.1640	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	62.8000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.2960	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	24.4000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00093	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00060	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.003940	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00420	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0018	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00064	mg/L		3/4/2020	ALS

**Sample No.** 199591  
**Sample Description:** SWQ25-101  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	0.0018	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

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## Certificate of Analysis for Sample No. 199592 v1

Date Authorised: March 4, 2020

Total Number of Pages: 8

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**Brock Bradford**

Analytical Services Branch Head

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The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.



**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199592  
**Sample Description:** SWQ25-Trip Blank  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	<3.0 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	<4 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	<20.0 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.004382 ± 0.033	mg/L		6/5/2019	COW_ASB
Arsenic (As), total in water	<0.000017 ± 0.042	mg/L		6/5/2019	COW_ASB
Barium (Ba), total in water	0.000193 ± 0.057	mg/L		6/5/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/5/2019	COW_ASB
Boron (B), total in water	<0.00208 ± 0.19	mg/L		6/5/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/5/2019	COW_ASB
Calcium (Ca), total in water	0.077 ± 0.071	mg/L		6/5/2019	COW_ASB
Chromium (Cr), total in water	0.00015 ± 0.044	mg/L		6/5/2019	COW_ASB
Copper (Cu), total in water	0.001237 ± 0.035	mg/L		6/5/2019	COW_ASB
Iron (Fe), total in water	0.00714 ± 0.043	mg/L		6/5/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		6/5/2019	COW_ASB
Magnesium (Mg), total in water	0.015 ± 0.04	mg/L		6/5/2019	COW_ASB
Manganese (Mn), total in water	0.00014 ± 0.041	mg/L		6/5/2019	COW_ASB
Nickel (Ni), total in water	<0.000021 ± 0.046	mg/L		6/5/2019	COW_ASB
Phosphorus (P), total in water	<0.0012 ± 0.033	mg/L		6/5/2019	COW_ASB
Potassium (K), total in water	0.040 ± 0.1	mg/L		6/5/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		6/5/2019	COW_ASB
Sodium (Na), total in water	0.112 ± 0.082	mg/L		6/5/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		6/5/2019	COW_ASB
Zinc (Zn), total in water	0.01174 ± 0.049	mg/L		6/5/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	<0.4 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	<0.4	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	6 ± 0.062	mg/L		5/4/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	7 ± 0.065	mg/L		5/4/2019	COW_ASB

**Sample No.** 199592  
**Sample Description:** SWQ25-Trip Blank  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	<3 ± 8.40%	mg/L		5/4/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	1.5 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	1.0 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	<0.3 ± 0.15	mg/L		5/1/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	<0.2	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.019 ± 0.165	mg/L		5/3/2019	COW_ASB
Nitrate+Nitrite Nitrogen	<0.003 ± 0.078	mg/L		5/3/2019	COW_ASB
Phosphorus, dissolved (0.45um)	<0.013 ± 0.075	mg/L		5/3/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	5.74 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	1900 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	0.47 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	<0.4 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	1.7	mg/L		5/7/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	<2	mg/L		5/9/2019	ALS
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	<1.20	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	<1.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		5/13/2019	ALS

**Sample No.** 199592  
**Sample Description:** SWQ25-Trip Blank  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	<0.01	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	<0.5	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	0.7	mg/L		5/13/2019	ALS
Total Dissolved Carbon	<1.0	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	<0.500	mg/L		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	<0.30	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	<1	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	<1	MPN/100mL		5/13/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by MPN QT97	<1	MPN/100mL		5/13/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS

**Sample No.** 199592  
**Sample Description:** SWQ25-Trip Blank  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0043	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	<0.000100	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	<0.0001	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	<0.0100	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	<0.000005	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	<0.0500	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00013	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	<0.4	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	<0.0100	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	0.0640	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	<0.0001	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	<0.00050	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	<0.030	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	<0.0500	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	<0.0002	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	0.1180	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	3.7700	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.0002	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	<0.5000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00254	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	<0.00030	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	<0.00050	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	<0.00006	mg/L		3/4/2020	ALS

**Sample No.** 199592  
**Sample Description:** SWQ25-Trip Blank  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	<0.0010	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 4, 2020

**Mr. Chris Kozak**

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## Certificate of Analysis for Sample No. 199593 v2

Date Authorised: March 4, 2020

Total Number of Pages: 8

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Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.



**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 199593  
**Sample Description:** SWQ25-Field Blank  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		5/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		5/2/2019	COW_ASB
Alkalinity, total to pH 4.5	<3.0 ± 0.028	mg/L		5/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		5/2/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	<4 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	<20.0 ± 0.068	mg/L		5/10/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	0.005007 ± 0.033	mg/L		6/5/2019	COW_ASB
Arsenic (As), total in water	<0.000017 ± 0.042	mg/L		6/5/2019	COW_ASB
Barium (Ba), total in water	0.000044 ± 0.057	mg/L		6/5/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		6/5/2019	COW_ASB
Boron (B), total in water	<0.00208 ± 0.19	mg/L		6/5/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		6/5/2019	COW_ASB
Calcium (Ca), total in water	0.034 ± 0.071	mg/L		6/5/2019	COW_ASB
Chromium (Cr), total in water	0.00008 ± 0.044	mg/L		6/5/2019	COW_ASB
Copper (Cu), total in water	0.003699 ± 0.035	mg/L		6/5/2019	COW_ASB
Iron (Fe), total in water	0.00532 ± 0.043	mg/L		6/5/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		6/5/2019	COW_ASB
Magnesium (Mg), total in water	0.011 ± 0.04	mg/L		6/5/2019	COW_ASB
Manganese (Mn), total in water	0.00007 ± 0.041	mg/L		6/5/2019	COW_ASB
Nickel (Ni), total in water	<0.000021 ± 0.046	mg/L		6/5/2019	COW_ASB
Phosphorus (P), total in water	<0.0012 ± 0.033	mg/L		6/5/2019	COW_ASB
Potassium (K), total in water	0.030 ± 0.1	mg/L		6/5/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		6/5/2019	COW_ASB
Sodium (Na), total in water	0.104 ± 0.082	mg/L		6/5/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		6/5/2019	COW_ASB
Zinc (Zn), total in water	0.00608 ± 0.049	mg/L		6/5/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	<0.4 ± 0.065	mg/L		6/6/2019	COW_ASB
Total Hardness, calculated in water	<0.4	mg/L		6/6/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	14 ± 0.062	mg/L		5/4/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	5 ± 0.065	mg/L		5/4/2019	COW_ASB

**Sample No.** 199593  
**Sample Description:** SWQ25-Field Blank  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	9 ± 8.40%	mg/L		5/4/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	0.8 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon as NPOC	1.3 ± 0.085	mg/L		5/1/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	<0.3 ± 0.15	mg/L		5/1/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	<0.2	mg/L		5/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.027 ± 0.165	mg/L		5/3/2019	COW_ASB
Nitrate+Nitrite Nitrogen	<0.003 ± 0.078	mg/L		5/3/2019	COW_ASB
Phosphorus, dissolved (0.45um)	<0.013 ± 0.075	mg/L		5/3/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	5.26 ± 0.065	units		5/1/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	1460 ± 0.023	uS		3/4/2020	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	0.18 ± 0.076	NTU		3/4/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	0.7 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	1.0	mg/L		5/7/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	<1.20	mg/L		5/13/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	<1.00	mg/L		5/13/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		5/13/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		5/13/2019	ALS

**Sample No.** 199593  
**Sample Description:** SWQ25-Field Blank  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	<0.01	mg/L		5/13/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	<0.5	mg/L		5/13/2019	ALS
Dissolved Organic Carbon	0.7	mg/L		5/13/2019	ALS
Total Dissolved Carbon	<1.0	mg/L		5/13/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	<0.500	mg/L		5/13/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	<0.30	mg/L		5/13/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by MPN QT97	<1	MPN/100mL		5/13/2019	ALS
Total Coliforms by MPN QT97	<1	MPN/100mL		5/13/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		5/13/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by MPN QT97	<1	MPN/100mL		5/13/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS

**Sample No.** 199593  
**Sample Description:** SWQ25-Field Blank  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0041	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	<0.000100	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	<0.0001	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	<0.0100	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	<0.000005	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	<0.0500	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00049	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	<0.2	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	<0.0100	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	0.0243	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0002	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	<0.00050	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	<0.030	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	0.0760	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	<0.0002	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	0.1240	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	2.9700	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	<0.0001	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	<0.5000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00320	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	<0.00030	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	<0.00050	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0011	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	<0.00006	mg/L		3/4/2020	ALS

**Sample No.** 199593  
**Sample Description:** SWQ25-Field Blank  
**Sample Date:** April 30, 2019  
**Sample Received:** April 30, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Cyanide</b>					
Cyanide, Total in water	<0.0010	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration

BOD5 Seeded by Automated Method

COD by Closed Reflux Method

Metals Total in Water by ICP-MS

Hardness, Calcium & Total by Calculation

Total Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Organic Carbon by High Temperature Combustion

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Kjeldahl Nitrogen Calculated

Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

pH in Laboratory by Electrometric Method

Conductivity by Electrometric Method

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Reference Method

Modified from SM 2320 B. Titration Method

Modified from SM 5210 B. 5-Day BOD Test

Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from EPA Methods 200.8

Modified from EPA Methods 200.8

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis

Modified from SM 4500 H+B (Electrometric Method)

Modified from SM 2510 B. Laboratory Measurement

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: February 25, 2020

Phone :

Email :

## Certificate of Analysis for Sample No. 205123

Date Authorised: February 14, 2020

Total Number of Pages: 2

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

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The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.



**Sample No.** 205123  
**Sample Description:** SWQ25-6  
**Sample Date:** May 16, 2019  
**Sample Received:** May 16, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	4390 ± 0.17	mg/L		5/21/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	3870	mg/L		5/23/2019	ALS

**Reference Information**

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

Accredited Test Methods Used:

Test Method

BOD5 Seeded by Automated Method

Reference Method

Modified from SM 5210 B. 5-Day BOD Test

Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

1120 Waverley Street

Winnipeg MB R3E 3S8

Phone : 204-986-2384

Email : ckozak@winnipeg.ca

## Certificate of Analysis for Sample No. 226830 v2

Date Authorised: March 5, 2020

Total Number of Pages: 8

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**Brock Bradford**

Analytical Services Branch Head

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**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 226830  
**Sample Description:** SWQ25-1  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	336 ± 0.04	mg/L		8/1/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		8/1/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		8/1/2019	COW_ASB
Alkalinity, total to pH 4.5	336 ± 0.028	mg/L		8/1/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		8/1/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.114 ± 0.165	mg/L		8/8/2019	COW_ASB
Nitrate+Nitrite Nitrogen	<0.003 ± 0.078	mg/L		8/8/2019	COW_ASB
Phosphorus, dissolved (0.45um)	0.220 ± 0.075	mg/L		8/8/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	45.0 ± 0.06	mg/L		3/5/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	6 ± 0.17	mg/L		3/5/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	156 ± 0.068	mg/L		8/8/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	765 ± 0.023	uS		8/2/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	179 ± 0.065	mg/L		12/10/2019	COW_ASB
Total Hardness, calculated in water	381	mg/L		12/10/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.31 ± 0.065	units		7/31/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	491 ± 0.065	mg/L		8/7/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	844 ± 0.062	mg/L		8/3/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	353 ± 8.40%	mg/L		8/7/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	1.8	mg/L		8/10/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	24.4 ± 0.085	mg/L		8/2/2019	COW_ASB

**Sample No.** 226830  
**Sample Description:** SWQ25-1  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	1.8 ± 0.15	mg/L		8/2/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	26.6 ± 0.085	mg/L		8/2/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		11/18/2019	COW_ASB
Arsenic (As), total in water	<0.000017 ± 0.042	mg/L		11/18/2019	COW_ASB
Barium (Ba), total in water	0.076744 ± 0.057	mg/L		11/18/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		11/18/2019	COW_ASB
Boron (B), total in water	<0.00208 ± 0.19	mg/L		11/18/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		11/18/2019	COW_ASB
Calcium (Ca), total in water	71.624 ± 0.071	mg/L		11/18/2019	COW_ASB
Chromium (Cr), total in water	<0.00004 ± 0.044	mg/L		11/18/2019	COW_ASB
Copper (Cu), total in water	<0.000022 ± 0.035	mg/L		11/18/2019	COW_ASB
Iron (Fe), total in water	2.0640 ± 0.043	mg/L		11/18/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		11/18/2019	COW_ASB
Magnesium (Mg), total in water	49.074 ± 0.04	mg/L		11/18/2019	COW_ASB
Manganese (Mn), total in water	0.24114 ± 0.041	mg/L		11/18/2019	COW_ASB
Nickel (Ni), total in water	0.012215 ± 0.046	mg/L		11/18/2019	COW_ASB
Phosphorus (P), total in water	<0.0012 ± 0.033	mg/L		11/18/2019	COW_ASB
Potassium (K), total in water	14.987 ± 0.1	mg/L		11/18/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		11/18/2019	COW_ASB
Sodium (Na), total in water	38.806 ± 0.082	mg/L		11/18/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		11/18/2019	COW_ASB
Zinc (Zn), total in water	0.02712 ± 0.049	mg/L		11/18/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	29.60 ± 0.076	NTU		7/31/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	407.00	mg/L		8/26/2019	ALS
<b>Total Alkalinity as CaCO<sub>3</sub></b>					
Alkalinity, total (as CaCO <sub>3</sub> )	334.00	mg/L		8/26/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		8/26/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		8/26/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.06	mg/L		8/26/2019	ALS

**Sample No.** 226830  
**Sample Description:** SWQ25-1  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	72.5	mg/L		8/26/2019	ALS
Dissolved Organic Carbon	24.9	mg/L		8/26/2019	ALS
Total Dissolved Carbon	97.3	mg/L		8/26/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	43.900	mg/L		8/26/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by QT97	88	MPN/100mL		8/26/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by QT97	46	MPN/100mL		8/26/2019	ALS
Total Coliforms by QT97	>2420	MPN/100mL		8/26/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		8/26/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	29.10	mg/L		8/26/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	32.0	mg/L		3/5/2020	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	11	mg/L		8/8/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	<0.0010	mg/L		3/4/2020	ALS

**Sample No.** 226830  
**Sample Description:** SWQ25-1  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0034	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000300	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00669	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0615	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0610	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	<0.000005	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	63.3000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00018	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00073	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00020	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	347.1	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.3530	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000051	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0691	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	45.9000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.1970	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.000452	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00276	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.292	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	12.6000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0010	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000171	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	8.2500	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	32.5000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.2760	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	10.2000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00102	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00045	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.000686	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00207	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00056	mg/L		3/4/2020	ALS

**Sample No.** 226830  
**Sample Description:** SWQ25-1  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration  
Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
COD by Closed Reflux Method

Conductivity by Electrometric Method  
Hardness, Calcium & Total by Calculation  
pH in Laboratory by Electrometric Method  
Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

#### Reference Method

Modified from SM 2320 B. Titration Method  
Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
Modified from SM 5210 B. 5-Day BOD Test  
Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
Modified from EPA Methods 200.8  
Modified from SM 4500 H+B (Electrometric Method)  
Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 B. Total Solids Dried at 103-105°C  
Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

### Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.



- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

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## Certificate of Analysis for Sample No. 226831 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 226831  
**Sample Description:** SWQ25-12  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	515 ± 0.04	mg/L		8/1/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		8/1/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		8/1/2019	COW_ASB
Alkalinity, total to pH 4.5	515 ± 0.028	mg/L		8/1/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		8/1/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.241 ± 0.165	mg/L		8/8/2019	COW_ASB
Nitrate+Nitrite Nitrogen	<0.003 ± 0.078	mg/L		8/8/2019	COW_ASB
Phosphorus, dissolved (0.45um)	0.456 ± 0.075	mg/L		8/8/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	222 ± 0.06	mg/L		3/5/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	61 ± 0.17	mg/L		3/5/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	176 ± 0.068	mg/L		8/7/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	1920 ± 0.023	uS		8/2/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	297 ± 0.065	mg/L		12/10/2019	COW_ASB
Total Hardness, calculated in water	914	mg/L		12/10/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.33 ± 0.065	units		7/31/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	5530 ± 0.062	mg/L		8/3/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	3.9	mg/L		8/10/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	32.0 ± 0.085	mg/L		8/2/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	3.9 ± 0.15	mg/L		8/2/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	54.9 ± 0.085	mg/L		8/2/2019	COW_ASB

**Sample No.** 226831  
**Sample Description:** SWQ25-12  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		11/18/2019	COW_ASB
Arsenic (As), total in water	<0.000017 ± 0.042	mg/L		11/18/2019	COW_ASB
Barium (Ba), total in water	0.15179 ± 0.057	mg/L		11/18/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		11/18/2019	COW_ASB
Boron (B), total in water	<0.00208 ± 0.19	mg/L		11/18/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		11/18/2019	COW_ASB
Calcium (Ca), total in water	118.97 ± 0.071	mg/L		11/18/2019	COW_ASB
Chromium (Cr), total in water	<0.00004 ± 0.044	mg/L		11/18/2019	COW_ASB
Copper (Cu), total in water	0.007573 ± 0.035	mg/L		11/18/2019	COW_ASB
Iron (Fe), total in water	3.0798 ± 0.043	mg/L		11/18/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		11/18/2019	COW_ASB
Magnesium (Mg), total in water	149.71 ± 0.04	mg/L		11/18/2019	COW_ASB
Manganese (Mn), total in water	1.3813 ± 0.041	mg/L		11/18/2019	COW_ASB
Nickel (Ni), total in water	0.012651 ± 0.046	mg/L		11/18/2019	COW_ASB
Phosphorus (P), total in water	0.3025 ± 0.033	mg/L		11/18/2019	COW_ASB
Potassium (K), total in water	16.466 ± 0.1	mg/L		11/18/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		11/18/2019	COW_ASB
Sodium (Na), total in water	180.62 ± 0.082	mg/L		11/18/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		11/18/2019	COW_ASB
Zinc (Zn), total in water	0.09575 ± 0.049	mg/L		11/18/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	148.00 ± 0.076	NTU		7/31/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	520.00	mg/L		8/26/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	426.00	mg/L		8/26/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		8/26/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		8/26/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.33	mg/L		8/26/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	91.9	mg/L		8/26/2019	ALS
Dissolved Organic Carbon	26.2	mg/L		8/26/2019	ALS
Total Dissolved Carbon	118.0	mg/L		8/26/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	205.000	mg/L		8/26/2019	ALS

**Sample No.** 226831  
**Sample Description:** SWQ25-12  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		8/26/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	243.00	mg/L		8/26/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	317	mg/L		3/5/2020	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid, calculated	532 ± 0.084	mg/L		8/3/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids	5000 ± 8.40%	mg/L		8/3/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	28	mg/L		8/8/2019	ALS
<b>Total and E. coli, 1:10 dilution by QT97</b>					
Escherichia Coliform by QT97	170	MPN/100mL		8/26/2019	ALS
Total Coliforms by QT97	>24200	MPN/100mL		8/26/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	260	MPN/100mL		8/26/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	<0.0010	mg/L		3/4/2020	ALS

**Sample No.** 226831  
**Sample Description:** SWQ25-12  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0063	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000200	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00383	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0954	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0100	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	<0.000005	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	83.5000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00028	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00052	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	617.8	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.3030	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.1320	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	99.4000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.5850	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.000241	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00180	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.178	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	12.6000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0014	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000202	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	8.3200	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	116.0000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.5530	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	67.8000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00032	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00061	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.002760	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00169	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0012	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00071	mg/L		3/4/2020	ALS

**Sample No.** 226831  
**Sample Description:** SWQ25-12  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration  
Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
COD by Closed Reflux Method

Conductivity by Electrometric Method  
Hardness, Calcium & Total by Calculation  
pH in Laboratory by Electrometric Method  
Total Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

Dissolved Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Reference Method

Modified from SM 2320 B. Titration Method  
Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
Modified from SM 5210 B. 5-Day BOD Test  
Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
Modified from EPA Methods 200.8  
Modified from SM 4500 H+B (Electrometric Method)  
Modified from SM 2540 B. Total Solids Dried at 103-105°C  
Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

### Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
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- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

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## Certificate of Analysis for Sample No. 226832 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

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Analytical Services Branch Head

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The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 226832  
**Sample Description:** SWQ25-2  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	865 ± 0.04	mg/L		8/1/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		8/1/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		8/1/2019	COW_ASB
Alkalinity, total to pH 4.5	865 ± 0.028	mg/L		8/1/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		8/1/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.037 ± 0.165	mg/L		8/8/2019	COW_ASB
Nitrate+Nitrite Nitrogen	<0.003 ± 0.078	mg/L		8/8/2019	COW_ASB
Phosphorus, dissolved (0.45um)	1.35 ± 0.075	mg/L		8/8/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	900 ± 0.06	mg/L		3/5/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	<4 ± 0.17	mg/L		3/5/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	320 ± 0.068	mg/L		8/7/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	4160 ± 0.023	uS		8/2/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	269 ± 0.065	mg/L		12/10/2019	COW_ASB
Total Hardness, calculated in water	1410	mg/L		12/10/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	8.11 ± 0.065	units		7/31/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	2780 ± 0.065	mg/L		8/7/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	3050 ± 0.062	mg/L		8/3/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	267 ± 8.40%	mg/L		8/7/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	10	mg/L		8/10/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	94.3 ± 0.085	mg/L		8/23/2019	COW_ASB

**Sample No.** 226832  
**Sample Description:** SWQ25-2  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	10.0 ± 0.15	mg/L		8/2/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	97.1 ± 0.085	mg/L		8/23/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		11/18/2019	COW_ASB
Arsenic (As), total in water	0.013987 ± 0.042	mg/L		11/18/2019	COW_ASB
Barium (Ba), total in water	0.18460 ± 0.057	mg/L		11/18/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		11/18/2019	COW_ASB
Boron (B), total in water	1.2628 ± 0.19	mg/L		11/18/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		11/18/2019	COW_ASB
Calcium (Ca), total in water	107.56 ± 0.071	mg/L		11/18/2019	COW_ASB
Chromium (Cr), total in water	0.01530 ± 0.044	mg/L		11/18/2019	COW_ASB
Copper (Cu), total in water	1.7431 ± 0.035	mg/L		11/18/2019	COW_ASB
Iron (Fe), total in water	0.86674 ± 0.043	mg/L		11/18/2019	COW_ASB
Lead (Pb), total in water	0.019950 ± 0.042	mg/L		11/18/2019	COW_ASB
Magnesium (Mg), total in water	277.57 ± 0.04	mg/L		11/18/2019	COW_ASB
Manganese (Mn), total in water	0.16781 ± 0.041	mg/L		11/18/2019	COW_ASB
Nickel (Ni), total in water	0.11389 ± 0.046	mg/L		11/18/2019	COW_ASB
Phosphorus (P), total in water	2.3664 ± 0.033	mg/L		11/18/2019	COW_ASB
Potassium (K), total in water	175.45 ± 0.1	mg/L		11/18/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		11/18/2019	COW_ASB
Sodium (Na), total in water	497.74 ± 0.082	mg/L		11/18/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		11/18/2019	COW_ASB
Zinc (Zn), total in water	9.9088 ± 0.049	mg/L		11/18/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	2.78 ± 0.076	NTU		7/31/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	1020.00	mg/L		8/26/2019	ALS
<b>Total Alkalinity as CaCO<sub>3</sub></b>					
Alkalinity, total (as CaCO <sub>3</sub> )	839.00	mg/L		8/26/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		8/26/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		8/26/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.13	mg/L		8/26/2019	ALS

**Sample No.** 226832  
**Sample Description:** SWQ25-2  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	188.0	mg/L		8/26/2019	ALS
Dissolved Organic Carbon	125.0	mg/L		8/26/2019	ALS
Total Dissolved Carbon	313.0	mg/L		8/26/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	768.000	mg/L		8/26/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by QT97	1410	MPN/100mL		8/26/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by QT97	1300	MPN/100mL		8/26/2019	ALS
Total Coliforms by QT97	>2420	MPN/100mL		8/26/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		8/26/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	263.00	mg/L		8/26/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	313	mg/L		3/5/2020	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	2	mg/L		8/8/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	0.0030	mg/L		3/4/2020	ALS

**Sample No.** 226832  
**Sample Description:** SWQ25-2  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0043	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000690	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.02920	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.1680	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	1.4200	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000010	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	89.5000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00131	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00187	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00106	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	1257.1	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0890	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.2570	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	251.0000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.1350	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.004710	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.05620	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	1.600	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	153.0000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0053	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000541	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	3.2100	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	0.000020	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	389.0000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.9400	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	90.7000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00083	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00038	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	0.00033	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.005130	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00391	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0020	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00132	mg/L		3/4/2020	ALS

**Sample No.** 226832  
**Sample Description:** SWQ25-2  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration  
Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
COD by Closed Reflux Method

Conductivity by Electrometric Method  
Hardness, Calcium & Total by Calculation  
pH in Laboratory by Electrometric Method  
Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Reference Method

Modified from SM 2320 B. Titration Method  
Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
Modified from SM 5210 B. 5-Day BOD Test  
Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
Modified from EPA Methods 200.8  
Modified from SM 4500 H+B (Electrometric Method)  
Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 B. Total Solids Dried at 103-105°C  
Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

### Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.



- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

1120 Waverley Street

Winnipeg MB R3E 3S8

Phone : 204-986-2384

Email : ckozak@winnipeg.ca

## Certificate of Analysis for Sample No. 226833 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 226833  
**Sample Description:** SWQ25-16  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	743 ± 0.04	mg/L		8/1/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		8/1/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		8/1/2019	COW_ASB
Alkalinity, total to pH 4.5	743 ± 0.028	mg/L		8/1/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		8/1/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	<0.003 ± 0.165	mg/L		8/8/2019	COW_ASB
Nitrate+Nitrite Nitrogen	<0.003 ± 0.078	mg/L		8/8/2019	COW_ASB
Phosphorus, dissolved (0.45um)	0.243 ± 0.075	mg/L		8/8/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	249 ± 0.06	mg/L		3/5/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	15 ± 0.17	mg/L		3/5/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	193 ± 0.068	mg/L		8/7/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	1850 ± 0.023	uS		8/2/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	291 ± 0.065	mg/L		12/10/2019	COW_ASB
Total Hardness, calculated in water	743	mg/L		12/10/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.33 ± 0.065	units		7/31/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	1290 ± 0.065	mg/L		8/7/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	1770 ± 0.062	mg/L		8/3/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	481 ± 8.40%	mg/L		8/7/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	3.8	mg/L		8/10/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	53.9 ± 0.085	mg/L		8/2/2019	COW_ASB

**Sample No.** 226833  
**Sample Description:** SWQ25-16  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	3.8 ± 0.15	mg/L		8/2/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	58.5 ± 0.085	mg/L		8/2/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		11/18/2019	COW_ASB
Arsenic (As), total in water	<0.000017 ± 0.042	mg/L		11/18/2019	COW_ASB
Barium (Ba), total in water	0.14590 ± 0.057	mg/L		11/18/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		11/18/2019	COW_ASB
Boron (B), total in water	0.04629 ± 0.19	mg/L		11/18/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		11/18/2019	COW_ASB
Calcium (Ca), total in water	116.64 ± 0.071	mg/L		11/18/2019	COW_ASB
Chromium (Cr), total in water	<0.00004 ± 0.044	mg/L		11/18/2019	COW_ASB
Copper (Cu), total in water	0.40132 ± 0.035	mg/L		11/18/2019	COW_ASB
Iron (Fe), total in water	1.0550 ± 0.043	mg/L		11/18/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		11/18/2019	COW_ASB
Magnesium (Mg), total in water	109.64 ± 0.04	mg/L		11/18/2019	COW_ASB
Manganese (Mn), total in water	0.49106 ± 0.041	mg/L		11/18/2019	COW_ASB
Nickel (Ni), total in water	0.025511 ± 0.046	mg/L		11/18/2019	COW_ASB
Phosphorus (P), total in water	<0.0012 ± 0.033	mg/L		11/18/2019	COW_ASB
Potassium (K), total in water	24.495 ± 0.1	mg/L		11/18/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		11/18/2019	COW_ASB
Sodium (Na), total in water	185.59 ± 0.082	mg/L		11/18/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		11/18/2019	COW_ASB
Zinc (Zn), total in water	2.2791 ± 0.049	mg/L		11/18/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	74.70 ± 0.076	NTU		7/31/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	449.00	mg/L		8/26/2019	ALS
<b>Total Alkalinity as CaCO<sub>3</sub></b>					
Alkalinity, total (as CaCO <sub>3</sub> )	368.00	mg/L		8/26/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		8/26/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		8/26/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.12	mg/L		8/26/2019	ALS

**Sample No.** 226833  
**Sample Description:** SWQ25-16  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	77.9	mg/L		8/26/2019	ALS
Dissolved Organic Carbon	47.3	mg/L		8/26/2019	ALS
Total Dissolved Carbon	125.0	mg/L		8/26/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	251.000	mg/L		8/26/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		8/26/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	312.00	mg/L		8/26/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	380	mg/L		3/5/2020	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	13	mg/L		8/8/2019	ALS
<b>Total and E. coli, 1:10 dilution by QT97</b>					
Escherichia Coliform by QT97	3650	MPN/100mL		8/26/2019	ALS
Total Coliforms by QT97	>24200	MPN/100mL		8/26/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	3260	MPN/100mL		8/26/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	0.0011	mg/L		3/4/2020	ALS

**Sample No.** 226833  
**Sample Description:** SWQ25-16  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0032	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000510	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00586	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.1410	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.5410	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000025	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	103.0000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00061	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00110	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00106	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	669.0	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.3270	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000126	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.1100	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	100.0000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.5920	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.000857	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.01080	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.626	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	22.5000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0018	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000403	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	17.8000	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	148.0000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.5480	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	95.9000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00124	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00069	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.001890	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00194	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0028	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00047	mg/L		3/4/2020	ALS

**Sample No.** 226833  
**Sample Description:** SWQ25-16  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration  
Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
COD by Closed Reflux Method

Conductivity by Electrometric Method  
Hardness, Calcium & Total by Calculation  
pH in Laboratory by Electrometric Method  
Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

#### Reference Method

Modified from SM 2320 B. Titration Method  
Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
Modified from SM 5210 B. 5-Day BOD Test  
Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
Modified from EPA Methods 200.8  
Modified from SM 4500 H+B (Electrometric Method)  
Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 B. Total Solids Dried at 103-105°C  
Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

### Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.



- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----



Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

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## Certificate of Analysis for Sample No. 226834 v1

Date Authorised: March 5, 2020

Total Number of Pages: 7

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 226834  
**Sample Description:** SWQ25-6  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample  
**Sample Comments:** ABSDN

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	2910 ± 0.04	mg/L		8/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		8/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		8/2/2019	COW_ASB
Alkalinity, total to pH 4.5	2910 ± 0.028	mg/L		8/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		8/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	NALE			3/5/2020	COW_ASB
Nitrate+Nitrite Nitrogen	NALE			3/5/2020	COW_ASB
Phosphorus, dissolved (0.45um)	NALE			3/5/2020	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	1490 ± 0.06	mg/L		3/5/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	2140 ± 0.17	mg/L		3/5/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	4790 ± 0.068	mg/L		8/7/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	8940 ± 0.023	uS		8/2/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	553 ± 0.065	mg/L		12/10/2019	COW_ASB
Total Hardness, calculated in water	2520	mg/L		12/10/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.87 ± 0.065	units		8/2/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	9450 ± 0.062	mg/L		8/3/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	NALE			2/10/2020	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	914 ± 0.085	mg/L		8/8/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	267 ± 0.15	mg/L		8/13/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	1465 ± 0.085	mg/L		8/8/2019	COW_ASB

**Sample No.** 226834  
**Sample Description:** SWQ25-6  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample  
**Sample Comments:** ABSDN

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		11/18/2019	COW_ASB
Arsenic (As), total in water	0.017969 ± 0.042	mg/L		11/18/2019	COW_ASB
Barium (Ba), total in water	0.30329 ± 0.057	mg/L		11/18/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		11/18/2019	COW_ASB
Boron (B), total in water	12.858 ± 0.19	mg/L		11/18/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		11/18/2019	COW_ASB
Calcium (Ca), total in water	221.43 ± 0.071	mg/L		11/18/2019	COW_ASB
Chromium (Cr), total in water	0.12009 ± 0.044	mg/L		11/18/2019	COW_ASB
Copper (Cu), total in water	0.14502 ± 0.035	mg/L		11/18/2019	COW_ASB
Iron (Fe), total in water	11.143 ± 0.043	mg/L		11/18/2019	COW_ASB
Lead (Pb), total in water	0.004724 ± 0.042	mg/L		11/18/2019	COW_ASB
Magnesium (Mg), total in water	476.63 ± 0.04	mg/L		11/18/2019	COW_ASB
Manganese (Mn), total in water	0.72421 ± 0.041	mg/L		11/18/2019	COW_ASB
Nickel (Ni), total in water	0.38149 ± 0.046	mg/L		11/18/2019	COW_ASB
Phosphorus (P), total in water	11.168 ± 0.033	mg/L		11/18/2019	COW_ASB
Potassium (K), total in water	439.20 ± 0.1	mg/L		11/18/2019	COW_ASB
Selenium (Se), total in water	0.01242 ± 0.15	mg/L		11/18/2019	COW_ASB
Sodium (Na), total in water	1507.6 ± 0.082	mg/L		11/18/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		11/18/2019	COW_ASB
Zinc (Zn), total in water	0.86361 ± 0.049	mg/L		11/18/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	820.00 ± 0.076	NTU		8/2/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	3500.00	mg/L		8/26/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	2870.00	mg/L		8/26/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		8/26/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		8/26/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	183.00	mg/L		8/26/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	365.0	mg/L		8/26/2019	ALS
Dissolved Organic Carbon	1460.0	mg/L		8/26/2019	ALS
Total Dissolved Carbon	1820.0	mg/L		8/26/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	1690.000	mg/L		8/26/2019	ALS

**Sample No.** 226834  
**Sample Description:** SWQ25-6  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample  
**Sample Comments:** ABSDN

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000025	pg/L		8/26/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	<15.00	mg/L		8/26/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	<0.4	mg/L	ANXHT	3/5/2020	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids	3280 ± 8.40%	mg/L		8/3/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid, calculated	6180 ± 0.084	mg/L		8/3/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	2070	mg/L		8/9/2019	ALS
<b>Total and E. coli, 1:10 dilution by QT97</b>					
Escherichia Coliform by QT97	5480	MPN/100mL		8/26/2019	ALS
Total Coliforms by QT97	>24200	MPN/100mL		8/26/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	6130	MPN/100mL		8/26/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	0.00205	mg/L		3/4/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	0.0079	mg/L		3/4/2020	ALS
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0619	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.003620	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.02840	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.1550	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	0.00051	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	9.1500	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000019	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	117.0000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	0.000091	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.07590	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.01960	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00071	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	1906.4	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.4480	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000496	mg/L		3/4/2020	ALS

**Sample No.** 226834  
**Sample Description:** SWQ25-6  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample  
**Sample Comments:** ABSDN

Test Parameters	Result	Units	Comments	Completed	Lab #
Lithium (Li), dissolved in water	0.4620	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	392.0000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.1960	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.002310	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.22500	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.459	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	324.0000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0835	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.002040	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	26.4000	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	0.000112	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	1260.0000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	1.6600	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	24.3000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00304	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.03960	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	0.00192	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.001360	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.03010	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0026	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.02890	mg/L		3/4/2020	ALS

## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

## Glossary of Terms:

ABSDN : Abnormal sample, appears darker, discoloured or thicker than normal  
 ANXHT : Analyzed past holding time  
 NALE : Not analyzed, laboratory error  
 NALE : Not analyzed, laboratory error

**Accredited Test Methods Used:**

**Test Method**

Alkalinity by Titration  
 Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis  
 BOD5 Seeded by Automated Method  
 COD by Closed Reflux Method

Conductivity by Electrometric Method  
 Hardness, Calcium & Total by Calculation  
 pH in Laboratory by Electrometric Method  
 Total Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

Total Suspended Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

**Additional Test Methods Used:**

**Test Method**

Chloride by Mercuric Thiocyanate Method  
 Sulfate by HACH Method

**Reference Method**

Modified from SM 2320 B. Titration Method  
 Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
 Modified from SM 5210 B. 5-Day BOD Test  
 Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
 Modified from EPA Methods 200.8  
 Modified from SM 4500 H+B (Electrometric Method)  
 Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

**Reference Method**

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113  
 Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

**Laboratories:**

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4  
 COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

**Additional Comments:**

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

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## Certificate of Analysis for Sample No. 226835 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

This report is issued under the authority of:

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Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 226835  
**Sample Description:** SWQ25-7  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	266 ± 0.04	mg/L		8/2/2019	COW_ASB
Alkalinity, carbonate, calculated	46.1	mg/L		8/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		8/2/2019	COW_ASB
Alkalinity, total to pH 4.5	312 ± 0.028	mg/L		8/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	23.0 ± 0.028	mg/L		8/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.292 ± 0.165	mg/L		8/8/2019	COW_ASB
Nitrate+Nitrite Nitrogen	0.399 ± 0.078	mg/L		8/8/2019	COW_ASB
Phosphorus, dissolved (0.45um)	0.507 ± 0.075	mg/L		8/8/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	298 ± 0.06	mg/L		3/4/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	<4 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	179 ± 0.068	mg/L		8/8/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	2470 ± 0.023	uS		8/2/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	299 ± 0.065	mg/L		12/10/2019	COW_ASB
Total Hardness, calculated in water	1110	mg/L		12/10/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	8.77 ± 0.065	units		8/2/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	1830 ± 0.065	mg/L		8/7/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	2240 ± 0.062	mg/L		8/3/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	410 ± 8.40%	mg/L		8/7/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	56	mg/L		8/8/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	54.0 ± 0.085	mg/L		8/8/2019	COW_ASB

**Sample No.** 226835  
**Sample Description:** SWQ25-7  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	56.2 ± 0.15	mg/L		8/7/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		11/18/2019	COW_ASB
Arsenic (As), total in water	0.000552 ± 0.042	mg/L		11/18/2019	COW_ASB
Barium (Ba), total in water	0.055229 ± 0.057	mg/L		11/18/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		11/18/2019	COW_ASB
Boron (B), total in water	<0.00208 ± 0.19	mg/L		11/18/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		11/18/2019	COW_ASB
Calcium (Ca), total in water	119.70 ± 0.071	mg/L		11/18/2019	COW_ASB
Chromium (Cr), total in water	<0.00004 ± 0.044	mg/L		11/18/2019	COW_ASB
Copper (Cu), total in water	<0.000022 ± 0.035	mg/L		11/18/2019	COW_ASB
Iron (Fe), total in water	0.30472 ± 0.043	mg/L		11/18/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		11/18/2019	COW_ASB
Magnesium (Mg), total in water	197.57 ± 0.04	mg/L		11/18/2019	COW_ASB
Manganese (Mn), total in water	0.14583 ± 0.041	mg/L		11/18/2019	COW_ASB
Nickel (Ni), total in water	0.017891 ± 0.046	mg/L		11/18/2019	COW_ASB
Phosphorus (P), total in water	<0.0012 ± 0.033	mg/L		11/18/2019	COW_ASB
Potassium (K), total in water	70.826 ± 0.1	mg/L		11/18/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		11/18/2019	COW_ASB
Sodium (Na), total in water	211.26 ± 0.082	mg/L		11/18/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		11/18/2019	COW_ASB
Zinc (Zn), total in water	0.02954 ± 0.049	mg/L		11/18/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	6.79 ± 0.076	NTU		8/2/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	301.00	mg/L		8/26/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	300.00	mg/L		8/26/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	32.20	mg/L		8/26/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		8/26/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.25	mg/L		8/26/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	63.2	mg/L		8/26/2019	ALS
Dissolved Organic Carbon	57.0	mg/L		8/26/2019	ALS
Total Dissolved Carbon	120.0	mg/L		8/26/2019	ALS

**Sample No.** 226835  
**Sample Description:** SWQ25-7  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	362.000	mg/L		8/26/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by QT97	397	MPN/100mL		8/26/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by QT97	488	MPN/100mL		8/26/2019	ALS
Total Coliforms by QT97	>2420	MPN/100mL		8/26/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		8/26/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	621.00	mg/L		8/26/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	582	mg/L		3/4/2020	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	58.5 ± 0.085	mg/L		8/8/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	<2	mg/L		8/9/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	0.0020	mg/L		3/4/2020	ALS

**Sample No.** 226835  
**Sample Description:** SWQ25-7  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0170	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000710	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.01360	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0554	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.1360	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	<0.000005	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	103.0000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00020	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00104	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00160	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	1031.4	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0370	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000091	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.1640	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	188.0000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0757	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.005740	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.01020	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.627	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	61.7000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0043	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000361	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	1.2100	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	169.0000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.8010	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	201.0000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00037	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00104	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	0.00013	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.004370	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00410	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0013	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00057	mg/L		3/4/2020	ALS

**Sample No.** 226835  
**Sample Description:** SWQ25-7  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration  
Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
COD by Closed Reflux Method

Conductivity by Electrometric Method  
Hardness, Calcium & Total by Calculation  
pH in Laboratory by Electrometric Method  
Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

Total Organic Carbon by High Temperature Combustion

#### Reference Method

Modified from SM 2320 B. Titration Method  
Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
Modified from SM 5210 B. 5-Day BOD Test  
Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
Modified from EPA Methods 200.8  
Modified from SM 4500 H+B (Electrometric Method)  
Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 B. Total Solids Dried at 103-105°C  
Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

Modified from SM 5310 B. High Temperature Combustion

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

### Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.

- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

1120 Waverley Street

Winnipeg MB R3E 3S8

Phone : 204-986-2384

Email : ckozak@winnipeg.ca

## Certificate of Analysis for Sample No. 226836 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 226836  
**Sample Description:** SWQ25-8  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	660 ± 0.04	mg/L		8/2/2019	COW_ASB
Alkalinity, carbonate, calculated	41.7	mg/L		8/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		8/2/2019	COW_ASB
Alkalinity, total to pH 4.5	701 ± 0.028	mg/L		8/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	20.8 ± 0.028	mg/L		8/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.885 ± 0.165	mg/L		8/8/2019	COW_ASB
Nitrate+Nitrite Nitrogen	0.231 ± 0.078	mg/L		8/8/2019	COW_ASB
Phosphorus, dissolved (0.45um)	2.75 ± 0.075	mg/L		8/8/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	500 ± 0.06	mg/L		3/5/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	9 ± 0.17	mg/L		3/4/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	428 ± 0.068	mg/L		8/8/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	3300 ± 0.023	uS		8/2/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	360 ± 0.065	mg/L		12/10/2019	COW_ASB
Total Hardness, calculated in water	1060	mg/L		12/10/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	8.43 ± 0.065	units		8/2/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	2420 ± 0.065	mg/L		8/7/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	2630 ± 0.062	mg/L		8/3/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	204 ± 8.40%	mg/L		8/7/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	16	mg/L		8/8/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	158 ± 0.085	mg/L		8/8/2019	COW_ASB

**Sample No.** 226836  
**Sample Description:** SWQ25-8  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	16.3 ± 0.15	mg/L		8/7/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	162.4 ± 0.085	mg/L		8/8/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		11/18/2019	COW_ASB
Arsenic (As), total in water	0.007905 ± 0.042	mg/L		11/18/2019	COW_ASB
Barium (Ba), total in water	0.096013 ± 0.057	mg/L		11/18/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		11/18/2019	COW_ASB
Boron (B), total in water	0.04134 ± 0.19	mg/L		11/18/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		11/18/2019	COW_ASB
Calcium (Ca), total in water	144.20 ± 0.071	mg/L		11/18/2019	COW_ASB
Chromium (Cr), total in water	<0.00004 ± 0.044	mg/L		11/18/2019	COW_ASB
Copper (Cu), total in water	0.008567 ± 0.035	mg/L		11/18/2019	COW_ASB
Iron (Fe), total in water	0.83882 ± 0.043	mg/L		11/18/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		11/18/2019	COW_ASB
Magnesium (Mg), total in water	169.81 ± 0.04	mg/L		11/18/2019	COW_ASB
Manganese (Mn), total in water	0.55454 ± 0.041	mg/L		11/18/2019	COW_ASB
Nickel (Ni), total in water	0.057408 ± 0.046	mg/L		11/18/2019	COW_ASB
Phosphorus (P), total in water	3.5907 ± 0.033	mg/L		11/18/2019	COW_ASB
Potassium (K), total in water	504.82 ± 0.1	mg/L		11/18/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		11/18/2019	COW_ASB
Sodium (Na), total in water	138.77 ± 0.082	mg/L		11/18/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		11/18/2019	COW_ASB
Zinc (Zn), total in water	0.04238 ± 0.049	mg/L		11/18/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	14.60 ± 0.076	NTU		8/2/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	790.00	mg/L		8/26/2019	ALS
<b>Total Alkalinity as CaCO<sub>3</sub></b>					
Alkalinity, total (as CaCO <sub>3</sub> )	686.00	mg/L		8/26/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	23.40	mg/L		8/26/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		8/26/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	1.06	mg/L		8/26/2019	ALS

**Sample No.** 226836  
**Sample Description:** SWQ25-8  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	135.0	mg/L		8/26/2019	ALS
Dissolved Organic Carbon	153.0	mg/L		8/26/2019	ALS
Total Dissolved Carbon	288.0	mg/L		8/26/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	478.000	mg/L		8/26/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000025	pg/L		8/26/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	350.00	mg/L		8/26/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	412	mg/L		3/5/2020	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	<6	mg/L		8/9/2019	ALS
<b>Total and E. coli, 1:10 dilution by QT97</b>					
Escherichia Coliform by QT97	1470	MPN/100mL		8/26/2019	ALS
Total Coliforms by QT97	>24200	MPN/100mL		8/26/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	1870	MPN/100mL		8/26/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	0.0063	mg/L		3/4/2020	ALS

**Sample No.** 226836  
**Sample Description:** SWQ25-8  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
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Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0051	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000790	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.02320	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0859	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.7200	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000022	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	133.0000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	0.000020	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00097	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00488	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00716	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	1011.6	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.1570	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000414	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.2050	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	165.0000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.4920	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.007600	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.03880	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	3.560	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	430.0000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0317	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.001130	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	10.0000	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	0.000026	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	111.0000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.8450	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	122.0000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00062	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00298	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	0.00029	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.006680	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.01250	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0053	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00515	mg/L		3/4/2020	ALS

**Sample No.** 226836  
**Sample Description:** SWQ25-8  
**Sample Date:** July 31, 2019  
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**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration  
Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
COD by Closed Reflux Method

Conductivity by Electrometric Method  
Hardness, Calcium & Total by Calculation  
pH in Laboratory by Electrometric Method  
Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

#### Reference Method

Modified from SM 2320 B. Titration Method  
Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
Modified from SM 5210 B. 5-Day BOD Test  
Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
Modified from EPA Methods 200.8  
Modified from SM 4500 H+B (Electrometric Method)  
Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C  
Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Additional Comments:

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- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.

- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division  
1120 Waverley Street  
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## Certificate of Analysis for Sample No. 226837 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

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The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 226837  
**Sample Description:** SWQ25-9A  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	205 ± 0.04	mg/L		8/2/2019	COW_ASB
Alkalinity, carbonate, calculated	30.0	mg/L		8/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		8/2/2019	COW_ASB
Alkalinity, total to pH 4.5	235 ± 0.028	mg/L		8/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	15.0 ± 0.028	mg/L		8/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	<0.003 ± 0.165	mg/L		8/8/2019	COW_ASB
Nitrate+Nitrite Nitrogen	<0.003 ± 0.078	mg/L		8/8/2019	COW_ASB
Phosphorus, dissolved (0.45um)	0.986 ± 0.075	mg/L		8/8/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	100 ± 0.06	mg/L		3/5/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	10 ± 0.17	mg/L		3/5/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	82.0 ± 0.068	mg/L		8/8/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	926 ± 0.023	uS		8/2/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	162 ± 0.065	mg/L		11/27/2019	COW_ASB
Total Hardness, calculated in water	459	mg/L		11/27/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	8.96 ± 0.065	units		8/2/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	578 ± 0.065	mg/L		8/7/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	806 ± 0.062	mg/L		8/3/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	228 ± 8.40%	mg/L		8/7/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	1.7	mg/L		8/8/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	20.9 ± 0.085	mg/L		8/8/2019	COW_ASB

**Sample No.** 226837  
**Sample Description:** SWQ25-9A  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	1.8 ± 0.15	mg/L		8/7/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	21.2 ± 0.085	mg/L		8/8/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		11/18/2019	COW_ASB
Arsenic (As), total in water	0.004061 ± 0.042	mg/L		11/18/2019	COW_ASB
Barium (Ba), total in water	0.088329 ± 0.057	mg/L		11/18/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		11/18/2019	COW_ASB
Boron (B), total in water	<0.00208 ± 0.19	mg/L		11/18/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		11/18/2019	COW_ASB
Calcium (Ca), total in water	64.826 ± 0.071	mg/L		11/18/2019	COW_ASB
Chromium (Cr), total in water	<0.00004 ± 0.044	mg/L		11/18/2019	COW_ASB
Copper (Cu), total in water	0.007468 ± 0.035	mg/L		11/18/2019	COW_ASB
Iron (Fe), total in water	2.1317 ± 0.043	mg/L		11/18/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		11/18/2019	COW_ASB
Magnesium (Mg), total in water	72.098 ± 0.04	mg/L		11/18/2019	COW_ASB
Manganese (Mn), total in water	0.23333 ± 0.041	mg/L		11/18/2019	COW_ASB
Nickel (Ni), total in water	0.014922 ± 0.046	mg/L		11/18/2019	COW_ASB
Phosphorus (P), total in water	0.1594 ± 0.033	mg/L		11/18/2019	COW_ASB
Potassium (K), total in water	22.807 ± 0.1	mg/L		11/18/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		11/18/2019	COW_ASB
Sodium (Na), total in water	63.107 ± 0.082	mg/L		11/18/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		11/18/2019	COW_ASB
Zinc (Zn), total in water	0.02541 ± 0.049	mg/L		11/18/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	63.80 ± 0.076	NTU		8/2/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	251.00	mg/L		8/26/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	244.00	mg/L		8/26/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	22.90	mg/L		8/26/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		8/26/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.06	mg/L		8/26/2019	ALS

**Sample No.** 226837  
**Sample Description:** SWQ25-9A  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	51.7	mg/L		8/26/2019	ALS
Dissolved Organic Carbon	17.5	mg/L		8/26/2019	ALS
Total Dissolved Carbon	69.2	mg/L		8/26/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	114.000	mg/L		8/26/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by QT97	225	MPN/100mL		8/26/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by QT97	365	MPN/100mL		8/26/2019	ALS
Total Coliforms by QT97	>2420	MPN/100mL		8/26/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		8/26/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	72.80	mg/L		8/26/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	73.0	mg/L		3/5/2020	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	8	mg/L		8/9/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	<0.0010	mg/L		3/4/2020	ALS

**Sample No.** 226837  
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Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0079	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000480	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.01550	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0666	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	0.000085	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0970	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000005	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	53.5000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00057	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00187	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	345.3	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	<0.0100	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000063	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0896	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	51.4000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0015	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.003530	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00507	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.413	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	17.1000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0011	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000304	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	8.9400	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	45.9000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.3110	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	24.1000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00157	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.002310	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00615	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00025	mg/L		3/4/2020	ALS

**Sample No.** 226837  
**Sample Description:** SWQ25-9A  
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Test Parameters	Result	Units	Comments	Completed	Lab #
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## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration  
Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
COD by Closed Reflux Method

Conductivity by Electrometric Method  
Hardness, Calcium & Total by Calculation  
pH in Laboratory by Electrometric Method  
Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

#### Reference Method

Modified from SM 2320 B. Titration Method  
Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
Modified from SM 5210 B. 5-Day BOD Test  
Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
Modified from EPA Methods 200.8  
Modified from SM 4500 H+B (Electrometric Method)  
Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C  
Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

#### Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.

- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

1120 Waverley Street

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## Certificate of Analysis for Sample No. 226838 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

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**Re-Issue Comments**

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**Sample No.** 226838  
**Sample Description:** SWQ25-9B  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	207 ± 0.04	mg/L		8/2/2019	COW_ASB
Alkalinity, carbonate, calculated	35.1	mg/L		8/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		8/2/2019	COW_ASB
Alkalinity, total to pH 4.5	242 ± 0.028	mg/L		8/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	17.6 ± 0.028	mg/L		8/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.028 ± 0.165	mg/L		8/8/2019	COW_ASB
Nitrate+Nitrite Nitrogen	<0.003 ± 0.078	mg/L		8/8/2019	COW_ASB
Phosphorus, dissolved (0.45um)	0.181 ± 0.075	mg/L		8/8/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	82.0 ± 0.06	mg/L		3/5/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	14 ± 0.17	mg/L		3/5/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	103 ± 0.068	mg/L		8/8/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	761 ± 0.023	uS		8/2/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	115 ± 0.065	mg/L		12/10/2019	COW_ASB
Total Hardness, calculated in water	352	mg/L		12/10/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	8.93 ± 0.065	units		8/2/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	497 ± 0.065	mg/L		8/7/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	794 ± 0.062	mg/L		8/3/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	297 ± 8.40%	mg/L		8/7/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	1.8	mg/L		8/10/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	19.2 ± 0.085	mg/L		8/8/2019	COW_ASB

**Sample No.** 226838  
**Sample Description:** SWQ25-9B  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	1.8 ± 0.15	mg/L		8/7/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	19.6 ± 0.085	mg/L		8/8/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		11/18/2019	COW_ASB
Arsenic (As), total in water	0.002416 ± 0.042	mg/L		11/18/2019	COW_ASB
Barium (Ba), total in water	0.11423 ± 0.057	mg/L		11/18/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		11/18/2019	COW_ASB
Boron (B), total in water	<0.00208 ± 0.19	mg/L		11/18/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		11/18/2019	COW_ASB
Calcium (Ca), total in water	46.096 ± 0.071	mg/L		11/18/2019	COW_ASB
Chromium (Cr), total in water	<0.00004 ± 0.044	mg/L		11/18/2019	COW_ASB
Copper (Cu), total in water	0.001784 ± 0.035	mg/L		11/18/2019	COW_ASB
Iron (Fe), total in water	3.1113 ± 0.043	mg/L		11/18/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		11/18/2019	COW_ASB
Magnesium (Mg), total in water	57.607 ± 0.04	mg/L		11/18/2019	COW_ASB
Manganese (Mn), total in water	0.29916 ± 0.041	mg/L		11/18/2019	COW_ASB
Nickel (Ni), total in water	0.038096 ± 0.046	mg/L		11/18/2019	COW_ASB
Phosphorus (P), total in water	0.0605 ± 0.033	mg/L		11/18/2019	COW_ASB
Potassium (K), total in water	21.301 ± 0.1	mg/L		11/18/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		11/18/2019	COW_ASB
Sodium (Na), total in water	49.238 ± 0.082	mg/L		11/18/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		11/18/2019	COW_ASB
Zinc (Zn), total in water	0.03628 ± 0.049	mg/L		11/18/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	89.60 ± 0.076	NTU		8/2/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	245.00	mg/L		8/26/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	235.00	mg/L		8/26/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	20.50	mg/L		8/26/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		8/26/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.19	mg/L		8/26/2019	ALS

**Sample No.** 226838  
**Sample Description:** SWQ25-9B  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	51.2	mg/L		8/26/2019	ALS
Dissolved Organic Carbon	17.9	mg/L		8/26/2019	ALS
Total Dissolved Carbon	69.0	mg/L		8/26/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	88.700	mg/L		8/26/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by QT97	816	MPN/100mL		8/26/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by QT97	921	MPN/100mL		8/26/2019	ALS
Total Coliforms by QT97	>2420	MPN/100mL		8/26/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		8/26/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	38.70	mg/L		8/26/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	42.2	mg/L		3/5/2020	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	13	mg/L		8/9/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	<0.0010	mg/L		3/4/2020	ALS

**Sample No.** 226838  
**Sample Description:** SWQ25-9B  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0381	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000400	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.01520	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0701	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0720	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	<0.000005	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	38.5000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	0.000014	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00012	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00054	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00074	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	280.2	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0280	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000063	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0687	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	44.7000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0066	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.003270	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00430	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.251	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	17.3000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0011	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000202	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	8.9200	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	39.5000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.2690	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	13.9000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00015	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00154	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.001970	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00656	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0011	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00022	mg/L		3/4/2020	ALS

**Sample No.** 226838  
**Sample Description:** SWQ25-9B  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration  
Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
COD by Closed Reflux Method

Conductivity by Electrometric Method  
Hardness, Calcium & Total by Calculation  
pH in Laboratory by Electrometric Method  
Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

#### Reference Method

Modified from SM 2320 B. Titration Method  
Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
Modified from SM 5210 B. 5-Day BOD Test  
Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
Modified from EPA Methods 200.8  
Modified from SM 4500 H+B (Electrometric Method)  
Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 B. Total Solids Dried at 103-105°C  
Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

### Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.

- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

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## Certificate of Analysis for Sample No. 226839 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

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**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 226839  
**Sample Description:** SWQ25-11A  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	677 ± 0.04	mg/L		8/2/2019	COW_ASB
Alkalinity, carbonate, calculated	108	mg/L		8/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		8/2/2019	COW_ASB
Alkalinity, total to pH 4.5	784 ± 0.028	mg/L		8/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	53.8 ± 0.028	mg/L		8/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	1.10 ± 0.165	mg/L		8/8/2019	COW_ASB
Nitrate+Nitrite Nitrogen	0.758 ± 0.078	mg/L		8/8/2019	COW_ASB
Phosphorus, dissolved (0.45um)	1.41 ± 0.075	mg/L		8/8/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	680 ± 0.06	mg/L		3/5/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	18 ± 0.17	mg/L		3/5/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	359 ± 0.068	mg/L		8/7/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	4020 ± 0.023	uS		8/2/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	286 ± 0.065	mg/L		12/10/2019	COW_ASB
Total Hardness, calculated in water	1450	mg/L		12/10/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	8.63 ± 0.065	units		8/2/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	2720 ± 0.065	mg/L		8/7/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	3090 ± 0.062	mg/L		8/3/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	366 ± 8.40%	mg/L		8/7/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	12	mg/L		8/8/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	120 ± 0.085	mg/L		8/8/2019	COW_ASB

**Sample No.** 226839  
**Sample Description:** SWQ25-11A  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	12.8 ± 0.15	mg/L		8/7/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	125.4 ± 0.085	mg/L		8/8/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		11/18/2019	COW_ASB
Arsenic (As), total in water	0.025699 ± 0.042	mg/L		11/18/2019	COW_ASB
Barium (Ba), total in water	0.21986 ± 0.057	mg/L		11/18/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		11/18/2019	COW_ASB
Boron (B), total in water	1.2516 ± 0.19	mg/L		11/18/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		11/18/2019	COW_ASB
Calcium (Ca), total in water	114.58 ± 0.071	mg/L		11/18/2019	COW_ASB
Chromium (Cr), total in water	<0.00004 ± 0.044	mg/L		11/18/2019	COW_ASB
Copper (Cu), total in water	0.008574 ± 0.035	mg/L		11/18/2019	COW_ASB
Iron (Fe), total in water	2.7528 ± 0.043	mg/L		11/18/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		11/18/2019	COW_ASB
Magnesium (Mg), total in water	283.83 ± 0.04	mg/L		11/18/2019	COW_ASB
Manganese (Mn), total in water	0.13516 ± 0.041	mg/L		11/18/2019	COW_ASB
Nickel (Ni), total in water	0.087650 ± 0.046	mg/L		11/18/2019	COW_ASB
Phosphorus (P), total in water	1.5182 ± 0.033	mg/L		11/18/2019	COW_ASB
Potassium (K), total in water	265.51 ± 0.1	mg/L		11/18/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		11/18/2019	COW_ASB
Sodium (Na), total in water	429.90 ± 0.082	mg/L		11/18/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		11/18/2019	COW_ASB
Zinc (Zn), total in water	0.02620 ± 0.049	mg/L		11/18/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	63.50 ± 0.076	NTU		8/2/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	875.00	mg/L		8/26/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	794.00	mg/L		8/26/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	46.10	mg/L		8/26/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		8/26/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	1.37	mg/L		8/26/2019	ALS

**Sample No.** 226839  
**Sample Description:** SWQ25-11A  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	156.0	mg/L		8/26/2019	ALS
Dissolved Organic Carbon	129.0	mg/L		8/26/2019	ALS
Total Dissolved Carbon	285.0	mg/L		8/26/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	699.000	mg/L		8/26/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by QT97	240	MPN/100mL		8/26/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by QT97	326	MPN/100mL		8/26/2019	ALS
Total Coliforms by QT97	>2420	MPN/100mL		8/26/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		8/26/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	410.00	mg/L		8/26/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	443	mg/L		3/5/2020	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	6	mg/L		8/9/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	0.0044	mg/L		3/4/2020	ALS

**Sample No.** 226839  
**Sample Description:** SWQ25-11A  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0074	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.001020	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.03830	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.1880	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	1.4300	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000015	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	90.0000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	0.000018	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00123	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00452	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00637	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	1192.5	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0200	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000130	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.2380	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	235.0000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0506	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.009010	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.05580	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	1.680	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	228.0000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0106	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000776	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	5.1500	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	0.000025	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	322.0000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.9370	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	137.0000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00128	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00126	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	0.00059	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.005750	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.01850	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0023	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00344	mg/L		3/4/2020	ALS

**Sample No.** 226839  
**Sample Description:** SWQ25-11A  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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**Reference Information**

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

**Accredited Test Methods Used:**

Test Method

Alkalinity by Titration  
 Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
 COD by Closed Reflux Method

Conductivity by Electrometric Method  
 Hardness, Calcium & Total by Calculation  
 pH in Laboratory by Electrometric Method  
 Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

Reference Method

Modified from SM 2320 B. Titration Method  
 Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
 Modified from SM 5210 B. 5-Day BOD Test  
 Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
 Modified from EPA Methods 200.8  
 Modified from SM 4500 H+B (Electrometric Method)  
 Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

**Additional Test Methods Used:**

Test Method

Chloride by Mercuric Thiocyanate Method  
 Sulfate by HACH Method

Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113  
 Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

**Laboratories:**

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4  
 COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

**Additional Comments:**

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- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

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## Certificate of Analysis for Sample No. 226840 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

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**Brock Bradford**

Analytical Services Branch Head

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The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 226840  
**Sample Description:** SWQ25-11B  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	585 ± 0.04	mg/L		8/2/2019	COW_ASB
Alkalinity, carbonate, calculated	178	mg/L		8/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		8/2/2019	COW_ASB
Alkalinity, total to pH 4.5	763 ± 0.028	mg/L		8/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	88.9 ± 0.028	mg/L		8/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.208 ± 0.165	mg/L		8/8/2019	COW_ASB
Nitrate+Nitrite Nitrogen	0.469 ± 0.078	mg/L		8/8/2019	COW_ASB
Phosphorus, dissolved (0.45um)	1.16 ± 0.075	mg/L		8/8/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	660 ± 0.06	mg/L		3/5/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	<5 ± 0.17	mg/L		3/5/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	311 ± 0.068	mg/L		8/7/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	3950 ± 0.023	uS		8/2/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	242 ± 0.065	mg/L		12/10/2019	COW_ASB
Total Hardness, calculated in water	1280	mg/L		12/10/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	8.96 ± 0.065	units		8/2/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	2600 ± 0.065	mg/L		8/7/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	2890 ± 0.062	mg/L		8/3/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	292 ± 8.40%	mg/L		8/7/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	10	mg/L		8/8/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	111 ± 0.085	mg/L		8/12/2019	COW_ASB

**Sample No.** 226840  
**Sample Description:** SWQ25-11B  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	10.7 ± 0.15	mg/L		8/7/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	117.2 ± 0.085	mg/L		8/8/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		11/18/2019	COW_ASB
Arsenic (As), total in water	0.019151 ± 0.042	mg/L		11/18/2019	COW_ASB
Barium (Ba), total in water	0.17204 ± 0.057	mg/L		11/18/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		11/18/2019	COW_ASB
Boron (B), total in water	1.1332 ± 0.19	mg/L		11/18/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		11/18/2019	COW_ASB
Calcium (Ca), total in water	96.865 ± 0.071	mg/L		11/18/2019	COW_ASB
Chromium (Cr), total in water	<0.00004 ± 0.044	mg/L		11/18/2019	COW_ASB
Copper (Cu), total in water	0.007055 ± 0.035	mg/L		11/18/2019	COW_ASB
Iron (Fe), total in water	0.42898 ± 0.043	mg/L		11/18/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		11/18/2019	COW_ASB
Magnesium (Mg), total in water	250.97 ± 0.04	mg/L		11/18/2019	COW_ASB
Manganese (Mn), total in water	0.02877 ± 0.041	mg/L		11/18/2019	COW_ASB
Nickel (Ni), total in water	0.076864 ± 0.046	mg/L		11/18/2019	COW_ASB
Phosphorus (P), total in water	1.1077 ± 0.033	mg/L		11/18/2019	COW_ASB
Potassium (K), total in water	245.00 ± 0.1	mg/L		11/18/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		11/18/2019	COW_ASB
Sodium (Na), total in water	407.75 ± 0.082	mg/L		11/18/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		11/18/2019	COW_ASB
Zinc (Zn), total in water	0.05062 ± 0.049	mg/L		11/18/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	12.50 ± 0.076	NTU		8/2/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	696.00	mg/L		8/26/2019	ALS
<b>Total Alkalinity as CaCO<sub>3</sub></b>					
Alkalinity, total (as CaCO <sub>3</sub> )	733.00	mg/L		8/26/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	97.70	mg/L		8/26/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		8/26/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.37	mg/L		8/26/2019	ALS

**Sample No.** 226840  
**Sample Description:** SWQ25-11B  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	147.0	mg/L		8/26/2019	ALS
Dissolved Organic Carbon	119.0	mg/L		8/26/2019	ALS
Total Dissolved Carbon	267.0	mg/L		8/26/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	682.000	mg/L		8/26/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by QT97	613	MPN/100mL		8/26/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by QT97	345	MPN/100mL		8/26/2019	ALS
Total Coliforms by QT97	>2420	MPN/100mL		8/26/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		8/26/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	386.00	mg/L		8/26/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	423	mg/L		3/5/2020	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	2	mg/L		8/9/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/5/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	0.0039	mg/L		3/5/2020	ALS

**Sample No.** 226840  
**Sample Description:** SWQ25-11B  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0052	mg/L		3/5/2020	ALS
Antimony (Sb), dissolved in water	0.000970	mg/L		3/5/2020	ALS
Arsenic (As), dissolved in water	0.03400	mg/L		3/5/2020	ALS
Barium (Ba), dissolved in water	0.1630	mg/L		3/5/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/5/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/5/2020	ALS
Boron (B), dissolved in water	1.4200	mg/L		3/5/2020	ALS
Cadmium (Cd), dissolved in water	0.000013	mg/L		3/5/2020	ALS
Calcium (Ca), dissolved in water	82.2000	mg/L		3/5/2020	ALS
Cesium (Cs), dissolved in water	0.000017	mg/L		3/5/2020	ALS
Chromium (Cr), dissolved in water	0.00128	mg/L		3/5/2020	ALS
Cobalt (Co), dissolved in water	0.00374	mg/L		3/5/2020	ALS
Copper (Cu), dissolved in water	0.00427	mg/L		3/5/2020	ALS
Hardness dissolved in water, calculated	1144.2	mg/L		3/5/2020	ALS
Iron (Fe), dissolved in water	0.0280	mg/L		3/5/2020	ALS
Lead (Pb), dissolved in water	0.000089	mg/L		3/5/2020	ALS
Lithium (Li), dissolved in water	0.2360	mg/L		3/5/2020	ALS
Magnesium (Mg), dissolved in water	228.0000	mg/L		3/5/2020	ALS
Manganese (Mn), dissolved in water	0.0221	mg/L		3/5/2020	ALS
Molybdenum (Mo), dissolved in water	0.008160	mg/L		3/5/2020	ALS
Nickel (Ni), dissolved in water	0.05200	mg/L		3/5/2020	ALS
Phosphorus (P), dissolved in water	1.430	mg/L		3/5/2020	ALS
Potassium (K), dissolved in water	208.0000	mg/L		3/5/2020	ALS
Rubidium (Rb), dissolved in water	0.0108	mg/L		3/5/2020	ALS
Selenium (Se), dissolved in water	0.000746	mg/L		3/5/2020	ALS
Silicon (Si), dissolved in water	3.8400	mg/L		3/5/2020	ALS
Silver (Ag), dissolved in water	0.000020	mg/L		3/5/2020	ALS
Sodium (Na), dissolved in water	318.0000	mg/L		3/5/2020	ALS
Strontium (Sr), dissolved in water	0.8790	mg/L		3/5/2020	ALS
Sulfur (S), dissolved in water	128.0000	mg/L		3/5/2020	ALS
Tellurium (Te), dissolved in water	0.00020	mg/L		3/5/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/5/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/5/2020	ALS
Tin (Sn), dissolved in water	0.00135	mg/L		3/5/2020	ALS
Titanium (Ti), dissolved in water	0.00104	mg/L		3/5/2020	ALS
Tungsten (W), dissolved in water	0.00054	mg/L		3/5/2020	ALS
Uranium (U), dissolved in water	0.005370	mg/L		3/5/2020	ALS
Vanadium (V), dissolved in water	0.01460	mg/L		3/5/2020	ALS
Zinc (Zn), dissolved in water	0.0017	mg/L		3/5/2020	ALS
Zirconium (Zr), dissolved in water	0.00309	mg/L		3/5/2020	ALS

**Sample No.** 226840  
**Sample Description:** SWQ25-11B  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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**Reference Information**

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

**Accredited Test Methods Used:**

Test Method

Alkalinity by Titration  
 Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
 COD by Closed Reflux Method

Conductivity by Electrometric Method  
 Hardness, Calcium & Total by Calculation  
 pH in Laboratory by Electrometric Method  
 Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

Reference Method

Modified from SM 2320 B. Titration Method  
 Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
 Modified from SM 5210 B. 5-Day BOD Test  
 Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
 Modified from EPA Methods 200.8  
 Modified from SM 4500 H+B (Electrometric Method)  
 Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

**Additional Test Methods Used:**

Test Method

Chloride by Mercuric Thiocyanate Method  
 Sulfate by HACH Method

Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113  
 Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

**Laboratories:**

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4  
 COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.

- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division  
1120 Waverley Street  
Winnipeg MB R3E 3S8

Phone : 204-986-2384

Email : ckozak@winnipeg.ca

## Certificate of Analysis for Sample No. 226841 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 226841  
**Sample Description:** SWQ25-11C  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	622 ± 0.04	mg/L		8/1/2019	COW_ASB
Alkalinity, carbonate, calculated	276	mg/L		8/1/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		8/1/2019	COW_ASB
Alkalinity, total to pH 4.5	898 ± 0.028	mg/L		8/1/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	138 ± 0.028	mg/L		8/1/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.090 ± 0.165	mg/L		8/8/2019	COW_ASB
Nitrate+Nitrite Nitrogen	0.003 ± 0.078	mg/L		8/8/2019	COW_ASB
Phosphorus, dissolved (0.45um)	1.82 ± 0.075	mg/L		8/8/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	970 ± 0.06	mg/L		3/5/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	<4 ± 0.17	mg/L		3/5/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	337 ± 0.068	mg/L		8/7/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	4140 ± 0.023	uS		8/2/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	240 ± 0.065	mg/L		12/10/2019	COW_ASB
Total Hardness, calculated in water	1460	mg/L		12/10/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	9.02 ± 0.065	units		7/31/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	2890 ± 0.065	mg/L		8/7/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	3160 ± 0.062	mg/L		8/3/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	269 ± 8.40%	mg/L		8/7/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	11	mg/L		8/8/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	100. ± 0.085	mg/L		8/23/2019	COW_ASB

**Sample No.** 226841  
**Sample Description:** SWQ25-11C  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	10.9 ± 0.15	mg/L		8/2/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	103.8 ± 0.085	mg/L		8/23/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		11/18/2019	COW_ASB
Arsenic (As), total in water	0.025662 ± 0.042	mg/L		11/18/2019	COW_ASB
Barium (Ba), total in water	0.16589 ± 0.057	mg/L		11/18/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		11/18/2019	COW_ASB
Boron (B), total in water	1.4213 ± 0.19	mg/L		11/18/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		11/18/2019	COW_ASB
Calcium (Ca), total in water	96.098 ± 0.071	mg/L		11/18/2019	COW_ASB
Chromium (Cr), total in water	<0.00004 ± 0.044	mg/L		11/18/2019	COW_ASB
Copper (Cu), total in water	0.008433 ± 0.035	mg/L		11/18/2019	COW_ASB
Iron (Fe), total in water	0.28886 ± 0.043	mg/L		11/18/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		11/18/2019	COW_ASB
Magnesium (Mg), total in water	296.11 ± 0.04	mg/L		11/18/2019	COW_ASB
Manganese (Mn), total in water	0.04589 ± 0.041	mg/L		11/18/2019	COW_ASB
Nickel (Ni), total in water	0.080170 ± 0.046	mg/L		11/18/2019	COW_ASB
Phosphorus (P), total in water	2.0015 ± 0.033	mg/L		11/18/2019	COW_ASB
Potassium (K), total in water	215.54 ± 0.1	mg/L		11/18/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		11/18/2019	COW_ASB
Sodium (Na), total in water	515.83 ± 0.082	mg/L		11/18/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		11/18/2019	COW_ASB
Zinc (Zn), total in water	0.04048 ± 0.049	mg/L		11/18/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	8.35 ± 0.076	NTU		7/31/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	776.00	mg/L		8/26/2019	ALS
<b>Total Alkalinity as CaCO<sub>3</sub></b>					
Alkalinity, total (as CaCO <sub>3</sub> )	873.00	mg/L		8/26/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	143.00	mg/L		8/26/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		8/26/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.29	mg/L		8/26/2019	ALS

**Sample No.** 226841  
**Sample Description:** SWQ25-11C  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	183.0	mg/L		8/26/2019	ALS
Dissolved Organic Carbon	131.0	mg/L		8/26/2019	ALS
Total Dissolved Carbon	314.0	mg/L		8/26/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	802.000	mg/L		8/26/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by QT97	308	MPN/100mL		8/26/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by QT97	228	MPN/100mL		8/26/2019	ALS
Total Coliforms by QT97	>2420	MPN/100mL		8/26/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		8/26/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	321.00	mg/L		8/26/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	349	mg/L		3/5/2020	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	3	mg/L		8/8/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/5/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	0.0036	mg/L		3/5/2020	ALS

**Sample No.** 226841  
**Sample Description:** SWQ25-11C  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0067	mg/L		3/5/2020	ALS
Antimony (Sb), dissolved in water	0.000910	mg/L		3/5/2020	ALS
Arsenic (As), dissolved in water	0.03850	mg/L		3/5/2020	ALS
Barium (Ba), dissolved in water	0.1600	mg/L		3/5/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/5/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/5/2020	ALS
Boron (B), dissolved in water	1.6100	mg/L		3/5/2020	ALS
Cadmium (Cd), dissolved in water	0.000015	mg/L		3/5/2020	ALS
Calcium (Ca), dissolved in water	82.6000	mg/L		3/5/2020	ALS
Cesium (Cs), dissolved in water	0.000017	mg/L		3/5/2020	ALS
Chromium (Cr), dissolved in water	0.00136	mg/L		3/5/2020	ALS
Cobalt (Co), dissolved in water	0.00288	mg/L		3/5/2020	ALS
Copper (Cu), dissolved in water	0.00585	mg/L		3/5/2020	ALS
Hardness dissolved in water, calculated	1268.7	mg/L		3/5/2020	ALS
Iron (Fe), dissolved in water	0.0130	mg/L		3/5/2020	ALS
Lead (Pb), dissolved in water	0.000156	mg/L		3/5/2020	ALS
Lithium (Li), dissolved in water	0.2440	mg/L		3/5/2020	ALS
Magnesium (Mg), dissolved in water	258.0000	mg/L		3/5/2020	ALS
Manganese (Mn), dissolved in water	0.0309	mg/L		3/5/2020	ALS
Molybdenum (Mo), dissolved in water	0.006620	mg/L		3/5/2020	ALS
Nickel (Ni), dissolved in water	0.05740	mg/L		3/5/2020	ALS
Phosphorus (P), dissolved in water	2.180	mg/L		3/5/2020	ALS
Potassium (K), dissolved in water	184.0000	mg/L		3/5/2020	ALS
Rubidium (Rb), dissolved in water	0.0082	mg/L		3/5/2020	ALS
Selenium (Se), dissolved in water	0.000675	mg/L		3/5/2020	ALS
Silicon (Si), dissolved in water	3.2100	mg/L		3/5/2020	ALS
Silver (Ag), dissolved in water	0.000019	mg/L		3/5/2020	ALS
Sodium (Na), dissolved in water	391.0000	mg/L		3/5/2020	ALS
Strontium (Sr), dissolved in water	0.9450	mg/L		3/5/2020	ALS
Sulfur (S), dissolved in water	107.0000	mg/L		3/5/2020	ALS
Tellurium (Te), dissolved in water	0.00021	mg/L		3/5/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/5/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/5/2020	ALS
Tin (Sn), dissolved in water	0.00104	mg/L		3/5/2020	ALS
Titanium (Ti), dissolved in water	0.00103	mg/L		3/5/2020	ALS
Tungsten (W), dissolved in water	0.00063	mg/L		3/5/2020	ALS
Uranium (U), dissolved in water	0.004200	mg/L		3/5/2020	ALS
Vanadium (V), dissolved in water	0.01230	mg/L		3/5/2020	ALS
Zinc (Zn), dissolved in water	0.0018	mg/L		3/5/2020	ALS
Zirconium (Zr), dissolved in water	0.00259	mg/L		3/5/2020	ALS

**Sample No.** 226841  
**Sample Description:** SWQ25-11C  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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**Reference Information**

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

**Accredited Test Methods Used:**

Test Method

Alkalinity by Titration  
 Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
 COD by Closed Reflux Method

Conductivity by Electrometric Method  
 Hardness, Calcium & Total by Calculation  
 pH in Laboratory by Electrometric Method  
 Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

Reference Method

Modified from SM 2320 B. Titration Method  
 Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
 Modified from SM 5210 B. 5-Day BOD Test  
 Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
 Modified from EPA Methods 200.8  
 Modified from SM 4500 H+B (Electrometric Method)  
 Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

**Additional Test Methods Used:**

Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

**Laboratories:**

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

**Additional Comments:**

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.

- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division  
1120 Waverley Street  
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## Certificate of Analysis for Sample No. 226846 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 226846  
**Sample Description:** SWQ25-15A  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	837 ± 0.04	mg/L		8/1/2019	COW_ASB
Alkalinity, carbonate, calculated	70.5	mg/L		8/1/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		8/1/2019	COW_ASB
Alkalinity, total to pH 4.5	907 ± 0.028	mg/L		8/1/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	35.2 ± 0.028	mg/L		8/1/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.312 ± 0.165	mg/L		8/8/2019	COW_ASB
Nitrate+Nitrite Nitrogen	0.082 ± 0.078	mg/L		8/8/2019	COW_ASB
Phosphorus, dissolved (0.45um)	1.74 ± 0.075	mg/L		8/8/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	880 ± 0.06	mg/L		3/5/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	29 ± 0.17	mg/L		3/5/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	442 ± 0.068	mg/L		8/7/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	4410 ± 0.023	uS		8/2/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	221 ± 0.065	mg/L		12/10/2019	COW_ASB
Total Hardness, calculated in water	1440	mg/L		12/10/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	8.34 ± 0.065	units		7/31/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	2920 ± 0.065	mg/L		8/7/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	3700 ± 0.062	mg/L		8/3/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	781 ± 8.40%	mg/L		8/7/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	12	mg/L		8/10/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	99.1 ± 0.085	mg/L		8/23/2019	COW_ASB

**Sample No.** 226846  
**Sample Description:** SWQ25-15A  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	11.7 ± 0.15	mg/L		8/2/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	107.6 ± 0.085	mg/L		8/23/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		11/18/2019	COW_ASB
Arsenic (As), total in water	0.025086 ± 0.042	mg/L		11/18/2019	COW_ASB
Barium (Ba), total in water	0.19589 ± 0.057	mg/L		11/18/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		11/18/2019	COW_ASB
Boron (B), total in water	1.4054 ± 0.19	mg/L		11/18/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		11/18/2019	COW_ASB
Calcium (Ca), total in water	88.307 ± 0.071	mg/L		11/18/2019	COW_ASB
Chromium (Cr), total in water	<0.00004 ± 0.044	mg/L		11/18/2019	COW_ASB
Copper (Cu), total in water	0.010555 ± 0.035	mg/L		11/18/2019	COW_ASB
Iron (Fe), total in water	3.0910 ± 0.043	mg/L		11/18/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		11/18/2019	COW_ASB
Magnesium (Mg), total in water	297.32 ± 0.04	mg/L		11/18/2019	COW_ASB
Manganese (Mn), total in water	0.62444 ± 0.041	mg/L		11/18/2019	COW_ASB
Nickel (Ni), total in water	0.087784 ± 0.046	mg/L		11/18/2019	COW_ASB
Phosphorus (P), total in water	2.6194 ± 0.033	mg/L		11/18/2019	COW_ASB
Potassium (K), total in water	210.30 ± 0.1	mg/L		11/18/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		11/18/2019	COW_ASB
Sodium (Na), total in water	506.01 ± 0.082	mg/L		11/18/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		11/18/2019	COW_ASB
Zinc (Zn), total in water	0.08632 ± 0.049	mg/L		11/18/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	55.30 ± 0.076	NTU		7/31/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	1030.00	mg/L		8/26/2019	ALS
<b>Total Alkalinity as CaCO<sub>3</sub></b>					
Alkalinity, total (as CaCO <sub>3</sub> )	865.00	mg/L		8/26/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	10.80	mg/L		8/26/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		8/26/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.47	mg/L		8/26/2019	ALS

**Sample No.** 226846  
**Sample Description:** SWQ25-15A  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	189.0	mg/L		8/26/2019	ALS
Dissolved Organic Carbon	118.0	mg/L		8/26/2019	ALS
Total Dissolved Carbon	308.0	mg/L		8/26/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	843.000	mg/L		8/26/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by QT97	>2420	MPN/100mL		8/26/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by QT97	>2420	MPN/100mL		8/26/2019	ALS
Total Coliforms by QT97	>2420	MPN/100mL		8/26/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		8/26/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	327.00	mg/L		8/26/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	425	mg/L		3/5/2020	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	25	mg/L		8/8/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	0.0028	mg/L		3/4/2020	ALS

**Sample No.** 226846  
**Sample Description:** SWQ25-15A  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0041	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000800	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.03630	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.1550	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	1.6200	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000006	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	77.1000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00138	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00199	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00161	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	1300.3	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0340	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.2620	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	269.0000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0938	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.005380	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.05760	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	2.410	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	187.0000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0075	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000618	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	5.5900	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	0.000018	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	415.0000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.9380	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	105.0000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00197	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00089	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	0.00059	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.004010	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00714	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0019	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00238	mg/L		3/4/2020	ALS

**Sample No.** 226846  
**Sample Description:** SWQ25-15A  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration  
Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
COD by Closed Reflux Method

Conductivity by Electrometric Method  
Hardness, Calcium & Total by Calculation  
pH in Laboratory by Electrometric Method  
Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Reference Method

Modified from SM 2320 B. Titration Method  
Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
Modified from SM 5210 B. 5-Day BOD Test  
Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
Modified from EPA Methods 200.8  
Modified from SM 4500 H+B (Electrometric Method)  
Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

### Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
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- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division  
1120 Waverley Street  
Winnipeg MB R3E 3S8

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## Certificate of Analysis for Sample No. 226847 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 226847  
**Sample Description:** SWQ25-15B  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	788 ± 0.04	mg/L		8/1/2019	COW_ASB
Alkalinity, carbonate, calculated	90.0	mg/L		8/1/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		8/1/2019	COW_ASB
Alkalinity, total to pH 4.5	878 ± 0.028	mg/L		8/1/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	45.0 ± 0.028	mg/L		8/1/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.749 ± 0.165	mg/L		8/8/2019	COW_ASB
Nitrate+Nitrite Nitrogen	0.045 ± 0.078	mg/L		8/8/2019	COW_ASB
Phosphorus, dissolved (0.45um)	1.66 ± 0.075	mg/L		8/8/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	960 ± 0.06	mg/L		3/5/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	19 ± 0.17	mg/L		3/5/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	458 ± 0.068	mg/L		8/7/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	4390 ± 0.023	uS		8/2/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	236 ± 0.065	mg/L		12/10/2019	COW_ASB
Total Hardness, calculated in water	1490	mg/L		12/10/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	8.51 ± 0.065	units		7/31/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	13800 ± 0.062	mg/L		8/3/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	13	mg/L		8/10/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	101 ± 0.085	mg/L		8/23/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	13.1 ± 0.15	mg/L		8/2/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	114.8 ± 0.085	mg/L		8/23/2019	COW_ASB

**Sample No.** 226847  
**Sample Description:** SWQ25-15B  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		11/18/2019	COW_ASB
Arsenic (As), total in water	0.039034 ± 0.042	mg/L		11/18/2019	COW_ASB
Barium (Ba), total in water	0.26468 ± 0.057	mg/L		11/18/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		11/18/2019	COW_ASB
Boron (B), total in water	1.4255 ± 0.19	mg/L		11/18/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		11/18/2019	COW_ASB
Calcium (Ca), total in water	94.462 ± 0.071	mg/L		11/18/2019	COW_ASB
Chromium (Cr), total in water	0.00471 ± 0.044	mg/L		11/18/2019	COW_ASB
Copper (Cu), total in water	0.011268 ± 0.035	mg/L		11/18/2019	COW_ASB
Iron (Fe), total in water	6.0505 ± 0.043	mg/L		11/18/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		11/18/2019	COW_ASB
Magnesium (Mg), total in water	304.92 ± 0.04	mg/L		11/18/2019	COW_ASB
Manganese (Mn), total in water	0.35372 ± 0.041	mg/L		11/18/2019	COW_ASB
Nickel (Ni), total in water	0.098681 ± 0.046	mg/L		11/18/2019	COW_ASB
Phosphorus (P), total in water	2.2849 ± 0.033	mg/L		11/18/2019	COW_ASB
Potassium (K), total in water	215.81 ± 0.1	mg/L		11/18/2019	COW_ASB
Selenium (Se), total in water	0.00734 ± 0.15	mg/L		11/18/2019	COW_ASB
Sodium (Na), total in water	520.17 ± 0.082	mg/L		11/18/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		11/18/2019	COW_ASB
Zinc (Zn), total in water	0.10311 ± 0.049	mg/L		11/18/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	214.00 ± 0.076	NTU		7/31/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	1310.00	mg/L		8/26/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	1120.00	mg/L		8/26/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	26.30	mg/L		8/26/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		8/26/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.52	mg/L		8/26/2019	ALS
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	188.0	mg/L		8/26/2019	ALS
Dissolved Organic Carbon	123.0	mg/L		8/26/2019	ALS
Total Dissolved Carbon	311.0	mg/L		8/26/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	834.000	mg/L		8/26/2019	ALS

**Sample No.** 226847  
**Sample Description:** SWQ25-15B  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		8/26/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	315.00	mg/L		8/26/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	402	mg/L		3/5/2020	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids	11900 ± 8.40%	mg/L		8/3/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid, calculated	1870 ± 0.084	mg/L		8/3/2019	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	<100	mg/L		8/8/2019	ALS
<b>Total and E. coli, 1:10 dilution by QT97</b>					
Escherichia Coliform by QT97	1840	MPN/100mL		8/26/2019	ALS
Total Coliforms by QT97	>24200	MPN/100mL		8/26/2019	ALS
<b>Fecal coliforms, 1:10 dilution by QT97</b>					
Fecal Coliforms, 1:10 dilution by QT97	2760	MPN/100mL		8/26/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/5/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	0.0023	mg/L		3/5/2020	ALS

**Sample No.** 226847  
**Sample Description:** SWQ25-15B  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0047	mg/L		3/5/2020	ALS
Antimony (Sb), dissolved in water	0.000760	mg/L		3/5/2020	ALS
Arsenic (As), dissolved in water	0.03510	mg/L		3/5/2020	ALS
Barium (Ba), dissolved in water	0.1510	mg/L		3/5/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/5/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/5/2020	ALS
Boron (B), dissolved in water	1.6800	mg/L		3/5/2020	ALS
Cadmium (Cd), dissolved in water	0.000009	mg/L		3/5/2020	ALS
Calcium (Ca), dissolved in water	73.5000	mg/L		3/5/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/5/2020	ALS
Chromium (Cr), dissolved in water	0.00141	mg/L		3/5/2020	ALS
Cobalt (Co), dissolved in water	0.00167	mg/L		3/5/2020	ALS
Copper (Cu), dissolved in water	0.00140	mg/L		3/5/2020	ALS
Hardness dissolved in water, calculated	1254.2	mg/L		3/5/2020	ALS
Iron (Fe), dissolved in water	0.0440	mg/L		3/5/2020	ALS
Lead (Pb), dissolved in water	0.000069	mg/L		3/5/2020	ALS
Lithium (Li), dissolved in water	0.2530	mg/L		3/5/2020	ALS
Magnesium (Mg), dissolved in water	260.0000	mg/L		3/5/2020	ALS
Manganese (Mn), dissolved in water	0.1110	mg/L		3/5/2020	ALS
Molybdenum (Mo), dissolved in water	0.005020	mg/L		3/5/2020	ALS
Nickel (Ni), dissolved in water	0.05420	mg/L		3/5/2020	ALS
Phosphorus (P), dissolved in water	2.140	mg/L		3/5/2020	ALS
Potassium (K), dissolved in water	179.0000	mg/L		3/5/2020	ALS
Rubidium (Rb), dissolved in water	0.0068	mg/L		3/5/2020	ALS
Selenium (Se), dissolved in water	0.000621	mg/L		3/5/2020	ALS
Silicon (Si), dissolved in water	5.3800	mg/L		3/5/2020	ALS
Silver (Ag), dissolved in water	0.000019	mg/L		3/5/2020	ALS
Sodium (Na), dissolved in water	400.0000	mg/L		3/5/2020	ALS
Strontium (Sr), dissolved in water	0.9020	mg/L		3/5/2020	ALS
Sulfur (S), dissolved in water	105.0000	mg/L		3/5/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/5/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/5/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/5/2020	ALS
Tin (Sn), dissolved in water	0.00089	mg/L		3/5/2020	ALS
Titanium (Ti), dissolved in water	0.00078	mg/L		3/5/2020	ALS
Tungsten (W), dissolved in water	0.00062	mg/L		3/5/2020	ALS
Uranium (U), dissolved in water	0.003940	mg/L		3/5/2020	ALS
Vanadium (V), dissolved in water	0.00777	mg/L		3/5/2020	ALS
Zinc (Zn), dissolved in water	0.0056	mg/L		3/5/2020	ALS
Zirconium (Zr), dissolved in water	0.00263	mg/L		3/5/2020	ALS

**Sample No.** 226847  
**Sample Description:** SWQ25-15B  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration  
Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
COD by Closed Reflux Method

Conductivity by Electrometric Method  
Hardness, Calcium & Total by Calculation  
pH in Laboratory by Electrometric Method  
Total Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

Total Suspended Solids by Gravimetric Analysis

Dissolved Solids by Gravimetric Analysis

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Reference Method

Modified from SM 2320 B. Titration Method  
Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
Modified from SM 5210 B. 5-Day BOD Test  
Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
Modified from EPA Methods 200.8  
Modified from SM 4500 H+B (Electrometric Method)  
Modified from SM 2540 B. Total Solids Dried at 103-105°C  
Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

### Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.

- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

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## Certificate of Analysis for Sample No. 226848 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 226848  
**Sample Description:** SWQ25-100  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	878 ± 0.04	mg/L		8/1/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		8/1/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		8/1/2019	COW_ASB
Alkalinity, total to pH 4.5	878 ± 0.028	mg/L		8/1/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		8/1/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.028 ± 0.165	mg/L		8/8/2019	COW_ASB
Nitrate+Nitrite Nitrogen	<0.003 ± 0.078	mg/L		8/8/2019	COW_ASB
Phosphorus, dissolved (0.45um)	1.34 ± 0.075	mg/L		8/8/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	810 ± 0.06	mg/L		3/5/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	NRISD			3/5/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	321 ± 0.068	mg/L		8/7/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	4130 ± 0.023	uS		8/2/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	256 ± 0.065	mg/L		12/10/2019	COW_ASB
Total Hardness, calculated in water	1450	mg/L		12/10/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	8.06 ± 0.065	units		7/31/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	2750 ± 0.065	mg/L		8/7/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	3070 ± 0.062	mg/L		8/3/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	320 ± 8.40%	mg/L		8/7/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	12	mg/L		8/10/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	90.6 ± 0.085	mg/L		8/23/2019	COW_ASB

**Sample No.** 226848  
**Sample Description:** SWQ25-100  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	12.2 ± 0.15	mg/L		8/2/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	97.1 ± 0.085	mg/L		8/23/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		11/18/2019	COW_ASB
Arsenic (As), total in water	0.015308 ± 0.042	mg/L		11/18/2019	COW_ASB
Barium (Ba), total in water	0.17118 ± 0.057	mg/L		11/18/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		11/18/2019	COW_ASB
Boron (B), total in water	1.4074 ± 0.19	mg/L		11/18/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		11/18/2019	COW_ASB
Calcium (Ca), total in water	102.55 ± 0.071	mg/L		11/18/2019	COW_ASB
Chromium (Cr), total in water	<0.00004 ± 0.044	mg/L		11/18/2019	COW_ASB
Copper (Cu), total in water	0.005065 ± 0.035	mg/L		11/18/2019	COW_ASB
Iron (Fe), total in water	0.20798 ± 0.043	mg/L		11/18/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		11/18/2019	COW_ASB
Magnesium (Mg), total in water	290.82 ± 0.04	mg/L		11/18/2019	COW_ASB
Manganese (Mn), total in water	0.16337 ± 0.041	mg/L		11/18/2019	COW_ASB
Nickel (Ni), total in water	0.086454 ± 0.046	mg/L		11/18/2019	COW_ASB
Phosphorus (P), total in water	1.0974 ± 0.033	mg/L		11/18/2019	COW_ASB
Potassium (K), total in water	184.92 ± 0.1	mg/L		11/18/2019	COW_ASB
Selenium (Se), total in water	0.01250 ± 0.15	mg/L		11/18/2019	COW_ASB
Sodium (Na), total in water	499.21 ± 0.082	mg/L		11/18/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		11/18/2019	COW_ASB
Zinc (Zn), total in water	0.10756 ± 0.049	mg/L		11/18/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	2.16 ± 0.076	NTU		7/31/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	1050.00	mg/L		8/26/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	864.00	mg/L		8/26/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		8/26/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		8/26/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.16	mg/L		8/26/2019	ALS

**Sample No.** 226848  
**Sample Description:** SWQ25-100  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	177.0	mg/L		8/26/2019	ALS
Dissolved Organic Carbon	125.0	mg/L		8/26/2019	ALS
Total Dissolved Carbon	302.0	mg/L		8/26/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	795.000	mg/L		8/26/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by QT97	792	MPN/100mL		8/26/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by QT97	1200	MPN/100mL		8/26/2019	ALS
Total Coliforms by QT97	>2420	MPN/100mL		8/26/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		8/26/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	257.00	mg/L		8/26/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	329	mg/L		3/5/2020	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	2	mg/L		8/8/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	0.0028	mg/L		3/4/2020	ALS

**Sample No.** 226848  
**Sample Description:** SWQ25-100  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0032	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000660	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.03000	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.1650	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	1.4300	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000032	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	90.4000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	0.000013	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00129	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00191	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00123	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	1267.6	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0920	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.2460	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	253.0000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.1330	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.004920	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.05550	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	1.630	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	157.0000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0053	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000559	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	2.9900	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	0.000014	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	381.0000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.9580	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	90.8000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00173	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00030	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	0.00035	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.005210	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00386	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0028	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00135	mg/L		3/4/2020	ALS

**Sample No.** 226848  
**Sample Description:** SWQ25-100  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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**Reference Information**

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

**Glossary of Terms:**

NRISD : No result, insufficient seed/depletion

**Accredited Test Methods Used:**

Test Method

Alkalinity by Titration  
 Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis  
 BOD5 Seeded by Automated Method  
 COD by Closed Reflux Method

Conductivity by Electrometric Method  
 Hardness, Calcium & Total by Calculation  
 pH in Laboratory by Electrometric Method  
 Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis  
 Total Suspended Solids by Gravimetric Analysis  
 Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion  
 Total Nitrogen by High Temperature Combustion  
 Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS  
 Turbidity in Laboratory by Nephelometric Method

**Additional Test Methods Used:**

Test Method

Chloride by Mercuric Thiocyanate Method  
 Sulfate by HACH Method

Reference Method

Modified from SM 2320 B. Titration Method  
 Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
 Modified from SM 5210 B. 5-Day BOD Test  
 Modified from SM 5220 D. Closed Reflux, Colorimetric Method  
 Modified from SM 2510 B. Laboratory Measurement  
 Modified from EPA Methods 200.8  
 Modified from SM 4500 H+B (Electrometric Method)  
 Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C  
 Modified from SM 2540 B. Total Solids Dried at 103-105°C  
 Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C  
 Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis  
 Modified from SM 5310 B. High Temperature Combustion  
 Modified from SM 5310 B. High Temperature Combustion  
 Modified from EPA Methods 200.8  
 Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113  
 Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4  
 COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

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## Certificate of Analysis for Sample No. 226849 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

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Analytical Services Branch Head

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The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 226849  
**Sample Description:** SWQ25-101  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	667 ± 0.04	mg/L		8/1/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		8/1/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		8/1/2019	COW_ASB
Alkalinity, total to pH 4.5	667 ± 0.028	mg/L		8/1/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		8/1/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.069 ± 0.165	mg/L		8/8/2019	COW_ASB
Nitrate+Nitrite Nitrogen	<0.003 ± 0.078	mg/L		8/8/2019	COW_ASB
Phosphorus, dissolved (0.45um)	0.225 ± 0.075	mg/L		8/8/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	52.0 ± 0.06	mg/L		3/5/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	5 ± 0.17	mg/L		3/5/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	82.0 ± 0.068	mg/L		8/7/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	772 ± 0.023	uS		8/2/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	183 ± 0.065	mg/L		12/10/2019	COW_ASB
Total Hardness, calculated in water	394	mg/L		12/10/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.31 ± 0.065	units		7/31/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	493 ± 0.065	mg/L		8/7/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	640 ± 0.062	mg/L		8/3/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	147 ± 8.40%	mg/L		8/7/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	1900	mg/L		8/20/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	23.2 ± 0.085	mg/L		8/2/2019	COW_ASB

**Sample No.** 226849  
**Sample Description:** SWQ25-101  
**Sample Date:** July 31, 2019  
**Sample Received:** July 31, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	1900 ± 0.15	mg/L		8/20/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	27.6 ± 0.085	mg/L		8/19/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		11/18/2019	COW_ASB
Arsenic (As), total in water	<0.000017 ± 0.042	mg/L		11/18/2019	COW_ASB
Barium (Ba), total in water	0.076270 ± 0.057	mg/L		11/18/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		11/18/2019	COW_ASB
Boron (B), total in water	<0.00208 ± 0.19	mg/L		11/18/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		11/18/2019	COW_ASB
Calcium (Ca), total in water	73.160 ± 0.071	mg/L		11/18/2019	COW_ASB
Chromium (Cr), total in water	<0.00004 ± 0.044	mg/L		11/18/2019	COW_ASB
Copper (Cu), total in water	<0.000022 ± 0.035	mg/L		11/18/2019	COW_ASB
Iron (Fe), total in water	1.8874 ± 0.043	mg/L		11/18/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		11/18/2019	COW_ASB
Magnesium (Mg), total in water	51.359 ± 0.04	mg/L		11/18/2019	COW_ASB
Manganese (Mn), total in water	0.23612 ± 0.041	mg/L		11/18/2019	COW_ASB
Nickel (Ni), total in water	0.009254 ± 0.046	mg/L		11/18/2019	COW_ASB
Phosphorus (P), total in water	0.5114 ± 0.033	mg/L		11/18/2019	COW_ASB
Potassium (K), total in water	15.420 ± 0.1	mg/L		11/18/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		11/18/2019	COW_ASB
Sodium (Na), total in water	40.607 ± 0.082	mg/L		11/18/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		11/18/2019	COW_ASB
Zinc (Zn), total in water	0.03125 ± 0.049	mg/L		11/18/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	27.40 ± 0.076	NTU		7/31/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	391.00	mg/L		8/26/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	320.00	mg/L		8/26/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		8/26/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		8/26/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.05	mg/L		8/26/2019	ALS

**Sample No.** 226849  
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Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	71.2	mg/L		8/26/2019	ALS
Dissolved Organic Carbon	22.3	mg/L		8/26/2019	ALS
Total Dissolved Carbon	93.5	mg/L		8/26/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	43.700	mg/L		8/26/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by QT97	214	MPN/100mL		8/26/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by QT97	5	MPN/100mL		8/26/2019	ALS
Total Coliforms by QT97	>2420	MPN/100mL		8/26/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		8/26/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	29.50	mg/L		8/26/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	28.8	mg/L		3/5/2020	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	5	mg/L		8/8/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	<0.0010	mg/L		3/4/2020	ALS

**Sample No.** 226849  
**Sample Description:** SWQ25-101  
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Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0111	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000250	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00683	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0606	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0640	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	<0.000005	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	66.0000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00018	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00072	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00021	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	331.2	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.3540	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000055	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0742	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	40.4000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.1950	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.000398	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00322	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.325	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	12.2000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0009	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000248	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	10.7000	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	32.4000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.2460	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	13.8000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00069	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00073	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.000655	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00201	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00050	mg/L		3/4/2020	ALS

**Sample No.** 226849  
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Test Parameters	Result	Units	Comments	Completed	Lab #
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**Reference Information**

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

**Accredited Test Methods Used:**

Test Method

Alkalinity by Titration  
 Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
 COD by Closed Reflux Method

Conductivity by Electrometric Method  
 Hardness, Calcium & Total by Calculation  
 pH in Laboratory by Electrometric Method  
 Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

Reference Method

Modified from SM 2320 B. Titration Method  
 Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
 Modified from SM 5210 B. 5-Day BOD Test  
 Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
 Modified from EPA Methods 200.8  
 Modified from SM 4500 H+B (Electrometric Method)  
 Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

**Additional Test Methods Used:**

Test Method

Chloride by Mercuric Thiocyanate Method  
 Sulfate by HACH Method

Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113  
 Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

**Laboratories:**

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4  
 COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

**Additional Comments:**

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.

- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division  
1120 Waverley Street  
Winnipeg MB R3E 3S8

Phone : 204-986-2384

Email : ckozak@winnipeg.ca

## Certificate of Analysis for Sample No. 226850 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 226850  
**Sample Description:** SWQ25-Trip Blank  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	<3.0 ± 0.04	mg/L		8/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		8/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		8/2/2019	COW_ASB
Alkalinity, total to pH 4.5	<3.0 ± 0.028	mg/L		8/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		8/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	<0.003 ± 0.165	mg/L		8/8/2019	COW_ASB
Nitrate+Nitrite Nitrogen	0.003 ± 0.078	mg/L		8/8/2019	COW_ASB
Phosphorus, dissolved (0.45um)	0.016 ± 0.075	mg/L		8/8/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	NALE			3/5/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	<4 ± 0.17	mg/L		3/5/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	<20.0 ± 0.068	mg/L		8/8/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	1.7 ± 0.023	uS		8/2/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	2.5 ± 0.065	mg/L		12/10/2019	COW_ASB
Total Hardness, calculated in water	3.6	mg/L		12/10/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	6.14 ± 0.065	units		8/2/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	<3 ± 0.065	mg/L		8/7/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	<3 ± 0.062	mg/L		8/3/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	3 ± 8.40%	mg/L		8/7/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	<0.2	mg/L		8/10/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	1.0 ± 0.085	mg/L		8/8/2019	COW_ASB

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Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	<0.3 ± 0.15	mg/L		8/7/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	0.7 ± 0.085	mg/L		8/8/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		11/18/2019	COW_ASB
Arsenic (As), total in water	<0.000017 ± 0.042	mg/L		11/18/2019	COW_ASB
Barium (Ba), total in water	<0.000014 ± 0.057	mg/L		11/18/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		11/18/2019	COW_ASB
Boron (B), total in water	<0.00208 ± 0.19	mg/L		11/18/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		11/18/2019	COW_ASB
Calcium (Ca), total in water	0.985 ± 0.071	mg/L		11/18/2019	COW_ASB
Chromium (Cr), total in water	<0.00004 ± 0.044	mg/L		11/18/2019	COW_ASB
Copper (Cu), total in water	0.032299 ± 0.035	mg/L		11/18/2019	COW_ASB
Iron (Fe), total in water	0.01840 ± 0.043	mg/L		11/18/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		11/18/2019	COW_ASB
Magnesium (Mg), total in water	0.273 ± 0.04	mg/L		11/18/2019	COW_ASB
Manganese (Mn), total in water	<0.00002 ± 0.041	mg/L		11/18/2019	COW_ASB
Nickel (Ni), total in water	0.003609 ± 0.046	mg/L		11/18/2019	COW_ASB
Phosphorus (P), total in water	<0.0012 ± 0.033	mg/L		11/18/2019	COW_ASB
Potassium (K), total in water	0.233 ± 0.1	mg/L		11/18/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		11/18/2019	COW_ASB
Sodium (Na), total in water	0.610 ± 0.082	mg/L		11/18/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		11/18/2019	COW_ASB
Zinc (Zn), total in water	0.24706 ± 0.049	mg/L		11/18/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	1.00 ± 0.076	NTU		8/2/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	<1.20	mg/L		8/26/2019	ALS
<b>Total Alkalinity as CaCO<sub>3</sub></b>					
Alkalinity, total (as CaCO <sub>3</sub> )	<1.00	mg/L		8/26/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		8/26/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		8/26/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	<0.01	mg/L		8/26/2019	ALS

**Sample No.** 226850  
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Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	<0.5	mg/L		8/26/2019	ALS
Dissolved Organic Carbon	<0.5	mg/L		8/26/2019	ALS
Total Dissolved Carbon	<1.0	mg/L		8/26/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	<0.500	mg/L		8/26/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by QT97	<1	MPN/100mL		8/26/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by QT97	<1	MPN/100mL		8/26/2019	ALS
Total Coliforms by QT97	<1	MPN/100mL		8/26/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		8/26/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	<0.30	mg/L		8/26/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	<0.4	mg/L		3/5/2020	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	<2	mg/L		8/9/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	<0.0010	mg/L		3/4/2020	ALS

**Sample No.** 226850  
**Sample Description:** SWQ25-Trip Blank  
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Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	<0.000100	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	<0.0001	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0130	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	<0.000005	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	<0.0500	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	<0.1	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	<0.0100	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	<0.0050	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	<0.0001	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	<0.00050	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	<0.030	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	<0.0500	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	<0.0002	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	<0.0500	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	<0.0500	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	<0.0001	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	<0.5000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	<0.00030	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	<0.00050	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	<0.00020	mg/L		3/4/2020	ALS

**Sample No.** 226850  
**Sample Description:** SWQ25-Trip Blank  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Glossary of Terms:

NALE : Not analyzed, laboratory error

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration  
 Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis  
 BOD5 Seeded by Automated Method  
 COD by Closed Reflux Method

Conductivity by Electrometric Method  
 Hardness, Calcium & Total by Calculation  
 pH in Laboratory by Electrometric Method  
 Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method  
 Sulfate by HACH Method

#### Reference Method

Modified from SM 2320 B. Titration Method  
 Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
 Modified from SM 5210 B. 5-Day BOD Test  
 Modified from SM 5220 D. Closed Reflux, Colorimetric Method  
 Modified from SM 2510 B. Laboratory Measurement  
 Modified from EPA Methods 200.8  
 Modified from SM 4500 H+B (Electrometric Method)  
 Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C  
 Modified from SM 2540 B. Total Solids Dried at 103-105°C  
 Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C  
 Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis  
 Modified from SM 5310 B. High Temperature Combustion  
 Modified from SM 5310 B. High Temperature Combustion  
 Modified from SM 5310 B. High Temperature Combustion  
 Modified from EPA Methods 200.8  
 Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113  
 Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

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Winnipeg MB R3E 3S8

Phone : 204-986-2384

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## Certificate of Analysis for Sample No. 226851 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 226851  
**Sample Description:** SWQ25-Field Blank  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	<3.0 ± 0.04	mg/L		8/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		8/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		8/2/2019	COW_ASB
Alkalinity, total to pH 4.5	<3.0 ± 0.028	mg/L		8/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		8/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	<0.003 ± 0.165	mg/L		8/8/2019	COW_ASB
Nitrate+Nitrite Nitrogen	0.003 ± 0.078	mg/L		8/8/2019	COW_ASB
Phosphorus, dissolved (0.45um)	0.016 ± 0.075	mg/L		8/8/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	1.0 ± 0.06	mg/L		3/5/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	<4 ± 0.17	mg/L		3/5/2020	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	<20.0 ± 0.068	mg/L		8/8/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	9.3 ± 0.023	uS		8/2/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	2.8 ± 0.065	mg/L		12/10/2019	COW_ASB
Total Hardness, calculated in water	3.7	mg/L		12/10/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	5.74 ± 0.065	units		8/2/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	<3 ± 0.065	mg/L		8/7/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	<3 ± 0.062	mg/L		8/3/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	3 ± 8.40%	mg/L		8/7/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	<0.2	mg/L		8/10/2019	COW_ASB
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	0.8 ± 0.085	mg/L		8/8/2019	COW_ASB

**Sample No.** 226851  
**Sample Description:** SWQ25-Field Blank  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	<0.3 ± 0.15	mg/L		8/7/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	<0.1 ± 0.085	mg/L		8/8/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		11/18/2019	COW_ASB
Arsenic (As), total in water	<0.000017 ± 0.042	mg/L		11/18/2019	COW_ASB
Barium (Ba), total in water	<0.000014 ± 0.057	mg/L		11/18/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		11/18/2019	COW_ASB
Boron (B), total in water	<0.00208 ± 0.19	mg/L		11/18/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		11/18/2019	COW_ASB
Calcium (Ca), total in water	1.129 ± 0.071	mg/L		11/18/2019	COW_ASB
Chromium (Cr), total in water	<0.00004 ± 0.044	mg/L		11/18/2019	COW_ASB
Copper (Cu), total in water	0.069594 ± 0.035	mg/L		11/18/2019	COW_ASB
Iron (Fe), total in water	0.03045 ± 0.043	mg/L		11/18/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		11/18/2019	COW_ASB
Magnesium (Mg), total in water	0.210 ± 0.04	mg/L		11/18/2019	COW_ASB
Manganese (Mn), total in water	<0.00002 ± 0.041	mg/L		11/18/2019	COW_ASB
Nickel (Ni), total in water	0.004277 ± 0.046	mg/L		11/18/2019	COW_ASB
Phosphorus (P), total in water	<0.0012 ± 0.033	mg/L		11/18/2019	COW_ASB
Potassium (K), total in water	0.127 ± 0.1	mg/L		11/18/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		11/18/2019	COW_ASB
Sodium (Na), total in water	1.174 ± 0.082	mg/L		11/18/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		11/18/2019	COW_ASB
Zinc (Zn), total in water	0.42996 ± 0.049	mg/L		11/18/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	1.51 ± 0.076	NTU		8/2/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	1.80	mg/L		8/26/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	1.50	mg/L		8/26/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		8/26/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		8/26/2019	ALS
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	<0.01	mg/L		8/26/2019	ALS

**Sample No.** 226851  
**Sample Description:** SWQ25-Field Blank  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Carbons Dissolved</b>					
Dissolved Inorganic Carbon	<0.5	mg/L		8/26/2019	ALS
Dissolved Organic Carbon	<0.5	mg/L		8/26/2019	ALS
Total Dissolved Carbon	<1.0	mg/L		8/26/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	<0.500	mg/L		8/26/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by QT97	<1	MPN/100mL		8/26/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by QT97	<1	MPN/100mL		8/26/2019	ALS
Total Coliforms by QT97	<1	MPN/100mL		8/26/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		8/26/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	<0.30	mg/L		8/26/2019	ALS
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	1.0	mg/L		3/5/2020	COW_ASB
<b>Biochemical Oxygen Demand (BOD)</b>					
Biochemical Oxygen Demand (BOD)	<2	mg/L		8/9/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS
<b>Cyanide</b>					
Cyanide, Total in water	<0.0010	mg/L		3/4/2020	ALS

**Sample No.** 226851  
**Sample Description:** SWQ25-Field Blank  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	<0.000100	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	<0.0001	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0130	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	<0.000005	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	0.0770	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00020	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	0.3	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	<0.0100	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	0.0315	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	<0.0001	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	<0.00050	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	<0.030	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	<0.0500	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	<0.0002	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	<0.0500	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	0.0580	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.0001	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	<0.5000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00348	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	<0.00030	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	<0.00050	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	<0.00020	mg/L		3/4/2020	ALS

**Sample No.** 226851  
**Sample Description:** SWQ25-Field Blank  
**Sample Date:** July 31, 2019  
**Sample Received:** August 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration  
Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
COD by Closed Reflux Method

Conductivity by Electrometric Method  
Hardness, Calcium & Total by Calculation  
pH in Laboratory by Electrometric Method  
Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

#### Reference Method

Modified from SM 2320 B. Titration Method  
Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
Modified from SM 5210 B. 5-Day BOD Test  
Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
Modified from EPA Methods 200.8  
Modified from SM 4500 H+B (Electrometric Method)  
Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 B. Total Solids Dried at 103-105°C  
Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

### Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
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- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

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Winnipeg MB R3E 3S8

Phone : 204-986-2384

Email : ckozak@winnipeg.ca

## Certificate of Analysis for Sample No. 245405 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 245405  
**Sample Description:** SWQ25-1  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	193 ± 0.04	mg/L		10/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		10/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		10/2/2019	COW_ASB
Alkalinity, total to pH 4.5	193 ± 0.028	mg/L		10/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		10/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.011 ± 0.165	mg/L		10/2/2019	COW_ASB
Nitrate+Nitrite Nitrogen	0.022 ± 0.078	mg/L		10/2/2019	COW_ASB
Phosphorus, dissolved (0.45um)	0.098 ± 0.075	mg/L		10/2/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	15.8 ± 0.06	mg/L		10/11/2019	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	3.0	mg/L		10/11/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	6 ± 0.17	mg/L		10/8/2019	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	195 ± 0.068	mg/L		10/11/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	492 ± 0.023	uS		10/9/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	242 ± 0.065	mg/L		12/12/2019	COW_ASB
Total Hardness, calculated in water	471	mg/L		12/12/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.65 ± 0.065	units		10/1/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	323 ± 0.065	mg/L		10/4/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	1400 ± 0.062	mg/L		10/2/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	1080 ± 8.40%	mg/L		10/9/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	2.2	mg/L		10/9/2019	COW_ASB

**Sample No.** 245405  
**Sample Description:** SWQ25-1  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	14.6 ± 0.085	mg/L		10/8/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	2.3 ± 0.15	mg/L		10/7/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	29.7 ± 0.085	mg/L		10/8/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		12/11/2019	COW_ASB
Arsenic (As), total in water	<0.000017 ± 0.042	mg/L		12/11/2019	COW_ASB
Barium (Ba), total in water	0.28618 ± 0.057	mg/L		12/11/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		12/11/2019	COW_ASB
Boron (B), total in water	<0.00208 ± 0.19	mg/L		12/11/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		12/11/2019	COW_ASB
Calcium (Ca), total in water	96.863 ± 0.071	mg/L		12/11/2019	COW_ASB
Chromium (Cr), total in water	0.04974 ± 0.044	mg/L		12/11/2019	COW_ASB
Copper (Cu), total in water	0.023082 ± 0.035	mg/L		12/11/2019	COW_ASB
Iron (Fe), total in water	37.846 ± 0.043	mg/L		12/11/2019	COW_ASB
Lead (Pb), total in water	0.018876 ± 0.042	mg/L		12/11/2019	COW_ASB
Magnesium (Mg), total in water	55.709 ± 0.04	mg/L		12/11/2019	COW_ASB
Manganese (Mn), total in water	0.78161 ± 0.041	mg/L		12/11/2019	COW_ASB
Nickel (Ni), total in water	<0.000021 ± 0.046	mg/L		12/11/2019	COW_ASB
Phosphorus (P), total in water	<0.0012 ± 0.033	mg/L		12/11/2019	COW_ASB
Potassium (K), total in water	18.405 ± 0.1	mg/L		12/11/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		12/11/2019	COW_ASB
Sodium (Na), total in water	12.780 ± 0.082	mg/L		12/11/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		12/11/2019	COW_ASB
Zinc (Zn), total in water	0.16549 ± 0.049	mg/L		12/11/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	790.00 ± 0.076	NTU		10/3/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	497.00	mg/L		10/29/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		10/29/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		10/29/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	408.00	mg/L		10/29/2019	ALS

**Sample No.** 245405  
**Sample Description:** SWQ25-1  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.02	mg/L		10/29/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	15.100	mg/L		10/29/2019	ALS
<b>Cyanide</b>					
Cyanide, Total in water	0.0011	mg/L		10/29/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		10/29/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	23.00	mg/L		10/29/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by QT97	225	MPN/100mL		10/29/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by QT97	133	MPN/100mL		10/29/2019	ALS
Total Coliforms by QT97	>2420	MPN/100mL		10/29/2019	ALS
<b>Carbons</b>					
Dissolved Inorganic Carbon	49.4	mg/L		12/10/2019	ALS
Dissolved Organic Carbon	13.3	mg/L		12/10/2019	ALS
Total Dissolved Carbon by Calculation	62.7	mg/L		12/10/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS

**Sample No.** 245405  
**Sample Description:** SWQ25-1  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0055	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000160	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00218	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0561	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0230	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000018	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	46.3000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00020	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00034	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00243	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	214.0	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0440	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000083	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0558	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	23.9000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0639	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.001180	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00498	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.149	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	9.5100	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0009	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000255	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	10.9000	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	12.5000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.1860	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	7.2900	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00014	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00057	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.001960	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00356	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0019	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00050	mg/L		3/4/2020	ALS

**Sample No.** 245405  
**Sample Description:** SWQ25-1  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration  
Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
COD by Closed Reflux Method

Conductivity by Electrometric Method  
Hardness, Calcium & Total by Calculation  
pH in Laboratory by Electrometric Method  
Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

#### Reference Method

Modified from SM 2320 B. Titration Method  
Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
Modified from SM 5210 B. 5-Day BOD Test  
Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
Modified from EPA Methods 200.8  
Modified from SM 4500 H+B (Electrometric Method)  
Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C  
Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

### Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.

- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

1120 Waverley Street

Winnipeg MB R3E 3S8

Phone : 204-986-2384

Email : ckozak@winnipeg.ca

## Certificate of Analysis for Sample No. 245406 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 245406  
**Sample Description:** SWQ25-12  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	194 ± 0.04	mg/L		10/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		10/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		10/2/2019	COW_ASB
Alkalinity, total to pH 4.5	194 ± 0.028	mg/L		10/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		10/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.004 ± 0.165	mg/L		10/2/2019	COW_ASB
Nitrate+Nitrite Nitrogen	0.035 ± 0.078	mg/L		10/2/2019	COW_ASB
Phosphorus, dissolved (0.45um)	0.166 ± 0.075	mg/L		10/2/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	23.6 ± 0.06	mg/L		10/11/2019	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	<0.4	mg/L		10/11/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	<4 ± 0.17	mg/L		10/8/2019	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	80.0 ± 0.068	mg/L		10/11/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	456 ± 0.023	uS		10/9/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	137 ± 0.065	mg/L		12/12/2019	COW_ASB
Total Hardness, calculated in water	271	mg/L		12/12/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.65 ± 0.065	units		10/1/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	295 ± 0.065	mg/L		10/4/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	420 ± 0.062	mg/L		10/2/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	125 ± 8.40%	mg/L		10/9/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	1.2	mg/L		10/9/2019	COW_ASB

**Sample No.** 245406  
**Sample Description:** SWQ25-12  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	16.5 ± 0.085	mg/L		10/8/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	1.2 ± 0.15	mg/L		10/7/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	19.7 ± 0.085	mg/L		10/8/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		12/11/2019	COW_ASB
Arsenic (As), total in water	<0.000017 ± 0.042	mg/L		12/11/2019	COW_ASB
Barium (Ba), total in water	0.072370 ± 0.057	mg/L		12/11/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		12/11/2019	COW_ASB
Boron (B), total in water	<0.00208 ± 0.19	mg/L		12/11/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		12/11/2019	COW_ASB
Calcium (Ca), total in water	54.701 ± 0.071	mg/L		12/11/2019	COW_ASB
Chromium (Cr), total in water	0.00017 ± 0.044	mg/L		12/11/2019	COW_ASB
Copper (Cu), total in water	<0.000022 ± 0.035	mg/L		12/11/2019	COW_ASB
Iron (Fe), total in water	3.7751 ± 0.043	mg/L		12/11/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		12/11/2019	COW_ASB
Magnesium (Mg), total in water	32.729 ± 0.04	mg/L		12/11/2019	COW_ASB
Manganese (Mn), total in water	0.14919 ± 0.041	mg/L		12/11/2019	COW_ASB
Nickel (Ni), total in water	<0.000021 ± 0.046	mg/L		12/11/2019	COW_ASB
Phosphorus (P), total in water	<0.0012 ± 0.033	mg/L		12/11/2019	COW_ASB
Potassium (K), total in water	14.463 ± 0.1	mg/L		12/11/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		12/11/2019	COW_ASB
Sodium (Na), total in water	24.380 ± 0.082	mg/L		12/11/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		12/11/2019	COW_ASB
Zinc (Zn), total in water	0.02296 ± 0.049	mg/L		12/11/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	59.50 ± 0.076	NTU		10/3/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	249.00	mg/L		10/29/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		10/29/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		10/29/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	204.00	mg/L		10/29/2019	ALS

**Sample No.** 245406  
**Sample Description:** SWQ25-12  
**Sample Date:** September 30, 2019  
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**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.05	mg/L		10/29/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	27.000	mg/L		10/29/2019	ALS
<b>Cyanide</b>					
Cyanide, Total in water	0.0012	mg/L		10/29/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		10/29/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	33.10	mg/L		10/29/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by QT97	1730	MPN/100mL		10/29/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by QT97	1050	MPN/100mL		10/29/2019	ALS
Total Coliforms by QT97	>2420	MPN/100mL		10/29/2019	ALS
<b>Carbons</b>					
Dissolved Inorganic Carbon	40.8	mg/L		12/10/2019	ALS
Dissolved Organic Carbon	14.2	mg/L		12/10/2019	ALS
Total Dissolved Carbon by Calculation	55.0	mg/L		12/10/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	0.00061	mg/L		3/4/2020	ALS

**Sample No.** 245406  
**Sample Description:** SWQ25-12  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0036	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000180	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00284	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0343	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0430	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000006	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	41.5000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00022	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00039	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00230	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	215.6	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.2070	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000067	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0463	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	27.2000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0570	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.000953	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00283	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.184	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	10.3000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0007	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000156	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	7.4500	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	24.9000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.2090	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	10.6000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00044	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.002670	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00433	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0045	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00049	mg/L		3/4/2020	ALS

**Sample No.** 245406  
**Sample Description:** SWQ25-12  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration  
Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
COD by Closed Reflux Method

Conductivity by Electrometric Method  
Hardness, Calcium & Total by Calculation  
pH in Laboratory by Electrometric Method  
Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

#### Reference Method

Modified from SM 2320 B. Titration Method  
Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
Modified from SM 5210 B. 5-Day BOD Test  
Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
Modified from EPA Methods 200.8  
Modified from SM 4500 H+B (Electrometric Method)  
Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 B. Total Solids Dried at 103-105°C  
Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C

Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

### Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.

- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

1120 Waverley Street

Winnipeg MB R3E 3S8

Phone : 204-986-2384

Email : ckozak@winnipeg.ca

## Certificate of Analysis for Sample No. 245407 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 245407  
**Sample Description:** SWQ25-2  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	271 ± 0.04	mg/L	ANXHT	10/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L	ANXHT	10/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L	ANXHT	10/2/2019	COW_ASB
Alkalinity, total to pH 4.5	271 ± 0.028	mg/L	ANXHT	10/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L	ANXHT	10/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	>2.000 ± 0.165	mg/L		10/2/2019	COW_ASB
Nitrate+Nitrite Nitrogen	0.829 ± 0.078	mg/L		10/2/2019	COW_ASB
Phosphorus, dissolved (0.45um)	0.344 ± 0.075	mg/L		10/2/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	117 ± 0.06	mg/L		1/28/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	<0.4	mg/L		10/11/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	8 ± 0.17	mg/L		10/8/2019	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	99.0 ± 0.068	mg/L		10/11/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	1040 ± 0.023	uS		10/9/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	178 ± 0.065	mg/L		12/12/2019	COW_ASB
Total Hardness, calculated in water	483	mg/L		12/12/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.81 ± 0.065	units		10/1/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	675 ± 0.065	mg/L		10/4/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	778 ± 0.062	mg/L		10/2/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	103 ± 8.40%	mg/L		10/9/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	5.3	mg/L		10/9/2019	COW_ASB

**Sample No.** 245407  
**Sample Description:** SWQ25-2  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	30.8 ± 0.085	mg/L		10/8/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	6.1 ± 0.15	mg/L		10/7/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	33.0 ± 0.085	mg/L		10/8/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		12/11/2019	COW_ASB
Arsenic (As), total in water	<0.000017 ± 0.042	mg/L		12/11/2019	COW_ASB
Barium (Ba), total in water	0.083958 ± 0.057	mg/L		12/11/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		12/11/2019	COW_ASB
Boron (B), total in water	<0.00208 ± 0.19	mg/L		12/11/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		12/11/2019	COW_ASB
Calcium (Ca), total in water	71.129 ± 0.071	mg/L		12/11/2019	COW_ASB
Chromium (Cr), total in water	<0.00004 ± 0.044	mg/L		12/11/2019	COW_ASB
Copper (Cu), total in water	<0.000022 ± 0.035	mg/L		12/11/2019	COW_ASB
Iron (Fe), total in water	1.2206 ± 0.043	mg/L		12/11/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		12/11/2019	COW_ASB
Magnesium (Mg), total in water	74.179 ± 0.04	mg/L		12/11/2019	COW_ASB
Manganese (Mn), total in water	0.09751 ± 0.041	mg/L		12/11/2019	COW_ASB
Nickel (Ni), total in water	<0.000021 ± 0.046	mg/L		12/11/2019	COW_ASB
Phosphorus (P), total in water	<0.0012 ± 0.033	mg/L		12/11/2019	COW_ASB
Potassium (K), total in water	48.640 ± 0.1	mg/L		12/11/2019	COW_ASB
Selenium (Se), total in water	0.00206 ± 0.15	mg/L		12/11/2019	COW_ASB
Sodium (Na), total in water	80.875 ± 0.082	mg/L		12/11/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		12/11/2019	COW_ASB
Zinc (Zn), total in water	0.03418 ± 0.049	mg/L		12/11/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	55.40 ± 0.076	NTU		10/3/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	332.00	mg/L		10/29/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		10/29/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		10/29/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	272.00	mg/L		10/29/2019	ALS

**Sample No.** 245407  
**Sample Description:** SWQ25-2  
**Sample Date:** September 30, 2019  
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**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	2.39	mg/L		10/29/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	120.000	mg/L		10/29/2019	ALS
<b>Cyanide</b>					
Cyanide, Total in water	0.0012	mg/L		10/29/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		10/29/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	126.00	mg/L		10/29/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by QT97	727	MPN/100mL		10/29/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by QT97	866	MPN/100mL		10/29/2019	ALS
Total Coliforms by QT97	>2420	MPN/100mL		10/29/2019	ALS
<b>Carbons</b>					
Dissolved Inorganic Carbon	56.8	mg/L		12/10/2019	ALS
Dissolved Organic Carbon	28.6	mg/L		12/10/2019	ALS
Total Dissolved Carbon by Calculation	85.4	mg/L		12/10/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS

**Sample No.** 245407  
**Sample Description:** SWQ25-2  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0031	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000300	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00585	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0656	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.2720	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000016	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	56.2000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00114	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00134	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00268	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	369.7	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0770	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000060	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0937	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	55.7000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0494	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.003500	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.01280	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.416	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	38.4000	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0033	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000382	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	6.7200	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	64.0000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.3410	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	40.7000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	0.00012	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00061	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.004180	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00380	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0038	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00093	mg/L		3/4/2020	ALS

**Sample No.** 245407  
**Sample Description:** SWQ25-2  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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**Reference Information**

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

**Glossary of Terms:**

ANXHT : Analyzed past holding time

**Accredited Test Methods Used:**

Test Method

Alkalinity by Titration  
 Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis  
 BOD5 Seeded by Automated Method  
 COD by Closed Reflux Method

Conductivity by Electrometric Method  
 Hardness, Calcium & Total by Calculation  
 pH in Laboratory by Electrometric Method  
 Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis  
 Total Suspended Solids by Gravimetric Analysis  
 Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion  
 Total Nitrogen by High Temperature Combustion  
 Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS  
 Turbidity in Laboratory by Nephelometric Method

**Additional Test Methods Used:**

Test Method

Chloride by Mercuric Thiocyanate Method  
 Sulfate by HACH Method

Reference Method

Modified from SM 2320 B. Titration Method  
 Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
 Modified from SM 5210 B. 5-Day BOD Test  
 Modified from SM 5220 D. Closed Reflux, Colorimetric Method  
 Modified from SM 2510 B. Laboratory Measurement  
 Modified from EPA Methods 200.8  
 Modified from SM 4500 H+B (Electrometric Method)  
 Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C  
 Modified from SM 2540 B. Total Solids Dried at 103-105°C  
 Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C  
 Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis  
 Modified from SM 5310 B. High Temperature Combustion  
 Modified from SM 5310 B. High Temperature Combustion  
 Modified from SM 5310 B. High Temperature Combustion  
 Modified from EPA Methods 200.8  
 Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113  
 Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4  
 COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

1120 Waverley Street

Winnipeg MB R3E 3S8

Phone : 204-986-2384

Email : ckozak@winnipeg.ca

## Certificate of Analysis for Sample No. 245408 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 245408  
**Sample Description:** SWQ25-100  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	323 ± 0.04	mg/L		10/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		10/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		10/2/2019	COW_ASB
Alkalinity, total to pH 4.5	323 ± 0.028	mg/L		10/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		10/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	0.005 ± 0.165	mg/L		10/2/2019	COW_ASB
Nitrate+Nitrite Nitrogen	0.025 ± 0.078	mg/L		10/2/2019	COW_ASB
Phosphorus, dissolved (0.45um)	0.107 ± 0.075	mg/L		10/2/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	16.8 ± 0.06	mg/L		10/11/2019	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	<0.4	mg/L		10/11/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	4 ± 0.17	mg/L		10/8/2019	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	245 ± 0.068	mg/L		10/11/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	501 ± 0.023	uS		10/9/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	317 ± 0.065	mg/L		12/12/2019	COW_ASB
Total Hardness, calculated in water	599	mg/L		12/12/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.59 ± 0.065	units		10/1/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	320 ± 0.065	mg/L		10/4/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	1780 ± 0.062	mg/L		10/2/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	1460 ± 8.40%	mg/L		10/9/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	3.7	mg/L		10/9/2019	COW_ASB

**Sample No.** 245408  
**Sample Description:** SWQ25-100  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	15.8 ± 0.085	mg/L		10/8/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	3.7 ± 0.15	mg/L		10/7/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	46.4 ± 0.085	mg/L		10/8/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		12/11/2019	COW_ASB
Arsenic (As), total in water	0.001446 ± 0.042	mg/L		12/11/2019	COW_ASB
Barium (Ba), total in water	0.39398 ± 0.057	mg/L		12/11/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		12/11/2019	COW_ASB
Boron (B), total in water	<0.00208 ± 0.19	mg/L		12/11/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		12/11/2019	COW_ASB
Calcium (Ca), total in water	127.01 ± 0.071	mg/L		12/11/2019	COW_ASB
Chromium (Cr), total in water	0.07839 ± 0.044	mg/L		12/11/2019	COW_ASB
Copper (Cu), total in water	0.039311 ± 0.035	mg/L		12/11/2019	COW_ASB
Iron (Fe), total in water	56.446 ± 0.043	mg/L		12/11/2019	COW_ASB
Lead (Pb), total in water	0.032424 ± 0.042	mg/L		12/11/2019	COW_ASB
Magnesium (Mg), total in water	68.548 ± 0.04	mg/L		12/11/2019	COW_ASB
Manganese (Mn), total in water	1.1244 ± 0.041	mg/L		12/11/2019	COW_ASB
Nickel (Ni), total in water	0.020532 ± 0.046	mg/L		12/11/2019	COW_ASB
Phosphorus (P), total in water	0.3140 ± 0.033	mg/L		12/11/2019	COW_ASB
Potassium (K), total in water	22.985 ± 0.1	mg/L		12/11/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		12/11/2019	COW_ASB
Sodium (Na), total in water	14.089 ± 0.082	mg/L		12/11/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		12/11/2019	COW_ASB
Zinc (Zn), total in water	0.23066 ± 0.049	mg/L		12/11/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	1010.00 ± 0.076	NTU		10/3/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	300.00	mg/L		10/29/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		10/29/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		10/29/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	246.00	mg/L		10/29/2019	ALS

**Sample No.** 245408  
**Sample Description:** SWQ25-100  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.03	mg/L		10/29/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	14.200	mg/L		10/29/2019	ALS
<b>Cyanide</b>					
Cyanide, Total in water	<0.0010	mg/L		10/29/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		10/29/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	22.20	mg/L		10/29/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by QT97	108	MPN/100mL		10/29/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by QT97	96	MPN/100mL		10/29/2019	ALS
Total Coliforms by QT97	>2420	MPN/100mL		10/29/2019	ALS
<b>Carbons</b>					
Dissolved Inorganic Carbon	48.7	mg/L		12/10/2019	ALS
Dissolved Organic Carbon	16.2	mg/L		12/10/2019	ALS
Total Dissolved Carbon by Calculation	65.0	mg/L		12/10/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS

**Sample No.** 245408  
**Sample Description:** SWQ25-100  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	0.0041	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	0.000140	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	0.00215	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0571	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	0.0240	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	0.000009	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	48.5000	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	0.00018	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	0.00036	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	0.00251	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	219.5	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	0.0430	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	0.000079	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	0.0563	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	23.9000	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	0.0652	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	0.001100	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	0.00286	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	0.163	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	9.8400	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	0.0009	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	0.000169	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	9.2200	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	12.1000	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.1930	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	5.4900	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	0.00040	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	0.002030	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	0.00358	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	0.0036	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	0.00051	mg/L		3/4/2020	ALS

**Sample No.** 245408  
**Sample Description:** SWQ25-100  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration  
Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
COD by Closed Reflux Method

Conductivity by Electrometric Method  
Hardness, Calcium & Total by Calculation  
pH in Laboratory by Electrometric Method  
Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

#### Reference Method

Modified from SM 2320 B. Titration Method  
Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
Modified from SM 5210 B. 5-Day BOD Test  
Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
Modified from EPA Methods 200.8  
Modified from SM 4500 H+B (Electrometric Method)  
Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C  
Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

### Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.

- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

Solid Waste Services Division

1120 Waverley Street

Winnipeg MB R3E 3S8

Phone : 204-986-2384

Email : ckozak@winnipeg.ca

## Certificate of Analysis for Sample No. 245409 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 245409  
**Sample Description:** SWQ25-Trip Blank  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	<3.0 ± 0.04	mg/L	ANXHT	10/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L	ANXHT	10/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L	ANXHT	10/2/2019	COW_ASB
Alkalinity, total to pH 4.5	<3.0 ± 0.028	mg/L	ANXHT	10/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L	ANXHT	10/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	<0.003 ± 0.165	mg/L		10/2/2019	COW_ASB
Nitrate+Nitrite Nitrogen	<0.003 ± 0.078	mg/L		10/2/2019	COW_ASB
Phosphorus, dissolved (0.45um)	<0.013 ± 0.075	mg/L		10/2/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	<0.4 ± 0.06	mg/L		1/28/2020	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	<0.4	mg/L		2/5/2020	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	<4 ± 0.17	mg/L		10/8/2019	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	<20.0 ± 0.068	mg/L		10/11/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	3.1 ± 0.023	uS		10/9/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	<0.4 ± 0.065	mg/L		12/12/2019	COW_ASB
Total Hardness, calculated in water	<0.4	mg/L		12/12/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	5.86 ± 0.065	units		10/1/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	5 ± 0.065	mg/L		10/4/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	16 ± 0.062	mg/L		10/2/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	11 ± 8.40%	mg/L		10/9/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	<0.2	mg/L		10/9/2019	COW_ASB

**Sample No.** 245409  
**Sample Description:** SWQ25-Trip Blank  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	2.0 ± 0.085	mg/L		10/8/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	<0.3 ± 0.15	mg/L		10/7/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	1.5 ± 0.085	mg/L		10/8/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		12/11/2019	COW_ASB
Arsenic (As), total in water	<0.000017 ± 0.042	mg/L		12/11/2019	COW_ASB
Barium (Ba), total in water	<0.000014 ± 0.057	mg/L		12/11/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		12/11/2019	COW_ASB
Boron (B), total in water	<0.00208 ± 0.19	mg/L		12/11/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		12/11/2019	COW_ASB
Calcium (Ca), total in water	0.052 ± 0.071	mg/L		12/11/2019	COW_ASB
Chromium (Cr), total in water	<0.00004 ± 0.044	mg/L		12/11/2019	COW_ASB
Copper (Cu), total in water	0.032210 ± 0.035	mg/L		12/11/2019	COW_ASB
Iron (Fe), total in water	0.34591 ± 0.043	mg/L		12/11/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		12/11/2019	COW_ASB
Magnesium (Mg), total in water	<0.002 ± 0.04	mg/L		12/11/2019	COW_ASB
Manganese (Mn), total in water	<0.00002 ± 0.041	mg/L		12/11/2019	COW_ASB
Nickel (Ni), total in water	<0.000021 ± 0.046	mg/L		12/11/2019	COW_ASB
Phosphorus (P), total in water	<0.0012 ± 0.033	mg/L		12/11/2019	COW_ASB
Potassium (K), total in water	0.125 ± 0.1	mg/L		12/11/2019	COW_ASB
Selenium (Se), total in water	<0.00019 ± 0.15	mg/L		12/11/2019	COW_ASB
Sodium (Na), total in water	<0.005 ± 0.082	mg/L		12/11/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		12/11/2019	COW_ASB
Zinc (Zn), total in water	<0.00011 ± 0.049	mg/L		12/11/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	1.78 ± 0.076	NTU		10/3/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	<1.20	mg/L		10/29/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		10/29/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		10/29/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	<1.00	mg/L		10/29/2019	ALS

**Sample No.** 245409  
**Sample Description:** SWQ25-Trip Blank  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	<0.01	mg/L		10/29/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	<0.500	mg/L		10/29/2019	ALS
<b>Cyanide</b>					
Cyanide, Total in water	<0.1000	mg/L		10/29/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		10/29/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	<0.30	mg/L		10/29/2019	ALS
<b>Carbons</b>					
Dissolved Inorganic Carbon	<0.5	mg/L		12/10/2019	ALS
Dissolved Organic Carbon	<0.5	mg/L		12/10/2019	ALS
Total Dissolved Carbon by Calculation	<1.0	mg/L		12/10/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS

**Sample No.** 245409  
**Sample Description:** SWQ25-Trip Blank  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	<0.000100	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	<0.0001	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	<0.0100	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	<0.000005	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	<0.0500	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	<0.1	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	<0.0100	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	<0.0050	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	<0.0001	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	<0.00050	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	<0.030	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	<0.0500	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	<0.0002	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	<0.0500	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	<0.0500	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	<0.0001	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	<0.5000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	<0.00030	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	<0.00050	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	<0.00020	mg/L		3/4/2020	ALS

**Sample No.** 245409  
**Sample Description:** SWQ25-Trip Blank  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
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**Reference Information**

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

**Glossary of Terms:**

ANXHT : Analyzed past holding time

**Accredited Test Methods Used:**

**Test Method**

Alkalinity by Titration  
 Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis  
 BOD5 Seeded by Automated Method  
 COD by Closed Reflux Method

Conductivity by Electrometric Method  
 Hardness, Calcium & Total by Calculation  
 pH in Laboratory by Electrometric Method  
 Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis  
 Total Suspended Solids by Gravimetric Analysis  
 Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion  
 Total Nitrogen by High Temperature Combustion  
 Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS  
 Turbidity in Laboratory by Nephelometric Method

**Additional Test Methods Used:**

**Test Method**

Chloride by Mercuric Thiocyanate Method  
 Sulfate by HACH Method

**Reference Method**

Modified from SM 2320 B. Titration Method  
 Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
 Modified from SM 5210 B. 5-Day BOD Test  
 Modified from SM 5220 D. Closed Reflux, Colorimetric Method  
 Modified from SM 2510 B. Laboratory Measurement  
 Modified from EPA Methods 200.8  
 Modified from SM 4500 H+B (Electrometric Method)  
 Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C  
 Modified from SM 2540 B. Total Solids Dried at 103-105°C  
 Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C  
 Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis  
 Modified from SM 5310 B. High Temperature Combustion  
 Modified from SM 5310 B. High Temperature Combustion  
 Modified from SM 5310 B. High Temperature Combustion  
 Modified from EPA Methods 200.8  
 Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

**Reference Method**

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113  
 Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

**Laboratories:**

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4  
 COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----





Report To:

Report Date: March 5, 2020

**Mr. Chris Kozak**

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## Certificate of Analysis for Sample No. 245410 v1

Date Authorised: March 5, 2020

Total Number of Pages: 8

This report is issued under the authority of:

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Re-Issue Comments**

Document formatting was required for the CofA re-issue.

**Sample No.** 245410  
**Sample Description:** SWQ25-Field Blank  
**Sample Date:** September 30, 2019  
**Sample Received:** October 1, 2019  
**Sample Plan:** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Alkalinity by Titration</b>					
Alkalinity, bicarbonate, calculated	3.0 ± 0.04	mg/L		10/2/2019	COW_ASB
Alkalinity, carbonate, calculated	<3.0	mg/L		10/2/2019	COW_ASB
Alkalinity, hydroxide, calculated	<3.0 ± 0.04	mg/L		10/2/2019	COW_ASB
Alkalinity, total to pH 4.5	3.0 ± 0.028	mg/L		10/2/2019	COW_ASB
Alkalinity, phenolphthalein to pH 8.3	<3.0 ± 0.028	mg/L		10/2/2019	COW_ASB
<b>Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis</b>					
Ammonia, Low	<0.003 ± 0.165	mg/L		10/2/2019	COW_ASB
Nitrate+Nitrite Nitrogen	<0.003 ± 0.078	mg/L		10/2/2019	COW_ASB
Phosphorus, dissolved (0.45um)	<0.013 ± 0.075	mg/L		10/2/2019	COW_ASB
<b>Chloride by Mercuric Thiocyanate Method</b>					
Chloride, dissolved in Water	<0.4 ± 0.06	mg/L		10/16/2019	COW_ASB
<b>Sulfate by HACH Method</b>					
Sulfate, dissolved in water	130	mg/L		10/11/2019	COW_ASB
<b>BOD5 Seeded by Automated Method</b>					
Biochemical Oxygen Demand Seeded	<4 ± 0.17	mg/L		10/8/2019	COW_ASB
<b>COD by Closed Reflux Method</b>					
Chemical Oxygen Demand	<20.0 ± 0.068	mg/L		10/11/2019	COW_ASB
<b>Conductivity by Electrometric Method</b>					
Specific Conductance at 25 degrees C in water	1.5 ± 0.023	uS		10/9/2019	COW_ASB
<b>Hardness, Calcium &amp; Total by Calculation</b>					
Calcium Hardness, calculated in water	0.4 ± 0.065	mg/L		12/12/2019	COW_ASB
Total Hardness, calculated in water	<0.4	mg/L		12/12/2019	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	5.87 ± 0.065	units		10/1/2019	COW_ASB
<b>Dissolved Solids by Gravimetric Analysis</b>					
Total Dissolved Solid	<3 ± 0.065	mg/L		10/4/2019	COW_ASB
<b>Total Solids by Gravimetric Analysis</b>					
Total Solid	6 ± 0.062	mg/L		10/2/2019	COW_ASB
<b>Total Suspended Solids by Gravimetric Analysis</b>					
Total Suspended Solids, calculated	9 ± 8.40%	mg/L		10/9/2019	COW_ASB
<b>Total Kjeldahl Nitrogen Calculated</b>					
Total Kjeldahl Nitrogen, calculated	<0.2	mg/L		10/9/2019	COW_ASB

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Test Parameters	Result	Units	Comments	Completed	Lab #
<b>Dissolved Organic Carbon by High Temperature Combustion</b>					
Dissolved Organic Carbon, as NPOC	1.0 ± 0.085	mg/L		10/8/2019	COW_ASB
<b>Total Nitrogen by High Temperature Combustion</b>					
Total Nitrogen	<0.3 ± 0.15	mg/L		10/7/2019	COW_ASB
<b>Total Organic Carbon by High Temperature Combustion</b>					
Total Organic Carbon as NPOC	1.0 ± 0.085	mg/L		10/8/2019	COW_ASB
<b>Metals Total in Water by ICP-MS</b>					
Antimony (Sb), total in water	<0.000025 ± 0.033	mg/L		12/11/2019	COW_ASB
Arsenic (As), total in water	<0.000017 ± 0.042	mg/L		12/11/2019	COW_ASB
Barium (Ba), total in water	<0.000014 ± 0.057	mg/L		12/11/2019	COW_ASB
Beryllium (Be), total in water	<0.00003 ± 0.13	mg/L		12/11/2019	COW_ASB
Boron (B), total in water	<0.00208 ± 0.19	mg/L		12/11/2019	COW_ASB
Cadmium (Cd), total in water	<0.000007 ± 0.039	mg/L		12/11/2019	COW_ASB
Calcium (Ca), total in water	0.163 ± 0.071	mg/L		12/11/2019	COW_ASB
Chromium (Cr), total in water	<0.00004 ± 0.044	mg/L		12/11/2019	COW_ASB
Copper (Cu), total in water	<0.000022 ± 0.035	mg/L		12/11/2019	COW_ASB
Iron (Fe), total in water	0.11576 ± 0.043	mg/L		12/11/2019	COW_ASB
Lead (Pb), total in water	<0.000065 ± 0.042	mg/L		12/11/2019	COW_ASB
Magnesium (Mg), total in water	<0.002 ± 0.04	mg/L		12/11/2019	COW_ASB
Manganese (Mn), total in water	<0.00002 ± 0.041	mg/L		12/11/2019	COW_ASB
Nickel (Ni), total in water	<0.000021 ± 0.046	mg/L		12/11/2019	COW_ASB
Phosphorus (P), total in water	<0.0012 ± 0.033	mg/L		12/11/2019	COW_ASB
Potassium (K), total in water	0.196 ± 0.1	mg/L		12/11/2019	COW_ASB
Selenium (Se), total in water	0.00325 ± 0.15	mg/L		12/11/2019	COW_ASB
Sodium (Na), total in water	<0.005 ± 0.082	mg/L		12/11/2019	COW_ASB
Uranium (U), total in water	<0.000032 ± 0.044	mg/L		12/11/2019	COW_ASB
Zinc (Zn), total in water	<0.00011 ± 0.049	mg/L		12/11/2019	COW_ASB
<b>Turbidity in Laboratory by Nephelometric Method</b>					
Turbidity in water	1.97 ± 0.076	NTU		10/3/2019	COW_ASB
<b>Alkalinity, Bicarbonate</b>					
Alkalinity, bicarbonate	1.20	mg/L		10/29/2019	ALS
<b>Alkalinity, Carbonate</b>					
Alkalinity, carbonate	<0.60	mg/L		10/29/2019	ALS
<b>Alkalinity, Hydroxide</b>					
Alkalinity, hydroxide	<0.34	mg/L		10/29/2019	ALS
<b>Total Alkalinity as CaCO3</b>					
Alkalinity, total (as CaCO3)	1.00	mg/L		10/29/2019	ALS

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<b>Ammonia by colour</b>					
Ammonia, total (as N) in water	0.02	mg/L		10/29/2019	ALS
<b>Chloride in Water by IC (Low Level)</b>					
Chloride in water by IC (Low Level)	<0.500	mg/L		10/29/2019	ALS
<b>Cyanide</b>					
Cyanide, Total in water	0.0018	mg/L		10/29/2019	ALS
<b>Mercury, Dissolved</b>					
Mercury (Hg) dissolved in water	<0.000005	pg/L		10/29/2019	ALS
<b>Sulfate in Water by IC</b>					
Sulfate in water by IC	<0.30	mg/L		10/29/2019	ALS
<b>Fecal Coliform by MPN QT97</b>					
Fecal Coliform by QT97	<1	MPN/100mL		10/29/2019	ALS
<b>Total Coliform and E.coli QT97</b>					
Escherichia Coliform by QT97	<1	MPN/100mL		10/29/2019	ALS
Total Coliforms by QT97	<1	MPN/100mL		10/29/2019	ALS
<b>Carbons</b>					
Dissolved Inorganic Carbon	1.3	mg/L		12/10/2019	ALS
Dissolved Organic Carbon	<0.5	mg/L		12/10/2019	ALS
Total Dissolved Carbon by Calculation	1.3	mg/L		12/10/2019	ALS
<b>Chromium +6 - Low Level</b>					
Chromium +6 Hexavalent in water	<0.00050	mg/L		3/4/2020	ALS

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<b>Total Metals by ICP-MS</b>					
Aluminum (Al), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Antimony (Sb), dissolved in water	<0.000100	mg/L		3/4/2020	ALS
Arsenic (As), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Barium (Ba), dissolved in water	0.0002	mg/L		3/4/2020	ALS
Beryllium (Be), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Bismuth (Bi), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Boron (B), dissolved in water	<0.0100	mg/L		3/4/2020	ALS
Cadmium (Cd), dissolved in water	<0.000005	mg/L		3/4/2020	ALS
Calcium (Ca), dissolved in water	0.0750	mg/L		3/4/2020	ALS
Cesium (Cs), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Chromium (Cr), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Cobalt (Co), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Copper (Cu), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Hardness dissolved in water, calculated	0.3	mg/L		3/4/2020	ALS
Iron (Fe), dissolved in water	<0.0100	mg/L		3/4/2020	ALS
Lead (Pb), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Lithium (Li), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Magnesium (Mg), dissolved in water	0.0173	mg/L		3/4/2020	ALS
Manganese (Mn), dissolved in water	<0.0001	mg/L		3/4/2020	ALS
Molybdenum (Mo), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Nickel (Ni), dissolved in water	<0.00050	mg/L		3/4/2020	ALS
Phosphorus (P), dissolved in water	<0.030	mg/L		3/4/2020	ALS
Potassium (K), dissolved in water	<0.0500	mg/L		3/4/2020	ALS
Rubidium (Rb), dissolved in water	<0.0002	mg/L		3/4/2020	ALS
Selenium (Se), dissolved in water	<0.000050	mg/L		3/4/2020	ALS
Silicon (Si), dissolved in water	<0.0500	mg/L		3/4/2020	ALS
Silver (Ag), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Sodium (Na), dissolved in water	0.0650	mg/L		3/4/2020	ALS
Strontium (Sr), dissolved in water	0.0005	mg/L		3/4/2020	ALS
Sulfur (S), dissolved in water	<0.5000	mg/L		3/4/2020	ALS
Tellurium (Te), dissolved in water	<0.00020	mg/L		3/4/2020	ALS
Thallium (Tl), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Thorium (Th), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Tin (Sn), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Titanium (Ti), dissolved in water	<0.00030	mg/L		3/4/2020	ALS
Tungsten (W), dissolved in water	<0.00010	mg/L		3/4/2020	ALS
Uranium (U), dissolved in water	<0.000010	mg/L		3/4/2020	ALS
Vanadium (V), dissolved in water	<0.00050	mg/L		3/4/2020	ALS
Zinc (Zn), dissolved in water	<0.0010	mg/L		3/4/2020	ALS
Zirconium (Zr), dissolved in water	<0.00020	mg/L		3/4/2020	ALS

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Test Parameters	Result	Units	Comments	Completed	Lab #
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## Reference Information

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

### Accredited Test Methods Used:

#### Test Method

Alkalinity by Titration  
Ammonia, Nitrogen and Phosphorus by Flow Injection Analysis

BOD5 Seeded by Automated Method  
COD by Closed Reflux Method

Conductivity by Electrometric Method  
Hardness, Calcium & Total by Calculation  
pH in Laboratory by Electrometric Method  
Dissolved Solids by Gravimetric Analysis

Total Solids by Gravimetric Analysis

Total Suspended Solids by Gravimetric Analysis

Total Kjeldahl Nitrogen Calculated

Dissolved Organic Carbon by High Temperature Combustion

Total Nitrogen by High Temperature Combustion

Total Organic Carbon by High Temperature Combustion

Metals Total in Water by ICP-MS

Turbidity in Laboratory by Nephelometric Method

#### Reference Method

Modified from SM 2320 B. Titration Method  
Modified from SM 4500-NH3 H. NO3 I & P G. Flow Injection Analysis  
Modified from SM 5210 B. 5-Day BOD Test  
Modified from SM 5220 D. Closed Reflux, Colorimetric Method

Modified from SM 2510 B. Laboratory Measurement  
Modified from EPA Methods 200.8  
Modified from SM 4500 H+B (Electrometric Method)  
Modified from SM 2540 C. Total Dissolved Solids Dried at 180°C

Modified from SM 2540 B. Total Solids Dried at 103-105°C

Modified from SM 2540 D. Total Suspended Solids Dried at 103-105°C  
Modified from SM 5310 B. High Temperature Combustion and SM 4500-NO3 I. Flow Injection Analysis

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from SM 5310 B. High Temperature Combustion

Modified from EPA Methods 200.8

Modified from SM 2130 A. Turbidity & 2130 B. Nephelometric Method

### Additional Test Methods Used:

#### Test Method

Chloride by Mercuric Thiocyanate Method

Sulfate by HACH Method

#### Reference Method

Modified from SM 4500Cl-G Mercuric Thiocyanate & HACH Method 8113

Modified from HACH Method 8051, SulfaVer 4, & SM 4500-SO4-2 E. Turbidimetric

### Laboratories:

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg R2V 4T8

### Additional Comments:

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.

- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----