



Certificate of Analysis

Page 1 of 5

Client:	Selwyn District Council	Lab No:	2138580	DWUPv1
Contact:	Lisa Shaw	Date Received:	08-Mar-2019	
	C/- Food and Health Standards (2006) Limited	Date Reported:	14-Mar-2019	
	PO Box 7469	Quote No:	64980	
	Christchurch 8240	Order No:		
		Client Reference:	SDC- Routine Water & Heavy Metals	
		Submitted By:	Catherine McGoldrick	

Sample Type: Aqueous

Sample Name:		Rolleston Source - Illinois Drive G02009 08-Mar-2019 12:51 pm	Rolleston Source - Izone G01672 08-Mar-2019 12:28 pm	Guideline Value	Maximum Acceptable Values (MAV)
Lab Number:		2138580.1	2138580.2		
Individual Tests					
Total Arsenic	g/m ³	< 0.0011 ± 0.00074	< 0.0011 ± 0.00074	-	0.01
Total Cadmium	g/m ³	< 0.000053 ± 0.000036	< 0.000053 ± 0.000036	-	0.004
Total Chromium	g/m ³	0.00073 ± 0.00036	0.00101 ± 0.00036	-	0.05
Total Lead	g/m ³	0.000659 ± 0.000084	< 0.00011 ± 0.000074	-	0.01
Total Nickel	g/m ³	< 0.00053 ± 0.00036	< 0.00053 ± 0.00036	-	0.08
Routine Water Profile					
pH	pH Units	7.6 ± 0.2	7.8 ± 0.2	7.0 - 8.5	-
Total Alkalinity	g/m ³ as CaCO ₃	47.1 ± 2.0	46.1 ± 2.0	-	-
Free Carbon Dioxide	g/m ³ at 25°C	2.5 ± 1.2	1.38 ± 0.64	-	-
Total Hardness	g/m ³ as CaCO ₃	79.2 ± 2.9	49.0 ± 1.8	< 200	-
Electrical Conductivity (EC)	mS/m	21.8 ± 0.5	14.1 ± 0.3	-	-
Electrical Conductivity (EC)	µS/cm	218 ± 5	141 ± 3	-	-
Approx Total Dissolved Salts	g/m ³	146.1 ± 3.0	94.6 ± 2.0	< 1000	-
Total Boron	g/m ³	0.0239 ± 0.0049	0.0237 ± 0.0048	-	1.4
Total Calcium	g/m ³	23.44 ± 0.94	16.68 ± 0.67	-	-
Total Copper	g/m ³	0.00162 ± 0.00039	< 0.00053 ± 0.00036	< 1	2
Total Iron	g/m ³	0.190 ± 0.030	< 0.021 ± 0.014	< 0.2	-
Total Magnesium	g/m ³	5.02 ± 0.41	1.80 ± 0.15	-	-
Total Manganese	g/m ³	0.00888 ± 0.00096	< 0.00053 ± 0.00036	< 0.04 (Staining) < 0.10 (Taste)	0.4
Total Potassium	g/m ³	1.458 ± 0.095	0.936 ± 0.067	-	-
Total Sodium	g/m ³	15.14 ± 0.91	8.19 ± 0.50	< 200	-
Total Zinc	g/m ³	0.178 ± 0.015	0.00702 ± 0.00092	< 1.5	-
Chloride	g/m ³	16.06 ± 0.84	7.65 ± 0.50	< 250	-
Nitrate-N	g/m ³	6.98 ± 0.54	2.68 ± 0.21	-	11.3
Sulphate	g/m ³	4.13 ± 0.44	1.09 ± 0.34	< 250	-



Sample Type: Aqueous					
Sample Name:		Rolleston Source - Moore Street - Well 1 G00167 08-Mar-2019 12:05 pm	Rolleston Source - Moore Street - Well 2 G02191 08-Mar-2019 11:56 am	Guideline Value	Maximum Acceptable Values (MAV)
Lab Number:		2138580.3	2138580.4		
Individual Tests					
Total Arsenic	g/m³	< 0.0011 ± 0.00074	< 0.0011 ± 0.00074	-	0.01
Total Cadmium	g/m³	< 0.000053 ± 0.000036	< 0.000053 ± 0.000036	-	0.004
Total Chromium	g/m³	0.00095 ± 0.00036	0.00098 ± 0.00036	-	0.05
Total Lead	g/m³	< 0.00011 ± 0.000074	< 0.00011 ± 0.000074	-	0.01
Total Nickel	g/m³	< 0.00053 ± 0.00036	< 0.00053 ± 0.00036	-	0.08
Routine Water Profile					
pH	pH Units	7.8 ± 0.2	7.9 ± 0.2	7.0 - 8.5	-
Total Alkalinity	g/m³ as CaCO₃	46.9 ± 2.0	46.1 ± 2.0	-	-
Free Carbon Dioxide	g/m³ at 25°C	1.35 ± 0.63	1.29 ± 0.60	-	-
Total Hardness	g/m³ as CaCO₃	46.0 ± 1.7	46.8 ± 1.7	< 200	-
Electrical Conductivity (EC)	mS/m	13.2 ± 0.3	13.8 ± 0.3	-	-
Electrical Conductivity (EC)	µS/cm	132 ± 3	138 ± 3	-	-
Approx Total Dissolved Salts	g/m³	88.6 ± 1.9	92.4 ± 2.0	< 1000	-
Total Boron	g/m³	0.0231 ± 0.0048	0.0227 ± 0.0047	-	1.4
Total Calcium	g/m³	15.07 ± 0.61	15.70 ± 0.63	-	-
Total Copper	g/m³	< 0.00053 ± 0.00036	< 0.00053 ± 0.00036	< 1	2
Total Iron	g/m³	< 0.021 ± 0.014	< 0.021 ± 0.014	< 0.2	-
Total Magnesium	g/m³	2.03 ± 0.17	1.84 ± 0.15	-	-
Total Manganese	g/m³	< 0.00053 ± 0.00036	< 0.00053 ± 0.00036	< 0.04 (Staining) < 0.10 (Taste)	0.4
Total Potassium	g/m³	0.910 ± 0.065	0.934 ± 0.067	-	-
Total Sodium	g/m³	7.90 ± 0.48	8.13 ± 0.49	< 200	-
Total Zinc	g/m³	0.00848 ± 0.0010	0.00405 ± 0.00080	< 1.5	-
Chloride	g/m³	6.49 ± 0.46	7.24 ± 0.48	< 250	-
Nitrate-N	g/m³	1.43 ± 0.12	2.04 ± 0.16	-	11.3
Sulphate	g/m³	1.20 ± 0.35	1.21 ± 0.35	< 250	-

Sample Type: Aqueous					
Sample Name:		Rolleston Source - Overbury G01113 08-Mar-2019 11:19 am	Rolleston - Helpet G02192 08-Mar-2019 11:32 am	Guideline Value	Maximum Acceptable Values (MAV)
Lab Number:		2138580.5	2138580.6		
Individual Tests					
Total Arsenic	g/m³	< 0.0011 ± 0.00074	< 0.0011 ± 0.00074	-	0.01
Total Cadmium	g/m³	< 0.000053 ± 0.000036	< 0.000053 ± 0.000036	-	0.004
Total Chromium	g/m³	0.00086 ± 0.00036	0.00099 ± 0.00036	-	0.05
Total Lead	g/m³	< 0.00011 ± 0.000074	0.000325 ± 0.000076	-	0.01
Total Nickel	g/m³	< 0.00053 ± 0.00036	< 0.00053 ± 0.00036	-	0.08
Routine Water Profile					
pH	pH Units	7.8 ± 0.2	7.8 ± 0.2	7.0 - 8.5	-
Total Alkalinity	g/m³ as CaCO₃	47.8 ± 2.1	51.4 ± 2.2	-	-
Free Carbon Dioxide	g/m³ at 25°C	1.52 ± 0.71	1.48 ± 0.69	-	-
Total Hardness	g/m³ as CaCO₃	57.4 ± 2.1	48.6 ± 1.8	< 200	-
Electrical Conductivity (EC)	mS/m	17.9 ± 0.4	14.7 ± 0.4	-	-
Electrical Conductivity (EC)	µS/cm	179 ± 4	147 ± 4	-	-
Approx Total Dissolved Salts	g/m³	119.8 ± 2.5	98.4 ± 2.1	< 1000	-
Total Boron	g/m³	0.0223 ± 0.0047	0.0216 ± 0.0046	-	1.4
Total Calcium	g/m³	19.20 ± 0.77	15.82 ± 0.64	-	-
Total Copper	g/m³	< 0.00053 ± 0.00036	0.00151 ± 0.00039	< 1	2
Total Iron	g/m³	< 0.021 ± 0.014	< 0.021 ± 0.014	< 0.2	-
Total Magnesium	g/m³	2.29 ± 0.19	2.21 ± 0.18	-	-
Total Manganese	g/m³	< 0.00053 ± 0.00036	< 0.00053 ± 0.00036	< 0.04 (Staining) < 0.10 (Taste)	0.4
Total Potassium	g/m³	1.096 ± 0.075	0.932 ± 0.067	-	-
Total Sodium	g/m³	10.94 ± 0.66	8.67 ± 0.53	< 200	-
Total Zinc	g/m³	0.00763 ± 0.00096	0.0166 ± 0.0016	< 1.5	-
Chloride	g/m³	12.95 ± 0.71	7.85 ± 0.51	< 250	-
Nitrate-N	g/m³	4.16 ± 0.32	1.97 ± 0.16	-	11.3
Sulphate	g/m³	2.09 ± 0.36	1.70 ± 0.36	< 250	-

Sample Type: Aqueous				
Sample Name:		Rolleston Source - Westland Place G01874	Guideline Value	Maximum Acceptable Values (MAV)
Lab Number:		08-Mar-2019		
		2138580.7		
Individual Tests				
Total Arsenic	g/m³	< 0.0011 ± 0.00074	-	0.01
Total Cadmium	g/m³	< 0.000053 ± 0.000036	-	0.004
Total Chromium	g/m³	0.00100 ± 0.00036	-	0.05
Total Lead	g/m³	< 0.00011 ± 0.000074	-	0.01
Total Nickel	g/m³	< 0.00053 ± 0.00036	-	0.08
Routine Water Profile				
pH	pH Units	7.8 ± 0.2	7.0 - 8.5	-
Total Alkalinity	g/m³ as CaCO₃	43.9 ± 1.9	-	-
Free Carbon Dioxide	g/m³ at 25°C	1.23 ± 0.58	-	-
Total Hardness	g/m³ as CaCO₃	48.1 ± 1.8	< 200	-
Electrical Conductivity (EC)	mS/m	14.2 ± 0.3	-	-
Electrical Conductivity (EC)	µS/cm	142 ± 3	-	-
Approx Total Dissolved Salts	g/m³	95.5 ± 2.0	< 1000	-
Total Boron	g/m³	0.0235 ± 0.0048	-	1.4
Total Calcium	g/m³	16.33 ± 0.66	-	-
Total Copper	g/m³	< 0.00053 ± 0.00036	< 1	2
Total Iron	g/m³	< 0.021 ± 0.014	< 0.2	-
Total Magnesium	g/m³	1.78 ± 0.15	-	-
Total Manganese	g/m³	< 0.00053 ± 0.00036	< 0.04 (Staining) < 0.10 (Taste)	0.4
Total Potassium	g/m³	0.951 ± 0.068	-	-
Total Sodium	g/m³	8.36 ± 0.51	< 200	-
Total Zinc	g/m³	0.00428 ± 0.00081	< 1.5	-
Chloride	g/m³	7.78 ± 0.50	< 250	-
Nitrate-N	g/m³	2.81 ± 0.22	-	11.3
Sulphate	g/m³	1.12 ± 0.34	< 250	-

Note: The Guideline Values and Maximum Acceptable Values (MAV) are taken from the publication 'Drinking-water Standards for New Zealand 2005 (Revised 2018)', Ministry of Health. Copies of this publication are available from <https://www.health.govt.nz/publication/drinking-water-standards-new-zealand-2005-revised-2018>

The Maximum Acceptable Values (MAVs) have been defined by the Ministry of Health for parameters of health significance and should not be exceeded. The Guideline Values are the limits for aesthetic determinands that, if exceeded, may render the water unattractive to consumers.

The reported uncertainty is an expanded uncertainty with a level of confidence of approximately 95 percent (i.e. two standard deviations, calculated using a coverage factor of 2). Reported uncertainties are calculated from the performance of typical matrices, and do not include variation due to sampling.

For further information on uncertainty of measurement at Hill Laboratories, refer to the technical note on our website: www.hill-laboratories.com/files/Intro_To_UOM.pdf, or contact the laboratory.

Note that the units g/m³ are the same as mg/L and ppm.

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Routine Water Profile		-	1-7
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter. Performed at Hill Laboratories - Chemistry; 101c Waterloo Road, Christchurch.	-	1-7
Total Digestion	Nitric acid digestion. APHA 3030 E (modified) 23 rd ed. 2017.	-	1-7
pH	pH meter. Analysed at Hill Laboratories - Chemistry; 101c Waterloo Road, Christchurch. APHA 4500-H ⁺ B 23 rd ed. 2017. Note: It is not possible to achieve the APHA Maximum Storage Recommendation for this test (15 min) when samples are analysed upon receipt at the laboratory, and not in the field. Samples and Standards are analysed at an equivalent laboratory temperature (typically 18 to 22 °C). Temperature compensation is used.	0.1 pH Units	1-7

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Total Alkalinity	Titration to pH 4.5 (M-alkalinity), autotitrator. Analysed at Hill Laboratories - Chemistry; 101c Waterloo Road, Christchurch. APHA 2320 B (modified for Alkalinity <20) 23 rd ed. 2017.	1.0 g/m ³ as CaCO ₃	1-7
Free Carbon Dioxide	Calculation: from alkalinity and pH, valid where TDS is not >500 mg/L and alkalinity is almost entirely due to hydroxides, carbonates or bicarbonates. APHA 4500-CO ₂ D 23 rd ed. 2017.	1.0 g/m ³ at 25°C	1-7
Total Hardness	Calculation from Calcium and Magnesium. APHA 2340 B 23 rd ed. 2017.	1.0 g/m ³ as CaCO ₃	1-7
Electrical Conductivity (EC)	Conductivity meter, 25°C. Analysed at Hill Laboratories - Chemistry; 101c Waterloo Road, Christchurch. APHA 2510 B 23 rd ed. 2017.	0.1 mS/m	1-7
Electrical Conductivity (EC)	Conductivity meter, 25°C. APHA 2510 B 23 rd ed. 2017.	1 µS/cm	1-7
Approx Total Dissolved Salts	Calculation: from Electrical Conductivity.	2 g/m ³	1-7
Total Arsenic	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017 / US EPA 200.8.	0.0011 g/m ³	1-7
Total Boron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.0053 g/m ³	1-7
Total Cadmium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017 / US EPA 200.8.	0.000053 g/m ³	1-7
Total Calcium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.053 g/m ³	1-7
Total Chromium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017 / US EPA 200.8.	0.00053 g/m ³	1-7
Total Copper	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017 / US EPA 200.8.	0.00053 g/m ³	1-7
Total Iron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.021 g/m ³	1-7
Total Lead	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017 / US EPA 200.8.	0.00011 g/m ³	1-7
Total Magnesium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.021 g/m ³	1-7
Total Manganese	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017 / US EPA 200.8.	0.00053 g/m ³	1-7
Total Nickel	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017 / US EPA 200.8.	0.00053 g/m ³	1-7
Total Potassium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.053 g/m ³	1-7
Total Sodium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017.	0.021 g/m ³	1-7
Total Zinc	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23 rd ed. 2017 / US EPA 200.8.	0.0011 g/m ³	1-7
Chloride	Filtered sample from Christchurch. Ion Chromatography. APHA 4110 B (modified) 23 rd ed. 2017.	0.5 g/m ³	1-7
Nitrate-N	Filtered sample from Christchurch. Ion Chromatography. APHA 4110 B (modified) 23 rd ed. 2017.	0.05 g/m ³	1-7
Sulphate	Filtered sample from Christchurch. Ion Chromatography. APHA 4110 B (modified) 23 rd ed. 2017.	0.5 g/m ³	1-7

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.

Ara Heron BSc (Tech)
Client Services Manager - Environmental