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Certificate of Analysis

Client:	Hawkes Bay Regional Council	**Lab No:**	2922897 SPv1
Contact:	Ariana Mackay C/- Hawkes Bay Regional Council Private Bag 6006 Napier 4142	**Date Received:**	19-Mar-2022
		Date Reported:	29-Mar-2022
		Quote No:	105684
		Order No:	PN00001167
		Client Reference:	Whangawehi (Mar.)
		Add. Client Ref:	102312
		Submitted By:	Ariana Mackay

Sample Type: Aqueous

Sample Name:		86407 - Whangawehi Strm at Pat O'Brians-3304 18-Mar-2022 10:30 am	86408 - Mangatupae Strm at Pat O'Brians-3303 18-Mar-2022 10:40 am	86409 - Whangawehi at George Ormonds -3301 18-Mar-2022 12:30 pm	86410 - Coops - Trib of Whangawhi - 3306 18-Mar-2022 9:30 am	86411 - Reserve Stream - Trib of Whangawehi - 3307 18-Mar-2022 9:00 am
Lab Number:		2922897.1	2922897.2	2922897.3	2922897.4	2922897.5
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	1,700 #1	1,000 #1	300 #2	2,200 #3	600 #4
Escherichia coli	cfu / 100mL	1,400 #1	600 #1	300 #2	1,800 #3	600 #4
HBRC Standard River						
Turbidity ISO	FNU	3.7	4.8	3.4	4.6	2.9
pH	pH Units	8.3	8.2	8.3	8.4	8.1
Electrical Conductivity (EC)	µS/cm	427	420	427	384	418
Volatile Suspended Solids	g/m³	0.6	1.4	0.7	1.3	0.7
Total Suspended Solids	g/m³	4.7	9.3	4.9	10.8	4.9
Total Nitrogen	g/m³	0.40	0.37	0.45	0.29	0.20
Total Ammoniacal-N	g/m³	0.007	0.005	0.005	0.005	0.018
Nitrite-N	g/m³	0.0020	0.0022	0.0020	0.0019	0.0013
Nitrate-N	g/m³	0.136	0.107	0.137	0.116	0.078
Nitrate-N + Nitrite-N	g/m³	0.138	0.109	0.139	0.118	0.079
Total Kjeldahl Nitrogen (TKN)	g/m³	0.26	0.26	0.31	0.17	0.12
Dissolved Reactive Phosphorus	g/m³	0.045	0.046	0.045	0.039	0.079
Total Phosphorus	g/m³	0.054	0.058	0.054	0.048	0.087

Sample Name:		86412 - Whangawehi US Reserve Confl - 3308 18-Mar-2022 8:00 am	86413 - Whangawehi DS Cattleyards - 3309 18-Mar-2022 8:05 am			
Lab Number:		2922897.6	2922897.7			
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	350 #5	200 #5	-	-	-
Escherichia coli	cfu / 100mL	320 #5	190 #5	-	-	-
HBRC Standard River						
Turbidity ISO	FNU	3.1	1.81	-	-	-
pH	pH Units	8.1	8.0	-	-	-
Electrical Conductivity (EC)	µS/cm	444	401	-	-	-
Volatile Suspended Solids	g/m³	0.7	0.9	-	-	-
Total Suspended Solids	g/m³	3.0	2.5	-	-	-
Total Nitrogen	g/m³	0.76	0.60	-	-	-
Total Ammoniacal-N	g/m³	0.016	0.013	-	-	-
Nitrite-N	g/m³	0.0033	0.0016	-	-	-

Sample Type: Aqueous						
Sample Name:		86412 - Whangawehi US Reserve Confl - 3308 18-Mar-2022 8:00 am	86413 - Whangawehi DS Cattleyards - 3309 18-Mar-2022 8:05 am			
Lab Number:		2922897.6	2922897.7			
HBRC Standard River						
Nitrate-N	g/m³	0.45	0.025	-	-	-
Nitrate-N + Nitrite-N	g/m³	0.46	0.026	-	-	-
Total Kjeldahl Nitrogen (TKN)	g/m³	0.31	0.58	-	-	-
Dissolved Reactive Phosphorus	g/m³	0.071	0.056	-	-	-
Total Phosphorus	g/m³	0.087	0.077	-	-	-

Analyst's Comments

#1 Statistically estimated count based on the theoretical countable range for the stated method.
Please interpret this microbiological result with caution as the sample was > 24 (24-26 hours) hours old at the time of testing in the laboratory. The sample is required to reach the laboratory with sufficient time to allow testing to commence within 24 hours of sampling.
Please interpret this result with caution as the sample was > 10 °C on receipt at the lab. The sample temperature is recommended by the laboratory's reference methods to be less than 10 °C on receipt at the laboratory (but not frozen). However, it is acknowledged that samples that are transported quickly to the laboratory after sampling, may not have been cooled to this temperature.

#2 Statistically estimated count based on the theoretical countable range for the stated method.
Please interpret this result with caution as the sample was > 10 °C on receipt at the lab. The sample temperature is recommended by the laboratory's reference methods to be less than 10 °C on receipt at the laboratory (but not frozen). However, it is acknowledged that samples that are transported quickly to the laboratory after sampling, may not have been cooled to this temperature.

#3 Please interpret this microbiological result with caution as the sample was > 24 (24-26 hours) hours old at the time of testing in the laboratory. The sample is required to reach the laboratory with sufficient time to allow testing to commence within 24 hours of sampling.
Please interpret this result with caution as the sample was > 10 °C on receipt at the lab. The sample temperature is recommended by the laboratory's reference methods to be less than 10 °C on receipt at the laboratory (but not frozen). However, it is acknowledged that samples that are transported quickly to the laboratory after sampling, may not have been cooled to this temperature.

#4 Statistically estimated count based on the theoretical countable range for the stated method.
Please interpret this microbiological result with caution as the sample was > 24 hours old at the time of testing in the laboratory. The sample is required to reach the laboratory with sufficient time to allow testing to commence within 24 hours of sampling.
Please interpret this result with caution as the sample was > 10 °C on receipt at the lab. The sample temperature is recommended by the laboratory's reference methods to be less than 10 °C on receipt at the laboratory (but not frozen). However, it is acknowledged that samples that are transported quickly to the laboratory after sampling, may not have been cooled to this temperature.

#5 Please interpret this microbiological result with caution as the sample was >24 hours old on receipt at the lab. The sample is required to reach the laboratory with sufficient time to allow testing to commence within 24 hours of sampling.
Please interpret this result with caution as the sample was > 10 °C on receipt at the lab. The sample temperature is recommended by the laboratory's reference methods to be less than 10 °C on receipt at the laboratory (but not frozen). However, it is acknowledged that samples that are transported quickly to the laboratory after sampling, may not have been cooled to this temperature.

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 simple 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. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request.
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**
Individual Tests			
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-	1-7
Turbidity ISO	Analysis using a Hach 2100N IS, Turbidity meter. ISO 7027:1999(E) (modified).	0.05 FNU	1-7

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
pH	pH meter. APHA 4500-H^+ B 23rd 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
Electrical Conductivity (EC)	Conductivity meter, 25°C. APHA 2510 B 23rd ed. 2017.	1 µS/cm	1-7
Volatile Suspended Solids	Filtration (GF/C, 1.2 µm). Ashing 550°C, 30 min. Gravimetric. APHA 2540 E (modified) 23rd ed. 2017.	0.5 g/m³	1-7
Total Suspended Solids	Filtration of a 2L sample using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D (modified) 23rd ed. 2017.	0.5 g/m³	1-7
Total Nitrogen	Calculation: TKN + Nitrate-N + Nitrite-N. Please note: The Default Detection Limit of 0.05 g/m³ is only attainable when the TKN has been determined using a trace method utilising duplicate analyses. In cases where the Detection Limit for TKN is 0.10 g/m³, the Default Detection Limit for Total Nitrogen will be 0.11 g/m³. In-house calculation.	0.05 g/m³	1-7
Total Ammoniacal-N Trace	Phenol/hypochlorite colorimetry. Flow injection analyser. (NH4-N = NH4+-N + NH3-N). APHA 4500-NH_3 H 23rd ed. 2017.	0.005 g/m³	1-7
Nitrite-N Trace	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.0010 g/m³	1-7
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m³	1-7
Nitrate-N + Nitrite-N Trace	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.0010 g/m³	1-7
Total Kjeldahl Nitrogen (TKN)	Total Kjeldahl digestion, phenol/hypochlorite colorimetry. Discrete Analyser. APHA 4500-N_{org} D (modified) 4500 NH_3 F (modified) 23rd ed. 2017.	0.10 g/m³	1-7
Dissolved Reactive Phosphorus (trace)	Filtered sample. Molybdenum blue colorimetry. Flow injection analyser. APHA 4500-P G 23rd ed. 2017.	0.0010 g/m³	1-7
Total Phosphorus	Total phosphorus digestion, automated ascorbic acid colorimetry. Flow Injection Analyser. APHA 4500-P H 23rd ed. 2017.	0.002 g/m³	1-7
HBRC Standard River		-	1-7
Faecal Coliforms and E. coli profile			
Faecal Coliforms	Membrane Filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, Confirmation. APHA 9222 D 23rd ed. 2017.	1 cfu / 100mL	1-7
Escherichia coli	Membrane filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, MUG Confirmation. APHA 9222 I 23rd ed. 2017.	1 cfu / 100mL	1-7

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

Testing was completed between 22-Mar-2022 and 29-Mar-2022. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

Ara Heron BSc (Tech)
Client Services Manager - Environmental