



## Certificate of Analysis

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<b>Client:</b>	Hawkes Bay Regional Council	<b>Lab No:</b>	2220253	SPv1
<b>Contact:</b>	Ariana Mackay	<b>Date Received:</b>	07-Aug-2019	
	C/- Hawkes Bay Regional Council	<b>Date Reported:</b>	13-Aug-2019	
	Private Bag 6006	<b>Quote No:</b>	99521	
	Napier 4142	<b>Order No:</b>	RM861	
		<b>Client Reference:</b>	Whangawehi	
		<b>Add. Client Ref:</b>	312-302	
		<b>Submitted By:</b>	Ariana Mackay	

### Sample Type: Aqueous

Sample Name:	74018 - Whangawehi Strm at Pat O'Brians-3304 06-Aug-2019 11:23 am	74019 - Mangatupae Strm at Pat O'Brians-3303 06-Aug-2019 11:27 am	74020 - Whangawehi at George Ormonds -3301 06-Aug-2019 1:14 pm	74021 - Coops - Trib of Whangawehi - 3306 06-Aug-2019 10:30 am	74022 - Reserve Stream - Trib of Whangawehi - 3307 06-Aug-2019 11:00 am
Lab Number:	2220253.1	2220253.2	2220253.3	2220253.4	2220253.5

#### Faecal Coliforms and E. coli profile

Faecal Coliforms	cfu / 100mL	110 #1	100 #1	20 #1	70 #1	50 #1
Escherichia coli	cfu / 100mL	110 #1	90 #1	20 #1	70 #1	40 #1

#### HBRC Standard River

Turbidity ISO	FNU	2.1	1.23	1.60	0.57	1.07
pH	pH Units	8.1	8.1	8.1	8.3	8.1
Electrical Conductivity (EC)	mS/m	50.9	52.6	50.5	53.6	54.0
Volatile Suspended Solids	g/m <sup>3</sup>	< 0.5	< 0.5	0.6	< 0.5	< 0.5
Total Suspended Solids	g/m <sup>3</sup>	4.0	1.7	2.7	1.6	1.1
Total Nitrogen	g/m <sup>3</sup>	0.30	0.13	0.29	0.11	0.28
Total Ammoniacal-N	g/m <sup>3</sup>	0.006	< 0.005	0.009	< 0.005	0.028
Nitrite-N	g/m <sup>3</sup>	0.0015	< 0.0010	0.0015	< 0.0010	0.0011
Nitrate-N	g/m <sup>3</sup>	0.110	0.0121	0.121	0.0092	0.156
Nitrate-N + Nitrite-N	g/m <sup>3</sup>	0.112	0.0129	0.123	0.0098	0.157
Total Kjeldahl Nitrogen (TKN)	g/m <sup>3</sup>	0.19	0.11	0.16	0.10	0.12
Dissolved Reactive Phosphorus	g/m <sup>3</sup>	0.029	0.0168	0.031	0.0172	0.062
Total Phosphorus	g/m <sup>3</sup>	0.046	0.028	0.046	0.026	0.086

Sample Name:	74023 - Whangawehi US Reserve Confl - 3308 06-Aug-2019 10:00 am	74024 - Whangawehi DS Cattleyards - 3309 06-Aug-2019 11:22 am	74025 - Taiporutu Stream at Mo - 4308 06-Aug-2019 12:30 pm		
Lab Number:	2220253.6	2220253.7	2220253.8		

#### Faecal Coliforms and E. coli profile

Faecal Coliforms	cfu / 100mL	140 #1	240	< 10 #1	-	-
Escherichia coli	cfu / 100mL	140 #1	240	< 10 #1	-	-

#### HBRC Standard River

Turbidity ISO	FNU	1.41	1.16	4.4	-	-
pH	pH Units	8.0	7.9	8.9	-	-
Electrical Conductivity (EC)	mS/m	47.1	42.0	64.3	-	-
Volatile Suspended Solids	g/m <sup>3</sup>	< 0.5	< 0.5	2.7	-	-
Total Suspended Solids	g/m <sup>3</sup>	1.4	1.1	13.0	-	-
Total Nitrogen	g/m <sup>3</sup>	0.63	0.44	0.22	-	-
Total Ammoniacal-N	g/m <sup>3</sup>	0.007	0.005	< 0.005	-	-
Nitrite-N	g/m <sup>3</sup>	0.0021	0.0014	< 0.0010	-	-



This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.  
The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked \*, which are not accredited.

Sample Type: Aqueous						
<b>Sample Name:</b>		74023 - Whangawehi US Reserve Confl - 3308 06-Aug-2019 10:00 am	74024 - Whangawehi DS Cattleyards - 3309 06-Aug-2019 11:22 am	74025 - Taiporutu Stream at Mo - 4308 06-Aug-2019 12:30 pm		
<b>Lab Number:</b>		2220253.6	2220253.7	2220253.8		
HBRC Standard River						
Nitrate-N	g/m <sup>3</sup>	0.42	0.191	< 0.0010	-	-
Nitrate-N + Nitrite-N	g/m <sup>3</sup>	0.42	0.192	< 0.0010	-	-
Total Kjeldahl Nitrogen (TKN)	g/m <sup>3</sup>	0.21	0.24	0.22	-	-
Dissolved Reactive Phosphorus	g/m <sup>3</sup>	0.048	0.031	0.0082	-	-
Total Phosphorus	g/m <sup>3</sup>	0.080	0.056	0.026	-	-

### Analyst's Comments

#1 Statistically estimated count based on the theoretical countable range for the stated method.

## 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
Individual Tests			
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-	1-8
Turbidity - ISO 7027 Method	Analysis using a Hach 2100N IS, Turbidity meter. ISO 7027:1999(E) (modified).	0.05 FNU	1-8
pH	pH meter. APHA 4500-H <sup>+</sup> B 23 <sup>rd</sup> 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	1-8
Electrical Conductivity (EC)	Conductivity meter, 25°C. APHA 2510 B 23 <sup>rd</sup> ed. 2017.	0.1 mS/m	1-8
Volatile Suspended Solids	Filtration (GF/C, 1.2 µm). Ashing 550°C, 30 min. Gravimetric. APHA 2540 E (modified) 23 <sup>rd</sup> ed. 2017.	0.5 g/m <sup>3</sup>	1-8
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) 23 <sup>rd</sup> ed. 2017.	0.5 g/m <sup>3</sup>	1-8
Total Nitrogen	Calculation: TKN + Nitrate-N + Nitrite-N. Please note: The Default Detection Limit of 0.05 g/m <sup>3</sup> 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/m <sup>3</sup> , the Default Detection Limit for Total Nitrogen will be 0.11 g/m <sup>3</sup> .	0.05 g/m <sup>3</sup>	1-8
Total Ammoniacal-N Trace	Phenol/hypochlorite colorimetry. Flow injection analyser. (NH <sub>4</sub> -N = NH <sub>4</sub> <sup>+</sup> -N + NH <sub>3</sub> -N). APHA 4500-NH <sub>3</sub> H 23 <sup>rd</sup> ed. 2017.	0.005 g/m <sup>3</sup>	1-8
Nitrite-N Trace	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO <sub>3</sub> <sup>-</sup> I (modified) 23 <sup>rd</sup> ed. 2017.	0.0010 g/m <sup>3</sup>	1-8
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO <sub>2</sub> N. In-House.	0.0010 g/m <sup>3</sup>	1-8
Nitrate-N + Nitrite-N Trace	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO <sub>3</sub> <sup>-</sup> I (modified) 23 <sup>rd</sup> ed. 2017.	0.0010 g/m <sup>3</sup>	1-8
Total Kjeldahl Nitrogen (TKN)	Total Kjeldahl digestion, phenol/hypochlorite colorimetry. Discrete Analyser. APHA 4500-N <sub>org</sub> D (modified) 4500 NH <sub>3</sub> F (modified) 23 <sup>rd</sup> ed. 2017.	0.10 g/m <sup>3</sup>	1-8
Dissolved Reactive Phosphorus (trace)	Filtered sample. Molybdenum blue colorimetry. Flow injection analyser. APHA 4500-P G 23 <sup>rd</sup> ed. 2017.	0.0010 g/m <sup>3</sup>	1-8
Total Phosphorus	Total phosphorus digestion, ascorbic acid colorimetry. Discrete Analyser. APHA 4500-P B & E (modified from manual analysis and also modified to include a reductant to reduce interference from any arsenic present in the sample) 23 <sup>rd</sup> ed. 2017. NWASCO, Water & soil Miscellaneous Publication No. 38, 1982.	0.004 g/m <sup>3</sup>	1-8
HBRC Standard River		-	1-8
Faecal Coliforms and E. coli profile			

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Faecal Coliforms	Membrane Filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, Confirmation. APHA 9222 D 23 <sup>rd</sup> ed. 2017.	1 cfu / 100mL	1-8
Escherichia coli	Membrane filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, MUG Confirmation. APHA 9222 G 23 <sup>rd</sup> ed. 2017.	1 cfu / 100mL	1-8

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.

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Ara Heron BSc (Tech)  
Client Services Manager - Environmental