



## Certificate of Analysis

<b>Client:</b>	Hawkes Bay Regional Council	<b>Lab No:</b>	2705582	SPV1
<b>Contact:</b>	Ariana Mackay C/- Hawkes Bay Regional Council Private Bag 6006 Napier 4142	<b>Date Received:</b>	16-Sep-2021	
		<b>Date Reported:</b>	23-Sep-2021	
		<b>Quote No:</b>	105684	
		<b>Order No:</b>	PN00001167	
		<b>Client Reference:</b>	Whangawehi (Sept.)	
		<b>Add. Client Ref:</b>	102312	
		<b>Submitted By:</b>	Ariana Mackay	

### Sample Type: Aqueous

Sample Name:	83355 - Whangawehi Strm at Pat O'Brians-3304 15-Sep-2021 2:00 pm	83356 - Mangatupae Strm at Pat O'Brians-3303 15-Sep-2021 2:00 pm	83357 - Whangawehi at George Ormonds -3301 15-Sep-2021 3:00 pm	83358 - Coops - Trib of Whangawehi - 3306 15-Sep-2021 1:30 pm	83359 - Reserve Stream - Trib of Whangawehi - 3307 15-Sep-2021 1:35 pm	
Lab Number:	2705582.1	2705582.2	2705582.3	2705582.4	2705582.5	
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	600 #1	1,100 #1	1,800 #1	1,500 #1	110 #1
Escherichia coli	cfu / 100mL	500 #1	1,100 #1	1,800 #1	1,500 #1	100 #1
HBRC Standard River						
Turbidity ISO	FNU	10.9	10.5	5.0	3.3	4.3
pH	pH Units	8.1	7.8	8.0	8.3	8.2
Electrical Conductivity (EC)	µS/cm	473	421	511	500	492
Volatile Suspended Solids	g/m <sup>3</sup>	2.0	0.9	1.0	0.6	0.7
Total Suspended Solids	g/m <sup>3</sup>	13.9	6.6	3.4	3.4	3.9
Total Nitrogen	g/m <sup>3</sup>	0.47	0.40	0.51	0.16	0.25
Total Ammoniacal-N	g/m <sup>3</sup>	0.013	< 0.005	< 0.005	< 0.005	0.021
Nitrite-N	g/m <sup>3</sup>	0.0024	0.0015	0.0023	< 0.0010	0.0017
Nitrate-N	g/m <sup>3</sup>	0.124	0.0020	0.039	0.0071	0.132
Nitrate-N + Nitrite-N	g/m <sup>3</sup>	0.126	0.0034	0.041	0.0077	0.134
Total Kjeldahl Nitrogen (TKN)	g/m <sup>3</sup>	0.34	0.40	0.47	0.15	0.12
Dissolved Reactive Phosphorus	g/m <sup>3</sup>	0.054	0.031	0.046	0.042	0.097
Total Phosphorus	g/m <sup>3</sup>	0.083	0.064	0.074	0.055	0.113

Sample Name:	83360 - Whangawehi US Reserve Confl - 3308 15-Sep-2021 1:30 pm	83361 - Whangawehi DS Cattleyards - 3309 15-Sep-2021 1:00 pm			
Lab Number:	2705582.6	2705582.7			
Faecal Coliforms and E. coli profile					
Faecal Coliforms	cfu / 100mL	240	300 #1	-	-
Escherichia coli	cfu / 100mL	180	300 #1	-	-
HBRC Standard River					
Turbidity ISO	FNU	5.8	3.0	-	-
pH	pH Units	8.1	7.9	-	-
Electrical Conductivity (EC)	µS/cm	448	432	-	-
Volatile Suspended Solids	g/m <sup>3</sup>	1.2	0.9	-	-
Total Suspended Solids	g/m <sup>3</sup>	3.7	2.9	-	-
Total Nitrogen	g/m <sup>3</sup>	0.66	0.51	-	-
Total Ammoniacal-N	g/m <sup>3</sup>	0.007	0.006	-	-
Nitrite-N	g/m <sup>3</sup>	0.0024	0.0019	-	-



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 \* or any comments and interpretations, which are not accredited.

**Sample Type: Aqueous**

<b>Sample Name:</b>	83360 - Whangawehi US Reserve Confl - 3308 15-Sep-2021 1:30 pm	83361 - Whangawehi DS Cattleyards - 3309 15-Sep-2021 1:00 pm			
<b>Lab Number:</b>	2705582.6	2705582.7			
HBRC Standard River					
Nitrate-N	g/m <sup>3</sup>	0.35	0.168	-	-
Nitrate-N + Nitrite-N	g/m <sup>3</sup>	0.35	0.170	-	-
Total Kjeldahl Nitrogen (TKN)	g/m <sup>3</sup>	0.31	0.34	-	-
Dissolved Reactive Phosphorus	g/m <sup>3</sup>	0.069	0.044	-	-
Total Phosphorus	g/m <sup>3</sup>	0.095	0.070	-	-

**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 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 7027 Method	Analysis using a Hach 2100N IS, Turbidity meter. ISO 7027:1999(E) (modified).	0.05 FNU	1-7
pH	pH meter. APHA 4500-H+ 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	1-7
Electrical Conductivity (EC)	Conductivity meter, 25°C. APHA 2510 B 23 <sup>rd</sup> 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) 23 <sup>rd</sup> ed. 2017.	0.5 g/m <sup>3</sup>	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) 23 <sup>rd</sup> ed. 2017.	0.5 g/m <sup>3</sup>	1-7
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> . In-house calculation.	0.05 g/m <sup>3</sup>	1-7
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>	1-7
Nitrite-N Trace	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO <sub>2</sub> <sup>-</sup> I (modified) 23 <sup>rd</sup> ed. 2017.	0.0010 g/m <sup>3</sup>	1-7
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO <sub>2</sub> N. In-House.	0.0010 g/m <sup>3</sup>	1-7
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>	1-7
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>	1-7
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>	1-7
Total Phosphorus	Total phosphorus digestion, automated ascorbic acid colorimetry. Flow Injection Analyser. APHA 4500-P H 23 <sup>rd</sup> ed. 2017.	0.002 g/m <sup>3</sup>	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 23 <sup>rd</sup> 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 23 <sup>rd</sup> 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 16-Sep-2021 and 23-Sep-2021. 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.

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A handwritten signature in blue ink, consisting of several overlapping, stylized strokes that form a unique, illegible mark.

Ara Heron BSc (Tech)  
Client Services Manager - Environmental