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R J Hill Laboratories Limited
28 Duke Street Frankton 3204
Private Bag 3205
Hamilton 3240 New Zealand

T 0508 HILL LAB (44 555 22)
T +64 7 858 2000
E mail@hill-labs.co.nz
W www.hill-laboratories.com

Certificate of Analysis

Client:	Hawkes Bay Regional Council	**Lab No:**	2141486	SPv1
Contact:	Ariana Mackay	**Date Received:**	14-Mar-2019	
	C/- Hawkes Bay Regional Council	**Date Reported:**	21-Mar-2019	
	Private Bag 6006	**Quote No:**	78490	
	Napier 4142	**Order No:**	RM198	
		Client Reference:	Whangawehi	
		Add. Client Ref:	312-302	
		Submitted By:	Ariana Mackay	

Sample Type: Aqueous

Sample Name:		71495 - Whangawehi Strm at Pat O'Brians-3304 13-Feb-2019 12:00 pm	71496 - Mangatupae Strm at Pat O'Brians-3303 13-Feb-2019 12:00 pm	71497 - Whangawehi at George Ormonds -3301 13-Feb-2019 12:00 pm	70955 - Taiporutu Stream at Mo - 4308 13-Feb-2019 12:00 pm	71498 - Coops - Trib of Whangawehi - 3306 13-Feb-2019 12:00 pm
Lab Number:		2141486.1	2141486.2	2141486.3	2141486.4	2141486.5
Individual Tests						
Turbidity	NTU	1.02	7.4	0.83	0.46	1.33
Turbidity ISO	FNU	1.20	6.0	1.21	0.40	1.78
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	90 #1	1,000 #1	30 #1	460 #4	220 #4
Escherichia coli	cfu / 100mL	80 #1	800 #1	30 #1	370 #4	210 #4
HBRC Standard River						
pH	pH Units	8.1	7.8	7.9	8.1	8.3
Volatile Suspended Solids	g/m³	< 0.5	1.9	1.1	< 1.5 #3	0.8
Total Suspended Solids	g/m³	0.7	8.7	1.3	< 1.5 #2	2.4
Total Nitrogen	g/m³	0.28	0.35	0.37	0.39	0.28
Total Ammoniacal-N	g/m³	< 0.005	< 0.005	< 0.005	< 0.005	0.007
Nitrite-N	g/m³	0.0017	< 0.0010	0.0025	< 0.0010	0.0011
Nitrate-N	g/m³	0.0043	0.0035	0.0081	< 0.0010	0.0060
Nitrate-N + Nitrite-N	g/m³	0.0060	0.0044	0.0106	< 0.0010	0.0071
Total Kjeldahl Nitrogen (TKN)	g/m³	0.27	0.34	0.36	0.39	0.27
Dissolved Reactive Phosphorus	g/m³	0.084	0.034	0.099	0.0021	0.066
Total Phosphorus	g/m³	0.104	0.050	0.123	0.008	0.075

Sample Name:		71499 - Reserve Stream - Trib of Whangawehi - 3307 13-Feb-2019 12:00 pm	71500 - Whangawehi US Reserve Confl -3308 13-Feb-2019 12:00 pm	71501 - Whangawehi DS Cattleyards - 3309 13-Feb-2019 12:00 pm		
Lab Number:		2141486.6	2141486.7	2141486.8		
Individual Tests						
Turbidity	NTU	2.9	1.69	0.62	-	-
Turbidity ISO	FNU	3.0	2.4	0.71	-	-
Faecal Coliforms and E. coli profile						
Faecal Coliforms	cfu / 100mL	550 #4	500 #4	230 #4	-	-
Escherichia coli	cfu / 100mL	420 #4	440 #4	200 #4	-	-
HBRC Standard River						
pH	pH Units	8.2	8.2	8.1	-	-
Volatile Suspended Solids	g/m³	1.6	< 0.5	< 0.5	-	-
Total Suspended Solids	g/m³	2.9	2.8	0.5	-	-
Total Nitrogen	g/m³	0.45	0.86	0.88	-	-

Sample Type: Aqueous						
Sample Name:		71499 - Reserve Stream - Trib of Whangawehi - 3307 13-Feb-2019 12:00 pm	71500 - Whangawehi US Reserve Confl -3308 13-Feb-2019 12:00 pm	71501 - Whangawehi DS Cattleyards - 3309 13-Feb-2019 12:00 pm		
Lab Number:		2141486.6	2141486.7	2141486.8		
HBRC Standard River						
Total Ammoniacal-N	g/m³	0.080	0.014	0.025	-	-
Nitrite-N	g/m³	0.0050	0.0037	0.0045	-	-
Nitrate-N	g/m³	0.158	0.55	0.26	-	-
Nitrate-N + Nitrite-N	g/m³	0.163	0.55	0.27	-	-
Total Kjeldahl Nitrogen (TKN)	g/m³	0.29	0.31	0.62	-	-
Dissolved Reactive Phosphorus	g/m³	0.111	0.110	0.092	-	-
Total Phosphorus	g/m³	0.162	0.125	0.104	-	-

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 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.

#2 There was insufficient sample left to filter the usual amount for the Total Suspended Solids test on sample 2141486/4, so the detection limit is higher than normal.

#3 There was insufficient sample left to filter the usual amount for the Volatile Suspended Solids test on sample 2141486/4, so the detection limits are higher than normal.

#4 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 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	Analysis using a Hach 2100N, Turbidity meter. APHA 2130 B 23rd ed. 2017.	0.05 NTU	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^+ 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	1-8
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	1-8
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) 23rd ed. 2017.	0.5 g/m³	1-8
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.	0.05 g/m³	1-8

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
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	1-8
Nitrite-N Trace	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.0010 g/m³	1-8
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m³	1-8
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	1-8
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	1-8
Dissolved Reactive Phosphorus (trace)	Filtered sample. Molybdenum blue colorimetry. Flow injection analyser. APHA 4500-P G 23rd ed. 2017.	0.0010 g/m³	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) 23rd ed. 2017. NWASCO, Water & soil Miscellaneous Publication No. 38, 1982.	0.004 g/m³	1-8
HBRC Standard River		-	1-8
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	1-8
Escherichia coli	Membrane filtration, Count on mFC agar, Incubated at 44.5°C for 22 hours, MUG Confirmation. APHA 9222 G 23rd 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.

Ara Heron BSc (Tech)
Client Services Manager - Environmental