Western Bay of Plenty District Council

Western Comprehensive Stormwater Annual Report

For Western Bay of Plenty District Council

November 2022

REPORT INFORMATION AND QUALITY CONTROL

Prepared for:	Erika MacGregor Western Bay of Plenty District Council

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1 INTRODUCTION

Western Bay of Plenty District Council (WBOPDC) holds Resource Consent 67093-DC.01. The purpose of this Resource Consent is to:

a.) *Authorise the discharge of stormwater from urban areas within the Western Catchments (refer to condition 2) of the Western Bay District; associated with the resource consents listed in Schedule 1 (as may be updated to include applicable consents which post-date the decision on this CSC); and*

b.) *To authorise temporary discharges of sediment contaminated stormwater from earthworks related to the replacement of stormwater infrastructure; and*

c.) *To incorporate existing stormwater discharges associated with the existing resource consents listed in Schedule 1: List of stormwater related consents in the Catchment Management Plans WSZ1, WSZ2 and WSZ3 submitted in support of this application (as updated on 23 January 2020)*

The Consent requires monitoring of a range of environmental indicators to assess the quality of stormwater discharges and sediment quality at the upstream, downstream, and stream-channel locations of the receiving environment. Pursuant to Condition 9.4 of Resource Consent 67093-DC.01, a summary of the monitoring results is to be collated in a report with other Stormwater network information from the reporting year (*November to November calendar year*)

4Sight Consulting Limited – Part of SLR was commissioned by WBOPDC to prepare the Western Comprehensive Stormwater Annual Report. Specifically, this refers to the requirements of Condition 9.4 which states:

9.4 The consent holder must submit to the Regional Council Chief Executive or delegate an annual report for the Waihi Beach and Katikati catchments, in November of each year, covering:

a) *A summary report of any monitoring undertaken including an analysis of the monitoring results;*

b) *Any stormwater network or stormwater infrastructure upgrade works undertaken;*

c) *Any stormwater induced erosion, flood risk alleviation, or stormwater quality mitigation measures implemented;*

d) *Any incidents resulting in unanticipated contaminants entering the stormwater network, the Investigation of the cause of the incidents and any remedial actions implemented to avoid a repeat occurrence of incident*

e) *An updated Asset Register; and*

f) *Any new structures to be included in the consent (Asset Register)*

The scope of this work is to collate information for and prepare the Western Comprehensive Stormwater Annual Report. Based on Condition 9.4 of the Western Comprehensive Stormwater Consent (*67903-DC.01*) for the Waihi Beach and Katikati catchments.

This includes the following:

- A high-level overview (summary) of the monitoring results;
- Desktop review and assessment of Compliance with the sub conditions of Condition 9.4; and
- Preparing a report which accurately captures this information.

Table 1 Consent condition specific information

Consent Condition 9.4	Supporting information (Page no.)
(a) *A summary report of any monitoring undertaken including an analysis of the monitoring results;*	2
(b) *Any stormwater network or stormwater infrastructure upgrade works undertaken*	21
(c) *Any stormwater induced erosion, flood risk alleviation, or stormwater quality mitigation measures implemented;*	21
(d) *Any incidents resulting in unanticipated contaminants entering the stormwater network, the Investigation of the cause of the incidents and any remedial actions implemented to avoid a repeat occurrence of incident;*	21
(e) *An updated Asset Register; and*	21
(f) *Any new structures to be included in the consent (Asset Register)*	22

2 MONITORING DATA REVIEW

The following section presents an overview of the monitoring results supplied by WBOPDC (Raw laboratory data is presented in Appendix A). Specifically, this includes the results for water quality at the five monitoring locations within the catchment (Appendix B). This including the findings from laboratory analysis and field observations.

It is noted that while consent condition 9 specifies that representative sediment samples are to be taken, no sediment samples were collected during the November 2021 to November 2022 period. WBOPDC have employed an ecology consultant to provide staff with expert assistance, and necessary technical support to ensure they are able to conduct sampling accurately in accordance with the sediment quality sampling methodology (Appendix B). It is anticipated that sediment sampling will commence in the Summer of 2022 -2023, these results will be included in the next Annual Report.

Furthermore, all of the receiving environment water quality monitoring from November 2021 to November 2022 was completed during dry weather and therefore the results generally present water quality findings for the respective upstream, downstream and in stream results. This was due to the practical difficulties in mobilising the sample team across multiple sites while conforming with the sample collection criteria (within 1 hour, greater than 10mm and following 3 days of dry weather). In a similar regard to the collection of sediment samples, WBOPDC is therefore seeking assistance from a contractor to assist with the rainfall event sampling, however in the interim limited conclusions can be drawn as to the influence of stormwater discharges in the freshwater and wider marine receiving environments.

Overall, with regard to Consent Condition 8.1 no water quality trigger values were exceeded in three consecutive sampling results, at the same site:

Where the quality of receiving waters into which stormwater is discharge exceeds the trigger levels listen in Table 1 of Appendix A to this Consent after reasonable mixing, the consent holder must implement the actions identified in Condition 9.2

2.1 Water quality laboratory analysis

An overview of the results for water quality monitoring are presented in the following sub-sections. Results for each parameter are plotted separately. The respective sample locations are illustrated in Appendix B.

Where applicable the horizontal yellow and grey line(s) indicates the ANZG (2018) 90% default guideline values (DGVs) for freshwater receiving environment trigger values. For those graphs where the horizontal yellow line is not present, there are no relevant guidelines values. Many of the monitoring results were below the laboratory level of reporting. For the purpose of analysis here, results were conservatively assumed to be equal to the reporting limit (e.g., <0.01 mg/L is reported as 0.01 mg/L).

Some monitoring locations, particularly point of discharge and downstream locations are close to the coastal marine area (CMA) boundary and are likely influenced to some extent by the tides (e.g., a change in flow speed or direction and changes in salinity). For consistency, sites that are outside the CMA have been assessed against freshwater guideline values to be consistent with their corresponding upstream sites. This is a conservative approach as the marine guidelines are less conservative (i.e., more lenient) than the equivalent freshwater guidelines, with the exception of mercury, and the preferred faecal bacteria being enterococci rather than E. coli.

2.1.1 Microbiological

Microbiological results are plotted and discussed in the following section.

In general, results show that:

- Several of the *E.coli* results were not within the trigger value of 900 g/m^3.
- There are no relevant guideline values for Enterococci. The magnitude and range of concentrations differs per site and sample date.

Table 2: Default Trigger Values, Freshwater Receiving Environments for *E.coli* and enterococci.

Parameter g/m3	
E.Coli	900
Enterococci	—

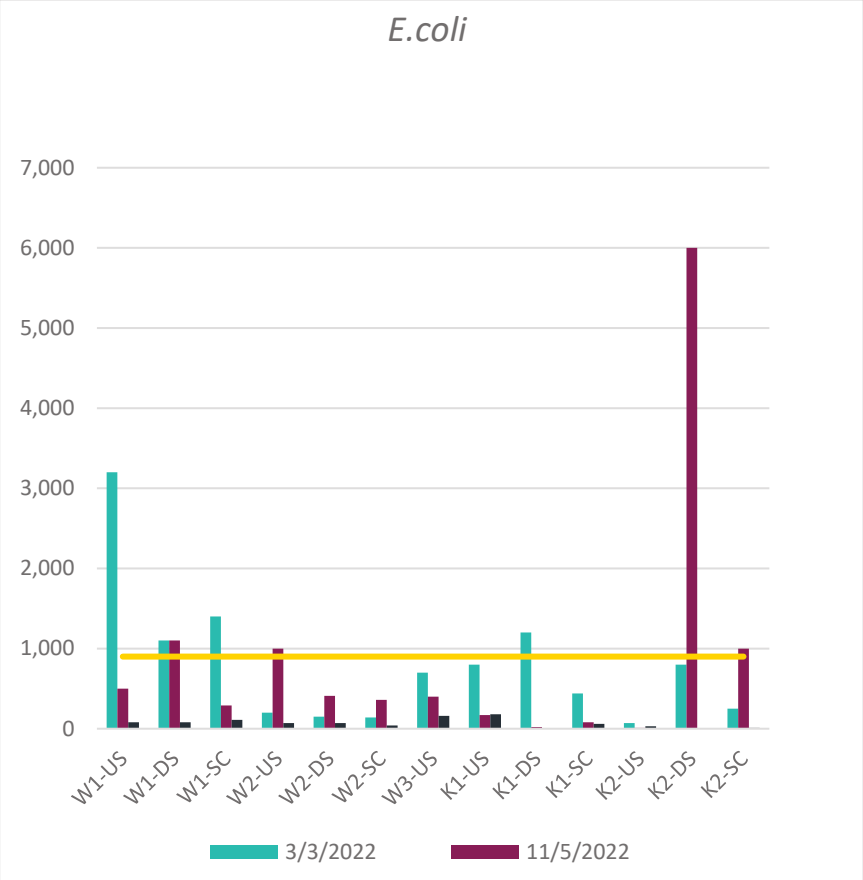

Figure 1 Summary of *E.coli* results

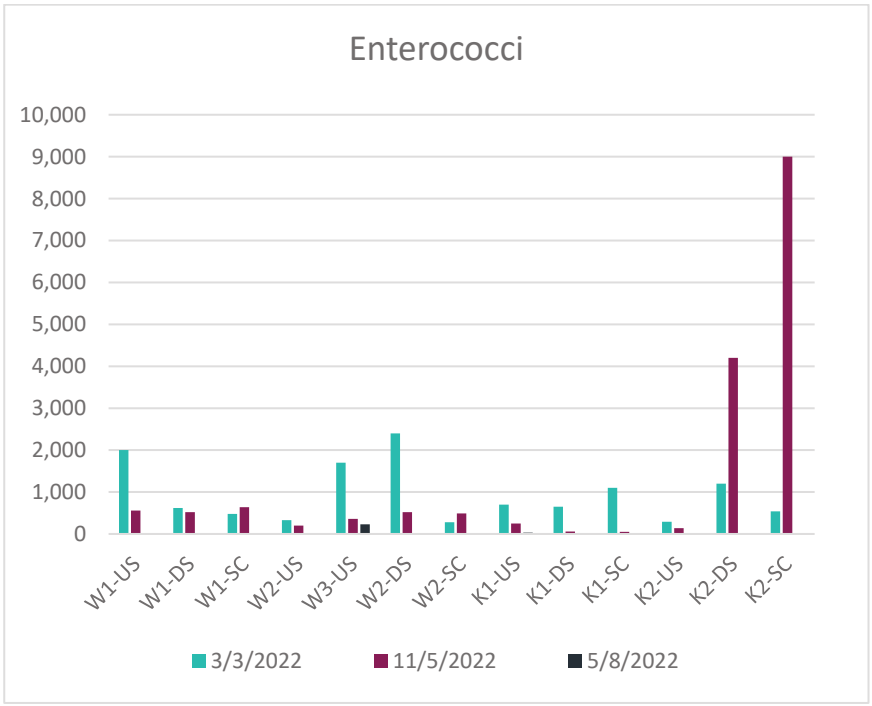

Figure 2 Summary of Enterococci results

2.1.2 Water Clarity

Water Clarity results are plotted and discussed in the following section.

In general, results show that:

- Turbidity results were within surveillance level.
- Total Suspended Solids results were within surveillance level.

Table 3: Default Trigger Values for Turbidity and Total Suspended Solids

Parameter g/m3	
Turbidity (NTU)	160
Total Suspended Solids (TSS)	150

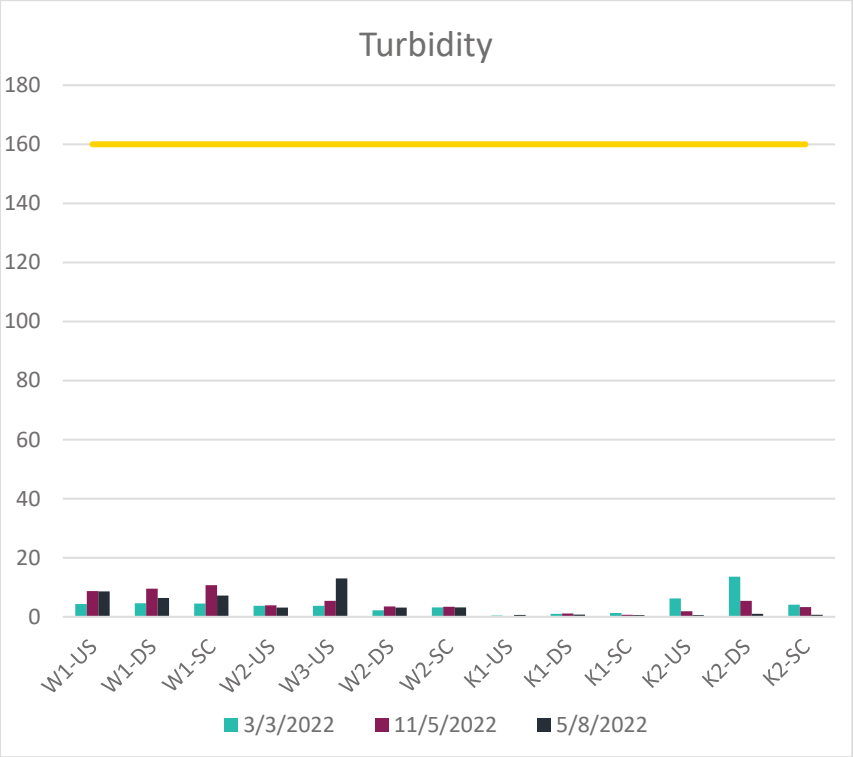

Figure 3: Summary of Turbidity results

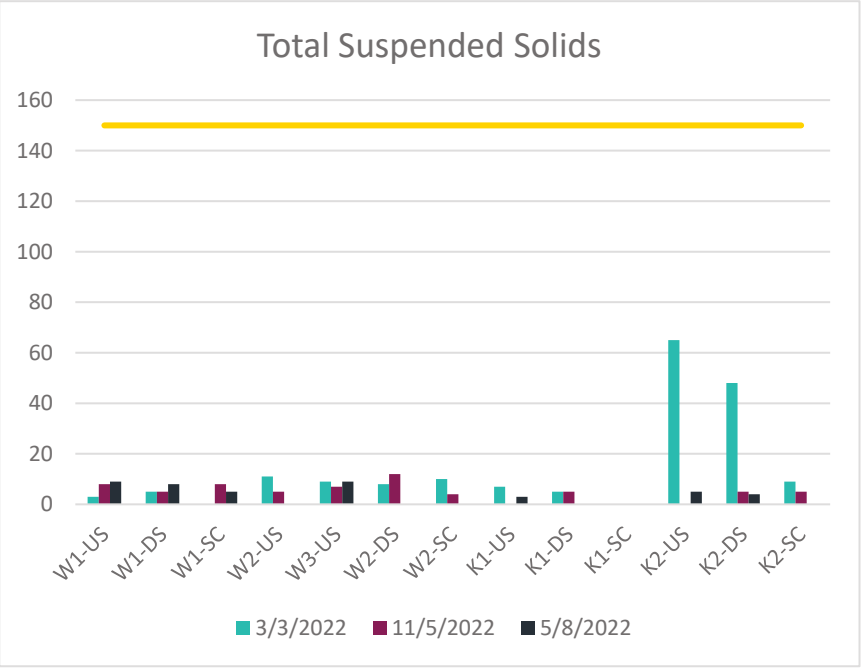

Figure 4: Summary of Total Suspended Solids results

2.1.3 Nutrients

Water column nutrients results are discussed in this section.

In general, results show that:

- Ammonia concentrations were within the surveillance level on all sampling occasions, other than August 2022 at Sample Site W3 – US. This exceedance was measured at 0.85 g/m3 and is over two times higher than the alert level.
- All Nitrate results were within the surveillance level.
- There are no relevant guideline values for Nitrite. Results were consistent throughout the monitoring period, aside from one high event occurring in March 2022 at Sample Site W3 – US which was measured at 0.066 g/m3.

Table 4: Default Trigger Values, Freshwater Receiving Environments for Ammonia, Nitrate, and Nitrite.

Parameter g/m3	
Ammonia	0.39
Nitrate	3.4
Nitrate	-

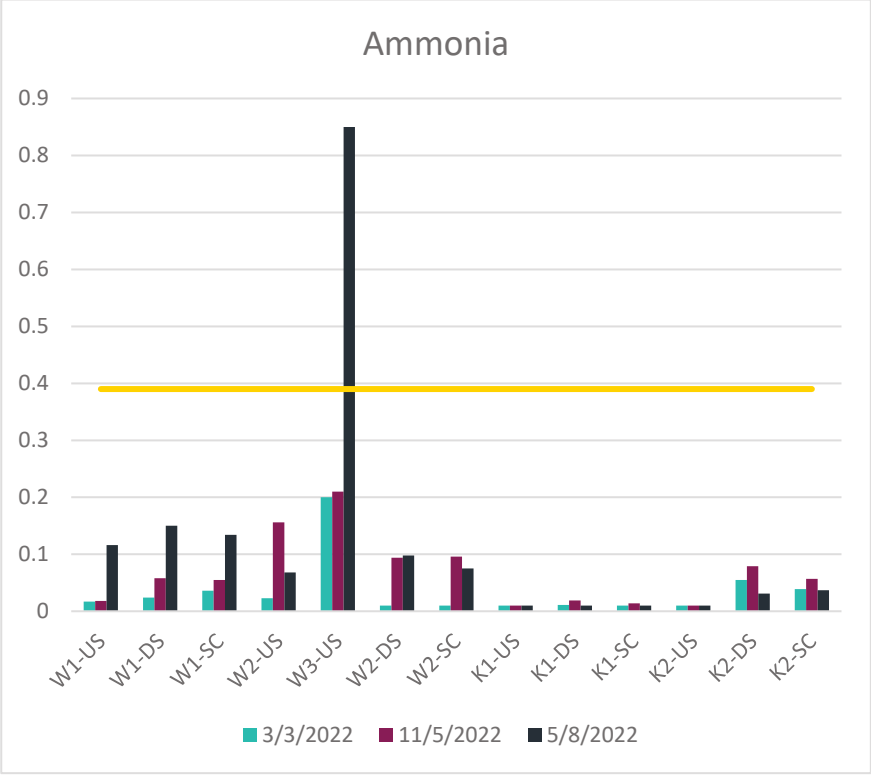

Figure 5: Summary of Ammonia results

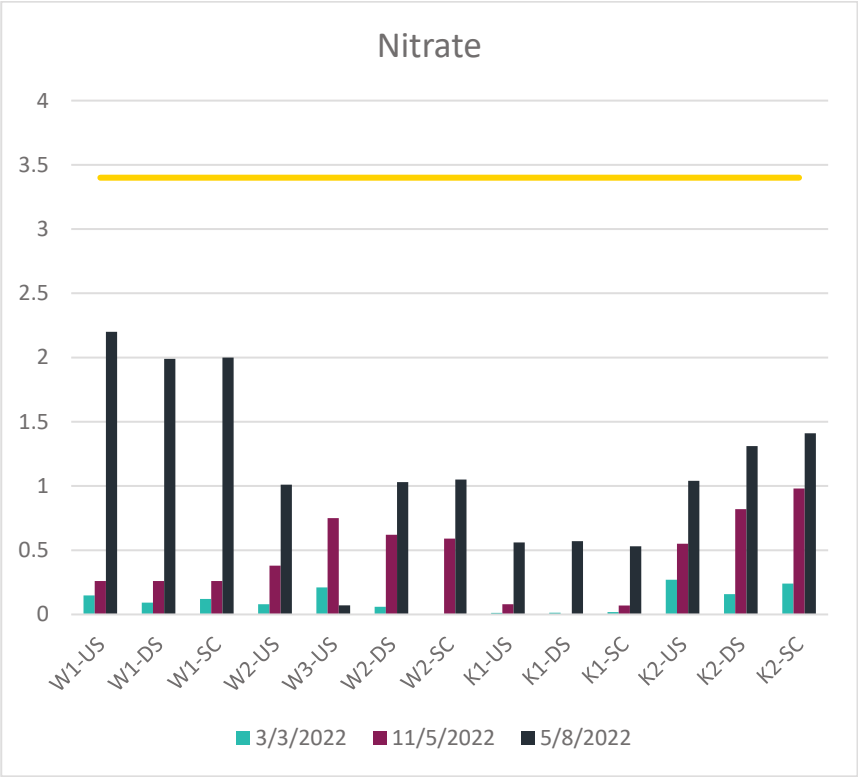

Figure 6: Summary of Nitrate results

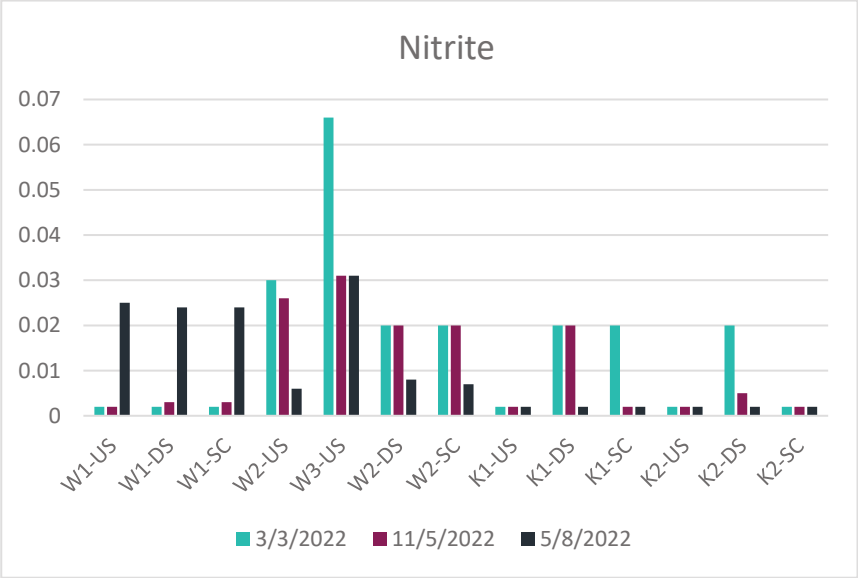

Figure 7: Summary of Nitrite results

2.1.4 Metals

Heavy Metal results are discussed in this section.

In general, results show that:

- There are no relevant guideline values for Arsenic and Nickel.
- Cadmium concentrations were within the surveillance level on all sampling occasions, other than in August 2022 at Sample Site W3 – US, and May 2022 at Sample Sites W2 – SC and K1 – DS.
- Chromium concentrations were within the surveillance level on all sampling occasions, other than in August 2022 at Sample Site W3 – US, and May 2022 at Sample Sites W2 – SC and K1 – DS.

- Copper concentrations exceed the guideline value in 9 out of the 39 samples, 6 of these exceedances occurred in samples taken in May 2022.
- Lead concentrations were within the surveillance level on all sampling occasions, other than in August 2022 at Sample Site W3 – US, and May 2022 at Sample Sites W2 – SC and K1 – DS.
- All Mercury concentrations were within the guideline value.
- Zinc concentrations exceed the guideline value in 7 out of the 39 samples, 5 of these exceedances occurred in samples taken in May 2022.

Table 5: Default Trigger Values for toxicants in Freshwater Receiving Environments (ANZG,2018)

Parameter g/m3	
Arsenic	-
Cadmium	0.0004
Chromium	0.006
Copper	0.0018
Lead	0.0056
Mercury	0.0019
Nickel	-
Zinc	0.015

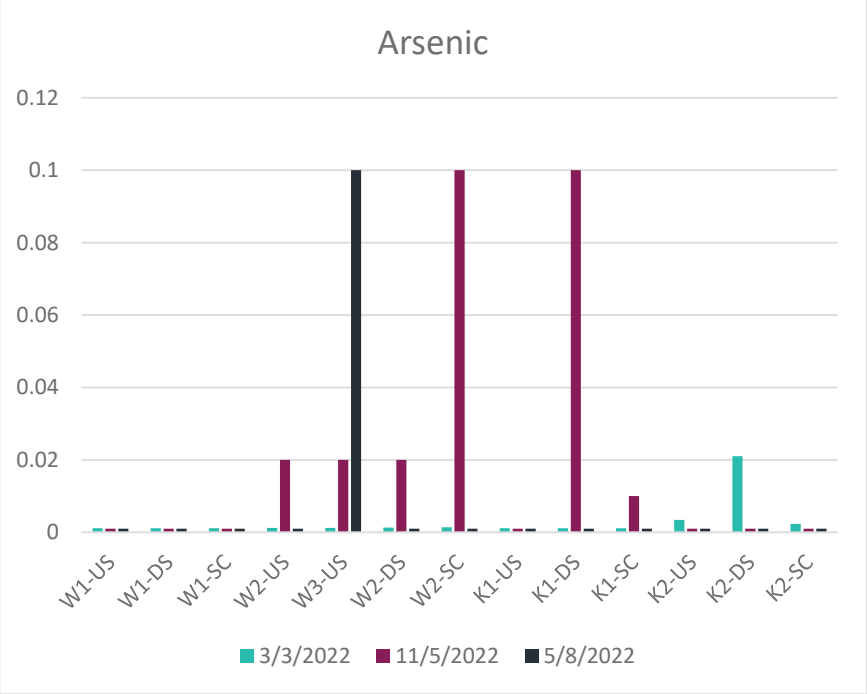

Figure 8: Summary of Arsenic results.

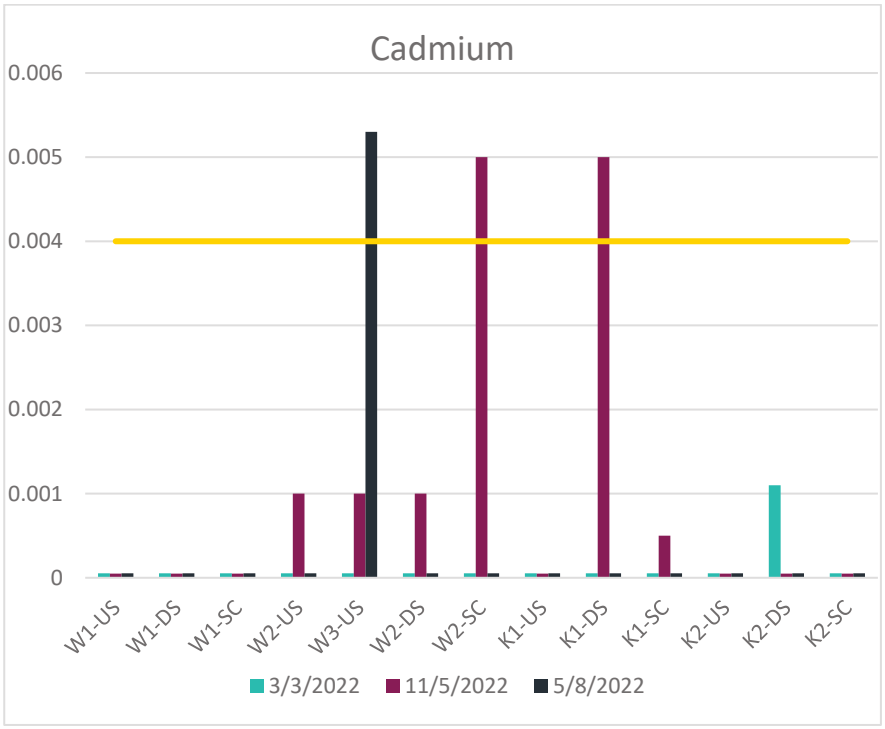

Figure 9: Summary of Cadmium results.

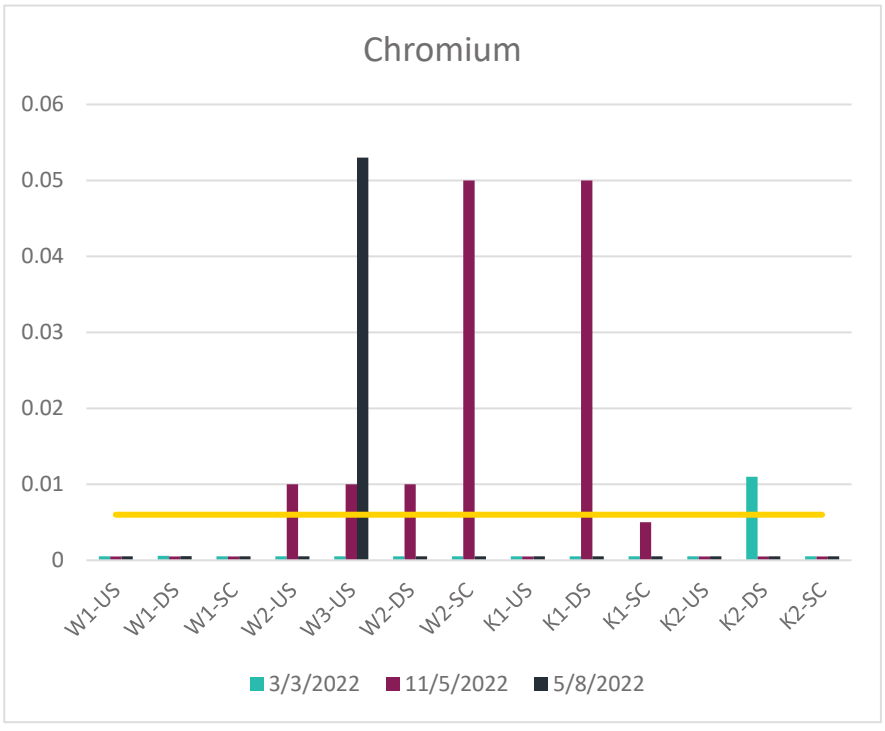

Figure 10: Summary of Chromium results.

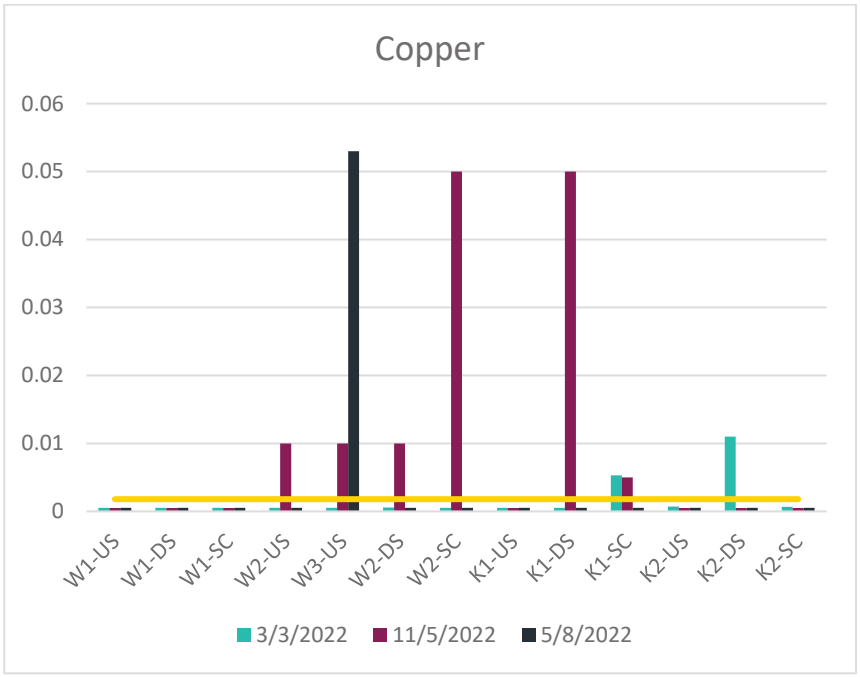

Figure 11: Summary of Copper results.

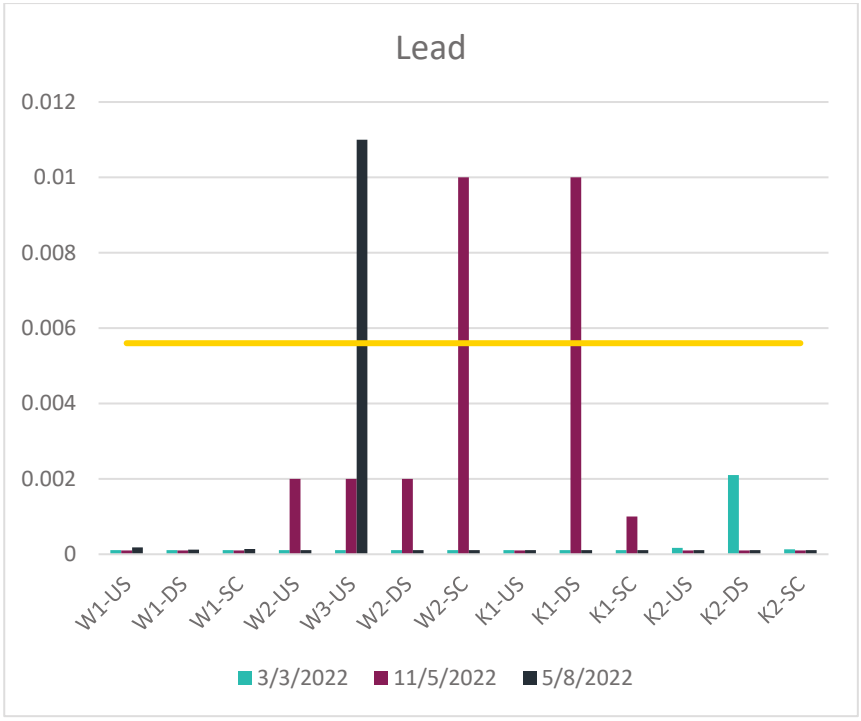

Figure 12: Summary of Lead results.

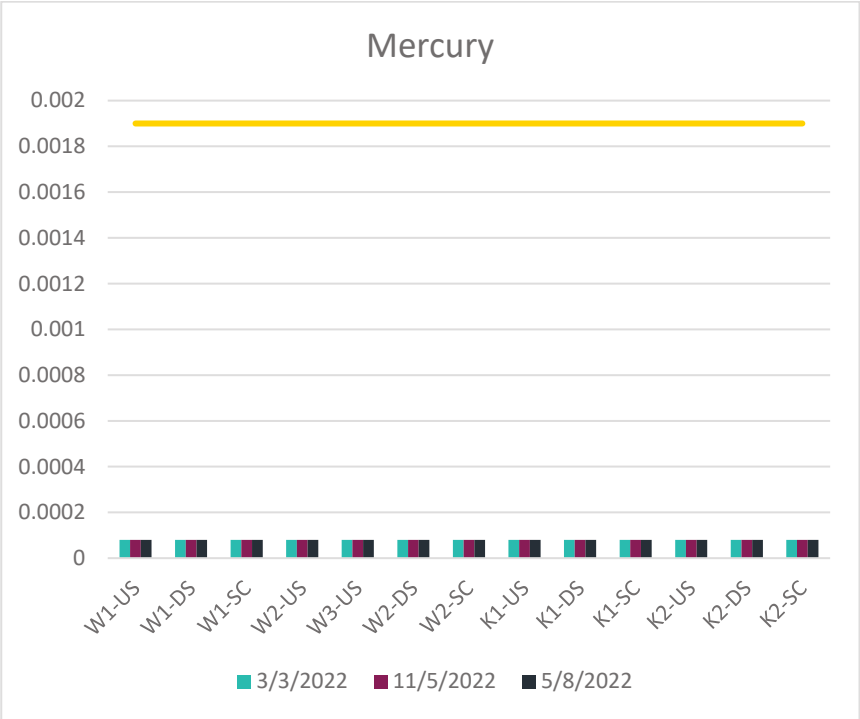

Figure 13: Summary of Mercury results.

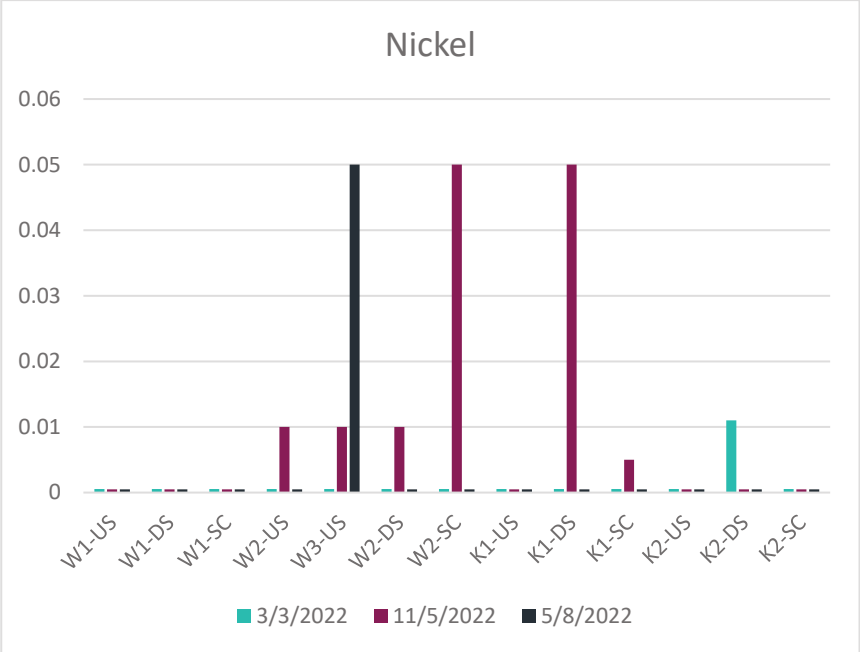

Figure 14: Summary of Nickel results.

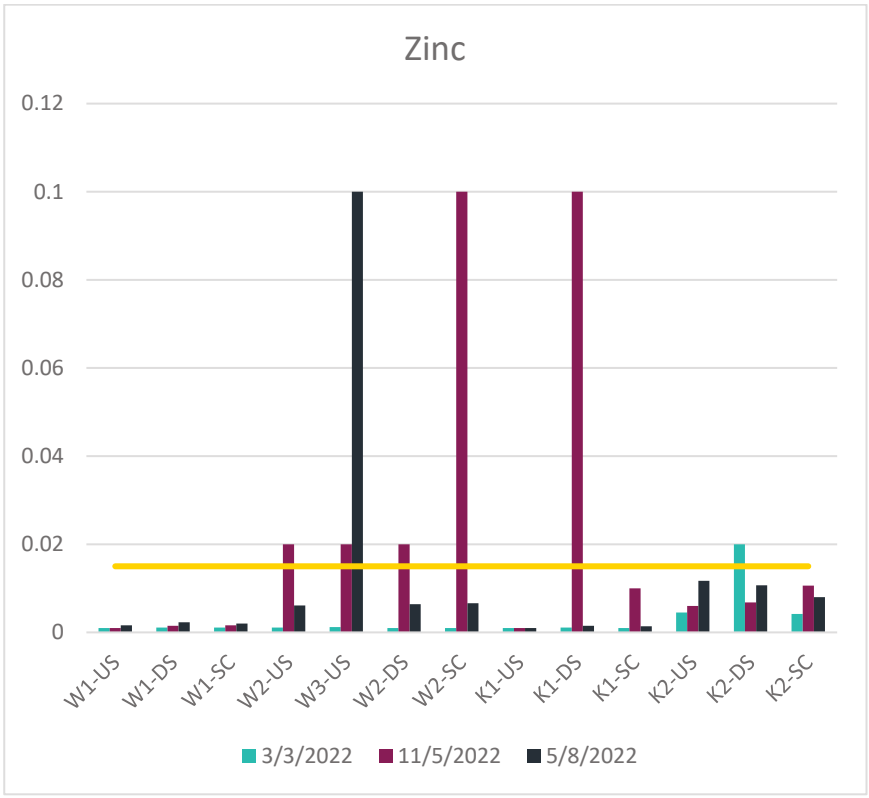

Figure 15: Summary of Zinc results.

2.1.5 Hydrocarbons

Hydrocarbons (Total Petroleum Hydrocarbons) results are discussed in this section.

In general, results show that:

- All Total Petroleum Hydrocarbon (TPH) concentrations were within the guideline value.

Table 6: Default Trigger Values for Total Petroleum Hydrocarbons in Freshwater Receiving Environments ANZG (2018)

Parameter g/m3	
Total Petroleum Hydrocarbons (TPH)	15

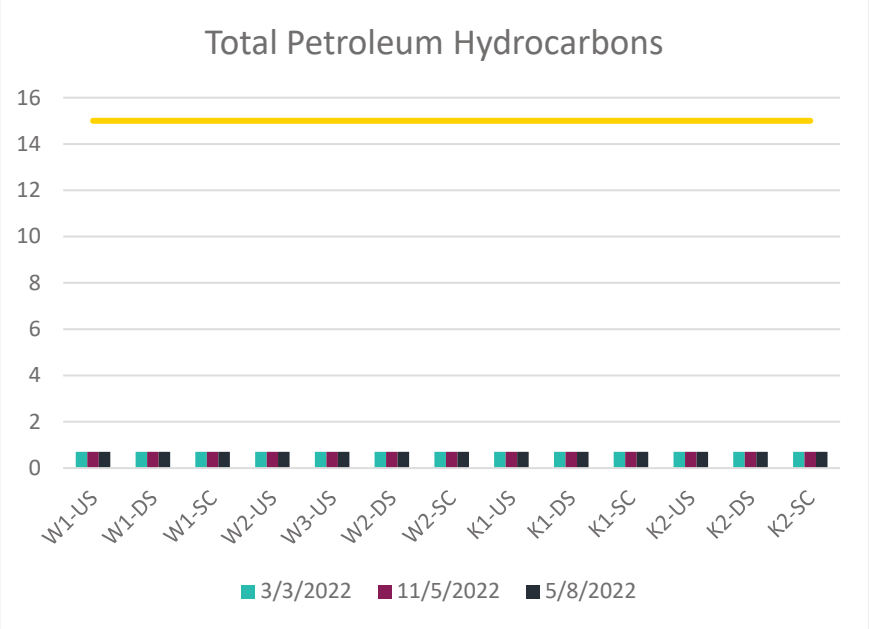

Figure 16: Summary of Total Petroleum Hydrocarbons (TPH) results.

2.1.6 Oxygen demand

Oxygen Demand (COD) results are discussed in this section.

In general, results show that:

- All Oxygen Demand (COD) concentrations were within the guideline value.

Table 7: Default Trigger Values for Chemical Oxygen Demand in Freshwater Receiving Environments ANZG (2018)

Parameter g/m3	
Chemical Oxygen Demand (COD)	250

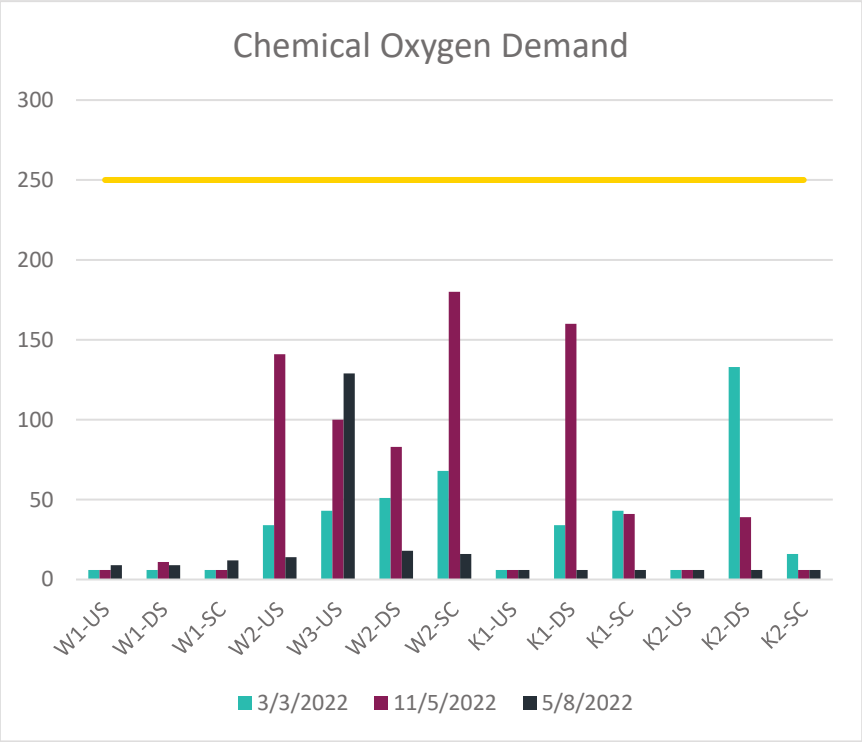

Figure 17: Summary of Chemical Oxygen Demand (COD) results

2.2 Water quality field analysis and observations

Water quality and field observations results are presented in this section, please also refer to the tables included which illustrate additional sample results from WBOPDC.

In general, results show that:

- pH concentrations were within the threshold level on all sampling occasions, other than in August 2022 at Sampling Site K1 – US.
- There are no relevant guideline values for temperature. Temperature results ranged between 12.1 °C at site K1 – US on 05/08/2022 and 23.3 °C at site K2 – US on 03/03/2022.

Table 8: Default Trigger Values for pH, ad Temperature in Freshwater Receiving Environments ANZG (2018)

Parameter g/m3	
pH	6 and 9
Temp (°C)	-

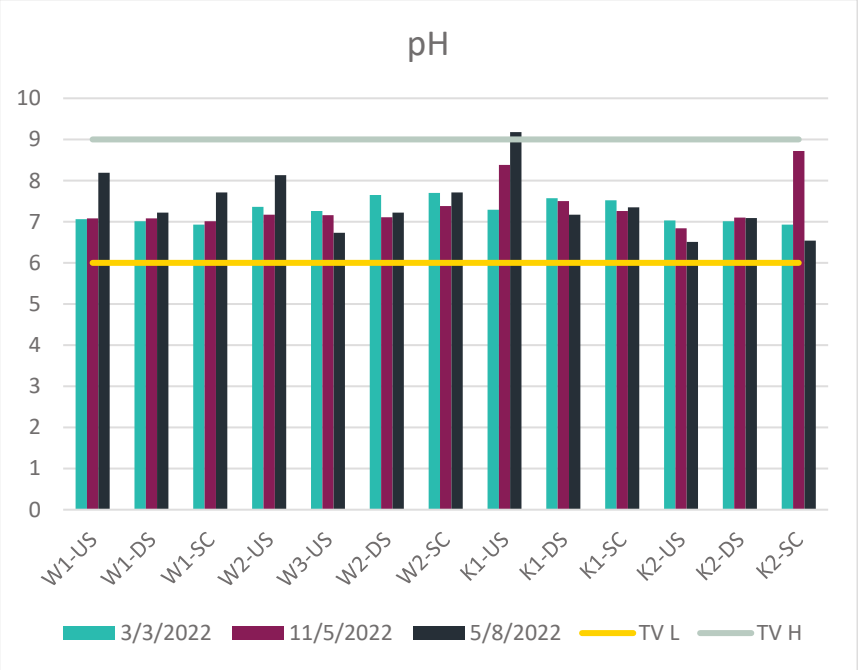

Figure 18: Summary of pH results.

The grey and yellow horizontal lines indicate the thresholds for pH levels in the Freshwater Receiving Environments ANZG (2018)

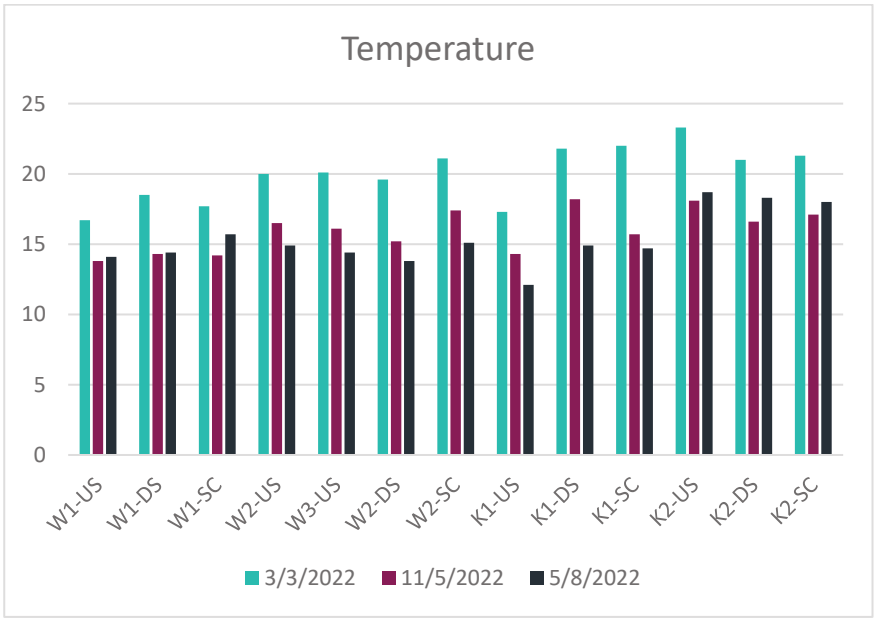

Figure 19: Summary of Temperature results.

Table 9: Results from WBOPDC for Dissolved Oxygen, pH, Conductivity, Temperature, Odour, Clarity, visual inspection on 03/02/2022.

	K1-US	K1-SC	K1-DS	K2-US	K2-SC	K2-DS	W1-US	W1-SC	W1-DS	W2-US	W2-SC	W2-DS	W3-US
DO (mg/L)	9.65	8.36	9.02	10.64	8.4	8.43	8.69	7.07	8.01	6.97	9.28	8.84	5.86
Conductivity	65.7	14428	5920	198.3	1913	13610	108.7	371.1	542	2150	5167	4633	132.3
Odour	No	No	No	No	No	No	No	Sewage odour	No	No	No	No	No
Clarity (m)	4.4	0.78	0.71	0.16	0.82	0.2	0.72	0.73	0.73	0.62	0.42	0.57	0.57
Visual check	Nothing to note	Nothing to note	Nothing to note	Green	Nothing to note	Slightly turbid	Oil, litter, grease		Clean	Grass	Nothing to note	Grass	Nothing to note

Table 10: Results from WBOPDC for Dissolved Oxygen, pH, Conductivity, Temperature, Odour, Clarity, visual inspection on 11/05/2022.

	K1-US	K1-SC	K1-DS	K2-US	K2-SC	K2-DS	W1-US	W1-SC	W1-DS	W2-US	W2-SC	W2-DS	W3-US
DO (mg/L)	11.46	10.99	9.32	9.97	10.14	10.52	9.11	8.6	8.75	6.7	7.62	8.83	6.11
Conductivity	628	4603	26866	96.7	1029	723	119.7	227.5	270.2	16599	18931	13907	14202
Odour	No	No	No	No	No	No	No	No	No	No	No	No	No
Clarity (m)	4.9	0.85	0.8	0.83	0.7	0.51	0.5	0.42	0.46	0.71	0.66	0.75	0.41
Visual check	Nothing to note	Nothing to note	leaves	Nothing to note	Nothing to note	Nothing to note	Nothing to note	leaves, feathers	Nothing to note	scum, seeds	Nothing to note	Nothing to note	Scum, weeds, seeds

Table 11: Results from WBOPDC for Dissolved Oxygen, pH, Conductivity, Temperature, Odour, Clarity, visual inspection on 05/08/2022.

	K1-US	K1-SC	K1-DS	K2-US	K2-SC	K2-DS	W1-US	W1-SC	W1-DS	W2-US	W2-SC	W2-DS	W3-US
DO (%)	91.8	95	96.4	89.4	91.8	93.3	88.3	88.5	85.7	79.6	78.4	91.4	65.2
Conductivity	70.3	92.7	251.3	86	80.5	99.4	129.2	145.3	202.9	730	367.7	378.5	720
Odour	No	No	No	No	No	No	No	No	No	No	No	No	No
Clarity (m)	6	5.5	>1 (Not safe to measure in river, too deep / uneven ground)	>1 (water was very clear, but full of weed and very shallow, so unable to test any further)	8	>1 (water was very clear, but getting into the stream stirred up too much silt to test any further	0.6	0.55	0.67	0.82	0.95	0.73	0.55
Visual check	Nothing to note	Foamy bubbles	Wide channel	Algae and weeds	Few fish, extremely clear	Eel in water	Nothing to note	Car battery	Nothing to note	Eels and dead	Nothing to note	Floating bubbles	Greasy residue

	K1-US	K1-SC	K1-DS	K2-US	K2-SC	K2-DS	W1-US	W1-SC	W1-DS	W2-US	W2-SC	W2-DS	W3-US
				in water				in the water		snapper in water			

3 STORMWATER NETWORK AND INFRASTRUCTURE UPDATES

During the 2021 – 2022 monitoring period no significant works were undertaken however, preventative scour works were undertaken in Waihi Beach, so to stop any further scouring along the rock wall opposite the outlet pipe.

4 STORMWATER MITIGATION MEASURES

Western Bay of Plenty District Council has been working with the Pios Shores and Bowentown Community to address stormwater related flooding issues within the catchment. The pump system consists of five pump stations and uses both gravity and pump fed systems, all of which have seen continuous upgrades and improvements over the years.

Western Bay of Plenty District Council employed Tonkin and Taylor, and GHD to undertake assessments and report on management options. Tonkin and Taylor produced a Pio Shores Stormwater Management Options Assessment on 11 October 2019 and in addition to this, an Options Assessment Addendum followed on 20 August 2021. The scope of this work was to investigate flooding and how to reduce its effects, in the Pio Shores and Bowentown Areas. GHD completed a Pio Shores Final Sand Dune Basin Assessment Report on 26 March 2021, which investigated the capacity of the three existing stormwater basins in the sand dunes.

Modelling of stormwater basin performance found that the basins can accommodate a higher rate of discharge and identified an opportunity to increase stormwater discharge to the basins (dunes). As a result, upgrades to the Papaunahi Road pump station, and Boulevard North pump station were scheduled.

Design for the upgrades to these pumpstations was finalised earlier this year. Initially it was intended that the construction and installation phase of this project would be completed by the end of July 2022. However, this timeframe has been delayed for several months due to a combination of unsuitable weather conditions and supply chain issues resulting from the COVID-19 global pandemic. Construction is currently underway, with completion scheduled before the end of December 2022.

5 STORMWATER RELATED INCIDENTS

A heavy rainfall event on 12th July created higher than normal wet weather flows into the treatment plant, as well as increased rainfall onto the ponds and wetlands. On 14 July 2022, an incident occurred at the Katikati Wastewater Treatment Plant (WWTP). The incident was recorded in the Western Bay of Plenty District Council record system as 'A sewer overflow into a stormwater drain, leading to the estuary.' Excessive rainfall during this time resulted in the WWTP reaching maximum capacity, causing the overflow to occur.

Condition 5.2 of Resource Consent 67093-DC.01 states:

The consent holder must notify the Chief Executive of the Regional Council or delegate, in writing, of all spills, accidents or similar incidents that result in contaminants entering the stormwater network authorised under this consent. Such notification must be undertaken by contacting the Regional Council Pollution Hotline (see Advice Note 3)

In accordance with the requirements of this Consent Condition, and in response to the overflow, WBOPDC notified Bay of Plenty Regional Council of this incident on Thursday 14/07/2022. Immediate preventive measures were put in place to try and mitigate the overflow. WBOPDC utilised the onsite emergency pond to hold excess water for storage, and sandbags were placed where necessary to prevent further seepage. There was no estimated volume of overflow however, it was described as 'trickle seepage.' The overflow ceased later on Thursday 14/07/2022.

6 UPDATES TO THE ASSET REGISTER

Pursuant to the requirements of Consent Condition 9.4(e), please refer to Appendix (C) which includes additions to the asset register during the monitored period November 2021 to November 2022.

7 NEW STRUCTURES INCLUDED IN THE CSC

As previously mentioned, there have been delays in construction for the Pio Shores and Bowentown Community Stormwater Improvements Project. This has meant that during the 2021 – 2022 period no new structures have been built under the Comprehensive Stormwater Consent, 67093.

Construction is expected to be complete before the end of December 2022, therefore the Annual Report for the next monitoring period will include updates on new structures resulting from this project.

Appendix A:

Raw Monitoring data (Hills Lab pdfs)

Hill Laboratories
TRIED, TESTED AND TRUSTED

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:	Western BOP District Council	**Lab No:**	2904579	SPv1
Contact:	Chris Chen C/- Western BOP District Council Private Bag 12803 Tauranga Mail Centre Tauranga 3143	**Date Received:**	04-Mar-2022	
		Date Reported:	14-Mar-2022	
		Quote No:	114326	
		Order No:	50286	
		Client Reference:	Stormwater monitoring	
		Submitted By:	Chris Chen	

Sample Type: Aqueous

Sample Name:		W1-US 03-Mar-2022 9:30 am	W1-DS 03-Mar-2022 10:07 am	W1-SC 03-Mar-2022 9:50 am	W2-US 03-Mar-2022 11:05 am	W3-US 03-Mar-2022 10:50 am
Lab Number:		2904579.1	2904579.2	2904579.3	2904579.4	2904579.5
Individual Tests						
Turbidity	NTU	4.3	4.6	4.5	3.7	3.7
Total Hardness	g/m³ as $CaCO_3$	25	68	53	230	420
Total Suspended Solids	g/m³	3	5	< 3	11	9
Dissolved Calcium	g/m³	5.0	8.0	6.9	21	33
Dissolved Magnesium	g/m³	2.9	11.7	8.6	44	82
Dissolved Mercury	g/m³	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Total Mercury	g/m³	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Total Nitrogen	g/m³	0.27	0.30	0.25	0.82	1.22
Total Ammoniacal-N	g/m³	0.017	0.024	0.036	0.023	0.20
Nitrite-N	g/m³	< 0.002	< 0.002	< 0.002	0.030	0.066
Nitrate-N	g/m³	0.148	0.092	0.121	0.080	0.21
Nitrate-N + Nitrite-N	g/m³	0.149	0.094	0.123	0.110	0.28
Total Kjeldahl Nitrogen (TKN)	g/m³	0.12	0.20	0.13	0.70	0.95
Dissolved Reactive Phosphorus	g/m³	0.013	0.009	0.012	0.46	0.51
Total Phosphorus	g/m³	0.029	0.030	0.030	0.67	0.80
Chemical Oxygen Demand (COD)	g O_2/m³	< 6	< 6	< 6	34	43
Escherichia coli	cfu / 100mL	3,200 #2	1,100 #3	1,400 #3	200 #3	700 #3
Enterococci	cfu / 100mL	2,000 #2	620 #3	480 #2	330 #2	1,700 #3
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Dissolved Arsenic	g/m³	< 0.0010	< 0.0010	< 0.0010	0.0010	< 0.0010
Dissolved Cadmium	g/m³	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Dissolved Chromium	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dissolved Copper	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dissolved Lead	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dissolved Nickel	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dissolved Zinc	g/m³	< 0.0010	0.0011	0.0011	0.0011	0.0012
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Arsenic	g/m³	< 0.0011	< 0.0011	< 0.0011	0.0012	0.0012
Total Cadmium	g/m³	< 0.000053	< 0.000053	< 0.000053	< 0.000053	< 0.000053
Total Chromium	g/m³	< 0.00053	0.00058	< 0.00053	< 0.00053	< 0.00053
Total Copper	g/m³	< 0.00053	< 0.00053	< 0.00053	< 0.00053	< 0.00053
Total Lead	g/m³	< 0.00011	< 0.00011	< 0.00011	< 0.00011	< 0.00011
Total Nickel	g/m³	< 0.00053	< 0.00053	< 0.00053	< 0.00053	< 0.00053
Total Zinc	g/m³	< 0.0011	0.0032	0.0013	0.0015	0.0017

Sample Type: Aqueous						
Sample Name:		W1-US 03-Mar-2022 9:30 am	W1-DS 03-Mar-2022 10:07 am	W1-SC 03-Mar-2022 9:50 am	W2-US 03-Mar-2022 11:05 am	W3-US 03-Mar-2022 10:50 am
Lab Number:		2904579.1	2904579.2	2904579.3	2904579.4	2904579.5
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
C10 - C14	g/m³	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
C15 - C36	g/m³	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7

Sample Name:		W2-DS 03-Mar-2022 9:20 am	W2-SC 03-Mar-2022 11:25 am	K1-US 03-Mar-2022 8:30 am	K1-DS 03-Mar-2022 12:40 pm	K1-SC 03-Mar-2022 12:30 pm
Lab Number:		2904579.6	2904579.7	2904579.8	2904579.9	2904579.10
Individual Tests						
Turbidity	NTU	2.2	3.2	0.40	1.02	1.30
Total Hardness	g/m³ as $CaCO_3$	550	580	16.3	640	590
Total Suspended Solids	g/m³	8	10	7	5	< 3
Dissolved Calcium	g/m³	42	43	3.4	42	38
Dissolved Magnesium	g/m³	108	114	1.91	129	120
Dissolved Mercury	g/m³	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Total Mercury	g/m³	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Total Nitrogen	g/m³	0.89	1.02	0.10	0.15	< 0.11
Total Ammoniacal-N	g/m³	< 0.010	< 0.010	< 0.010	0.011	0.010
Nitrite-N	g/m³	< 0.02 #4	< 0.02 #4	< 0.002	< 0.02 #7	< 0.02 #7
Nitrate-N	g/m³	0.06	< 0.02	0.012	0.013	0.019
Nitrate-N + Nitrite-N	g/m³	0.06 #4	< 0.02 #4	0.013	0.014	0.019
Total Kjeldahl Nitrogen (TKN)	g/m³	0.83	1.02	< 0.10	0.14	< 0.10
Dissolved Reactive Phosphorus	g/m³	0.28	0.28	< 0.004	< 0.04 #7	< 0.04 #7
Total Phosphorus	g/m³	0.40	0.42	0.002	0.004	0.004
Chemical Oxygen Demand (COD)	g O_2/m³	51	68	< 6	34	43
Escherichia coli	cfu / 100mL	150 #5	140 #3	800 #6	1,200 #3	440 #2
Enterococci	cfu / 100mL	2,400 #2	280 #2	700 #6	650 #3	1,100 #3
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Dissolved Arsenic	g/m³	0.0014 #1	0.0012	< 0.0010	< 0.0010	< 0.0010
Dissolved Cadmium	g/m³	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Dissolved Chromium	g/m³	< 0.0005	0.0007 #1	< 0.0005	< 0.0005	< 0.0005
Dissolved Copper	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dissolved Lead	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dissolved Nickel	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dissolved Zinc	g/m³	< 0.0010	< 0.0010	< 0.0010	0.0011	< 0.0010
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Arsenic	g/m³	0.0013 #1	0.0014	< 0.0011	< 0.0011	< 0.0011
Total Cadmium	g/m³	< 0.000053	< 0.000053	< 0.000053	< 0.000053	< 0.000053
Total Chromium	g/m³	< 0.00053	< 0.00053 #1	< 0.00053	< 0.00053	< 0.00053
Total Copper	g/m³	0.00058	< 0.00053	< 0.00053	< 0.00053	< 0.00053
Total Lead	g/m³	< 0.00011	< 0.00011	< 0.00011	< 0.00011	< 0.00011
Total Nickel	g/m³	< 0.00053	< 0.00053	< 0.00053	< 0.00053	< 0.00053
Total Zinc	g/m³	< 0.0011	0.0018	< 0.0011	0.0013	< 0.0011
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
C10 - C14	g/m³	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
C15 - C36	g/m³	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7

Sample Name:		K2-US 03-Mar-2022 1:35 pm	K2-DS 03-Mar-2022 1:00 pm	K2-SC 03-Mar-2022 1:15 pm		
Lab Number:		2904579.11	2904579.12	2904579.13		

Sample Type: Aqueous						
Sample Name:		K2-US 03-Mar-2022 1:35 pm	K2-DS 03-Mar-2022 1:00 pm	K2-SC 03-Mar-2022 1:15 pm		
Lab Number:		2904579.11	2904579.12	2904579.13		
Individual Tests						
Turbidity	NTU	6.2	13.6	4.1	-	-
Total Hardness	g/m³ as $CaCO_3$	6.2	1,660	173	-	-
Total Suspended Solids	g/m³	65	48	9	-	-
Dissolved Calcium	g/m³	1.22	107	11.7	-	-
Dissolved Magnesium	g/m³	0.76	340	35	-	-
Dissolved Mercury	g/m³	< 0.00008	< 0.00008	< 0.00008	-	-
Total Mercury	g/m³	< 0.00008	< 0.00008	< 0.00008	-	-
Total Nitrogen	g/m³	0.36	0.36	0.39	-	-
Total Ammoniacal-N	g/m³	< 0.010	0.055	0.039	-	-
Nitrite-N	g/m³	< 0.002	< 0.02 #7	< 0.002	-	-
Nitrate-N	g/m³	0.27	0.158	0.24	-	-
Nitrate-N + Nitrite-N	g/m³	0.27	0.159	0.24	-	-
Total Kjeldahl Nitrogen (TKN)	g/m³	< 0.10	0.20	0.15	-	-
Dissolved Reactive Phosphorus	g/m³	0.29	0.04 #7	0.137	-	-
Total Phosphorus	g/m³	0.44	0.128	0.23	-	-
Chemical Oxygen Demand (COD)	g O_2/m³	< 6	133	16	-	-
Escherichia coli	cfu / 100mL	70 #3	800 #3	250 #2	-	-
Enterococci	cfu / 100mL	290 #2	1,200 #3	540 #2	-	-
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Dissolved Arsenic	g/m³	0.0034 #1	< 0.02	0.0019	-	-
Dissolved Cadmium	g/m³	< 0.00005	< 0.0010	< 0.00005	-	-
Dissolved Chromium	g/m³	< 0.0005	< 0.010	< 0.0005	-	-
Dissolved Copper	g/m³	0.0007	< 0.010	< 0.0005	-	-
Dissolved Lead	g/m³	0.00013	< 0.002	< 0.00010	-	-
Dissolved Nickel	g/m³	< 0.0005	< 0.010	< 0.0005	-	-
Dissolved Zinc	g/m³	0.0045 #1	< 0.02	0.0042	-	-
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Arsenic	g/m³	0.0034 #1	< 0.021	0.0023	-	-
Total Cadmium	g/m³	< 0.000053	< 0.0011	< 0.000053	-	-
Total Chromium	g/m³	< 0.00053	< 0.011	< 0.00053	-	-
Total Copper	g/m³	0.00072	< 0.011	0.00067	-	-
Total Lead	g/m³	0.00017	< 0.0021	0.00013	-	-
Total Nickel	g/m³	< 0.00053	< 0.011	< 0.00053	-	-
Total Zinc	g/m³	0.0043 #1	< 0.021	0.0049	-	-
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	< 0.10	< 0.10	< 0.10	-	-
C10 - C14	g/m³	< 0.2	< 0.2	< 0.2	-	-
C15 - C36	g/m³	< 0.4	< 0.4	< 0.4	-	-
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	< 0.7	-	-

Analyst's Comments

#1 It has been noted that the result for the dissolved fraction was greater than that for the total fraction, but within analytical variation of the methods.

#2 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 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.

#4 Severe matrix interferences required that a dilution be performed prior to analysis of this sample, resulting in a detection limit higher than that normally achieved for the NO2N, NO3N and NOxN analysis.

#5 Statistically estimated count based on the theoretical countable range for the stated method.
Please interpret this microbiological result with caution as the sample required repeat analysis. Due to incubation times it is not possible to perform a repeat analysis within 24 hours of sampling as required by the method. Repeats are typically due to unexpected analyte levels.
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.

#6 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.

#7 Severe matrix interferences required that a dilution be performed prior to analysis of this sample, resulting in a detection limit higher than that normally achieved for the DRP and NO2N analysis.

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.	-	1-13
Total Digestion	Nitric acid digestion. APHA 3030 E (modified) 23rd ed. 2017.	-	1-13
Turbidity	Analysis by Turbidity meter. APHA 2130 B 23rd ed. 2017 (modified).	0.05 NTU	1-13
Total Hardness	Calculation from Calcium and Magnesium. APHA 2340 B 23rd ed. 2017.	1.0 g/m^3 as $CaCO_3$	1-13
Total Suspended Solids	Filtration 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.	3 g/m^3	1-13
Filtration for dissolved metals analysis	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B 23rd ed. 2017.	-	1-13
Dissolved Calcium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.05 g/m^3	1-13
Dissolved Magnesium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.02 g/m^3	1-13
Dissolved Mercury	0.45µm filtration, bromine oxidation followed by atomic fluorescence. US EPA Method 245.7, Feb 2005.	0.00008 g/m^3	1-13
Total Mercury	Bromine Oxidation followed by Atomic Fluorescence. US EPA Method 245.7, Feb 2005.	0.00008 g/m^3	1-13

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Total Nitrogen	Calculation: TKN + Nitrate-N + Nitrite-N. Please note: The Default Detection Limit of 0.05 g/m^3 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^3, the Default Detection Limit for Total Nitrogen will be 0.11 g/m^3. In-house calculation.	0.05 g/m^3	1-13
Total Ammoniacal-N	Phenol/hypochlorite colourimetry. Flow injection analyser. (NH_4-N = NH_4^+-N + NH_3-N). APHA 4500-NH_3 H (modified) 23rd ed. 2017.	0.010 g/m^3	1-13
Nitrite-N	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.002 g/m^3	1-13
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m^3	1-13
Nitrate-N + Nitrite-N	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.002 g/m^3	1-13
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/m^3	1-13
Dissolved Reactive Phosphorus	Filtered sample. Molybdenum blue colourimetry. Flow injection analyser. APHA 4500-P G (modified) 23rd ed. 2017.	0.004 g/m^3	1-13
Total Phosphorus	Total phosphorus digestion, automated ascorbic acid colorimetry. Flow Injection Analyser. APHA 4500-P H 23rd ed. 2017.	0.002 g/m^3	1-13
Chemical Oxygen Demand (COD), trace level	Dichromate/sulphuric acid digestion in Hach tubes, colorimetry. Trace Level method. APHA 5220 D 23rd ed. 2017.	6 g O_2/m^3	1-13
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	1-13
Enterococci	Membrane filtration, Count on mE agar, Incubated at 41°C for 48 hours, Confirmation. APHA 9230 C (modified) 23rd ed. 2017.	1 cfu / 100mL	1-13
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm Filtration, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.00005 - 0.0010 g/m^3	1-13
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.000053 - 0.0011 g/m^3	1-13
Total Petroleum Hydrocarbons in Water			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.10 g/m^3	1-13
C10 - C14	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.2 g/m^3	1-13
C15 - C36	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.4 g/m^3	1-13
Total hydrocarbons (C7 - C36)	Calculation: Sum of carbon bands from C7 to C36. In-house based on US EPA 8015.	0.7 g/m^3	1-13

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

Testing was completed between 05-Mar-2022 and 11-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

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TRIED, TESTED AND TRUSTED

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Certificate of Analysis

Client:	Western BOP District Council	**Lab No:**	2984486	SPv1
Contact:	Chris Chen C/- Western BOP District Council Private Bag 12803 Tauranga Mail Centre Tauranga 3143	**Date Received:**	12-May-2022	
		Date Reported:	19-May-2022	
		Quote No:	114326	
		Order No:	51371	
		Client Reference:	Stormwater monitoring	
		Submitted By:	Chris Chen	

Sample Type: Aqueous

Sample Name:		W1-US 11-May-2022 9:30 am	W1-DS 11-May-2022 9:45 am	W1-SC 11-May-2022 9:40 am	W2-US 11-May-2022 10:35 am	W3-US 11-May-2022 10:25 am
Lab Number:		2984486.1	2984486.2	2984486.3	2984486.4	2984486.5
Individual Tests						
Turbidity	NTU	8.7	9.5	10.7	3.9	5.4
Total Hardness	g/m³ as $CaCO_3$	25	45	35	2,400	1,500
Total Suspended Solids	g/m³	8	5	8	5	7
Dissolved Calcium	g/m³	5.3	7.3	6.2	155	97
Dissolved Magnesium	g/m³	2.8	6.5	4.6	500	300
Dissolved Mercury	g/m³	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Total Mercury	g/m³	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Total Nitrogen	g/m³	0.43	0.51	0.43	0.90	1.44
Total Ammoniacal-N	g/m³	0.018	0.058	0.055	0.156	0.21
Nitrite-N	g/m³	< 0.002	0.003	0.003	0.026	0.031
Nitrate-N	g/m³	0.26	0.26	0.26	0.38	0.75
Nitrate-N + Nitrite-N	g/m³	0.27	0.26	0.27	0.40	0.78
Total Kjeldahl Nitrogen (TKN)	g/m³	0.16	0.25	0.17	0.50	0.66
Dissolved Reactive Phosphorus	g/m³	0.005	0.010	0.009	0.06 #4	0.080
Total Phosphorus	g/m³	0.043	0.032	0.030	0.120	0.22
Chemical Oxygen Demand (COD)	g O_2/m³	< 6	11	< 6	141	100
Escherichia coli	cfu / 100mL	500 #1	1,100 #3	290	1,000 #3	400 #3
Enterococci	cfu / 100mL	560 #2	520	640 #3	200	360
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Dissolved Arsenic	g/m³	< 0.0010	< 0.0010	< 0.0010	< 0.02	< 0.02
Dissolved Cadmium	g/m³	< 0.00005	< 0.00005	< 0.00005	< 0.0010	< 0.0010
Dissolved Chromium	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.010	< 0.010
Dissolved Copper	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.010	< 0.010
Dissolved Lead	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.002	< 0.002
Dissolved Nickel	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.010	< 0.010
Dissolved Zinc	g/m³	0.0010	0.0015	0.0016	< 0.02	< 0.02
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Arsenic	g/m³	< 0.0011	< 0.0011	< 0.0011	< 0.11	< 0.11
Total Cadmium	g/m³	< 0.000053	< 0.000053	< 0.000053	< 0.0053	< 0.0053
Total Chromium	g/m³	< 0.00053	< 0.00053	0.00059	< 0.053	< 0.053
Total Copper	g/m³	< 0.00053	< 0.00053	0.00109	< 0.053	< 0.053
Total Lead	g/m³	0.00014	0.00013	0.00026	< 0.011	< 0.011
Total Nickel	g/m³	< 0.00053	< 0.00053	< 0.00053	< 0.053	< 0.053
Total Zinc	g/m³	0.0016	0.0020	0.0036	< 0.11	< 0.11

Sample Type: Aqueous						
Sample Name:		W1-US 11-May-2022 9:30 am	W1-DS 11-May-2022 9:45 am	W1-SC 11-May-2022 9:40 am	W2-US 11-May-2022 10:35 am	W3-US 11-May-2022 10:25 am
Lab Number:		2984486.1	2984486.2	2984486.3	2984486.4	2984486.5
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
C10 - C14	g/m³	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
C15 - C36	g/m³	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7

Sample Name:		W2-DS 11-May-2022 10:00 am	W2-SC 11-May-2022 10:50 am	K1-US 11-May-2022 12:10 pm	K1-DS 11-May-2022 1:00 pm	K1-SC 11-May-2022 12:45 pm
Lab Number:		2984486.6	2984486.7	2984486.8	2984486.9	2984486.10
Individual Tests						
Turbidity	NTU	3.5	3.4	0.27	1.14	0.68
Total Hardness	g/m³ as $CaCO_3$	1,650	2,900	34	3,800	620
Total Suspended Solids	g/m³	12	4	< 3	5	< 3
Dissolved Calcium	g/m³	105	186	4.4	230	40
Dissolved Magnesium	g/m³	340	590	5.6	780	126
Dissolved Mercury	g/m³	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Total Mercury	g/m³	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Total Nitrogen	g/m³	1.13	0.98	< 0.11	< 0.11	0.14
Total Ammoniacal-N	g/m³	0.094	0.096	< 0.010	0.019	0.014
Nitrite-N	g/m³	0.020	0.020	< 0.002	< 0.02 #5	< 0.002
Nitrate-N	g/m³	0.62	0.59	0.079	< 0.02	0.069
Nitrate-N + Nitrite-N	g/m³	0.64	0.61	0.080	< 0.02 #5	0.070
Total Kjeldahl Nitrogen (TKN)	g/m³	0.49	0.36	< 0.10	< 0.10	< 0.10
Dissolved Reactive Phosphorus	g/m³	0.050	0.052	< 0.004	< 0.04 #4	< 0.04 #4
Total Phosphorus	g/m³	0.150	0.145	0.002	0.006	< 0.004
Chemical Oxygen Demand (COD)	g O_2/m³	83	180	< 6	160	41
Escherichia coli	cfu / 100mL	410 #3	360	170	20 #3	80 #3
Enterococci	cfu / 100mL	520	490	250	60 #3	50 #3
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Dissolved Arsenic	g/m³	< 0.02	< 0.10	< 0.0010	< 0.10	< 0.010
Dissolved Cadmium	g/m³	< 0.0010	< 0.005	< 0.00005	< 0.005	< 0.0005
Dissolved Chromium	g/m³	< 0.010	< 0.05	< 0.0005	< 0.05	< 0.005
Dissolved Copper	g/m³	< 0.010	< 0.05	< 0.0005	< 0.05	< 0.005
Dissolved Lead	g/m³	< 0.002	< 0.010	< 0.00010	< 0.010	< 0.0010
Dissolved Nickel	g/m³	< 0.010	< 0.05	< 0.0005	< 0.05	< 0.005
Dissolved Zinc	g/m³	< 0.02	< 0.10	< 0.0010	< 0.10	< 0.010
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Arsenic	g/m³	< 0.021	< 0.11	< 0.0011	< 0.11	< 0.0053
Total Cadmium	g/m³	< 0.0011	< 0.0053	< 0.000053	< 0.0053	< 0.00027
Total Chromium	g/m³	< 0.011	< 0.053	< 0.00053	< 0.053	< 0.0027
Total Copper	g/m³	< 0.011	< 0.053	< 0.00053	< 0.053	< 0.0027
Total Lead	g/m³	< 0.0021	< 0.011	< 0.00011	< 0.011	< 0.00053
Total Nickel	g/m³	< 0.011	< 0.053	< 0.00053	< 0.053	< 0.0027
Total Zinc	g/m³	< 0.021	< 0.11	< 0.0011	< 0.11	< 0.0053
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
C10 - C14	g/m³	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
C15 - C36	g/m³	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7

Sample Name:		K2-US 11-May-2022 1:40 pm	K2-DS 11-May-2022 1:30 pm	K2-SC 11-May-2022 1:20 pm		
Lab Number:		2984486.11	2984486.12	2984486.13		

Sample Type: Aqueous						
Sample Name:		K2-US 11-May-2022 1:40 pm	K2-DS 11-May-2022 1:30 pm	K2-SC 11-May-2022 1:20 pm		
Lab Number:		2984486.11	2984486.12	2984486.13		
Individual Tests						
Turbidity	NTU	1.87	5.4	3.3	-	-
Total Hardness	g/m³ as $CaCO_3$	12.5	71	11.8	-	-
Total Suspended Solids	g/m³	< 3	5	5	-	-
Dissolved Calcium	g/m³	2.4	6.2	2.1	-	-
Dissolved Magnesium	g/m³	1.61	13.5	1.56	-	-
Dissolved Mercury	g/m³	< 0.00008	< 0.00008	< 0.00008	-	-
Total Mercury	g/m³	< 0.00008	< 0.00008	< 0.00008	-	-
Total Nitrogen	g/m³	0.60	1.00	1.07	-	-
Total Ammoniacal-N	g/m³	< 0.010	0.079	0.057	-	-
Nitrite-N	g/m³	< 0.002	0.005	0.002	-	-
Nitrate-N	g/m³	0.55	0.82	0.98	-	-
Nitrate-N + Nitrite-N	g/m³	0.55	0.83	0.98	-	-
Total Kjeldahl Nitrogen (TKN)	g/m³	< 0.10	0.17	< 0.10	-	-
Dissolved Reactive Phosphorus	g/m³	0.006	< 0.004	< 0.004	-	-
Total Phosphorus	g/m³	0.010	0.018	0.016	-	-
Chemical Oxygen Demand (COD)	g O_2/m³	< 6	39	< 6	-	-
Escherichia coli	cfu / 100mL	10 #3	6,000 #3	1,000 #3	-	-
Enterococci	cfu / 100mL	140 #3	4,200	9,000 #3	-	-
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Dissolved Arsenic	g/m³	< 0.0010	< 0.0010	< 0.0010	-	-
Dissolved Cadmium	g/m³	< 0.00005	< 0.00005	< 0.00005	-	-
Dissolved Chromium	g/m³	< 0.0005	< 0.0005	< 0.0005	-	-
Dissolved Copper	g/m³	< 0.0005	< 0.0005	< 0.0005	-	-
Dissolved Lead	g/m³	< 0.00010	< 0.00010	< 0.00010	-	-
Dissolved Nickel	g/m³	< 0.0005	< 0.0005	< 0.0005	-	-
Dissolved Zinc	g/m³	0.0060	0.0068	0.0106	-	-
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Arsenic	g/m³	< 0.0011	< 0.0011	< 0.0011	-	-
Total Cadmium	g/m³	< 0.000053	< 0.000053	< 0.000053	-	-
Total Chromium	g/m³	< 0.00053	< 0.00053	< 0.00053	-	-
Total Copper	g/m³	< 0.00053	0.00062	< 0.00053	-	-
Total Lead	g/m³	0.00011	0.00043	0.00024	-	-
Total Nickel	g/m³	< 0.00053	< 0.00053	< 0.00053	-	-
Total Zinc	g/m³	0.0065	0.0101	0.0118	-	-
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	< 0.10	< 0.10	< 0.10	-	-
C10 - C14	g/m³	< 0.2	< 0.2	< 0.2	-	-
C15 - C36	g/m³	< 0.4	< 0.4	< 0.4	-	-
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	< 0.7	-	-

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 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.

#2 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.

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

#4 Severe matrix interferences required that a dilution be performed prior to analysis, resulting in a detection limit higher than that normally achieved for the DRP analysis.

#5 Severe matrix interferences required that a dilution be performed prior to analysis, resulting in a detection limit higher than that normally achieved for the NOxN /NO2N analysis.

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.	-	1-13
Total Digestion	Nitric acid digestion. APHA 3030 E (modified) 23rd ed. 2017.	-	1-13
Turbidity	Analysis by Turbidity meter. APHA 2130 B 23rd ed. 2017 (modified).	0.05 NTU	1-13
Total Hardness	Calculation from Calcium and Magnesium. APHA 2340 B 23rd ed. 2017.	1.0 g/m^3 as $CaCO_3$	1-13
Total Suspended Solids	Filtration 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.	3 g/m^3	1-13
Filtration for dissolved metals analysis	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B 23rd ed. 2017.	-	1-13
Dissolved Calcium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.05 g/m^3	1-13
Dissolved Magnesium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.02 g/m^3	1-13
Dissolved Mercury	0.45µm filtration, bromine oxidation followed by atomic fluorescence. US EPA Method 245.7, Feb 2005.	0.00008 g/m^3	1-13
Total Mercury	Bromine Oxidation followed by Atomic Fluorescence. US EPA Method 245.7, Feb 2005.	0.00008 g/m^3	1-13
Total Nitrogen	Calculation: TKN + Nitrate-N + Nitrite-N. Please note: The Default Detection Limit of 0.05 g/m^3 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^3, the Default Detection Limit for Total Nitrogen will be 0.11 g/m^3. In-house calculation.	0.05 g/m^3	1-13
Total Ammoniacal-N	Phenol/hypochlorite colourimetry. Flow injection analyser. (NH_4-N = NH_4^+-N + NH_3-N). APHA 4500-NH_3 H (modified) 23rd ed. 2017.	0.010 g/m^3	1-13
Nitrite-N	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.002 g/m^3	1-13
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m^3	1-13
Nitrate-N + Nitrite-N	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.002 g/m^3	1-13
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/m^3	1-13
Dissolved Reactive Phosphorus	Filtered sample. Molybdenum blue colourimetry. Flow injection analyser. APHA 4500-P G (modified) 23rd ed. 2017.	0.004 g/m^3	1-13
Total Phosphorus	Total phosphorus digestion, ascorbic acid colorimetry. Flow Injection Analyser. APHA 4500-P H 23rd ed. 2017.	0.004 g/m^3	9-10
Total Phosphorus	Total phosphorus digestion, automated ascorbic acid colorimetry. Flow Injection Analyser. APHA 4500-P H 23rd ed. 2017.	0.002 g/m^3	1-8, 11-13
Chemical Oxygen Demand (COD), trace level	Dichromate/sulphuric acid digestion in Hach tubes, colorimetry. Trace Level method. APHA 5220 D 23rd ed. 2017.	6 g O_2/m^3	1-13
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	1-13
Enterococci	Membrane filtration, Count on mE agar, Incubated at 41°C for 48 hours, Confirmation. APHA 9230 C (modified) 23rd ed. 2017.	1 cfu / 100mL	1-13
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm Filtration, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.00005 - 0.0010 g/m^3	1-13
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.000053 - 0.0011 g/m^3	1-13
Total Petroleum Hydrocarbons in Water			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.10 g/m^3	1-13
C10 - C14	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.2 g/m^3	1-13
C15 - C36	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.4 g/m^3	1-13
Total hydrocarbons (C7 - C36)	Calculation: Sum of carbon bands from C7 to C36. In-house based on US EPA 8015.	0.7 g/m^3	1-13

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

Testing was completed between 13-May-2022 and 19-May-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

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TRIED, TESTED AND TRUSTED

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Certificate of Analysis

Client:	Western BOP District Council	**Lab No:**	3049322	SPv1
Contact:	Erika MacGregor	**Date Received:**	06-Aug-2022	
	C/- Western BOP District Council	**Date Reported:**	18-Aug-2022	
	Private Bag 12803	**Quote No:**	114326	
	Tauranga Mail Centre	**Order No:**	53281	
	Tauranga 3143	**Client Reference:**	Stormwater monitoring	
		Submitted By:	Erika MacGregor	

Sample Type: Aqueous

Sample Name:		W1-US 05-Aug-2022 10:25 am	W1-DS 05-Aug-2022 11:00 am	W1-SC 05-Aug-2022 10:45 am	W2-US 05-Aug-2022 11:55 am	W3-US 05-Aug-2022 11:40 am
Lab Number:		3049322.1	3049322.2	3049322.3	3049322.4	3049322.5
Individual Tests						
Turbidity	NTU	8.6	6.4	7.2	3.1	13.0
Total Hardness	g/m³ as $CaCO_3$	24	31	26	39	1,490
Total Suspended Solids	g/m³	9	8	5	< 3	9
Dissolved Calcium	g/m³	4.8	5.7	5.1	7.4	145
Dissolved Magnesium	g/m³	2.9	4.0	3.1	4.9	270
Dissolved Mercury	g/m³	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Total Mercury	g/m³	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Total Nitrogen	g/m³	2.4	2.3	2.3	1.44	1.84
Total Ammoniacal-N	g/m³	0.116	0.150	0.134	0.068	0.85
Nitrite-N	g/m³	0.025	0.024	0.024	0.006	0.031
Nitrate-N	g/m³	2.2	1.99	2.0	1.01	0.071
Nitrate-N + Nitrite-N	g/m³	2.2	2.0	2.0	1.02	0.102
Total Kjeldahl Nitrogen (TKN)	g/m³	0.23	0.29	0.29	0.42	1.74
Dissolved Reactive Phosphorus	g/m³	0.004	0.005	0.006	0.030	0.014
Total Phosphorus	g/m³	0.025	0.018	0.020	0.060	0.24
Chemical Oxygen Demand (COD)	g O_2/m³	9	9	12	14	129
Escherichia coli	cfu / 100mL	80 #2	80 #2	110 #2	70 #2	160
Enterococci	cfu / 100mL	10 #2	20 #2	< 10 #2	10 #2	230
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Dissolved Arsenic	g/m³	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.10
Dissolved Cadmium	g/m³	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.005
Dissolved Chromium	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.05
Dissolved Copper	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.05
Dissolved Lead	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.010
Dissolved Nickel	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.05
Dissolved Zinc	g/m³	0.0016	0.0023	0.0020	0.0061	< 0.10
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Arsenic	g/m³	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.11
Total Cadmium	g/m³	< 0.000053	< 0.000053	< 0.000053	< 0.000053	< 0.0053
Total Chromium	g/m³	< 0.00053	0.00055	< 0.00053	< 0.00053	< 0.053
Total Copper	g/m³	< 0.00053	< 0.00053	< 0.00053	< 0.00053	< 0.053
Total Lead	g/m³	0.00018	0.00012	0.00014	< 0.00011	< 0.011
Total Nickel	g/m³	< 0.00053	< 0.00053	< 0.00053	< 0.00053	< 0.053
Total Zinc	g/m³	0.0022	0.0027	0.0025	0.0069	< 0.11

Sample Type: Aqueous						
Sample Name:		W1-US 05-Aug-2022 10:25 am	W1-DS 05-Aug-2022 11:00 am	W1-SC 05-Aug-2022 10:45 am	W2-US 05-Aug-2022 11:55 am	W3-US 05-Aug-2022 11:40 am
Lab Number:		3049322.1	3049322.2	3049322.3	3049322.4	3049322.5
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
C10 - C14	g/m³	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
C15 - C36	g/m³	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7

Sample Name:		W2-DS 05-Aug-2022 11:15 am	W2-SC 05-Aug-2022 12:10 pm	K1-US 05-Aug-2022 9:30 am	K1-DS 05-Aug-2022 1:00 pm	K1-SC 05-Aug-2022 12:45 pm
Lab Number:		3049322.6	3049322.7	3049322.8	3049322.9	3049322.10
Individual Tests						
Turbidity	NTU	3.1	3.2	0.61	0.75	0.58
Total Hardness	g/m³ as $CaCO_3$	52	47	13.5	30	14.4
Total Suspended Solids	g/m³	< 3	< 3	3	< 3	< 3
Dissolved Calcium	g/m³	9.0	8.1	2.9	4.2	3.0
Dissolved Magnesium	g/m³	7.3	6.4	1.52	4.8	1.71
Dissolved Mercury	g/m³	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Total Mercury	g/m³	< 0.00008	< 0.00008	< 0.00008	< 0.00008	< 0.00008
Total Nitrogen	g/m³	1.41	1.36	0.59	0.63	0.58
Total Ammoniacal-N	g/m³	0.098	0.075	< 0.010	< 0.010	< 0.010
Nitrite-N	g/m³	0.008	0.007	< 0.002	< 0.002	< 0.002
Nitrate-N	g/m³	1.03	1.05	0.56	0.57	0.53
Nitrate-N + Nitrite-N	g/m³	1.03	1.06	0.56	0.57	0.53
Total Kjeldahl Nitrogen (TKN)	g/m³	0.38	0.30	< 0.10	< 0.10	< 0.10
Dissolved Reactive Phosphorus	g/m³	0.028	0.034	< 0.004	< 0.004	< 0.004
Total Phosphorus	g/m³	0.065	0.065	0.003	0.007	0.003
Chemical Oxygen Demand (COD)	g O_2/m³	18	16	< 6	6	< 6
Escherichia coli	cfu / 100mL	70 #2	40 #2	180 #3	< 10 #2	60 #2
Enterococci	cfu / 100mL	10 #2	20 #2	30 #4	10 #2	< 10 #2
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Dissolved Arsenic	g/m³	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Dissolved Cadmium	g/m³	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Dissolved Chromium	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dissolved Copper	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dissolved Lead	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dissolved Nickel	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dissolved Zinc	g/m³	0.0064	0.0066	< 0.0010	0.0015 #1	0.0014 #1
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Arsenic	g/m³	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011
Total Cadmium	g/m³	< 0.000053	< 0.000053	< 0.000053	< 0.000053	< 0.000053
Total Chromium	g/m³	< 0.00053	< 0.00053	< 0.00053	< 0.00053	< 0.00053
Total Copper	g/m³	< 0.00053	< 0.00053	< 0.00053	< 0.00053	< 0.00053
Total Lead	g/m³	< 0.00011	< 0.00011	< 0.00011	< 0.00011	< 0.00011
Total Nickel	g/m³	< 0.00053	< 0.00053	< 0.00053	< 0.00053	< 0.00053
Total Zinc	g/m³	0.0068	0.0075	< 0.0011	0.0013 #1	0.0011 #1
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
C10 - C14	g/m³	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
C15 - C36	g/m³	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7

Sample Name:		K2-US 05-Aug-2022 2:30 pm	K2-DS 05-Aug-2022 1:50 pm	K2-SC 05-Aug-2022 2:00 pm
Lab Number:		3049322.11	3049322.12	3049322.13
Individual Tests				
Turbidity	NTU	0.58	1.03	0.70
Total Hardness	g/m³ as $CaCO_3$	11.3	13.3	11.1

Sample Type: Aqueous				
Sample Name:		K2-US 05-Aug-2022 2:30 pm	K2-DS 05-Aug-2022 1:50 pm	K2-SC 05-Aug-2022 2:00 pm
Lab Number:		3049322.11	3049322.12	3049322.13
Individual Tests				
Total Suspended Solids	g/m³	5	4	< 3
Dissolved Calcium	g/m³	2.2	2.5	2.2
Dissolved Magnesium	g/m³	1.41	1.71	1.40
Dissolved Mercury	g/m³	< 0.00008	< 0.00008	< 0.00008
Total Mercury	g/m³	< 0.00008	< 0.00008	< 0.00008
Total Nitrogen	g/m³	1.07	1.38	1.46
Total Ammoniacal-N	g/m³	< 0.010	0.031	0.037
Nitrite-N	g/m³	< 0.002	< 0.002	< 0.002
Nitrate-N	g/m³	1.04	1.31	1.41
Nitrate-N + Nitrite-N	g/m³	1.04	1.31	1.41
Total Kjeldahl Nitrogen (TKN)	g/m³	< 0.10	< 0.10	< 0.10
Dissolved Reactive Phosphorus	g/m³	< 0.004	< 0.004	< 0.004
Total Phosphorus	g/m³	0.005	0.005	0.002
Chemical Oxygen Demand (COD)	g O_2/m³	< 6	6	< 6
Escherichia coli	cfu / 100mL	30 #2	< 10 #2	10 #2
Enterococci	cfu / 100mL	< 10 #2	< 10 #2	< 10 #2
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn				
Dissolved Arsenic	g/m³	< 0.0010	< 0.0010	< 0.0010
Dissolved Cadmium	g/m³	< 0.00005	< 0.00005	< 0.00005
Dissolved Chromium	g/m³	< 0.0005	< 0.0005	< 0.0005
Dissolved Copper	g/m³	< 0.0005	< 0.0005	< 0.0005
Dissolved Lead	g/m³	< 0.00010	< 0.00010	< 0.00010
Dissolved Nickel	g/m³	< 0.0005	< 0.0005	< 0.0005
Dissolved Zinc	g/m³	0.0117 #1	0.0107	0.0080
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn				
Total Arsenic	g/m³	< 0.0011	< 0.0011	< 0.0011
Total Cadmium	g/m³	< 0.000053	< 0.000053	< 0.000053
Total Chromium	g/m³	< 0.00053	< 0.00053	< 0.00053
Total Copper	g/m³	< 0.00053	< 0.00053	< 0.00053
Total Lead	g/m³	< 0.00011	< 0.00011	< 0.00011
Total Nickel	g/m³	< 0.00053	< 0.00053	< 0.00053
Total Zinc	g/m³	0.0110 #1	0.0109	0.0084
Total Petroleum Hydrocarbons in Water				
C7 - C9	g/m³	< 0.10	< 0.10	< 0.10
C10 - C14	g/m³	< 0.2	< 0.2	< 0.2
C15 - C36	g/m³	< 0.4	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	< 0.7

Analyst's Comments

#1 It has been noted that the result for the dissolved fraction was greater than that for the total fraction, but within analytical variation of the methods.

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

#3 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.

#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.

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.	-	1-13
Total Digestion	Nitric acid digestion. APHA 3030 E (modified) 23rd ed. 2017.	-	1-13
Turbidity	Analysis by Turbidity meter. APHA 2130 B 23rd ed. 2017 (modified).	0.05 NTU	1-13
Total Hardness	Calculation from Calcium and Magnesium. APHA 2340 B 23rd ed. 2017.	1.0 g/m^3 as $CaCO_3$	1-13
Total Suspended Solids	Filtration 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.	3 g/m^3	1-13
Filtration for dissolved metals analysis	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B 23rd ed. 2017.	-	1-13
Dissolved Calcium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.05 g/m^3	1-13
Dissolved Magnesium	Filtered sample, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.02 g/m^3	1-13
Dissolved Mercury	0.45µm filtration, bromine oxidation followed by atomic fluorescence. US EPA Method 245.7, Feb 2005.	0.00008 g/m^3	1-13
Total Mercury	Bromine Oxidation followed by Atomic Fluorescence. US EPA Method 245.7, Feb 2005.	0.00008 g/m^3	1-13
Total Nitrogen	Calculation: TKN + Nitrate-N + Nitrite-N. Please note: The Default Detection Limit of 0.05 g/m^3 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^3, the Default Detection Limit for Total Nitrogen will be 0.11 g/m^3. In-house calculation.	0.05 g/m^3	1-13
Total Ammoniacal-N	Phenol/hypochlorite colourimetry. Flow injection analyser. (NH_4-N = NH_4^+-N + NH_3-N). APHA 4500-NH_3 H (modified) 23rd ed. 2017.	0.010 g/m^3	1-13
Nitrite-N	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.002 g/m^3	1-13
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m^3	1-13
Nitrate-N + Nitrite-N	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I (modified) 23rd ed. 2017.	0.002 g/m^3	1-13
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/m^3	1-13
Dissolved Reactive Phosphorus	Filtered sample. Molybdenum blue colourimetry. Flow injection analyser. APHA 4500-P G (modified) 23rd ed. 2017.	0.004 g/m^3	1-13
Total Phosphorus	Total phosphorus digestion, automated ascorbic acid colorimetry. Flow Injection Analyser. APHA 4500-P H (modified) 23rd ed. 2017.	0.002 g/m^3	1-13
Chemical Oxygen Demand (COD), trace level	Dichromate/sulphuric acid digestion in Hach tubes, colorimetry. Trace Level method. APHA 5220 D 23rd ed. 2017.	6 g O_2/m^3	1-13
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	1-13
Enterococci	Membrane filtration, Count on mE agar, Incubated at 41°C for 48 hours, Confirmation. APHA 9230 C (modified) 23rd ed. 2017.	1 cfu / 100mL	1-13
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm Filtration, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.00005 - 0.0010 g/m^3	1-13
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.000053 - 0.0011 g/m^3	1-13
Total Petroleum Hydrocarbons in Water			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.10 g/m^3	1-13
C10 - C14	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.2 g/m^3	1-13
C15 - C36	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.4 g/m^3	1-13
Total hydrocarbons (C7 - C36)	Calculation: Sum of carbon bands from C7 to C36. In-house based on US EPA 8015.	0.7 g/m^3	1-13

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

Testing was completed between 07-Aug-2022 and 18-Aug-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.

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

Appendix B:

The Monitoring Plan prepared by Fresh Water Solutions

report

May 2021

Western Comprehensive Stormwater Consent Monitoring Plan

Submitted to:
Western Bay of Plenty District Council

freshsolutions water
environmental consultants

Quality Assurance

This report has been prepared and reviewed by the following:

Prepared by: Phil Taylor
Freshwater Ecologist

Susan McKegg
Freshwater Ecologist

Reviewed by: Richard Montgomerie
Director

Status: Final **Issued:** 17 May 2021

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1.0 Introduction

1.1 Background

Western Bay of Plenty District Council (WBOPDC) have been granted the Western Comprehensive Stormwater Consent (67093-DC.01) that authorises:

a) Discharge of stormwater from urban areas within the Western Catchments of the Western Bay District.

b) Temporary discharges of sediment contaminated stormwater from earthworks related to the replacement of stormwater infrastructure.

c) Incorporates existing stormwater discharges associated with existing consents (refer to Schedule 1 for a list of stormwater related consents).

The purpose of this report is to set out the proposed Stormwater Monitoring Plan that will be implemented to monitor the effects of the stormwater discharges.

1.2 Relevant Consent Conditions

Condition 7.3 outlines the details required in the Stormwater Monitoring Plan in items a–l. Item e, outlines the requirements of the monitoring plan as follows:

e) A Monitoring Plan, including monitoring locations, frequency of monitoring and reasonable mixing zones. The locations shall be provided on a map with GIS co-ordinates. The Monitoring Plan must include monitoring the discharge quality of representative stormwater discharges and representative receiving environment sediment[1] and macroinvertebrate conditions.

Condition 7.5 requires that:

The Monitoring Plan required by Condition 7.3(e) must be prepared, and certified as appropriate, for the catchment and the receiving environment, by a suitably qualified environmental scientist(s).

Condition 9.1 discusses the mandatory inclusions of the Monitoring Plan:

The Monitoring Plan required by Condition 7.3(e) must include the following specifications:

a) Representative samples of stormwater discharges must include the following locations:

(i) Upstream of "discharge"

(ii) Downstream of the discharge in the freshwater receiving environment (after accounting for reasonable mixing);

(iii) In coastal water (below MHWS).

b) Representative sediment samples must be taken at a depth of sediment not greater than 2 cm and composed of not less than 10 sub-samples taken from a minimum of 5 metres of stream length at the discharge, upstream and downstream locations identified in Condition 9.1(a). Analysis for metals shall be undertaken at trace detection level.

c) All sampling under (a) and (b) must be undertaken within 30 minutes of the commencement of a storm event, where practicable, but no later than 60 minutes after the commencement of a storm event.

[1] The consent conditions for sediment monitoring are currently being revised and updated. It is our understanding that the updated consent will specify quarterly, dry weather sediment sampling at representative locations.

d) Annual measurements of the stream channel width downstream of representative urban stormwater discharges into receiving freshwater streams as a stream bank erosion indicator. The exact location(s) of the channel measurements must be provided to the Regional Council Chief Executive or delegate within 12 months of granting this consent (map and GPS Co-ordinates). All subsequent measurements must be taken annually at the same location(s).

e) Investigations of the cause of streambank erosion or scour that has resulted in any increase of 5% or more in stream channel width from the grant of this consent.

f) All water and sediment analyses must be carried out by an IANZ registered laboratory.

g) All macroinvertebrate surveys must be undertaken by a suitably qualified and experienced ecologist.

1.3 Catchment Context

The Comprehensive Stormwater Consent (67093-DC.01) covers WBDC's Waihi Beach and Katikati wards, described as the Western Catchments. The Western Catchments include the existing and planned urban areas of the:

- Waihi Beach Catchment that comprises Waihi Beach (8 sub-catchments), Athenree (6 sub-catchments) and Bowentown/Pios Shores.
- Small Coastal Communities Catchments that include Tanners Point, Ongare Point, Te Kauri Village and Tuapiro
- Katikati Catchment (27 catchments).

Waihi Beach

Two Mile Creek in Waihi Beach is a highly modified soft bottom stream draining a predominantly rural 525 ha catchment. Most of the stream has been channelised and in the lower reaches the streams course is constrained by flood protection structures. Approximately 21 ha of the lower stream catchment is zoned residential and commercial. The stream discharges directly to the sea over Waihi Beach. The stormwater catchment sampled within Two Mile Creek is 4 ha in size and comprises a mixture of residential and commercial land use (Figure 1).

Okawe Stream originates within the Puketoki hills and drains through land adjacent to the Waihi Beach Stage 2 growth cell before discharging to the sea over Waihi Beach at Seaforth Road. The stormwater catchment comprises primarily residential landuse that may expand with the urban growth that is predicted to occur (Figure 2).

Katikati

The Uretara River is a hard bottom river draining a 32.9 km^2 catchment with a mean flow at Henry's Crossing of 0.88 m^3/s. The upper third of the catchment (26.5 km of river channel), located on the eastern flanks of the Kaimai Range, is covered in indigenous forest. The river then flows some 53 km from the Kaimai Ranges through pasture and horticultural land uses before entering the urban area (lower 5.5 km of river channel) in the north of Katikati. The river enters the Tauranga Harbour and has a saline estuary section that extends upstream of the state highway bridge in Katikati. The stormwater catchment sampled within the Uretara River is 7.5 ha in size and comprises a mixture of residential and commercial land use and is dominated by the state highway which runs through the middle of the catchment (Figure 3).

An unnamed drain that originates at a culvert from the stormwater catchment that runs beneath sports fields to the east of SH2/Main Road flows in a south easterly direction and discharges to the Tauranga Harbour at Willis Road. The drain is a small soft bottom channelised waterway draining a stormwater catchment of ~5.3 ha that has almost completely impervious land cover used for commercial and industrial purposes (Figure 3).

2.0 Water Quality Monitoring

2.1 Water Quality Monitoring Locations

Monitoring sites were selected to provide representative samples from 1) a developed catchment with both residential and industrial/commercial activity (Katikati and Waihi); and, 2) a less developed catchment with primarily residential land use (Athenree). Freshwater Solutions propose to focus the sampling effort on the more developed catchments of Waihi Beach and Katikati rather than the small coastal communities of Tanners Point, Ongare Point, Te Kauri Village and Tuapiro where stormwater discharge effects are expected to be minimal. No suitable watercourses were identified from aerial imagery at Athenree and Bowentown/Pios Shores for upstream/downstream receiving environment sampling. Therefore, no receiving environment monitoring will be carried out at these locations but a stormwater discharge sample will be collected at Anthenree to characterise the water quality.

In accordance with Condition 9.1, a water quality sample will be collected from upstream of the selected stormwater catchment and downstream in the freshwater receiving environment (after accounting for reasonable mixing) and in coastal catchments in coastal waters (below MHWS).

Water samples will be collected from the selected discharges (immediately before entering the stream) and from upstream of the main stormwater inputs and 20–50 m downstream of the urbanised portion of the selected stormwater catchment. Refer to Table 1 and Figure 1 to Figure 4 for site locations. Site W3-US is included to account for the Waihi Beach Stage 2 future development.

2.2 Timing and Frequency of Water Quality Sampling

Water quality monitoring will be carried out on six occasions per year and comprise quarterly dry weather (baseline) events and two storm events and will be analysed for the parameters presented in Table 2. Baseline sampling will be carried out in the receiving environment following at least three days of no rain. Storm event sampling will be carried out from each of the selected stormwater discharges and the receiving environments within 1 hour (ideally within the first 30 minutes) following a rainfall event that is greater than 10 mm and following at least three days of dry weather. The rainfall event definition is aligned with the Tauranga City Council Monitoring Plan (TCC 2012).

Sampling at Site K1-DS will be timed, where possible, to coincide with an outgoing tide in order to capture a more representative sample.

In the event that receiving environment monitoring identifies that any water quality trigger value (refer to Table 2) is exceeded, a further sample shall be taken within 2 months. If any water quality trigger value is exceeded in three consecutive sampling results for the same site, WBDC must undertake a contaminant source investigation within 3 months of the third exceedance and submit a report to the Regional Council Chief Executive or delegate. Detailing the contaminant source sampling and reporting is outside the scope of this monitoring plan.

Figure 1: Waihi Beach Two Mile Creek sampling site locations.

Figure 2: Waihi Beach Okawe Stream sampling site locations.

Figure 3: Katikati sampling site locations.

Figure 4: Athenree sampling site locations.

Table 1: Sampling site locations.

Location	Site code	Catchment	NZTM	
			Easting	Northing
Waihi	W1-US	Upstream – Two Mile Creek	1859913	5855747
Waihi	W1-DS	Downstream – Two Mile Creek	1860658	5855374
Waihi	W1-Dis	Stormwater Discharge	1860418	5855443
Waihi	W1-SC	Stream Channel – Two Mile Creek	1860434	5855454
Waihi	W2-US	Upstream – Okawe Stream	1860649	5854413
Waihi	W3-US	Upstream – Stage 2 Development	1859899	5854420
Waihi	W2-DS	Downstream – Okawe Stream	1861156	5854446
Waihi	W2-Dis	Stormwater Discharge	1861078	5854389
Waihi	W2-SC	Stream Channel – Okawe Stream	1861098	5854383
Katikati	K1-US	Upstream – Uretara Stream	1857368	5839375
Katikati	K1-DS	Downstream – Uretara Stream	1857951	5840107
Katikati	K1-Dis	Stormwater Discharge	1857659	5840059
Katikati	K1-SC	Stream Channel – Uretara Stream	1857700	5840032
Katikati	K2-US	Upstream – Unnamed drain	1858205	5839510
Katikati	K2-DS	Downstream - Unnamed drain	1858576	5839091
Katikati	K2-Dis	Stormwater Discharge	1858500	5839093
Katikati	K1-SC	Stream Channel – Uretara Stream	1857700	5840032
Athenree	A-Dis	Stormwater Discharge	1862114	5851732

2.3 Roles and Responsibilities for Water Quality Sampling

Water quality sampling will be carried out by WBOPDC staff or contractors who have the expertise to ensure that each discharge and receiving environment can be sampled during the first flush (i.e., within one hour of the storm event starting). To ensure that all samples are collected within one hour of a storm event it is expected that a combination of sampling methods using staff collecting water samples, Nalgen Bottle samplers and possibly auto samplers will need to be used.

2.4 Water Quality Sampling Methodology

Spot measurements of dissolved oxygen, pH, electrical conductivity and temperature will be made at all sites using calibrated handheld meters. The time at which measurements are made will be noted.

On all sampling occasions at each sampling site, visual observations of oil or grease films,

scums or foams, or floatable and/or suspended materials will be recorded and a photographic record made. Any objectionable odours emanating from the water will also be recorded. Visual clarity will be measured using a clarity tube or if water clarity is > 1m then black disc measurements will be made.

A grab sample will be collected from each site, labelled with site name, date and time and chilled before transport to Hills Laboratories for analysis. Chilled samples will be delivered to the laboratory within 24 hours. Samples will be analysed for the parameters presented in Table 2 and compared with consent trigger values.

Table 2: Water quality sampling parameters and guidelines.

Parameter	Unit	*Trigger Values Freshwater Receiving Environments*[a]	*Trigger Values Marine Receiving Environments*[a]	Where
pH		≤6 and ≥9	≤6 and ≥9	Field
Temp	°C	-	-	Field
Dissolved oxygen[b]	g/m³	>5	-	Field
Water clarity	m	-	-	Field
Turbidity	g/m³	-	-	Lab
Total suspended solids	g/m³	-	-	Lab
Chemical Oxygen Demand	g/m³	250	250	Lab
Dissolved reactive phosphorus	g/m³	-	-	Lab
Total phosphorus	g/m³	-	-	Lab
Total Kjeldahl nitrogen	g/m³	-	-	Lab
Nitrate [c]	g/m³	3.4	-	Lab
Nitrite	g/m³	-	-	Lab
Total ammoniacal nitrogen[d]	g/m³	0.39	1.2	Lab
Total nitrogen	g/m³	-	-	Lab
Hardness	g/m³	-	-	Lab
Metals and metalloids (total and dissolved)				
Copper[e]	g/m³	0.0018	0.003	Lab
Lead[e]	g/m³	0.0056	0.0066	Lab
Zinc[e]	g/m³	0.015	0.023	Lab
Mercury	g/m³	0.0019	0.0007	Lab
Cadmium[e]	g/m³	0.0004	0.014	Lab
Chromium	g/m³	0.006	0.02	Lab
Arsenic	g/m³	-	-	Lab
Nickel	g/m³	-	-	Lab
Total petroleum hydrocarbons	g/m³	15	15	Lab
E. coli [f]	CFU/100 ml	900	-	Lab
Enterococci [g]	CFU/100 ml	-	-	Lab

Table 2 Advice Notes:

a) Where available ANZG (2018) 90% level of protection is used for freshwater and marine receiving environment trigger values. Trigger values for stormwater related effects are determined by subtracting the upstream values. Trigger values for metals and metalloids are based on the dissolved fraction.

b) Dissolved oxygen Attribute State B for one-day minimum from the NPSFM (the 2017 and 2019 versions).

c) Nitrate nitrogen Attribute State B for annual 95th percentile from the NPSFM (the 2017 and draft 2019 versions).

d) For freshwater receiving environments Attribute State B in the NPSFM the 2017 and draft 2019 versions has been used: The ANZG (2018) guidelines for 90% protection are above the NPSFM Bottom Line, therefore the Ammonia triggers are set in accordance with the NPSFM. For marine receiving environments the ANZG (2018) trigger value for 90 % protection has been used.

e) At hardness = 30 g/m^3 as $CaCO_3$.

f) The E.coli guideline values in the freshwater receiving environment falls within Attribute State B in the NPS –FM (the 2017 and 2019 versions).

g) Enterococci guideline values from: MfE Guidelines for Recreational Water Quality 2003.

3.0 Sediment Quality Monitoring

3.1 Sediment Quality Sampling Sites

A stream sediment sample will be collected from upstream of the selected stormwater discharge and downstream in the freshwater receiving environment (after accounting for reasonable mixing) or in coastal catchments in coastal waters (below MHWS) in accordance with Condition 9.1.

3.2 Timing and Frequency of Sediment Quality Sampling

Sediment samples will be collected at all upstream and downstream receiving environment sites twice annually to coincide with the ecological sampling where possible. Sampling will be carried out following at least 3-days of dry weather.

3.3 Roles and Responsibilities for Sediment Quality Sampling

Sediment quality sampling will be carried out by qualified and experienced freshwater scientist.

3.4 Sediment Quality Sampling Methodology

At each sampling site a composite sediment sample will be collected of surface sediment (< 2 cm in depth) that is composed of 10 sub-samples. Each sample will be collected from a length of stream of at least 5 m with sediment sub-samples collected from across the width of the wetted channel working upstream to avoid disturbing the sediment being collected.

The samples will be stored in a plastic container and couriered to the laboratory. Analysis for the metals and hydrocarbons presented in Table 3 will be undertaken at trace detection level and compared with consent trigger values. Sediments will be analysed at the <63 µm fraction.

Table 3: Sediment quality sampling parameters and guidelines.

Parameter	Unit	*Trigger Values Freshwater and Marine Receiving Environments*	Where
Copper	m/kg dry weight	65	Lab
Lead	m/kg dry weight	50	Lab
Zinc	m/kg dry weight	200	Lab
Chromium	m/kg dry weight	-	Lab
Arsenic	m/kg dry weight	-	Lab
Nickel	m/kg dry weight	-	Lab
Total hydrocarbons	g/m³	-	Lab
PAH	g/m³	-	Lab
PCB	g/m³	-	Lab

4.0 Ecological Monitoring

4.1 Sampling Sites

Instream and riparian data and benthic invertebrate sampling will be undertaken at the same upstream and downstream sites from which sediment samples will be collected. Refer to Table 1 and Figure 1 – Figure 3 for site locations.

4.2 Timing and Frequency of Ecological Monitoring

Aquatic habitat and benthic invertebrate sampling will be undertaken once per year during summer low flow conditions at the same time as the dry weather sediment sampling.

4.3 Roles and Responsibilities for Ecological Sampling

Ecological sampling will be carried out by qualified and experienced freshwater ecologist.

4.4 Ecological Monitoring Methodology

Aquatic Habitat

Aquatic and riparian habitat was assessed at each receiving environment site. Habitat can influence benthic invertebrate communities so this data was collected to assist in the interpretation of results. Data will be recorded from the same habitat where the invertebrate samples are collected. Habitat parameters assessed will include:

- Channel width (m) and water depth (m).
- Streambed substrate (percent boulder, cobble, gravel, sand/silt).
- Streambed compaction and embeddedness.
- Organic matter content (percent logs, branches, leaves and detritus).
- Channel shade (%).
- Stream bank erosion (%).

Stream Erosion

Annual measurements of the stream channel width immediately downstream of the discharge sites will be recorded as a stream bank erosion indicator. Refer to Table 1 for details of the site locations. At each site a painted waratah will be installed on the bankside and GPS co-ordinates recorded to ensure exactly the same location is sampled each year. Photographs will be taken at each site and the parameters assessed will include:

- Stream bank erosion (%).
- Channel width (m).
- Channel depth (m).

Benthic Macroinvertebrates

Benthic invertebrates are a key part of stream ecosystems and are good indicators of water and habitat quality. One of the advantages of using benthic invertebrates in a water quality monitoring programme is that benthic invertebrates reflect the cumulative water quality effects of a discharge over the preceding 3 months (depending on stream flow conditions).

Four replicate benthic macroinvertebrate samples will be collected from each site using a sweep net and following the quantitative Protocol C3 or C4 (Stark et al. 2001, MfE 2020) depending on whether the stream is hard bottomed or soft bottomed respectively. Samples will be preserved and identified by an experienced taxonomist using Protocol P3 (full count + sub-sampling) in Stark et al. (2001) and MfE (2020).

Biological indices and metrics calculated from invertebrate data to assess community health and indicative habitat and water quality included taxa number, abundance, Macroinvertebrate Community Index (MCI), Quantitative Macroinvertebrate Community Index (QMCI) and EPT taxa number. A brief description of each of the metrics/indices is presented below:

- *Community composition* – relative abundance of the main taxonomic groups making up the macroinvertebrate communities recorded from each watercourse. Can be used to provide a general indication of stream health based on the relative proportions of water and habitat sensitive and tolerant taxonomic groups.
- *Taxa number* – a measure of the overall health of the benthic macroinvertebrate community and habitat and water quality. In general, high taxa number can be an indication of a healthy waterway. The number of taxa present at a site can be highly variable and can fluctuate depending on many factors including habitat, water quality and sampling effort.
- *Abundance* – a measure of the total number of individuals in a sample. Total abundance tends to increase in the presence of organic/nutrient enrichment but declines in the presence of toxic pollution.
- *Macroinvertebrate Community Index (QMCI)* – the MCI is a presence/absence based index for measuring stream health and in particular organic enrichment. Individual taxa scores range from 1 (pollution tolerant) to 10 (highly pollution sensitive). Community MCI scores range from < 80 (poor) to >120 (excellent) and are interpreted following the guidelines in Table 4.
- *Quantitative Macroinvertebrate Community Index (QMCI)* – the QMCI is a quantitative variant of the MCI and is used for measuring stream health and in particular organic enrichment. Individual taxa scores range from 1 (pollution tolerant) to 10 (highly pollution sensitive). QMCI scores range from <4.00 (poor) to

>6.00 (excellent) and are interpreted following the guidelines in Table 4.

- *EPT taxa number* – a measure of the overall health of the community and of habitat and water quality. A community that has a higher number of water and habitat sensitive taxa from the groups Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies) (EPT) indicates a healthy community and stream.

Table 4: MCI and QMCI classes and indicative stream health (Stark and Maxted 2007).

Stream health	Descriptions	MCI	QMCI
Excellent	Clean water	>120	>6.00
Good	Doubtful quality/possible mild pollution	100–119	5.00–5.99
Fair	Probable moderate pollution	80–99	4.00–4.99
Poor	Probable severe enrichment	<80	<4.00

5.0 Reporting

An annual report describing the sampling programme methods and presenting and interpreting the results of the stormwater water and stream sediment and biological sampling will be prepared and provided to WBOPDC in October of each year in a format that can be included in the WBOPDC report that must be submitted to the BOPRC in November of each year in accordance with Condition 9.4.

The consent holder must submit to the Regional Council Chief Executive or delegate an annual report of the Waihi Beach and Katikati catchments in November of each year, covering

a) A summary report of any monitoring undertaken including an analysis of the monitoring results;

b) Any stormwater network or stormwater infrastructure upgrade works undertaken;

c) Any stormwater induced erosion, flood risk alleviation, or stormwater quality mitigation measures implemented;

d) Any incidents resulting in unanticipated contaminants entering the stormwater network, the investigation of the cause of the incidents and any remedial actions implemented to avoid a repeat occurrence of the incident;

e) An updated Asset Register; and

f) Any new structures to be included in the consent (Asset Register)

The report will compare the stormwater and the receiving environment water and sediment quality and ecology results with any relevant water quality data held by EBOP. Recommendations for further sampling (if required) will be included in the report.

A 6-yearly report must be prepared by the consent holder in accordance with Condition 9.5, which states:

The consent holder must submit to the Regional Council Chief Executive or delegate a Catchment Management Overview Report to accompany the Catchment Management Plan review, on a 6- yearly basis, from the date of granting of this consent (Refer Advice Note 9). The Report must include, but not be limited to:

a) *An assessment of the catchment flood risk indicating improvements made over time;*

b) *A summary of any stormwater network upgrades and mitigation measures implemented, including treatment devices and low impact design improvements and specifically progress in achieving the requirements of condition 6.2(k);*

c) *An assessment of the effectiveness of previous mitigation methods and identification of any changes from previous methods used;*

d) *State of the receiving environment monitoring and trends;*

e) *A list of consents transferred to this consent;*

f) *A schedule of any changes to the Catchment Management Plans.*

6.0 References

ANZECC 2000. Australia and New Zealand Guidelines for Fresh and Marine Water Quality.

MfE 2020. National Environmental Monitoring Standards - Macroinvertebrates. Collection and Processing of Macroinvertebrate Samples from Rivers and Streams.

Stark, J. D., Boothroyd, I. K. G., Harding, J. S., Maxted, J. R., Scarsbrook, M. R. 2001: Protocols for sampling macroinvertebrates in wadeable streams. Prepared for the Ministry for the Environment. November 2001.

Stark, J., Maxted, J. 2007: A user guide for the Macroinvertebrate Community Index. Cawthron Report No 1166. April 2007.

TCC 2012. Monitoring Plan for Tauranga City Council Comprehensive Stormwater Consents.

APPENDIX A

Resource Consent

Resource Consent

Resource Consent 67093-AP

Following the processing of the Application received on the 9 May 2012, the Bay of Plenty Regional Council has granted the applicant(s):

Western BOP District Council

Consent(s) to:

67093-BC.02	Beds Damming and Diversion	Expiry	30 November 2054
67093-BC.03	River Structure	Expiry	30 November 2054
67093-CC.01	Disturb Coastal Habitat or Plants	Expiry	30 November 2054
67093-CC.02	Occupy Coastal Space	Expiry	30 November 2054
67093-DC.01	Discharge to Water	Expiry	30 November 2054
67093-LC.01	Earthworks or Excavation	Expiry	30 November 2054

The consent(s) are subject to the conditions specified on the attached schedule(s) for each activity. Advice notes are also provided as supplementary guidance, and to specify additional information to relevant conditions.

The Resource Consent hereby authorised is granted under the Resource Management Act 1991 does not constitute an authority under any other Act, Regulation or Bylaw.

DATED at Whakatane this 4th day of February 2020

For and on behalf of The Bay of Plenty Regional Council

Fiona McTavish
Chief Executive

Bay of Plenty Regional Council

Resource Consent

Pursuant to the Resource Management Act 1991, the **Bay of Plenty Regional Council**, by a decision dated 4 February 2020, **hereby grants**:

A resource consent:

- **Under section 14(2) of the Resource Management Act 1991 and Rule WQ R21 of the Bay of Plenty Regional Natural Resources Plan being a discretionary activity to temporarily divert and/ or dam water in various waterbodies within the western urban catchments of the Western Bay District**

subject to the following conditions:

1 Purpose

1.1 To authorise the temporary damming or diversion of water where it is associated with urban stormwater management and maintenance activities.

Advice Note: *For clarity, the purpose of this consent does not include any permanent damming, diversion or re-alignment of any water body listed in Schedule 1 of the Regional Natural Resources Plan, including the construction of stop banks and dams.*

2 Location

2.1 The urban catchments covered by this consent include:

i. The Waihī Beach Catchment as indicated on the CPG Waihī Beach Urban Limits Overall Layout Plan, referenced as B.O.P.R.C. Plan No. RC 67093/1, including:

- Waihī Beach (8 sub-catchments)
- Bowentown/ Pios Shores
- Anthenree (6 sub-catchments)

ii. The Small Coastal Communities Catchments as indicated on the CPG Stormwater Subcatchments – Small Communities Drawing SC SCS1, Revision A Urban Limits Overall Layout Plan, referenced as B.O.P.R.C. Plan No. RC 67093/2, including:

- Tanners Point
- Tuapiro
- Ongare Point
- Te Kauri Village

iii. The Katikati Catchment (27 subcatchments) as indicated on the CPG Katikati Urban Limits Overall Layout Plan, referenced as B.O.P.R.C. Plan No. RC 67093/3.

3 Map Reference

3.1 Stormwater structures, ponds and outlets which are authorised under this consent are listed in Appendix C: Overview of the stormwater reticulation and Appendix D: Overview of Discharge Points in the Catchment Management Plans WSZ1, WSZ2 and WSZ3, submitted in support of the application.

4 Legal Description

4.1 Various within the boundaries shown on the Plans referenced in Section 2 above.

5 Notifying the Regional Council

5.1 The consent holder must notify the Chief Executive of the Regional Council or delegate, in writing, no less than five working days prior to the start of any work in a freshwater body that will cause damming or diversion of the water. Notification must include details of who is responsible for on site management and ensuring compliance with consent conditions (see Advice Note 2).

5.2 Within 5 working days of completion of damming or diversion works authorised under this consent, the consent holder must notify the Chief Executive of the Regional Council or delegate.

Advice Note: *The purpose of the notification is to set up a final inspection meeting to verify compliance with the Damming and Diversion Plan required by condition 6.1.*

6 Damming and Diversion of Water

6.1 The consent holder shall provide to the Chief Executive of the Regional Council or delegate, for certification, a Damming and Diversion Plan, one month prior to any damming or diversion works commencing. The Plan must be prepared by a suitably qualified environmental engineer or environmental specialist and include the proposed work methodology and mitigation measures.

Advice Note: *The purpose of certification is to ensure that effects on habitat and instream and riparian ecology are appropriately mitigated and that any temporary effects are appropriately remediated.*

6.2 For any construction or maintenance work that requires temporary damming or diversion of a river or stream, the consent holder must:

a) Ensure that the temporary damming or diversion does not adversely affect the ecology or habitat of a wetland to any more than a minor extent;

b) Ensure that the temporary damming or diversion does not cause water flow downstream to fall below the instream minimum flow (if there is one set in a regional plan), or adversely affect any authorised water take;

c) Effectively stabilise any erosion or scour that results from the temporary damming or diversion of the water;

d) Ensure that the temporary dam or diversion structure(s) is maintained in a sound condition for the purpose for which it was constructed and is kept clear of debris;

e) Ensure that machinery is kept out of the bed of rivers and streams where practicable and that no machinery refuelling or fuel storage occurs in a location where fuel can enter the water body;

f) Take all practicable measures to avoid vegetation, soil, slash or other debris being deposited in a water body and ensure that on completion of any work on the banks or within the bed of a stream, that all debris and construction materials are removed from the bed and banks of the water body;

g) Not cause a permanent net loss of aquatic habitat area or a permanent reduction in aquatic habitat quality. This includes degraded or modified aquatic habitat (see Advice Note 6);

h) Provide for fish passage;

i) Undertake any temporary damming or diversion works outside of the fish spawning and juvenile migration periods listed in the Regional Natural Resources Plan, unless written approval to do otherwise is provided by the Chief Executive of the Regional Council or delegate; and

j) Undertake any additional measures as required by the Chief Executive of the Regional Council or delegate, to avoid, remedy or mitigate any actual or potential adverse effects on the water body as a result of the proposed works.

6.3 The banks of a water body must be reinstated to their original contour after completion of the

temporary damming or diversion of water.

7 Signage

7.1 Prior to the commencement of any damming or diversion works under this consent, the consent holder must erect a prominent sign adjacent to the entrance of site works, and maintain it throughout the period of the works. The sign must clearly display, as a minimum, the following information:

a) The name of the project;

b) The name of the main site contractor;

c) A 24-hour contact telephone number for the consent holder or appointed agent;

d) A clear explanation that the contact telephone number is for the purpose of receiving complaints and information from the public about dust nuisance or any other problem resulting from the exercise of this consent.

8 Review of Conditions

8.1 The Regional Council may, on completion of any environmental impact investigation or compliance report that shows there is an adverse effect on the environment as a result of the temporary damming or diversion of water, serve notice on the consent holder under s.128(1)(a)(i) and/or (iii) of the Resource Management Act 1991 of its intention to review the conditions of this consent. The purpose of such a review is to remediate any effect that was not anticipated at the time of granting consent.

9 Term of Consent

9.1 This consent shall expire on 30 November 2054.

10 Resource Management Charges

10.1 The consent holder shall pay the Bay of Plenty Regional Council such administrative charges as are fixed from time to time by the Regional Council in accordance with section 36 of the Resource Management Act 1991.

11 The Consent

11.1 The Consent hereby authorised is granted under the Resource Management Act 1991 and does not constitute an authority under any other Act, Regulation or Bylaw.

Advice Notes

1 This consent does not authorise the holder to modify or disturb any archaeological or historic sites within the area affected by this consent. Should any artefacts, bones or any other sites of archaeological or cultural significance be discovered within the area affected by this operation, written authorisation should be obtained from Heritage New Zealand Pouhere Taonga before any damage, modification or destruction is undertaken.

2 Reporting and notification required by conditions of this consent shall be directed (in writing) to the Manager Pollution Prevention, Bay of Plenty Regional Council, PO Box 364, Whakatane or fax 0800 884 882 or email notify@boprc.govt.nz, this notification shall include the consent number 67093.

3 The Regional Council Pollution Hotline Number is 0800 884 883.

4 The consent holder is responsible for ensuring that all contractors carrying out works under this consent are made aware of the relevant consent conditions, plans and associated documents.

5 The consent holder is advised that non-compliance with consent conditions may result in enforcement action against the consent holder and/or their contractors.

6 If no alternative measures can be implemented on site, habitat creation or enhancement nearby may be considered under a separate resource consent.

Bay of Plenty Regional Council

Resource Consent

Pursuant to the Resource Management Act 1991, the **Bay of Plenty Regional Council**, by a decision dated 4 February 2020, **hereby grants**:

A resource consent:

- **Under section 13(1) of the Resource Management Act 1991 and Rule BW R 36 of the Bay of Plenty Regional Natural Resources Plan being a discretionary activity to: Use, place, reconstruct, alter or remove structures in or on the beds of various water bodies within the western catchments of the Western Bay District; and**
- **Under section 13(1) of the Resource Management Act 1991 and Rule BW R 36 of the Bay of Plenty Regional Natural Resources Plan being a discretionary activity to: Disturb the beds of various waterbodies within the western catchments of the Western Bay District; and**
- **Under section 13(1) of the Resource Management Act 1991 and Rule BW R 36 of the Bay of Plenty Regional Natural Resources Plan being a discretionary activity to: Deposit material in the beds of various waterbodies within the western catchments of the Western Bay District**

subject to the following conditions:

1 Purpose

1.1 The purpose of this resource consent is to:

a) To authorise stormwater related activities including the use, maintenance, installation and reconstruction of structures (in streams and rivers),

b) To authorise stormwater related activities including the use, maintenance and installation of stormwater treatment devices; and

c) Vegetation management, including vegetation removal, planting and weed control.

Advice Note: *The purpose of this consent does not include:*

a) The installation of stormwater infrastructure and treatment devices within greenfield development sites and new subdivisions;

b) The installation of new rock revetment, training groynes or any other permanent structure in any water body listed in Schedule 1 of the Regional Natural Resources Plan or within the Coastal Margin, unless authorised by a consent and transferred to this consent;

c) Vegetation removal authorised by Consent 67093 LC.

2 Location

2.1 The urban catchments covered by this consent includes

i. The Waihī Beach Catchment as indicated on the CPG Waihī Beach Urban Limits Overall Layout Plan, referenced as B.O.P.R.C. Plan No. RC 67093/1, including:

- Waihī Beach (8 sub-catchments)
- Bowentown/ Pios Shores
- Anthenree (6 sub-catchments)

ii. The Small Coastal Communities Catchments as indicated on the CPG Stormwater

Subcatchments - Small Communities Drawing SC SCS1, Revision A Urban Limits Overall Layout Plan, referenced as B.O.P.R.C. Plan No. RC 67093/2, including:

- Tanners Point
- Tuapiro
- Ongare Point
- Te Kauri Village

iii. The Katikati Catchment (27 sub-catchments) as indicated on the CPG Katikati Urban Limits Overall Layout Plan, referenced as B.O.P.R.C. Plan No. RC 67093/3.

3 Map Reference

3.1 Stormwater structures, ponds and outlets which are authorised under this consent are listed in Appendix C: Overview of the stormwater reticulation and Appendix D: Overview of Discharge Points in the Catchment Management Plans WSZ1, WSZ2 and WSZ3, submitted in support of the application.

4 Legal Description

4.1 Various within the boundaries shown on the Plans referenced in Section 2 above.

5 Notifying the Regional Council

5.1 The consent holder must notify the Chief Executive of the Regional Council or delegate, in writing, no less than five working days prior to the start of the following work authorised under this consent:

a) Any stormwater infrastructure installation or structure reconstruction in the bed of a water body.

b) Any work in, or disturbance of, the bed of a water body.

Notification must include details of who is responsible for on site management and compliance with consent conditions (see Advice Note 2).

5.2 Within 30 working days of the completion of any stormwater infrastructure installation or structure re-construction works authorised under this consent, the consent holder must submit a Statement, signed by a suitably qualified Charted Professional Engineer, to certify that:

a) the works have been undertaken in accordance with good engineering practice; and

b) that the structure(s) have been installed or re-constructed in accordance with the current version of the Bay of Plenty Regional Council's Hydrological and Hydraulic Guidelines, the Erosion and Sediment Control Guidelines and the requirements of this consent (see Advice Note 2).

6 Maintenance, Construction and Reconstruction Works

6.1 The consent holder must undertake inspection and maintenance of stormwater structures, ponds and outlets in accordance with information submitted with the application for this consent including:

a) The current Asset Management Plan; or

b) Any other maintenance plan, included in the Catchment Management Plans.

6.2 The consent holder must ensure that stormwater outlets and associated erosion protection structures are operated and maintained in an effective working order at all times

6.3 At the same time that the outlet structures are inspected under condition 6.1, erosion effects must be assessed and remedied in accordance with condition 6.4.

6.4 Any erosion or scour of the banks of a river or stream resulting from either the presence of a

stormwater outlet(s), the discharge from an outlet(s) or from works authorised by this consent must be effectively stabilised and remedied.

6.5 For any works authorised by this consent, including the installation, maintenance, demolition, alteration, upgrade or reconstruction of existing outlets or structures, the consent holder must submit an erosion and sediment control plan to the Chief Executive of the Regional Council or delegate no later than five working days prior to the commencement of the works, for certification.

Advice Note: *The purpose of certification is to ensure that the erosion and sediment control plan meets the requirements of the Regional Council's "Erosion and Sediment Control Guidelines for Land Disturbing Activities," or its successor.*

6.6 New stormwater infrastructure must be designed by a suitably qualified Charted Professional Engineer. Where the new stormwater infrastructure includes a pond, embankment, stopbank, floodgate, spillway or any detention structure, the consent holder must consult with the Chief Executive of the Regional Council or delegate prior to detailed design and provide to the Chief Executive of the Regional Council or delegate the final design, for certification, prior to commencement of works.

Advice Note: *The purpose of certification is to ensure that new stormwater infrastructure meets the current version of the Bay of Plenty Regional Council's Hydrological and Hydraulic Guidelines, the Erosion and Sediment Control Guidelines and the requirements of this consent.*

6.7 For any construction or maintenance work that requires work within the bed of a stream, the consent holder must:

a) Ensure that any temporary damming or diversion does not adversely affect the ecology or habitat of a wetland to any more than a minor extent;

b) Effectively stabilise any erosion or scour that results from the stormwater related activities or vegetation management;

c) Ensure that machinery is kept out of the bed of rivers and streams where practicable and that no machinery refuelling or fuel storage occurs in a location where fuel can enter the water body;

d) Take all practicable measures to avoid vegetation, soil, slash or other debris being deposited in a water body and ensure that on completion of any work on the banks or within the bed of a stream, that all debris and construction materials are removed from the bed and banks of the water body;

e) Not cause any decrease in the length of any stream or river channel or any more than localised increases in the slope of the stream or river bed;

f) Not cause a permanent net loss of aquatic habitat area or a permanent reduction in aquatic habitat quality. This includes degraded or modified aquatic habitat (see Advice Note 7);

g) Provide for fish passage;

h) Undertake any works outside of the fish spawning and juvenile migration periods listed in the Regional Natural Resources Plan, unless written approval to do otherwise is provided by the Chief Executive of the Regional Council or delegate; and

i) Limit any dredging required to maintain conveyance capacity at outlets or in water bodies to the minimum area and volume required for the clearance of accumulated sediments; and

j) Undertake any additional measures as required by the Chief Executive of the Regional Council or delegate, to avoid, remedy or mitigate any actual or potential adverse effects on the water body as a result of the proposed works.

6.8 The banks of the water body must be effectively stabilised after completion of the works.

7 Signage

7.1 Prior to the commencement of stormwater infrastructure installation, reconstruction or maintenance

works under this consent, the consent holder must erect a prominent sign adjacent to the site, and maintain it throughout the period of the works. The sign must clearly display, as a minimum, the following information:

a) The name of the project;

b) The name of the main site contractor;

c) A 24-hour contact telephone number for the consent holder or appointed agent;

d) A clear explanation that the contact telephone number is for the purpose of receiving complaints and information from the public about dust nuisance or any other problem resulting from the exercise of this consent.

8 Review of Conditions

8.1 The Regional Council may, on completion of any environmental impact investigation or compliance report that shows there is an adverse effect on bed or banks of water bodies as a result of the presence of the stormwater infrastructure, its installation or maintenance, or as a result of vegetation management, serve notice on the consent holder under s.128(1)(a)(i) and/or (iii) of the Resource Management Act 1991 of its intention to review the conditions of this consent. The purpose of such a review is to assess the need for a review of a Catchment Management Plan, conditions or to require remedial works, as appropriate.

9 Term of Consent

9.1 This consent shall expire on 30 November 2054.

10 Resource Management Charges

10.1 The consent holder shall pay the Bay of Plenty Regional Council such administrative charges as are fixed from time to time by the Regional Council in accordance with section 36 of the Resource Management Act 1991.

11 The Consent

11.1 The Consent hereby authorised is granted under the Resource Management Act 1991 and does not constitute an authority under any other Act, Regulation or Bylaw.

Advice Notes

1 This consent does not authorise the holder to modify or disturb any archaeological or historic sites within the area affected by this consent. Should any artefacts, bones or any other sites of archaeological or cultural significance be discovered within the area affected by this operation, written authorisation should be obtained from the Heritage New Zealand Pouhere Taonga before any damage, modification or destruction is undertaken.

2 Reporting and notification required by conditions of this consent must be directed (in writing) to the Manager Pollution Prevention, Bay of Plenty Regional Council, PO Box 364, Whakatane or fax 0800 884 882 or email notify@boprc.govt.nz, this notification must include the consent number 67093.

3 The Regional Council Pollution Hotline Number is 0800 884 883.

4 The consent holder is responsible for ensuring that all contractors carrying out works under this consent are made aware of the relevant consent conditions, plans and associated documents.

5 The consent holder is advised that non-compliance with consent conditions may result in enforcement action against the consent holder and/or their contractors.

6 Streams and modified watercourses (including land drainage canals with ecological values) are as defined

in the Bay of Plenty Regional Natural Resources Plan.

7 If no alternative measures can be implemented on site, habitat creation or enhancement nearby may be considered under a separate resource consent.

8 Reference: Bay of Plenty regional Council Hydrological and Hydraulic Guidelines.

9 Where rivers or streams are integrated into the primary stormwater system, the design criteria downstream of that point must be as per the current version of the Hydrological and Hydraulic Guidelines.

10 Future review/update of the Development Code should take into account climate change effects to 2090.

Bay of Plenty Regional Council

Resource Consent

Pursuant to the Resource Management Act 1991, the **Bay of Plenty Regional Council**, by a decision dated 4 February 2020, **hereby grants**:

A resource consent:

- **Under section 12(1)(c) and (d) of the Resource Management Act 1991 and Rule DD14 of the Regional Coastal Environment Plan to undertake a discretionary activity being disturbing, depositing material or dredging of the bed of the Coastal Marine Area**

subject to the following conditions:

1 Purpose

1.1 The purpose of this resource consent is to authorise dredging and disturbance of the seabed and deposition of material in the Coastal Marine Area (CMA) associated with stormwater infrastructure maintenance or erosion protection.

Advice Note: *For clarity, this consent does not provide for any dredging, deposition or disturbance in a Coastal Biodiversity A area as identified in the Regional Coastal Environment Plan.*

2 Location

2.1 The urban catchments covered by this consent include:

i. The Waihī Beach Catchment as indicated on the CPG Waihī Beach Urban Limits Overall Layout Plan, referenced as B.O.P.R.C. Plan No. RC 67093/1, including:

- Waihī Beach (8 sub-catchments)
- Bowentown/ Pios Shores
- Anthenree (6 sub-catchments)

ii. The Small Coastal Communities Catchments as indicated on the CPG Stormwater Subcatchments – Small Communities Drawing SC SCS1, Revision A Urban Limits Overall Layout Plan, referenced as B.O.P.R.C. Plan No. RC 67093/2, including:

- Tanners Point
- Tuapiro
- Ongare Point
- Te Kauri Village

iii. The Katikati Catchment (27 sub-catchments) as indicated on the CPG Katikati Urban Limits Overall Layout Plan, referenced as B.O.P.R.C. Plan No. RC 67093/3.

3 Map Reference

3.1 Stormwater structures, ponds and outlets for which disturbance, deposition on, or dredging of the seabed is authorised under this consent are listed in Appendix C: Overview of the stormwater reticulation and Appendix D: Overview of Discharge Points in the Catchment Management Plans WSZ1, WSZ2 and WSZ3, submitted in support of the application.

4 Legal Description

4.1 Various within the boundaries shown on the Plans referenced in Section 2 above.

5 Notifying the Regional Council

5.1 The consent holder must notify the Chief Executive of the Regional Council or delegate, in writing, no less than five working days prior to the start of any work resulting in the dredging or disturbance of the seabed or deposition of a substance in the coastal marine area (CMA). Notification at this time must include details of who is responsible for on site management and compliance with consent conditions (see Advice Note 2).

Advice Note: *The CMA is defined as the foreshore, seabed, coastal water and airspace above the water of which the landward boundary is the line of mean high water spring, except where that line crosses a river, then the landward boundary is the lesser of one kilometre upstream or a distance five times the width of the river mouth.*

5.2 Within 30 working days of completion of any stormwater related works authorised under this consent, the consent holder must submit a Statement, signed by a suitably qualified person (e.g. coastal ecologist, Chartered Professional Engineer), to certify that the works have been undertaken in accordance with best practice.

6 Dredging, Disturbance and Deposition in the Coastal Marine Area

6.1 Any erosion or scour of the foreshore or seabed resulting from works authorised by this consent must be effectively stabilised.

6.2 Prior to the commencement of any dredging, disturbance and deposition works the consent holder must provide to the Chief Executive of the Regional Council or delegate a Works Plan, prepared and certified by a suitably qualified and experienced person(s). The Works Plan certification must include, but not be limited to confirmation that:

(a) The work methodology meets best practice;

(b) The work methodology minimises foreshore and seabed disturbance;

(c) The volume and area of any proposed dredging is appropriate;

(d) The disturbance is temporary in nature and that any potential adverse ecological effects will be appropriately avoided, remedied or mitigated.

6.3 Dredging provided for in condition 6.2 must be limited to the minimum area and volume required for the clearance of accumulated sediments at stormwater outlets to maintain their conveyance capacity and must not exceed 100 cubic metres per outlet for any single dredging event.

6.4 Works involving the dredging or disturbance of the seabed and deposition of material in the CMA must be overseen by a suitably qualified engineer, coastal ecologist or other suitably qualified person.

7 Signage

7.1 Prior to the commencement of works authorised under this consent, the consent holder must erect a prominent sign adjacent to the entrance of site works, and maintain it throughout the period of the works. The sign must clearly display, as a minimum, the following information:

(a) The name of the project;

(b) The name of the main site contractor;

(c) A 24 hour contact telephone number for the consent holder or appointed agent;

(d) A clear explanation that the contact telephone number is for the purpose of receiving complaints and information from the public about dust nuisance or any other problem resulting from the exercise of this consent.

8 Review of Conditions

8.1 The Regional Council may, on completion of any environmental impact investigation or compliance report that shows there is an adverse effect on the environment as a result of any dredging, disturbance or deposition works in the CMA, serve notice on the consent holder under s.128(1)(a)(i) and/or (iii) of the Resource Management Act 1991 of its intention to review the conditions of this consent. The purpose of such a review is to assess the need for additional mitigation, monitoring, or remedial works, as appropriate.

9 Term of Consent

9.1 This consent shall expire on 30 November 2054.

10 Resource Management Charges

10.1 The consent holder shall pay the Bay of Plenty Regional Council such administrative charges as are fixed from time to time by the Regional Council in accordance with section 36 of the Resource Management Act 1991.

11 The Consent

11.1 The Consent hereby authorised is granted under the Resource Management Act 1991 and does not constitute an authority under any other Act, Regulation or Bylaw.

Advice Notes

1 This consent does not authorise the holder to modify or disturb any archaeological or historic sites within the area affected by this consent. Should any artefacts, bones or any other sites of archaeological or cultural significance be discovered within the area affected by this operation, written authorisation should be obtained from the Heritage New Zealand Pouhere Taonga before any damage, modification or destruction is undertaken.

2 Reporting and notification required by conditions of this consent must be directed (in writing) to the Manager Pollution Prevention, Bay of Plenty Regional Council, PO Box 364, Whakatane or fax 0800 884 882 or email notify@boprc.govt.nz, this notification must include the consent number 67093.

3 The Regional Council Pollution Hotline Number is 0800 884 883.

4 The consent holder is responsible for ensuring that all contractors carrying out works under this consent are made aware of the relevant consent conditions, plans and associated documents.

5 The consent holder is advised that non-compliance with consent conditions may result in enforcement action against the consent holder and/or their contractors.

Bay of Plenty Regional Council

Resource Consent

Pursuant to the Resource Management Act 1991, the **Bay of Plenty Regional Council**, by a decision dated 4 February 2020, **hereby grants**:

A resource consent:

- **Under section 12(2)(a) of the Resource Management Act 1991 and Rules SO10 and SO11 of the Regional Coastal Environment Plan to undertake a discretionary activity being to occupy space in the Coastal Marine Area**

subject to the following conditions:

1 Purpose

1.1 The purpose of this resource consent is to authorise the occupation of space in the Coastal Marine Area by stormwater infrastructure.

2 Location

2.1 The urban catchments covered by this consent include:

i. The Waihī Beach Catchment as indicated on the CPG Waihī Beach Urban Limits Overall Layout Plan, referenced as B.O.P.R.C. Plan No. RC 67093/1, including:

- Waihī Beach (8 sub-catchments)
- Bowentown/ Pios Shores
- Anthenree (6 sub-catchments)

ii. The Small Coastal Communities Catchments as indicated on the CPG Stormwater Subcatchments – Small Communities Drawing SC SCS1, Revision A Urban Limits Overall Layout Plan, referenced as B.O.P.R.C. Plan No. RC 67093/2, including:

- Tanners Point
- Tuapiro
- Ongare Point
- Te Kauri Village

iii. The Katikati Catchment (27 sub-catchments) as indicated on the CPG Katikati Urban Limits Overall Layout Plan, referenced as B.O.P.R.C. Plan No. RC 67093/3.

3 Map Reference

3.1 Stormwater structures, ponds and outlets for which the occupation of space in the Coastal Marine Area is authorised under this consent are listed in Appendix C: Overview of the stormwater reticulation and Appendix D: Overview of Discharge Points in the Catchment Management Plans WSZ1, WSZ2 and WSZ3, submitted in support of the application.

4 Legal Description

4.1 Various within the boundaries shown on the Plans referenced in Section 2 above.

5 Occupation of Space in the Coastal Marine Area (CMA)

5.1 The consent holder must ensure that discharge structures in the CMA authorised by this consent do not impede public access to the CMA, except where the restriction of access is necessary to ensure public health and safety.

5.2 The consent holder must maintain all discharge structures in the CMA authorised by this consent in a structurally sound state.

6 Term of Consent

6.1 This consent shall expire on 30 November 2054.

7 Resource Management Charges

7.1 The consent holder shall pay the Bay of Plenty Regional Council such administrative charges as are fixed from time to time by the Regional Council in accordance with section 36 of the Resource Management Act 1991.

8 The Consent

8.1 The Consent hereby authorised is granted under the Resource Management Act 1991 and does not constitute an authority under any other Act, Regulation or Bylaw.

Bay of Plenty Regional Council

Resource Consent

Pursuant to the Resource Management Act 1991, the **Bay of Plenty Regional Council**, by a decision dated 4 February 2020, **hereby grants**:

A resource consent:

- **Under section 15(1)(b) of the Resource Management Act and Rule CD 6 of the pre-operative Bay of Plenty Regional Coastal Environment Plan to undertake a discretionary activity being to discharge stormwater to coastal water**
- **Under section 15(1) of the Resource Management Act 1991 and Rule DW R21 of the Bay of Plenty Regional Natural Resources Plan being a restricted discretionary activity to discharge stormwater to water within the western urban catchments of the Western Bay District; and**
- **Under section 15(1) of the Resource Management Act 1991 and Rule DW R23 of the Bay of Plenty Regional Natural Resources Plan being a restricted discretionary activity to discharge stormwater to land where it may enter water within the western urban catchments of the Western Bay District; and**
- **Under section 15(1) of the Resource Management Act 1991 and Rule DW R8 of the Bay of Regional Plenty Natural Resources Plan being a discretionary activity to discharge stormwater to water or to land where it may enter water within the western urban catchments of the Western Bay District; and**

subject to the following conditions:

1 Purpose

1.1 The purpose of this resource consent is to:

a) Authorise the discharge of stormwater from urban areas within the Western Catchments (refer to condition 2) of the Western Bay District; associated with the resource consents listed in Schedule 1 (as may be updated to include applicable consents which post-date the decision on this CSC); and

b) To authorise temporary discharges of sediment contaminated stormwater from earthworks related to the replacement of stormwater infrastructure; and

c) To incorporate existing stormwater discharges associated with the existing resource consents listed in Schedule 1: List of stormwater related consents in the Catchment Management Plans WSZ1, WSZ2 and WSZ3 submitted in support of this application (as updated on 23 January 2020).

Advice Notes: *The purpose of this consent does not include:*

a) Discharges of contaminated stormwater from industrial and trade premises. Contaminant discharges from industrial and trade premises are to be authorised by the Regional Council.

b) The discharge of stormwater from new urban development including greenfield development sites and new subdivisions. These activities will require authorisation by a third-party resource consent, which may be transferred to the Western Bay of Plenty District Council

2 Location

2.1 The urban catchments covered by this consent includes:

i. The Waihī Beach Catchment as indicated on the CPG Waihī Beach Urban Limits Overall Layout Plan, referenced as B.O.P.R.C. Plan No. RC 67093/1, including:

- Waihī Beach (8 sub-catchments)
- Bowentown/ Pios Shores
- Anthenree (6 sub-catchments)

ii. The Small Coastal Communities Catchments as indicated on the CPG Stormwater Subcatchments – Small Communities Drawing SC SCS1, Revision A Urban Limits Overall Layout Plan, referenced as B.O.P.R.C. Plan No. RC 67093/2, including:

- Tanners Point
- Tuapiro
- Ongare Point
- Te Kauri Village

iii. The Katikati Catchment (27 sub-catchments) as indicated on the CPG Katikati Urban Limits Overall Layout Plan, referenced as B.O.P.R.C. Plan No. RC 67093/3.

3 Map Reference

3.1 Stormwater structures, ponds and outlets from which discharges are authorised under this consent are listed in Appendix C: Overview of the stormwater reticulation and Appendix D: Overview of Discharge Points in the Catchment Management Plans WSZ1, WSZ2 and WSZ3, submitted in support of the application together with the stormwater discharges listed in Schedule 1: List of stormwater related consents in the Catchment Management Plans WSZ1, WSZ2 and WSZ3 submitted in support of this application (as updated on 23 January 2020).

4 Legal Description

4.1 Various within the boundaries shown on the Plans referenced in Section 2 above.

5 Notifying the Regional Council

5.1 The consent holder must notify the Chief Executive of the Regional Council or delegate, in writing, within 10 working days after the grant of this consent the details of who is responsible for management of the stormwater network and compliance with the conditions of this consent (see Advice Note 2).

5.2 The consent holder must notify the Chief Executive of the Regional Council or delegate, in writing, of all spills, accidents or similar incidents that result in contaminants entering the stormwater network authorised under this consent. Such notification must be undertaken by contacting the Regional Council Pollution Hotline (see Advice Note 3).

6 Stormwater Management

6.1 Stormwater must be managed in general accordance with the latest version of the following standards and Guidelines:

a) The Regional Hydrological and Hydraulic Guidelines;

b) The Stormwater Strategy for the Bay of Plenty Region and the Stormwater Management Guidelines for the Bay of Plenty Region;

c) The New Zealand Building Code; or

d) Any alternative standards certified as appropriate by the Chief Executive of the Regional Council or delegate.

6.2 Discharges from all new stormwater infrastructure and any upgrades of existing stormwater infrastructure must meet the following design criteria:

a) Overland flow paths must allow the passage of a 2% AEP (Q50) storm event without floodwater entering buildings;

b) The primary reticulated stormwater network must have capacity to hold the 20% AEP (Q5) storm event, in accordance with the Western Bay of Plenty Development Code;

c) Stormwater infrastructure upgrades must not cause or exacerbate flooding by constricting waterways, recognised floodplains or overland flow-paths;

d) Stormwater model downstream design boundaries must meet the criteria set out in the Regional Hydrological and Hydraulic Guideline criteria;

e) Rainfall design must use NIWA HIRDS V4, or an alternative certified by the Chief Executive of the Regional Council or delegate, and include climate change to 2090;

f) Any upgrades of existing stormwater infrastructure must result in a peak design stormwater discharge of no more than 80% of the pre-development peak stormwater discharge for the 1% AEP (Q100) storm event;

g) Any upgrades of existing stormwater infrastructure must result in a peak design stormwater discharge of no more than 100% of the pre-development peak stormwater discharge for the 50%AEP (Q2) and 10% AEP (Q10) storm events;

h) Scour and erosion protection of outlets, streams, channels and overland flow paths must cater for at least the 5% AEP (Q20) storm event flows without damage to the erosion protection;

i) Upgrades of existing stormwater infrastructure involving ponds and embankments (and their foundations) used to hold water must be designed and certified by a Chartered Professional Engineer;

j) Where upgrades of existing stormwater infrastructure involve ponds, the ponds must be provided with a spillway to carry the 1% AEP (Q100) flood with a minimum of 0.5 metre embankment freeboard;

k) Any upgrades of existing stormwater infrastructure must result in stormwater system discharges being treated using a method consistent with the standards and guidelines in condition 6.1 that traps at least 75% of the contributing catchment's long-term sediment discharge;

l) Elevated water temperature in ponds and open channels must be mitigated where practical by riparian planting;

m) Structures in the beds of waterways must not restrict flows or cause more than localised increases in flow velocities to any more than a minor extent, nor impede fish passage;

n) Alterations to natural/existing waterways resulting from upgrades of existing stormwater infrastructure must be designed to avoid a net loss of aquatic habitat area or a reduction in aquatic habitat quality. This includes degraded or modified aquatic habitats. Where it is not practical to avoid a net loss of aquatic habitat or a reduction in aquatic habitat quality, the residual loss or reduction shall be offset through the creation or enhancement of aquatic habitat in the same catchment. Any proposed offsets must be certified by the Chief Executive of the Regional Council or delegate; or

o) Any alternative design criteria approved by the Chief Executive of the Regional Council or delegate.

6.3 New stormwater infrastructure must be designed by a suitably qualified Chartered Professional Engineer.

6.4 The consent holder must provide a signed completion certificate from a suitably qualified Chartered Professional Engineer to verify that any new stormwater infrastructure meets the design criteria set in condition 6.2 or any alternative design criteria approved by the Chief Executive of the Regional Council or delegate in accordance with condition 6.2(o).

6.5 The consent holder must implement the following general principles of stormwater management (refer Advice Note 6):

a) To encourage, and where appropriate for new development or redevelopment require, the use of Low Impact Design solutions as a preferred option to stormwater management where this is practicable;

Advice Note: *Examples of Low Impact Design Solutions may include, but are not limited to the use of grassed swales and rain gardens for stormwater treatment and flow attenuation.*

b) The avoidance or mitigation of erosion resulting from the discharge of stormwater;

c) The use of ground soakage as a preferred option for the disposal of stormwater from roofs of buildings where such soakage does not exacerbate subsurface instability;

d) The use of indigenous and site appropriate riparian planting to achieve improved water quality and habitat outcomes. Riparian planting should provide for erosion control while not impeding channel capacity, flows or stormwater system maintenance;

e) The creation, enhancement, protection and use of wetlands to achieve improved water quality and biodiversity outcomes;

f) The use of stormwater detention ponds to provide treatment and attenuation of stormwater where other low impact design solutions are not practicable.

6.6 The consent holder must undertake stormwater flood modelling on a catchment basis that includes climate change factors to 2090, to be included in the first six yearly review of the Catchment Management Plans (refer Advice Note 7).

6.7 The modelling required by condition 6.6 must be used as a tool to assess the effects of urban expansion, changes in stormwater management and stormwater infrastructure upgrades. Revised flood maps based on this modelling must be added to the CMP's as part of each six yearly CMP review.

6.8 Flood mitigation and reduction measures to address flood risks identified through the modelling required by condition 6.6, must be scheduled on a risk and priority basis in the consent holder's Long-Term Plan (budget) and the Asset Management Plan (works).

6.9 Any new urban development incorporated into this consent, must not increase downstream flooding and must provide for stormwater treatment prior to discharge into a water body.

6.10 All stormwater network assets authorised by this consent must be mapped in a GIS database, within 12 months of the granting of this consent, and be made available to the Chief Executive of the Regional Council or delegate on request.

6.11 The schedule of works identified in the Asset Management Plan must be linked to the GIS database required by condition 6.10 and be made available to the Chief Executive of the Regional Council or delegate on request.

6.12 The consent holder must ensure that all stormwater ponds are maintained so as to retain their initial design capacity at all times, to the satisfaction of the Chief Executive of the Regional Council or delegate.

6.13 The consent holder must ensure that all treatment devices, including, but not limited to debris deflectors, catchpits, swales and constructed wetlands are maintained in sound operating condition at all times, to the satisfaction of the Chief Executive of the Regional Council or delegate.

6.14 All sediment and debris removed from stormwater treatment systems and ponds as a result of maintenance operations must be removed off-site to an authorised facility or placed in a suitable location where it cannot re-enter a water body.

7 Catchment Management Plans

7.1 The consent holder must manage the catchment(s) in general accordance with the Catchment Management Plans WSZ1, WSZ2 and WSZ3, submitted in support of this application.

7.2 Catchment Management Plans WSZ1, WSZ2 and WSZ3, submitted in support of this application, must be reviewed and updated to reflect land use changes and urban development within the catchments and the requirements of this consent, within 6 months after this consent is granted and

thereafter on a six yearly basis (calculated from the date of granting this consent).

7.3 The reviewed Stormwater Catchment Management Plans required under condition 7.2 must include:

a) Identification of catchment stormwater management issues.

b) Statutory and non-statutory mechanisms used in the Catchment Management Plan to achieve compliance with the conditions of this consent. These mechanisms may include:

i. Relevant objectives, policies and performance standards in the Long-Term Plan;
ii. Works and standards identified in the Annual Plan;
iii. Relevant bylaws; and
iv. Relevant codes, standards and guidelines;

c) An accurate asset register, which includes:

i. Location of stormwater outlets and treatment devices;
ii. All stormwater assets, including the reticulated network, all open channels, ponds, constructed wetlands, treatment devices and overland flow paths;
iii. An assessment of the condition of each asset;
iv. The flood conveyance capacity of the reticulated network, including all open channels and overland flow paths;
v. A priority rating for scheduled upgrades based on the asset condition (iii) and conveyance capacity (iv) or flood risk alleviation measures;
vi. Maintenance requirements for each stormwater asset; and
vii. An inspection, maintenance and works schedule planned for the next six years.

The asset register must be updated annually.

d) A Mitigation Plan that identifies all areas of the catchment, including the receiving environment, that require any form of mitigation from the effects of urban stormwater discharges. Mitigation may include, but is not limited to: low impact design upgrades, erosion protection, flood protection, and riparian planting. The identified mitigation must be prioritised and scheduled for the next 6 year period.

e) A Monitoring Plan, including monitoring locations, frequency of monitoring and reasonable mixing zones. The locations shall be provided on a map with GIS co-ordinates. The Monitoring Plan must include monitoring the discharge quality of representative stormwater discharges and representative receiving environment sediment and macroinvertebrate conditions.

f) Identification of areas developed for urban related activities in the past 6 year period and areas available for future urban development;

g) Updated flood maps and identification of measures undertaken to avoid, remedy, mitigate or manage any actual and potential adverse effects arising from the flood events (this may be included in the Mitigation Plan).

h) An incident management and reporting procedure.

i) A summary of any contaminant source investigations undertaken in the past 6 year period and how stormwater management will address both short and long term issues for any stormwater discharge quality trigger value exceedances.

j) Details of planned industry and community education and awareness programmes.

k) Where available and applicable, the cultural values of iwi and hapu with mana whenua within the catchment area and the related receiving environment, and details of how such cultural values are integrated into stormwater management in that area.

l) A list of discharge and structure consents which have been transferred to the consent holder, since this CSC consent was granted.

7.4 New stormwater infrastructure to be included in the CMP must clearly identified in each six-yearly review of the CMP.

7.5 The Monitoring Plan required by condition 7.3(e) must be prepared, and certified as appropriate, for the catchment and the receiving environment, by a suitably qualified environmental scientist(s).

7.6 Any update to the Monitoring Plan, Asset Management Plan or Mitigation Plan shall be forwarded to the Chief Executive of the Regional Council or delegate for certification prior to implementation.

***Advice Note**: Certification by the Regional Council will be undertaken by the following Regional Council staff or contracted staff:*

a) Plans relating to water quantity, e.g. Stormwater infrastructure design, modelling, erosion protection structures, will be certified by a suitably qualified engineer.

b) Proposals, plans and designs relating to stormwater treatment will be certified by a suitably qualified environmental engineer and/ or environmental specialist.

c) Monitoring Plans, monitoring results trend analysis and proposed mitigation relating to effects on the receiving aquatic environment and the coastal marine environment will be undertaken by a suitably qualified ecologist.

d) Monitoring Plans, monitoring results and trends relating to stormwater quality and instream water quality will be undertaken by a suitably qualified environmental specialist.

e) The overall Catchment Management Plan and plan reviews will be certified as complete by the Regional Council Compliance Officer after the various components listed in a) to d) above have been certified by the relevant experts.

8 Stormwater Quality

8.1 Where the quality of receiving waters into which stormwater is discharged exceeds the trigger levels listed Table 1 of Appendix A to this consent after reasonable mixing, the consent holder must implement the actions identified in condition 9.2.

8.2 Where sediment in the receiving environment into which stormwater is discharged exceeds the trigger levels listed in Table 2 of Appendix A to this consent, the consent holder must implement the actions identified in condition 9.2.

8.3 The consent holder may amend the trigger values in Appendix A to be consistent with any amendments to the water quality classifications in the Regional Natural Resources Plan or the inclusion of any new standard in the National Policy Statement for Freshwater Management or national environmental standards. However, prior to being applied, any amended Appendix A trigger values must be certified by the Regional Council Chief Executive or delegate.

8.4 No stormwater discharge resulting from the exercise of this consent shall result in any of the following after reasonable mixing:

a) The production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials;

b) Any conspicuous change in the colour or visual clarity;

c) Any emission of objectionable odour;

d) Any significant adverse effects on aquatic life;

e) The natural temperature of the water being changed by more than three degrees Celsius; or

f) Aquatic organisms being rendered unsuitable for human consumption by the presence of contaminants.

9 Discharge Monitoring and Reporting

9.1 The Monitoring Plan required by condition 7.3(e) must include the following specifications:

a) Representative samples of stormwater discharges must include the following locations:

(i) Upstream of “discharge”;
(ii) Downstream of the “discharge” in the freshwater receiving environment (after accounting for

reasonable mixing);
(iii) In coastal water (below MHWS).

b) Representative sediment samples must be taken at a depth of sediment not greater than 2cm and composed of not less than 10 sub-samples taken from a minimum of 5 metres of stream length at the discharge, upstream and downstream locations identified in condition 9.1(a). Analysis for metals shall be undertaken at trace detection level.

c) All sampling under (a) and (b) must be undertaken within 30 minutes of the commencement of a storm event, where practicable, but no later than 60 minutes after the commencement of a storm event.

d) Annual measurements of the stream channel width downstream of representative urban stormwater discharges into receiving freshwater streams as a stream bank erosion indicator. The exact location(s) of the channel measurements must be provided to the Regional Council Chief Executive or delegate within 12 months of granting this consent (map and GPS Co-ordinates). All subsequent measurements must be taken annually at the same location(s).

e) Investigations of the cause of streambank erosion or scour that has resulted in any increase of 5% or more in stream channel width from the grant of this consent.

f) All water and sediment analyses must be carried out by an IANZ registered laboratory.

g) All macroinvertebrate surveys must be undertaken by a suitably qualified and experienced ecologist.

9.2 In the event that receiving environment monitoring identifies that any water quality trigger value referred to in condition 8.1 is exceeded, a further sample shall be taken within 2 months. If any water quality trigger value referred to in condition 8.1 is exceeded in three consecutive sampling results for the same site, the consent holder must undertake a contaminant source investigation within 3 months of the third exceedance and submit a report to the Regional Council Chief Executive or delegate detailing:

a) The potential source(s) of high contaminant loads within the catchment of the respective network;

b) The options available to limit the further discharge of the high contaminant loads into the respective network;

c) The ability to implement potential remedial options as outlined in (b) above;

d) The selection of specific remedial option(s) to address the breach(es) in trigger levels;

e) Additional monitoring requirements to further characterise the discharge and/or post implementation of the remedial option(s) to establish compliance with trigger levels; and

f) The timeline for implementation of the selected remedial option(s) and/or monitoring.

9.3 The consent holder must implement the selected options as per the timeline identified in the report provided under condition 9.2.

9.4 The consent holder must submit to the Regional Council Chief Executive or delegate an annual report for the Waihī Beach and Katikati catchments, in November of each year, covering:

a) A summary report of any monitoring undertaken including an analysis of the monitoring results;

b) Any stormwater network or stormwater infrastructure upgrade works undertaken;

c) Any stormwater induced erosion, flood risk alleviation, or stormwater quality mitigation measures implemented;

d) Any incidents resulting in unanticipated contaminants entering the stormwater network, the investigation of the cause of the incidents and any remedial actions implemented to avoid a repeat occurrence of the incident;

e) An updated Asset Register; and

f) Any new structures to be included in the consent (Asset Register)

9.5 The consent holder must submit to the Regional Council Chief Executive or delegate a Catchment Management Overview Report to accompany the Catchment Management Plan review, on a 6-yearly basis, from the date of granting of this consent (Refer Advice Note 9). The Report must include, but not be limited to:

a) An assessment of the catchment flood risk indicating improvements made over time;

b) A summary of any stormwater network upgrades and mitigation measures implemented, including treatment devices and low impact design improvements and specifically progress in achieving the requirements of condition 6.2(k);

c) An assessment of the effectiveness of previous mitigation methods and identification of any changes from previous methods used;

d) State of the receiving environment monitoring and trends;

e) A list of consents transferred to this consent;

f) A schedule of any changes to the Catchment Management Plans.

10 Coastal Erosion

10.1 Should the training groynes at 3 Mile Creek (Consent 62914) or the dune enhancement works (Consent 62913) not be re-consented upon the expiry in 2032 of their current consents, the consent holder must provide a monitoring and mitigation report to the Regional Council Chief Executive or delegate for certification prior to the groynes being removed. The report must include the following:

a) A methodology for monitoring the adjacent shoreline at the stream mouth to assess the effect of the stormwater discharges authorised under this consent on coastal erosion of WBOPDC Reserves legally described as Lot 18 and 19 DPS 22035 and Lot 25 DPS 6534;

b) Measures to mitigate and/or remedy erosion of the adjacent shoreline at the stream mouth if the stormwater discharges authorised under this consent are, through monitoring, found to be exacerbating coastal erosion of WBOPDC Reserves legally described as Lot 18 and 19 DPS 22035 and Lot 25 DPS 6534. The mitigation and/or remedial measures must be supported by a pre-determined trigger for implementation which can be actively monitored through the methodology described above.

10.2 The consent holder must implement the monitoring set out in the report required under condition 10.1 within 1 month of receiving the Regional Council Chief Executive or delegate's certification.

10.3 The consent holder must implement any measures to mitigate and/or remedy erosion required under condition 10.1 as soon as practicable following the implementation trigger being met taking into account the measures may require resource consent. The report required by condition 10.1 must be prepared by appropriately qualified and experienced expert(s).

10.4 The consent holder must share the results of the monitoring and any mitigation proposed for implementation under condition 10.1 above with private property owners located on Glen Isla Place

10.5 The consent holder must apply for any consents required for the proposed erosion mitigation measures identified in condition 10.1.

11 Review of Conditions

11.1 The Regional Council may, on receipt of a 6 yearly Catchment Management Overview and Monitoring Report or upon receiving notice of any exceedance of the trigger values in Appendix A, serve notice on the consent holder under s.128(1)(a)(ii) and/or (iii) of the Resource Management Act 1991 of its intention to review the conditions of this consent. The purpose of such a review is to assess the need for additional monitoring or treatment of stormwater, or to require an environmental impact investigation, if appropriate.

11.2 The Regional Council may, on completion of any environmental impact investigation or compliance report that shows there is a decline in the habitat quality or ecological value of the receiving environment, as a result of a stormwater discharge authorised by this CSC, serve notice on the consent holder under s.128(1)(a)(i) and/or (iii) of the Resource Management Act 1991 of its intention to review the conditions of this consent. The purpose of such a review is to assess the need for a review of a Catchment Management Plan, or additional monitoring, treatment, discharge control conditions or erosion protection relating to stormwater discharges authorised by this CSC, as appropriate.

11.3 The Regional Council may serve notice on the consent holder under s.128(1)(a)(i) and/or (iii) of the Resource Management Act 1991 of its intention to review condition 6.2 of this consent, to align the design criteria for new infrastructure with any updated criteria required to manage climate change effects.

11.4 The Regional Council may serve notice on the consent holder under s.128(1)(a)(i) and/or (iii) of the Resource Management Act 1991 of its intention to review the trigger limits set in Appendix A to this consent, to align with any limits set in National Policy Statement(s), National Environmental Standards or regulations, or an Operative Regional Plan.

11.5 The Regional Council may, on completion of any environmental impact investigation or compliance report that the stormwater discharge is causing erosion in the receiving environment, including stream channel widening or scour, serve notice on the consent holder under s.128(1)(a)(i) and/or (iii) of the Resource Management Act 1991 of its intention to review the conditions of this consent. The purpose of such a review is to assess the need for additional monitoring, modelling and remedial action.

12 Term of Consent

12.1 This consent shall expire on 30 November 2054.

13 Resource Management Charges

13.1 The consent holder shall pay the Bay of Plenty Regional Council such administrative charges as are fixed from time to time by the Regional Council in accordance with section 36 of the Resource Management Act 1991.

14 The Consent

14.1 The Consent hereby authorised is granted under the Resource Management Act 1991 and does not constitute an authority under any other Act, Regulation or Bylaw.

Advice Notes

1 This consent does not authorise the holder to modify or disturb any archaeological or historic sites within the area affected by this consent. Should any artefacts, bones or any other sites of archaeological or cultural significance be discovered within the area affected by this operation, written authorisation should be obtained from the Heritage New Zealand Pouhere Taonga before any damage, modification or destruction is undertaken.

2 Reporting and notification required by conditions of this consent must be directed (in writing) to the Manager Pollution Prevention, Bay of Plenty Regional Council, PO Box 364, Whakatane or fax 0800 884 882 or email notify@boprc.govt.nz, this notification shall include the consent number 67093.

3 The Regional Council Pollution Hotline Number is 0800 884 883.

4 The consent holder is responsible for ensuring that all contractors carrying out works under this consent are made aware of the relevant consent conditions, plans and associated documents.

5 The consent holder is advised that non-compliance with consent conditions may result in enforcement action against the consent holder and/or their contractors.

6 It is recommended that the Western Bay District Council's Development Code be updated to require stormwater treatment and low impact design.

7 Modelling of stormwater should include a nested design storm that includes the full range of design intensities up to 24 hours and downstream boundary conditions should be selected in accordance with the BOPRC Hydrological and Hydraulic Guidelines. Note that this is at peak tide and a dynamic downstream boundary may be necessary for design of some systems.

8 Stormwater quality samples should be taken within the first 30 minutes of a storm event to capture the first flush and freshwater receiving environment sampling is the most representative if taken during the storm event, where it is practical to do so.

9 The Catchment Overview Report (condition 9.5) is intended as a summary of the catchment management outcomes for the past six years, whereas the CMP Review and updated CMP document how the catchment will be managed in the upcoming six year period.

10 This consent does not authorise discharges into the consent holder's system from high risk facilities/sites as identified in Schedule 4 of the Regional Natural Resources Plan unless a separate discharge consent is obtained, transferred to the consent holder, and included as part of this comprehensive stormwater consent.

11 Existing privately held stormwater discharge consents do not form part of this consent unless transferred to the consent holder.

12 On granting of this consent the consent holder is advised to provide a signed surrender form to the Regional Council for the surrender of all current consents held by the consent holder (listed in Appendix J of the Catchment Management Plans).

13 Where rivers or streams are integrated into the primary stormwater system, the design criteria downstream of that point must be as per the Hydrological and Hydraulic Guidelines.

14 Future review/update of the Development Code should take into account climate change effects to 2090.

Bay of Plenty Regional Council

Resource Consent

Pursuant to the Resource Management Act 1991, the **Bay of Plenty Regional Council**, by a decision dated 4 February 2020, **hereby grants**:

A resource consent:

- **Under section 9(2)(a) of the Resource Management Act and Rule LM R 4 of the Bay of Plenty Regional Water and Land Plan to undertake a discretionary activity being to carry out earthworks in the coastal margin, between 0 to 20 metres from the Coastal Marine Area**
- **Under section 9(2)(a) of the Resource Management Act 1991 and Rule LM R8 of the Bay of Plenty Regional Natural Resources Plan to undertake a controlled activity being the land and soil disturbance by vegetation clearance in an ephemeral flow path not in the erosion hazard zone**

subject to the following conditions:

1 Purpose

1.1 The purpose of this resource consent is to authorise earthworks required for the maintenance or reconstruction of stormwater infrastructure in the coastal margin and vegetation clearance in an ephemeral flow path that is not in the erosion hazard zone.

2 Location

2.1 The urban catchments covered by this consent includes:

i. The Waihī Beach Catchment as indicated on the CPG Waihī Beach Urban Limits Overall Layout Plan, referenced as B.O.P.R.C. Plan No. RC 67093/1, including:

- Waihī Beach (8 sub-catchments)
- Bowentown/ Pios Shores
- Anthenree (6 sub-catchments)

ii. The Small Coastal Communities Catchments as indicated on the CPG Stormwater Subcatchments – Small Communities Drawing SC SCS1, Revision A Urban Limits Overall Layout Plan, referenced as B.O.P.R.C. Plan No. RC 67093/2, including:

- Tanners Point
- Tuapiro
- Ongare Point
- Te Kauri Village

iii. The Katikati Catchment (27 sub-catchments) as indicated on the CPG Katikati Urban Limits Overall Layout Plan, referenced as B.O.P.R.C. Plan No. RC 67093/3.

3 Map Reference

3.1 Stormwater structures, ponds and outlets for which earthworks required for their maintenance or reconstruction are authorised under this consent are listed in Appendix C: Overview of the stormwater reticulation and Appendix D: Overview of Discharge Points in the Catchment Management Plans WSZ1, WSZ2 and WSZ3, submitted in support of the application.

4 Legal Description

4.1 Various within the boundaries shown on the Plans referenced in Section 2 above.

5 Notifying the Regional Council

5.1 The consent holder must notify the Chief Executive of the Regional Council or delegate, in writing, no less than five working days prior to the start of any earthworks in the coastal margin or the start of any vegetation removal in an ephemeral flow path that is not in the erosion hazard zone. Notification at this time must include details of who is responsible for on site management and compliance with consent conditions (see Advice Note 2).

5.2 The consent holder must notify the Chief Executive of the Regional Council or delegate within five working days of completion of any earthworks in the coastal margin and the completion of any vegetation removal in an ephemeral flow path that is not in the erosion hazard zone.

6 Earthworks and Vegetation Clearance

6.1 Earthworks in the coastal margin authorised by this consent must not exceed an area of 100 square metres and a volume of 50 cubic metres per "event" to install, maintain, or reconstruct stormwater related infrastructure.

6.2 For any earthworks or vegetation removal authorised by this consent, the consent holder must submit an erosion and sediment control plan to the Chief Executive of the Regional Council or delegate no later than five working days prior to the commencement of the works, for certification.

Advice Note: *The purpose of the certification of the erosion and sediment control plan is that it meets the requirements of the Regional Council's "Erosion and Sediment Control Guidelines for Land Disturbing Activities," or its successor.*

6.3 Erosion and sediment controls must be installed prior to the commencement of works.

6.4 Additional erosion and sediment controls must be installed, if required by the Chief Executive of the Regional Council or delegate.

6.5 The consent holder must ensure that there is no tracking of sediment off-site.

6.6 Any vegetation removed must either be removed from the site, or placed in a manner that ensures it will not be mobilised by stormwater into a watercourse, obstructs or diverts the flow of water, or causes erosion or instability of the banks or beds of watercourse.

6.7 For the removal of any exotic plant species that pose a biosecurity risk, the consent holder must submit a removal methodology and disposal plan to the Chief Executive of the Regional Council or delegate for certification.

6.8 Any earthworks site or vegetation removal site must be stabilised on completion of the works.

7 Review of Conditions

7.1 The Regional Council may, on completion of any environmental impact investigation or compliance report, that shows there is an adverse effect on the environment as a result of the works undertaken, serve notice on the consent holder under s.128(1)(a)(i) and/or (iii) of the Resource Management Act 1991 of its intention to review the conditions of this consent. The purpose of such a review is to provide for additional controls, as appropriate.

8 Term of Consent

8.1 This consent shall expire on 30 November 2054.

9 Resource Management Charges

9.1 The consent holder shall pay the Bay of Plenty Regional Council such administrative charges as are fixed from time to time by the Regional Council in accordance with section 36 of the Resource Management Act 1991.

10 The Consent

10.1 The Consent hereby authorised is granted under the Resource Management Act 1991 and does not constitute an authority under any other Act, Regulation or Bylaw.

Advice Notes

1 Except as provided for by consented activity (a) above, all other earthworks required for the maintenance or installation of the reticulated stormwater network, which is not authorised by this consent, shall be undertaken in accordance with the permitted earthworks Rules of the Regional Natural Resources Plan or be authorised through a resource consent.

2 This consent does not authorise the holder to modify or disturb any archaeological or historic sites within the area affected by this consent. Should any artefacts, bones or any other sites of archaeological or cultural significance be discovered within the area affected by this operation, written authorisation should be obtained from the Heritage New Zealand Pouhere Taonga before any damage, modification or destruction is undertaken.

3 Reporting and notification required by conditions of this consent must be directed (in writing) to the Manager Pollution Prevention, Bay of Plenty Regional Council, PO Box 364, Whakatane or fax 0800 884 882 or email notify@boprc.govt.nz, this notification must include the consent number 67093.

4 The Regional Council Pollution Hotline Number is 0800 884 883.

5 The consent holder is responsible for ensuring that all contractors carrying out works under this consent are made aware of the relevant consent conditions, plans and associated documents.

6 The consent holder is advised that non-compliance with consent conditions may result in enforcement action against the consent holder and/or their contractors.

Appendix C:

Updates to the asset register

uActivity	Service Status	Component Type Code	Asset Type	uUnitType	Asset Description	Asset Key (Compkey)	Unit ID	Unit ID2	Ownership	uInstallDate	Expired By Date	Expired By	Disposal Reason	Project Number	LegacyKey (AssetFinda ShortID)	Equipment Number/Tag	Drawing Number	Material	Size / Diameter	Size Unit of Measure	Length	Length Unit of Measure	Width	Height	Depth	Weight	Make	Model Number	Serial Number	Comments	Surface	Criticality Code	Tier 1 - Facility	Tier 1 - Facility Description	Tier 2 - Process Description	Tier 3 - District Description	Tier 4 - Set Description	Tier 5 - Position Description	Cost Centre Code	Business Area Code	House Number	Street Name	Street Type	Postal Code	Suburb
Stormwater Operational - in use	STMN	Storm Main	PIPE-NPRES	Culvert		82613833	WBP1473	WBP1474	WBP	16/12/2021		NA					RC10957	CONC	225		6.66			0							0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	2	Church	ST	3129	Katikati
Stormwater Operational - in use	STMN	Storm Main	PIPE-NPRES	Culvert		82613836	WBP1475	WBP1476	WBP	16/12/2021		NA					RC10957	PE	300		9.4			0							0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	27	Crossley	ST	3129	Katikati
Stormwater Operational - in use	STMN	Storm Main	PIPE-NPRES	Culvert		82613839	WBP1478	WBP1479	WBP	16/12/2021		NA					RC10957	CONC	225		5.36			0							0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	27	Crossley	ST	3129	Katikati
Stormwater Operational - in use	STMN	Storm Main	PIPE-NPRES	Gravity Main		82102202	81849266	81841935	WBP	17/03/2021		NA			SWPI09059			UNDEF	0	mm	108.8	m		0							0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	126	Capamagian	DR	3177	Waihi Beach
Stormwater Operational - in use	STMH	Storm Manhole	CHB-MH	Chamber-Manhole.		81841935	81841935		WBP	17/03/2021		NA			SWMH08477				0	mm						0					0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	126	Capamagian	DR	3177	Waihi Beach
Stormwater Operational - in use	STMS	Storm Miscellaneous	DRAIN-STD	Catchpit Single		82613818	WBP1471		WBP	16/12/2021		NA					RC10957		0		0		0	0	0	0					0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	26	Crossley	ST	3129	Katikati
Stormwater Operational - in use	STMS	Storm Miscellaneous	MFT-UNDEF	Fitting-Junction.		81849266	81849266		WBP	17/03/2021		NA			SWJN00259		Generated	UNDEF	0	mm			0		0					Topology fix for 3WC project	0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	126	Capamagian	DR	3177	Waihi Beach
Stormwater Operational - in use	STMS	Storm Miscellaneous	DRAIN-STD	Grass Swale		82613843	WBP1482		WBP	16/12/2021		NA					RC10957		0		0		0	0	0	0					0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	27	Crossley	ST	3129	Katikati
Stormwater Operational - in use	STMS	Storm Miscellaneous	DRAIN-STD	Grass Swale		82613844	WBP1483		WBP	16/12/2021		NA					RC10957		0		0		0	0	0	0					0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	27	Crossley	ST	3129	Katikati
Stormwater Operational - in use	STMS	Storm Miscellaneous	DRAIN-STD	Grass Swale		82613845	WBP1484		WBP	16/12/2021		NA					RC10957		0		0		0	0	0	0					0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	27	Crossley	ST	3129	Katikati
Stormwater Operational - in use	STND	Storm Node	NDE-IN	Inlet		82613831	WBP1473		WBP	16/12/2021		NA					RC10957														0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	2	Church	ST	3129	Katikati
Stormwater Operational - in use	STND	Storm Node	NDE-IN	Inlet		82613834	WBP1475		WBP	16/12/2021		NA					RC10957														0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	27	Crossley	ST	3129	Katikati
Stormwater Operational - in use	STND	Storm Node	NDE-IN	Inlet		82613837	WBP1478		WBP	16/12/2021		NA					RC10957														0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	27	Crossley	ST	3129	Katikati
Stormwater Operational - in use	STND	Storm Node	NDE-IN	Outlet-Inlet.		81839802	81839802		WBP	17/03/2021		NA			SWIL00001																0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	116	Capamagian	DR	3177	Waihi Beach
Stormwater Operational - in use	STND	Storm Node	NDE-OUT	Outlet-Outlet.		81839801	81839801		WBP	17/03/2021		NA			SWOL01688																0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	116	Capamagian	DR	3177	Waihi Beach
Stormwater Operational - in use	STND	Storm Node	NDE-OUT	Outlet		82613832	WBP1474		WBP	16/12/2021		NA					RC10957														0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	27	Crossley	ST	3129	Katikati
Stormwater Operational - in use	STND	Storm Node	NDE-OUT	Outlet		82613835	WBP1476		WBP	16/12/2021		NA					RC10957														0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	27	Crossley	ST	3129	Katikati
Stormwater Operational - in use	STND	Storm Node	NDE-OUT	Outlet		82613838	WBP1479		WBP	16/12/2021		NA					RC10957														0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	27	Crossley	ST	3129	Katikati
Stormwater Operational - in use	STSL	Storm Service Line	PIPE-NPRES	House Connection		82613846	WBP1485		WBP	16/12/2021		NA					RC10957	PVC-U	100	Meters	6.67	Meters			0						0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	27	Crossley	ST	3129	Katikati
Stormwater Operational - in use	STSL	Storm Service Line	PIPE-NPRES	House Connection		82613847	WBP1486		WBP	16/12/2021		NA					RC10957	PVC-U	100	Meters	7.88	Meters			0						0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	27	Crossley	ST	3129	Katikati
Stormwater Operational - in use	STSL	Storm Service Line	PIPE-NPRES	House Connection		82613848	WBP1487		WBP	16/12/2021		NA					RC10957	PVC-U	100	Meters	7.74	Meters			0						0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	27	Crossley	ST	3129	Katikati
Stormwater Operational - in use	STSL	Storm Service Line	PIPE-NPRES	House Connection		82613849	WBP1488		WBP	16/12/2021		NA					RC10957	PVC-U	100	Meters	33.66	Meters			0						0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	11	Philip Walter	DR	3170	Katikati
Stormwater Operational - in use	STSL	Storm Service Line	PIPE-NPRES	House Connection		82613850	WBP1489		WBP	16/12/2021		NA					RC10957	PVC-U	100	Meters	8.34	Meters			0						0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	27	Crossley	ST	3129	Katikati
Stormwater Operational - in use	STSL	Storm Service Line	PIPE-NPRES	House Connection		82613853	WBP1490		WBP	16/12/2021		NA					RC10957	PVC-U	100	Meters	27.41	Meters			0						0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	26	Crossley	ST	3129	Katikati
Stormwater Operational - in use	STSL	Storm Service Line	PIPE-NPRES	Laterals		82608009	WBP1140		WBP	01/12/2021		NA					New Connection		100	Meters	12	Meters			0						0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	5	Philip Walter	DR	3170	Katikati
Stormwater Operational - in use	STSL	Storm Service Line	PIPE-NPRES	Service Main		82613854	WBP1491		WBP	16/12/2021		NA					RC10957	PVC-U	100	Meters	9.91	Meters			0						0	ZR003	WBOP Networks Storm Water Reticulation	Gravity stormwater including Manholes	NA	NA	NA	97610101WBW	26	Crossley	ST	3129	Katikati