Kāpiti Coast
DISTRICT COUNCIL
Me Huri Whakamuri, Ka Titiro Whakamua

Waikanae River, Recharge and Borefield Annual Report 2020/21 - Consent WGN130103 [35973, 35974 & 35975]

Prepared for Greater Wellington Regional Council
by Kāpiti Coast District Council

[FINAL]

Revision History

Revision Nº	Prepared By	Description	Date
0	R Millican	First Draft - For Review by Line & Ops Managers	5/8/21
1	R Millican	Final Draft – For review by AMG (incl. GWRC)	9/8/21
2	R Millican	Final – Pre- RRwGW AMG Annual Meeting	9/9/21
3	T Drewitt	Final for public release	16/03/2023

Document Acceptance

Action	Name	Signed	Date
Prepared by	R Millican		9/9/21
Reviewed by	R Sharma	 (RS Reviewed - 22/9/21 email)	22/9/21
Endorsed by	B Nesbitt		15/9/21
Approved by	S Mallon		23/03/23

Contents

Appendices

Appendix A

Consent Requirements and Documents

Appendix B

Nga Manu Wetland Monitoring Report (Boffa Miskell, et al)

Appendix C

Operation and Maintenance Logs Intake and Production Bores

Appendix D

Bore Water Quality Sampling Results

Appendix E

Complaints Record

Appendix F

RRwGW Reporting Chart (Beca 2020)

Appendix G

Minutes of AMG Meeting

1 Introduction and Compliance Summary

Kāpiti Coast District Council (Council) holds resource consents (WGN130103 [35973], [35974] and [35975]) to enable the following activities:

- take groundwater from bores within the Waikanae Borefield for the purpose of supplementing public water supply, through Waikanae River recharge or as an emergency public water source
- to take water from the Waikanae River for public water supply
- to discharge groundwater from the Waikanae Borefield to the Waikanae River for the purpose of river recharge and bore trialling.

The groundwater take consent authorises the abstraction of groundwater from eight production wells within the Waikanae Borefield. All eight of these wells were operable throughout the 2020/21 year (1 July 2020 to 30 June 2021). The locations of the eight production wells and monitoring bores are shown in Figure 1.

The consents include the requirement to monitor three ecosystems (Waikanae River, Small Coastal Streams and Wetlands) and the Waikanae Borefield. Requirements for annual reporting are detailed in Appendix A. Periodically, there is additional monitoring activity required:

- The close of the fish species monitoring programme was summarised in the 2019/20 Annual Report (however, the RRwGW AMG have recommended readdressing this monitoring in the lead up to the Year-15 Review)
- The three-yearly wetlands monitoring programme, postponed from the 2019/20 Season, is addressed this year and in this Report.

A reference chart of the staged monitoring requirements for this environmental management programme is included in Appendix F.

Operation under the above consents was carried out as agreed with Greater Wellington Regional Council (GWRC) and in accordance with the approved Ongoing Mitigation Plans (OMPs). At the commencement of the 2020/21 all Ongoing Mitigation Plans (OMPs) were approved and operable. This will be the third year of operation under the full RRwGW operating regime.

There are a number of plans, manuals and reports required by the consent. These key documents are set out in the diagram in Appendix A. Where specialist reports are referred to as supplied with a previous Annual report these can be found on the Council public website, at the following location, along with previous Annual Reports: https://www.kapiticoast.govt.nz/your-council/forms-documents/reports/water-supply-annual-reports/.

A summary of compliance for the 2020/21 year is set out below, using the symbols shown in the adjacent key.

In summary:

- The report at this revision, and the Water Conservation Report, are offered for the 2020/21 RRwGW Season as now reviewed by the AMG, but released prior to the AMG Meeting and the inclusion of its meeting minutes.
- The river level/ flow rate has been low enough to require river recharge during this Season
- There have been no transgressions of ongoing environmental triggers
- A report on the three-yearly review of the environmental conditions in the wetlands (including aerial survey of species) is included this year, where the survey was postponed last year.
- No changes to operational practice have occurred, nor changes to operational documents made.

Table 1: Compliance Summary FY2020/21

Section	
River	River Abstraction
	River Recharge
	Downstream River Flows
	River Aquatic monitoring
Borefield	Abstraction Volumes and Rates
	Back-up wells PW1 and PW5
	Shallow Aquifer Drawdown Monitoring
	Deep Aquifer Drawdown Monitoring
	Saline Intrusion Monitoring
	Waikanae River Flow Gauging
Wetlands	Wetlands Monitoring
Small Coastal Streams	Small Coastal Streams Monitoring

Key	
	No triggers or actions needed
	Trigger or action
	Exceedance

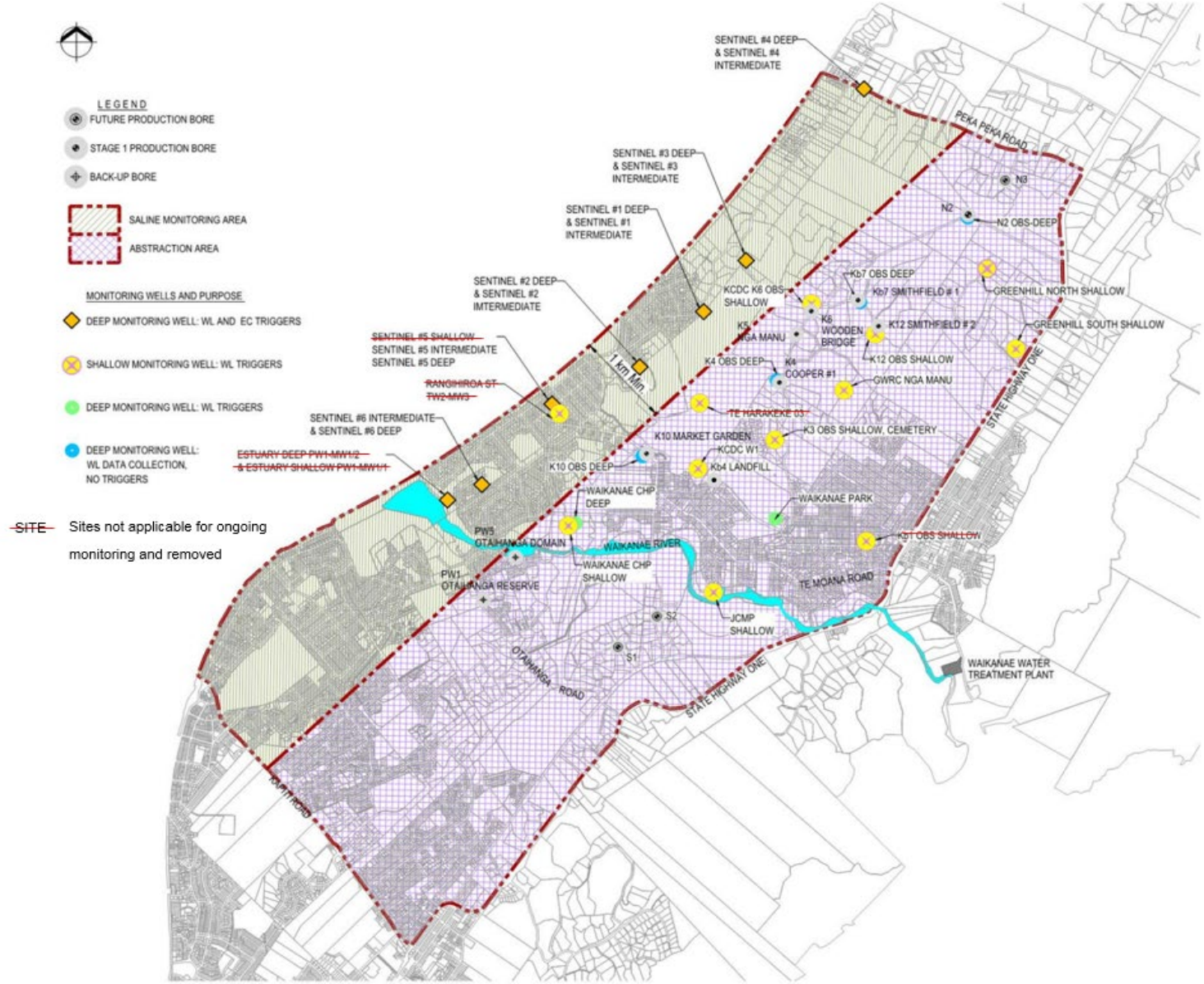


Figure 1: Location Plan - Waikanae Borefield Abstraction Wells and Monitoring Bores

2 Waikanae River

2.1 Waikanae River Flows

The Waikanae River flow is monitored by GWRC at a gauging station approximately 200m upstream of the Waikanae Water Treatment Plant (WTP) intake.

It is noted that Council's SCADA system receives river flow data from GWRC's SCADA system on an approximately 15-minute basis. The river flow data received and stored by Council is used for managing the water supply abstraction, and this data is not back-corrected if GWRC subsequently updates the algorithm for interpreting the level sampling data.

The upstream daily average river flow for the 2020/21 monitoring period is displayed in Figure 2, and the peak and low flow periods for the 2019/20 and 2020/21 monitoring periods are detailed in Table 2, below. As can be seen, river recharge was required during March and April 2021.

Table 2: Upstream Waikanae River Flows

Period	1 July 2019 - 30 June 2020	1 July 2020 - 30 June 2021
Peak flow	39,858 L/s on 18 June 2020	122,209 L/s on 23 September 2020
Minimum flow	1,074 on 21 March 2020	909 L/s on 5 March 2021
Low flow periods when river recharge used	*Recharge was not used*	March and April

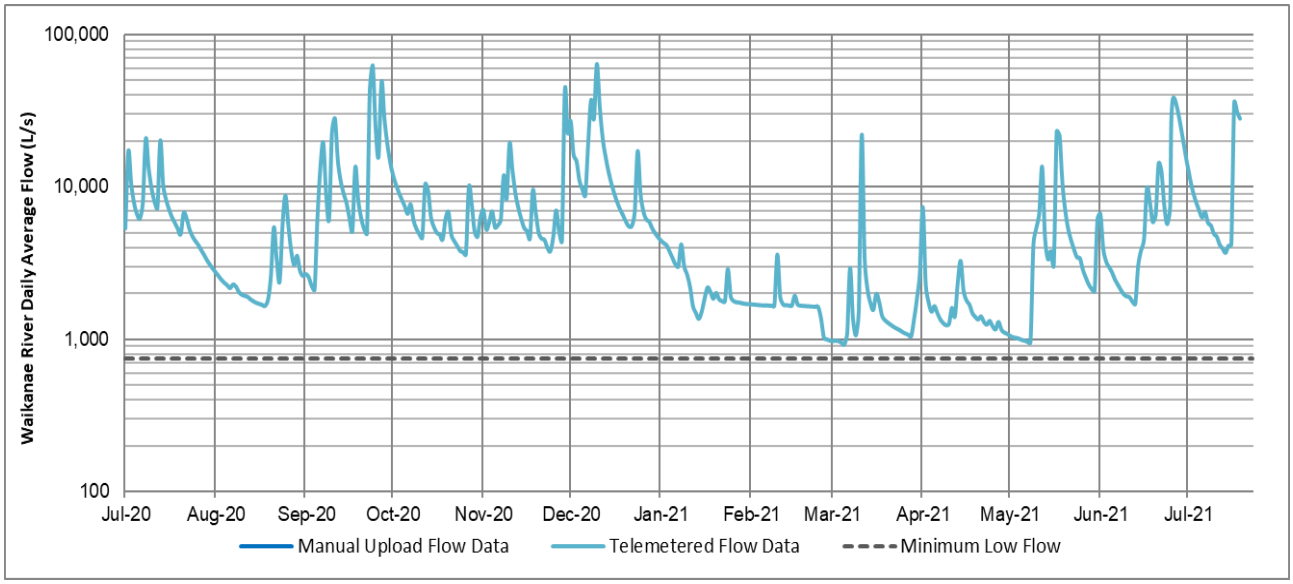


Figure 2: Waikanae River Flow at Water Treatment Plant (July 2020 – June 2021)

Upstream river flows were above 750 L/s for the entire monitoring period.

2.2 River Abstraction

No triggers or actions needed

Council measures and records the flow rates and volumes of water abstracted from the Waikanae River by way of a flow meter at the WTP intake. Council regularly submits its river abstraction records to GWRC, as

per Condition 13 of consent WGN130103 [35974]; this is done automatically from Council's SCADA to GWRC's Water Use Data Management System (Hydrotel). The instantaneous abstraction rate was less than consent condition targets at all times.

The daily abstraction volumes for the reporting period are provided in Table 3 and plotted in Figure 3 below. The orange line is the maximum allowable daily take permitted by the consent.

Table 3: Daily and Annual Waikanae River Abstractions

Period	1 July 2018 - 30 June 2019	1 July 2019 - 30 June 2020	1 July 2020 - 30 June 2021
Maximum daily abstraction	18,203 m3/day (on 11 July 2018)	20,537 m3/day (on 19 June 2020)	17,723 m^3/day (on 24 February 2021)
Maximum allowable daily volume permitted by Condition 5 of consent WGN130103 [35974]	30,700 m3/day	30,700 m3/day	30,700 m^3/day
Total annual abstraction volume	4,205,329 m3	4,345,261 m3	4,387,133 m^3
Equivalent average daily abstraction	11,521 m3/day	11,872 m3/day	12,020 m^3/day
Maximum total abstraction volume permitted by Condition 5 of consent WGN130103 [35974]	11,174,800 m3/year	11,174,800 m3/year	11,174,800 m^3/year

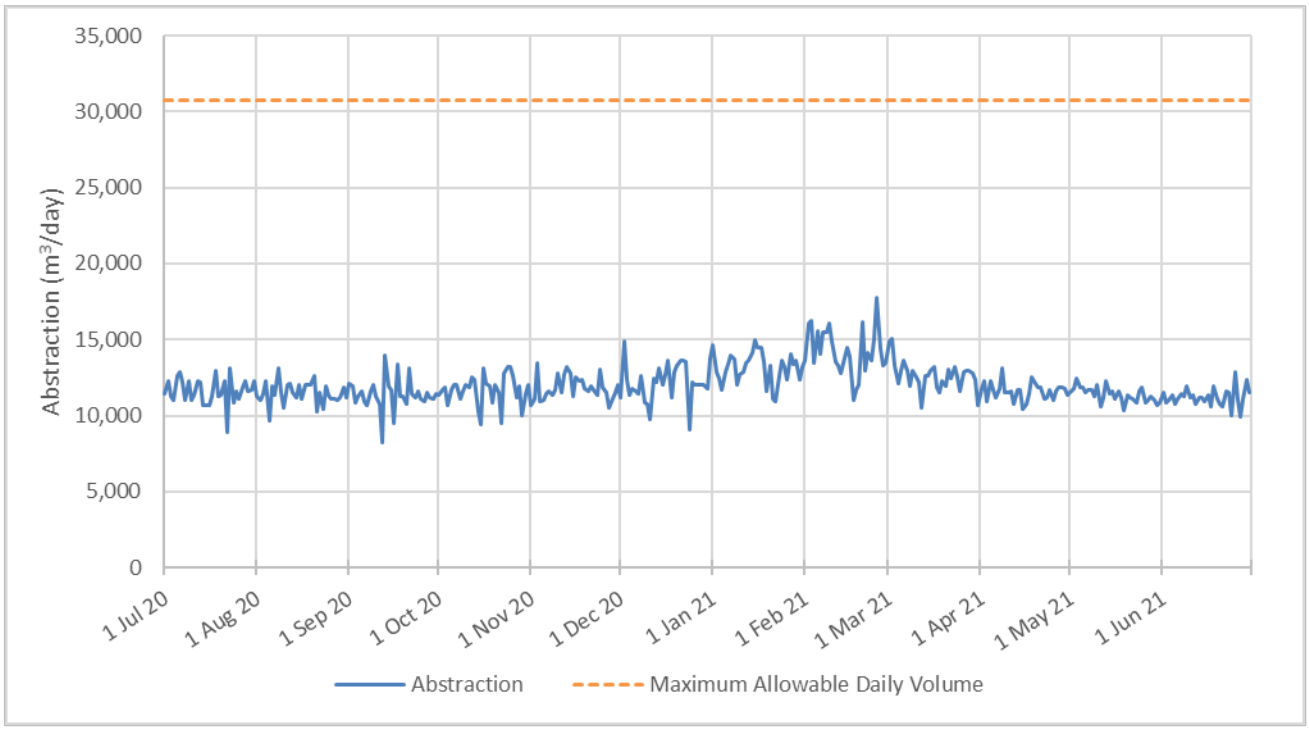


Figure 3: Waikanae WTP River Abstraction Volumes (m^3/day)

No daily abstraction volumes exceeded the consent conditions in the 2020/21 period.

The instantaneous rates of abstraction (recorded at 15-minute intervals) for the reporting period are shown in Table 4 and Figure 4 below.

Table 4: Instantaneous rates of abstraction from Waikanae River

Period	1 July 2018 - 30 June 2019	1 July 2019 - 30 June 2020	1 July 2020 - 30 June 2021
Maximum abstraction rate	250 L/s on 10 July 2019	240 L/s on 3 January 2020	240 L/s on 14 October 2020
Maximum abstraction rate at time of maximum abstraction permitted by Condition 5 [35974]*	463 L/s	463 L/s	463 L/s

** 355 L/s when the river flow is below 1,400 L/s and 463 L/s when river flow is above 1,400 L/s. This is adjustment to maximum abstraction rate is also expressed in Figure 4.*

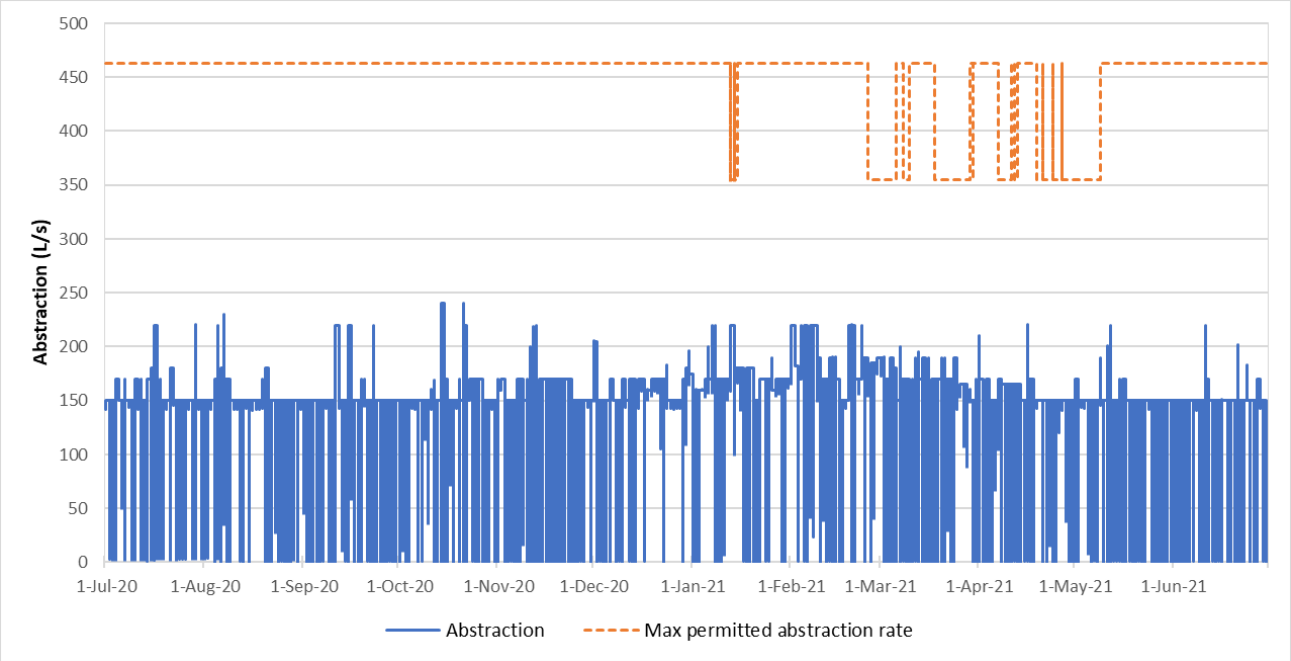


Figure 4: Waikanae WTP River Abstraction Rates (Instantaneous, L/s)

The instantaneous abstraction rate was less than consent limit conditions at all times.

2.3 River Recharge

No triggers or actions needed

River recharge must be deployed when Council is notified of low flows in the Waikanae River, to maintain the downstream river flow at 750 L/s or at its natural upstream flow rate, if less than 750 L/s. The recharge is undertaken in accordance with the approved Bore Preference Hierarchy Plan and approved Waikanae River OMP. There were instances of the requirement for river recharge in the 2020/21 season.

The trigger for periphyton monitoring and water quality sampling in the river is when discharge of bore water to the river exceeds 225 L/s for at least 48 hours. This trigger was not exceeded during this period.

The daily and instantaneous discharge of groundwater from the borefield to the river are outlined in Table 5 and plotted in Figure 5 and Figure 6 overleaf.

Table 5: River recharge discharges into the Waikanae River

Period	1 July 2018 - 30 June 2019	1 July 2019 – 30 June 2020	1 July 2020 - 30 June 2021
Number of days of river recharge	10 days in February, March & April	No requirement for river recharge.	4 days - 4th to 6th March, and on 21st April.
Maximum river recharge discharge	7,639 m^3/day on 31 March 2019	3,011 m^3/day on 21 March 2020 @	4,507 m^3/day on 5 March 2021
Ecological monitoring trigger exceeded? *	Trigger not exceeded	Trigger not exceeded	Trigger not exceeded
Number of days of short duration discharges #	12 days	19 days	14 days
Total volume of bore water discharged to the Waikanae River (river recharge and additional short-term discharges)	47,029 m^3	29,729 m^3	41,400 m^3

** recharge exceeds 225L/s for 48 hours or greater.*

 # discharge from the Waikanae borefield to the Waikanae River of less than six hours, up to maximum consented take, for bore maintenance, testing and stakeholder consultation (max. cumulative duration is 24 hours over a 30-day period).

@ river recharge was not required in 2019/20, but was discharged once on 21 March 2020 in error.

Due to a dry late-summer and autumn period in the District, river flows during the monitoring period were low and occasionally dipped below the recharge trigger level. Thus, a river recharge response was required, for a short spell each time, on four days during March and April. The total volume of bore water discharged to the river includes short-duration discharges for routine bore testing (Short Duration Discharges as defined by Consent WGN130103 [35975]).

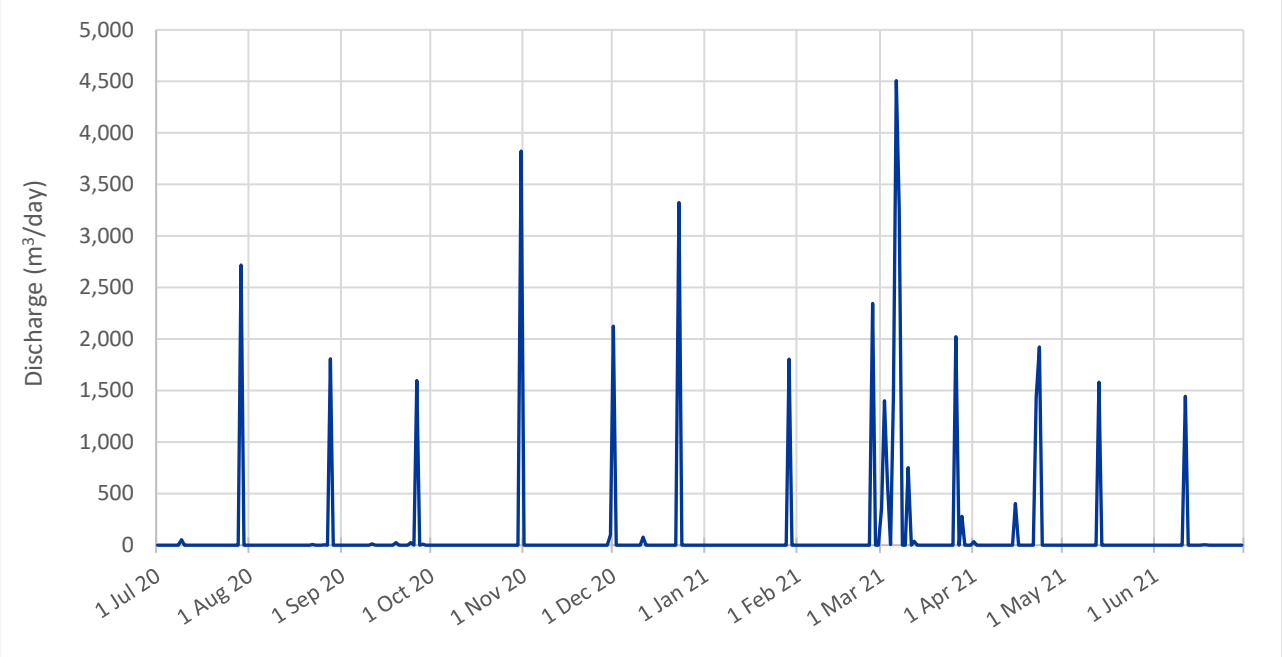


Figure 5: Daily Waikanae River Recharge (and Short Duration Discharges) for 2020/21 (m^3/day)

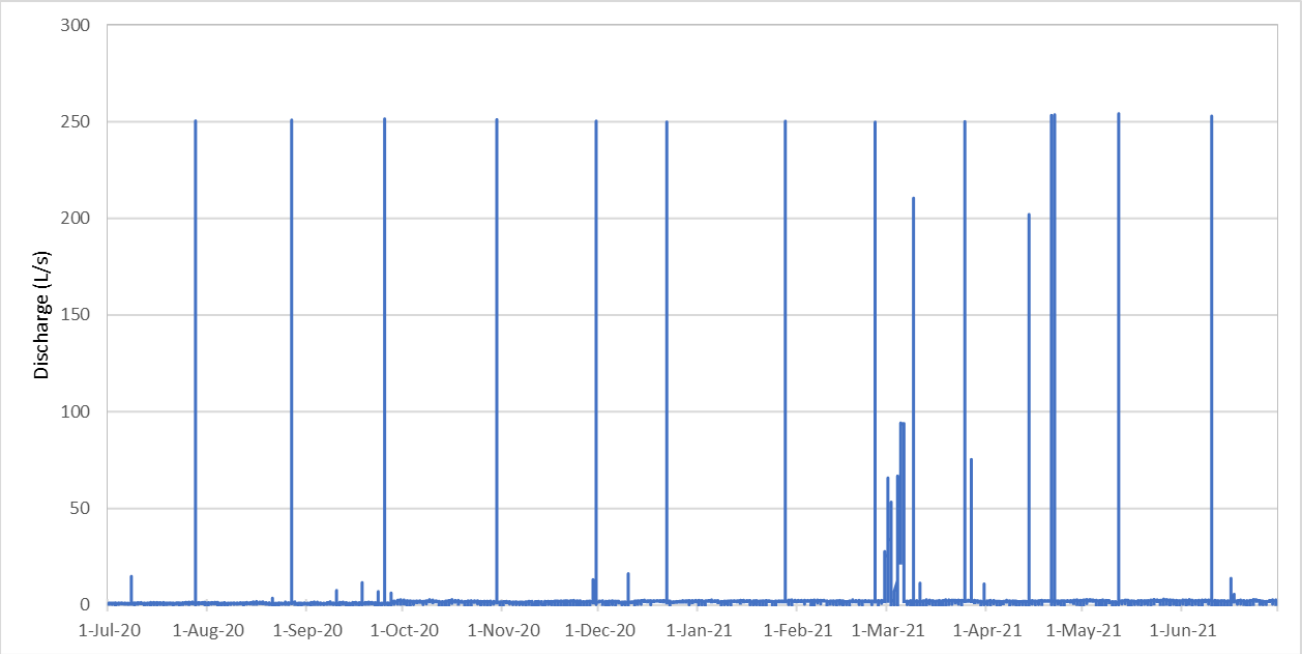


Figure 6: Instantaneous Waikanae River Recharge (and Short Duration Discharges) 2020/21 (L/s)

2.4 Downstream River Flows

No triggers or actions needed

The flow immediately downstream of the Waikanae Water Treatment Plant river recharge discharge structure is calculated as required by Condition 6 of consent WGN130103 [35974] and condition 12 of WGN130103 [35975]. During low flow periods, a minimum flow of 750 L/s is to be maintained downstream of the WTP unless the river naturally falls below this level upstream of the river intake to the WTP. The low downstream Waikanae River Flow data is detailed in Table 6 below.

Figure 7 shows the river flow at the GWRC gauging site upstream of the WTP (grey line), the WTP abstraction (yellow line), the river recharge (purple line) and the resulting calculated flow immediately downstream of the WTP (blue line) during the river recharge season of 2020/21 year. Due to low river flows in March and April 2021, Council abstracted water from the Waikanae Borefield for river recharge on for a total of four days. The yellow line depicts an unadjusted river abstraction rate, the purple line depicting the deployment of bore abstraction - in the main for trial runs. The orange line (low river level trigger threshold) and grey line (upstream river flow) never meet, but we see a very brief contact between the blue line (downstream flow) and the orange line.

Table 6: Downstream Waikanae River Flows

Period	1 July 2018 - 30 June 2019	1 July 2019 - 30 June 2020	1 July 2020 - 30 June 2021
Lowest downstream river flow	777 L/s on 19 February 2019	874 L/s on 16 February 2020	780.41 l/s on 1 March 2021 (742 L/s on 25 February 2021)
Minimum flow of downstream river in accordance with Condition 6 of consent WGN130103 [35974] and condition 12 of WGN130103 [35975]*	750 L/s	750 L/s	750 L/s
Maximum percentage recharge flow of river flow downstream	24%	21% *	20%

** conceptual value, only, for this period as flows were during bore trial runs*

*** values in blue reflect the actual raw data collected from the GWRC river flow source – lowest river flow value. As described in this Section, the value seems anomalous (two significantly discrepant data points over around a half-hour period), and so the performance index is measured off the next lowest (and more genuine) value measured.*

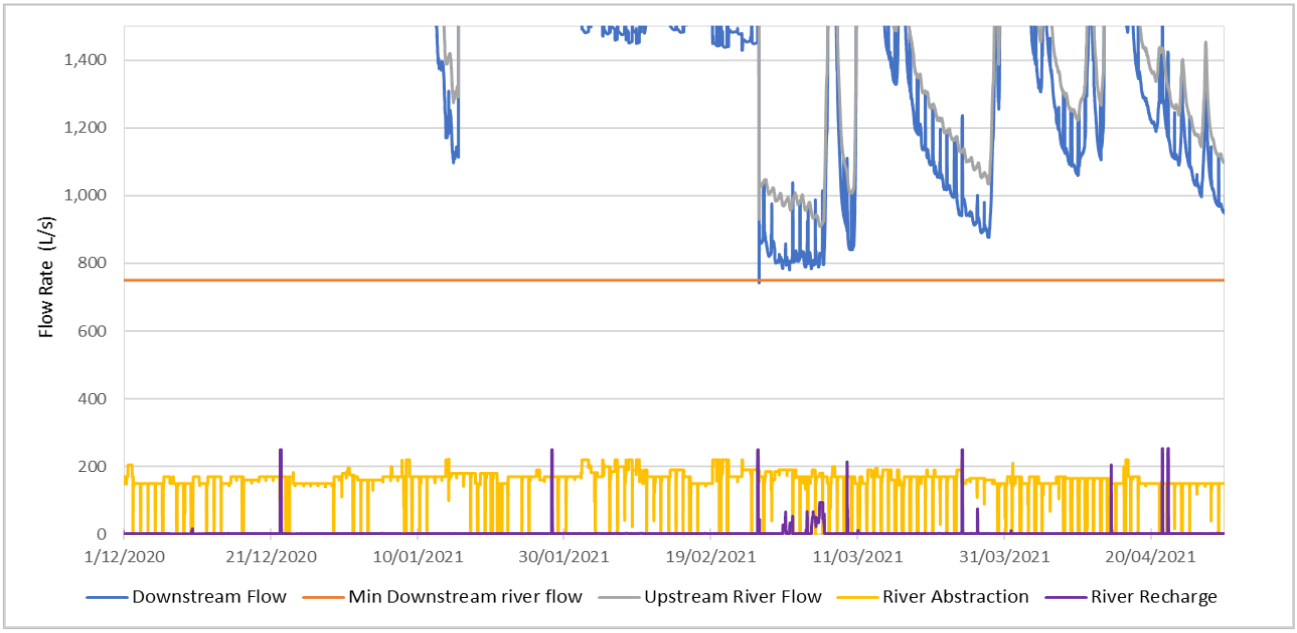


Figure 7: River flow upstream and downstream of WTP during low flow period December 2020 thru April 2021.

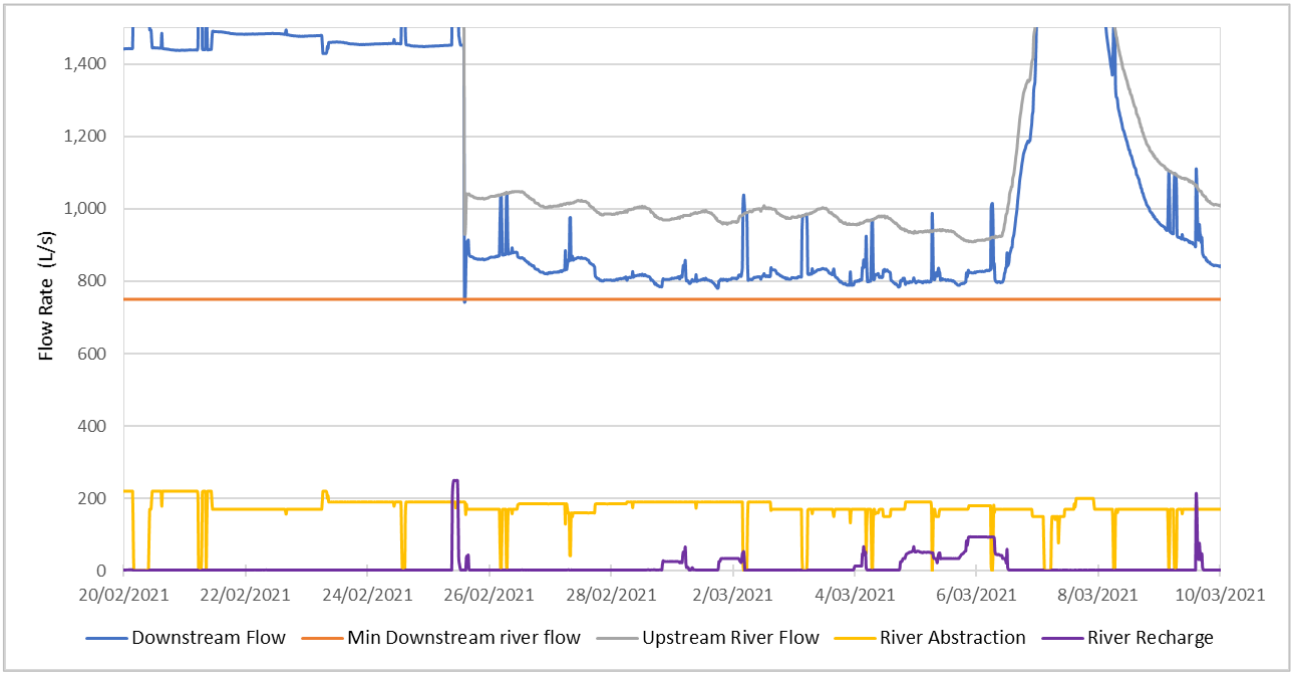


Figure 7a: River flow upstream and downstream of WTP during low flow period - analysed for period 20/2/21 to 10/3/21.

Figure 7b: Slice - River flow upstream and downstream of WTP (25 February 2021).

The raw data value for minimum downstream river flow, of 742 L/s on 25 February 2021, would have been a trigger event but proposed is the mark of "No triggers or actions needed" for this report Section, and the amended value in Table 6, for the following reasoning. We offer this as a more detailed example of the analysis we have done of these disparate data points (also discussed in later sections) and their relationship to recorded false-trigger events.

Figure 7a shows a more refined axis range of 20th February thru 10th March 2021. It is seen that the chart lines for downstream (and upstream; blue and grey) river flows take a distinct step around 25th February. This is assumed to coincide with GWRC's re-gauging of the river flow calculation/ monitoring regime, that can happen at about this time of year. Generally, this has created no issues, especially as Council retains full historical records of collected flow data, where the GWRC re-gauging process applies retrospective values to the data set.

However, a notable downward spike is seen in downstream river flow on 25th February itself, which is at odds with adjacent values. Figure 7b depicts a further refined 'slice' of the x-axis and indicates why the data indicates a minimum value of 742 l/s. Reviewing the data, the sub- 750 l/s values occur only at 14:30hrs and 14:45hrs on this day. We can only assume these two specific values to be erroneous, and we note that the river recharge mechanism adjusted itself to accommodate this shock value, as it should have done.

We note that the *next lowest* value collected in this data range was 780.41 l/s on 1st March 2021 (thus, above the trigger low-level of 750 l/s) and, thus, should be used as the minimum downstream river flow value for this trigger assessment.

2.5 River Aquatic Monitoring

No triggers or actions needed

Since the recharge of bore water did not exceed 225L/s for 48 hours, periphyton and water quality monitoring was not required over the 2020/21 period.

Periphyton and water quality monitoring in the Waikanae River is required when recharge of bore water exceeds 225L/s for 48 hours. Macroinvertebrates samples are taken when the level of periphyton in the river reaches high or very high levels as defined in the agreed letter. Section 2.3 Table 5 details if the ecological monitoring trigger was reached for the period, which it was not. Table 8 denotes historical surveys.

Table 7: River aquatic monitoring undertaken

Period	1 July 2018 - 30 June 2019	1 July 2019 - 30 June 2020	1 July 2020 - 30 June 2021
Periphyton monitoring	Not required	Not required	Not required
Water Quality Sampling-DRP	Not required	Not required	Not required
Water Quality Sampling-Conductivity	Not required	Not required	Not required
Temperature	Not required	Not required	Not required

Surveys were undertaken in the river above and below the Waikanae WTP in prior monitoring periods; the results of this annual monitoring were last documented in the report “Waikanae River Riffle Fishing Report” of 2 May 2019 by Boffa Miskell (included as Appendix B in the 2018/19 report).

A total of 937 fish were caught; summarised below in terms of 10 main indicator species:

- Torrentfish (405)
- Longfin eel (231)
- Shortfin eel (9)
- Redfin bully (138)
- Inanga (4)
- Koaro (2)
- Common bully (2)
- Brown trout (3)
- Bluegill bully (2)
- Banded kokopu (2)

On review of all findings, it was agreed with GWRC that no further surveys were required. However:

- GWRC requested a summary report to cover the total evidence from the three-year period of study
- The 2018/19 Report noted that: based on the results and analysis the AMG considered fish monitoring be re-considered at a future time, and proposed the following for GWRC consideration:
    - The AMG re-consider the inclusion of a fish survey in the years following the triggering of river monitoring activities by river recharge flow and duration events
    - The AMG re-consider the inclusion of a fish survey from year 10 to inform the Performance Assessment Report requirement in the 15th anniversary of the consent.

The Boffa Miskell report “Waikanae River - Riffle Fishing, Concluding Dataset Assessment”, prepared for Council on 8th April 2020, was included in the 2019/20 Annual Report.

Table 8: Summary of Fish Surveys undertaken

Period	1 July 2017 - 30 June 2018	1 July 2018 - 30 June 2019
Fish Monitoring	4 surveys undertaken February to March 2018.	4 surveys undertaken February to March 2019.

3 Waikanae Borefield

3.1 Abstraction Volumes and Rates

No triggers or actions needed

All individual bore abstractions were below the Stage 1 maximum yield values in Condition 8 of WGN130103 [35973].

Abstraction from each production well (L/s and m³/day) is measured and recorded in accordance with Conditions 13, 14 and 20 of consent WGN130103 [35973]. Council submits full abstraction records automatically via SCADA to GWRC as required by Condition 18. A summary of the abstraction for this reporting period is provided below in Table 9. The total daily abstraction from the Waikanae Borefield is plotted in Figure 8.

Table 9: Total daily and annual volumes pumped from the production bores

Period	1 July 2018 - 30 June 2019	1 July 2019 - 30 June 2020	1 July 2020 - 30 June 2021
Total annual volume pumped	43,818 m³	30,366 m³	41,211 m³ (92,201 m³)
Annual permitted volume (Condition 8 of WGN130103 [35973])	2,300,000 m³/year	2,300,000 m³/year	2,300,000 m³/year
Maximum total daily take volume and date	6,631 m³/day on 31 March 2019	3,359 m³/day on 23 October 2019	3,867 m³/day on 30 October 2020 (52,977 m³/day on 23 February 2021)
Maximum daily take permitted by Condition 6 of WGN130103 [35973] **	23,600 m³/day	23,600 m³/day	23,600 m³/day

** *This is now 23,600 m³/day, following the approval of the Borefield, Wetland and Small Coastal Streams OMPs.*

Blue text denotes data points before data review – black text denotes proposed amendment value from remainder of annual data set.

Table 9 for 2020/21 year and Figure 8 both depict a significant value logged for maximum abstracted (take) volume on 23rd February 2021. The value is large enough to be considered an anomaly and has a significant effect on the Total Annual Volume Pumped value. These values are marked in blue in Table 9 and seen as a large spike in Figure 8.

Specific data for each of bores also shows an extreme value for bore pump flows for wells Kb4, K4, K5 and K6, on this date, which sums to the value given above for Maximum Total Daily Take. However, the indicative (only) flowmeter at the Waikanae Water Treatment Plant inlet works suggests a more reasonable value of around 2,000 m³/day (around 4% of the given value). If the value of 2,000 m³/day is substituted for that day's bore water take, the Table 9 values in amendment of Total Annual Volume Pumped (river recharge) and Maximum Total Daily Take (bore take) values are the result. NB: as can also be seen in Figure 9 and Tables 10 & 11, maximum instantaneous bore abstraction flows did not meet the high trigger level at any time in the Season.

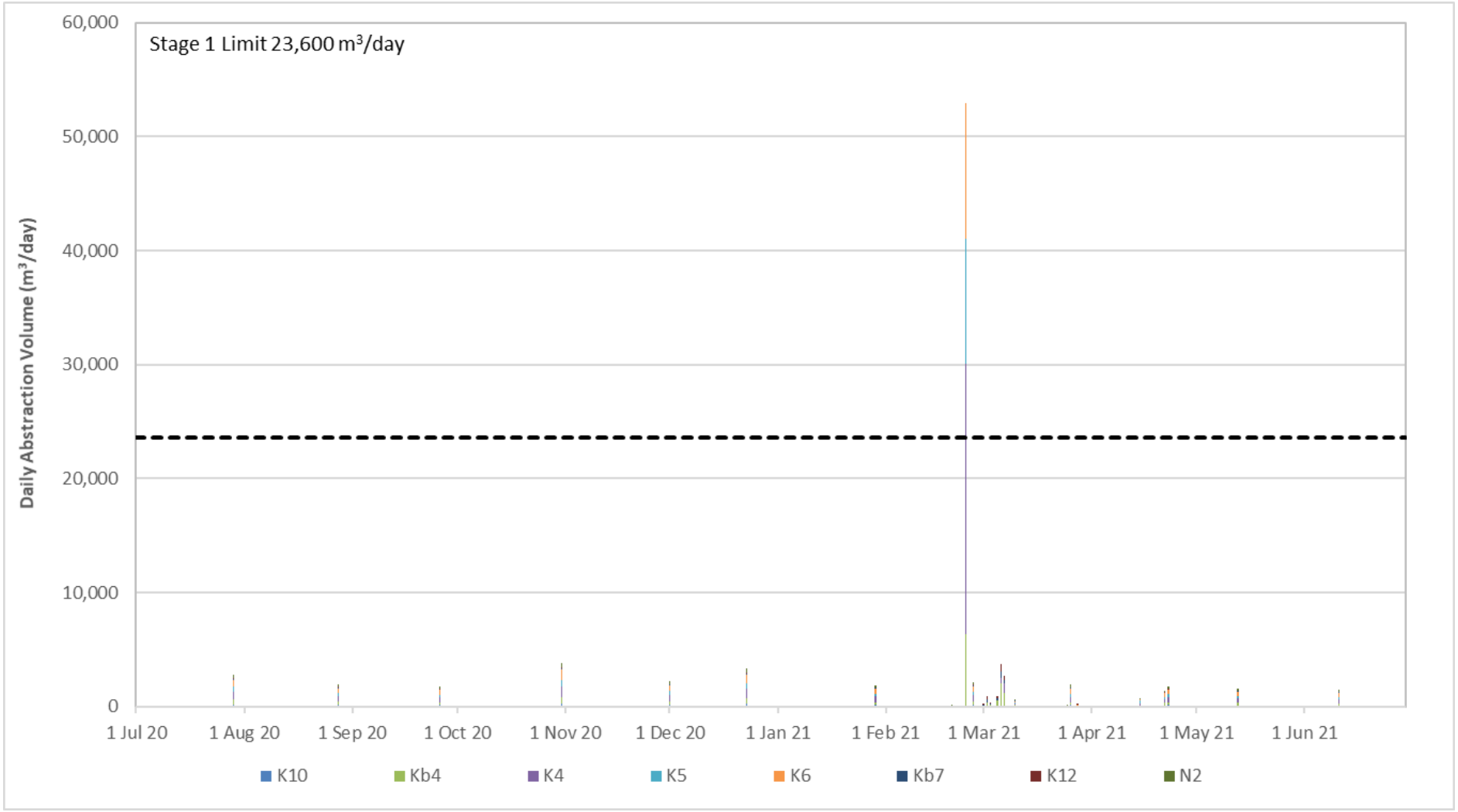


Figure 7: Daily Abstraction Volumes from Production Wells

The abstraction rates from the production wells are shown in Tables 10 and 11, and are plotted in Figure 9.

Table 10: Total instantaneous abstraction rate from production wells

Period	1 July 2018 - 30 June 2019	1 July 2019 - 30 June 2020	1 July 2020 - 30 June 2021
Maximum combined abstraction	258 L/s for 15 minutes on 21 December 2018.	252 L/s for 15 minutes on 23 October 2019.	261 L/s for 15 minutes on 12 May 2021
Maximum instantaneous abstraction permitted by Condition 8 of WGN130103 [35973].	273 L/s	273 L/s	273 L/s

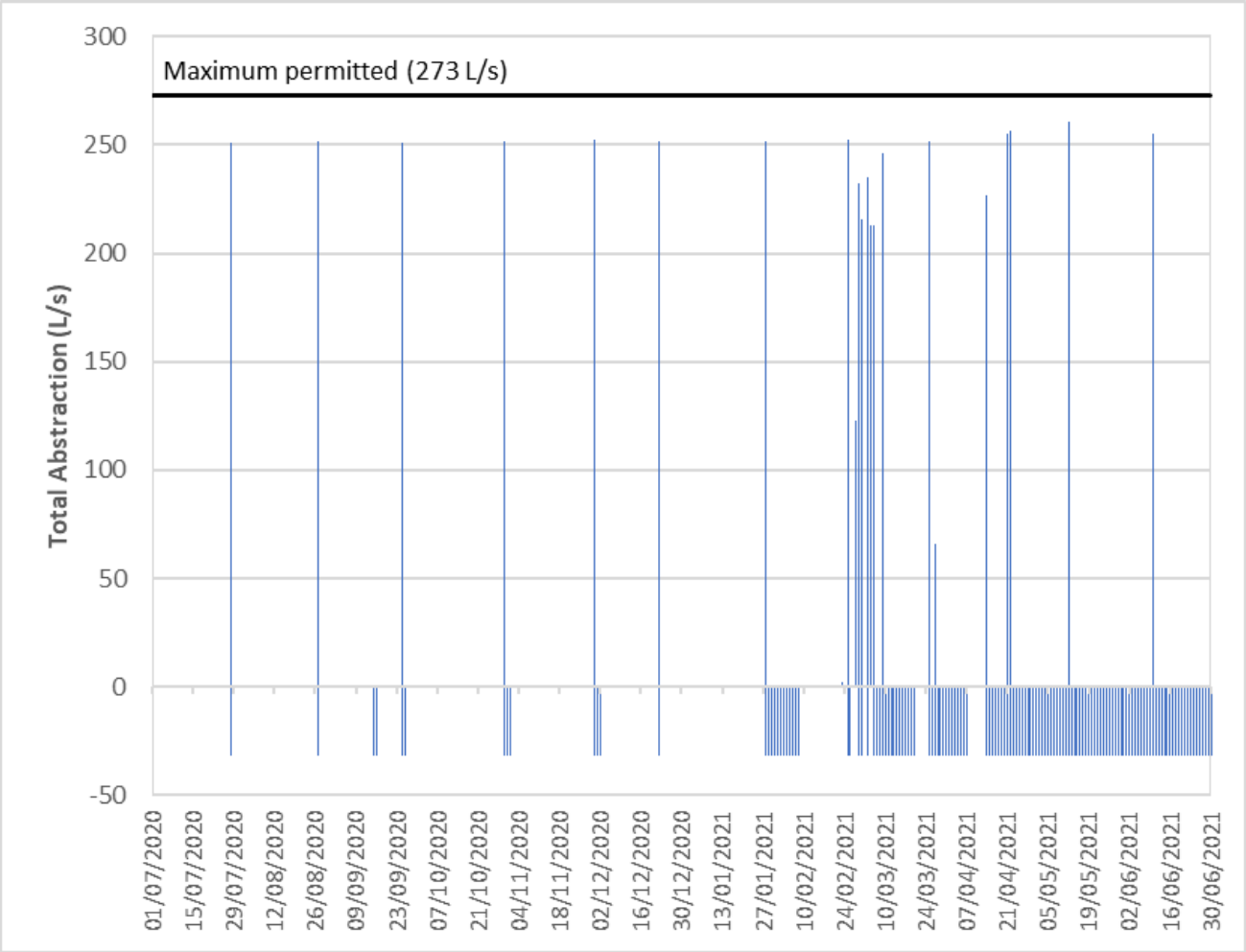


Figure 8: Total Instantaneous Abstraction from Production Wells

The combined instantaneous abstraction from the Borefield was below the maximum abstraction permitted by Condition 8 of WGN130103 [35973] during the 2019/20 period. The maximum instantaneous abstraction rates for the individual production bores are detailed in Table 11 below.

Table 11: Maximum Instantaneous abstraction rates for the individual production bores

Maximum instantaneous abstraction	1 July 2018 - 30 June 2019 *	1 July 2019 - 30 June 2020 *	1 July 2020 - 30 June 2021 *
K10	17 L/s	17 L/s	17 L/s
Kb4	35 L/s	35 L/s	35 L/s
K4	65 L/s	65 L/s	65 L/s
K5	36 L/s	36 L/s	36 L/s
K6	58 L/s	58 L/s	58 L/s
Kb7	6 L/s	6 L/s	6 L/s
K12	8 L/s	8 L/s	8 L/s
N2	25 L/s	25 L/s	25 L/s

* The apparently identical nature of values shown for 2018/19 thru 2020/21 seasons (three season) is due to rounding and similarity of operating regimes; it correctly reflects historic data for these periods.

3.2 Flow Gauging

No triggers or actions needed

Measurement of Waikanae River flows at Jim Cooke Memorial Park is undertaken when the borefield abstraction exceeds 23,000 m³/day for a three-day period as outlined in approved River and Borefield OMPs.

This trigger for additional flow monitoring was not reached during the 2020/21 period.

Table 12: Flow gauging of the Waikanae River

Period	1 July 2019 - 30 June 2020	1 July 2020 - 30 June 2021
Flow Gauging Trigger Status	Borefield abstraction of 23,000 m³/day for a three-day period was not exceeded.	Borefield abstraction of 23,000 m³/day for a three-day period was not exceeded.

3.3 Back-up Wells PW1 and PW5

No triggers or actions needed

Council holds a separate resource consent WGN050025 [33147] for two groundwater bores in Otaihanga (PW1 and PW5) for back up water supply.

The Back-up wells PW1 and PW5 were not connected to the reticulation and therefore were not used for back up water supply in the 2020/21 period.

Table 13: Combined abstraction from wells PW1 and PW5 for back up public water supply to the surrounding communities

Period	1 July 2019 - 30 June 2020	1 July 2020 - 30 June 2021
Combined abstraction from wells PW1 and PW5	Wells not used for back up water supply	Wells not used for back up water supply
Maximum combined abstraction permitted by Consent WGN050025 [33147].	7,000 m³/day	7,000 m³/day

3.4 Borefield Monitoring Programme

The Borefield Monitoring Programme is set out in the approved Borefield OMP.

3.4.1 Shallow Aquifer Drawdown Monitoring

No triggers or actions needed

Table 14 below lists the shallow aquifer monitoring sites, the applicable trigger levels and the minimum water level (daily average) recorded during the reporting period compared to prior years. There were no minimum level trigger events.

There were few alarm triggers notified during this monitoring period for all monitoring bore levels; with one for the Shallow Aquifer Monitoring (16th April) occurring during river recharge season (but not during recharge), and only due to equipment/ system anomalies.

Table 14: Shallow Aquifer Drawdown Monitoring Wells and Trigger Levels

Well Name	GWRC Bore Number	Trigger Level			Min level reporting period 2018/19 (mm AMSL)	Min level reporting period 2019/20 (mm AMSL)	Min level this reporting period 2020/21 (mm AMSL)
		Alert (mm AMSL)	Action (mm AMSL)	Cease (mm AMSL)			
KCDC K6 Obs Shallow	R26/6992	2180	1980	1780	3188	3319	3314
GWRC Nga Manu	R26/6991	7138	6938	6738	7883	7885	7801
KCDC W1	R26/7025	4350	4150	3950	5025	5116	4970
Waikanae CHP Shallow	R26/6916	1445	1245	1045	2226	2227	2259
K12 Obs Shallow, Smithfield Rd	R26/6300	5035	4835	4635	5631	5674	5714
JCMP Shallow, Jim Cooke Memorial Park	N/A	6641	6441	6241	7439	7411	7409
K3A Obs Shallow, Cemetery	R26/6290	6964	6764	6564	6998	7776	7868
Greenhill North Shallow, Greenhill Rd North	N/A	6387	6187	5987	6979	6996	7071
Greenhill South Shallow, Greenhill Rd South	N/A	11829	11629	11429	12538	12621	12732

Table 15 below summarises trigger and notification information. Further analysis of all bore monitoring automatic notification events (all of which were short-term monitoring equipment failures or anomalies) is included in Section 3.4.4.

Table 15: Shallow Aquifer Triggers

Period	1 July 2018 - 30 June 2019	1 July 2018 - 30 June 2019
Total number of notifications	5	3
Total number of actual triggers	0	0

3.4.2 Deep Aquifer Drawdown Monitoring

No triggers or actions needed

There were no level trigger events during this monitoring period for Deep monitoring bore levels.

Table 16 lists the deep aquifer monitoring sites, the applicable trigger levels and the minimum water level (daily average) recorded during this year's reporting period compared to prior years.

Table 16: Deep Aquifer Drawdown Monitoring Wells and Trigger Levels

Well Name	GWRC Bore Number	Trigger Level			Min level reporting - period 2018/19 (mm AMSL)	Min level reporting - period 2019/20 (mm AMSL)	Min level this reporting period 2020/21 (mm AMSL)
		Alert [mm AMSL]	Action [mm AMSL]	Cease [mm AMSL]			
Sentinel #1 Deep, Rutherford Drive	R26/6378	-1537	-3787	-5475	3324	3399	3388
Sentinel #1 Intermediate, Rutherford Drive	N/A	-2526	-4776	-6463	1876	2029	2080
Sentinel #2 Deep, Hodgkins Rd	N/A	-898	-2698	-4048	2891	2897	2952
Sentinel #2 Intermediate, Hodgkins Rd	N/A	-1757	-3557	-4907	1683	1832	1839
Sentinel #3 Deep, Old WWTP	R26/6776	-2090	-4490	-6290	3188	3052	3203
Sentinel #3 Intermediate, Old WWTP	N/A	-2547	-4947	-6747	2348	2466	2603
Sentinel #4 Deep, Peka Peka Rd	N/A	1832	932	257	3958	3984	4033
Sentinel #4 Intermediate, Peka Rd	N/A	284	-616	-1291	2085	2128	2230
Sentinel #5 Intermediate, Taiata St	R26/6955	-393	-1443	-2231	1825	1840	1907
Sentinel #5 Deep, Taiata St	N/A	19	-1031	-1819	2124	2139	2200
Sentinel #6 Deep, Tamati Place	N/A	560	-190	-752	2107	2175	2155
Sentinel #6 Intermediate, Tamati Place	N/A	599	-151	-714	2073	2109	2161
Waikanae CHP Deep	R26/6594	540	-510	-1298	2681	2722	2755
Waikanae Park	R26/6284	4611	2511	936	8662	8751	8814

Table 17: Deep Aquifer Triggers

Period	1 July 2018 - 30 June 2019	1 July 2019 - 30 June 2020	1 July 2020 - 30 June 2021
Total number of notifications	0	4	6
Total number of actual triggers	0	0	0

A small number of automated notifications of trigger values from Deep monitoring were received by Council and GWRC during the current year. River recharge was not underway during these times. All events were due to monitoring system anomalies. Table 17 summarises the overall situation. Further analysis of all bore monitoring automatic notification events (short-term monitoring equipment failures or anomalies) is included in Section 3.4.4.

NB: a number of events automatically notified by the SCADA system are “cascade” events, where the three alarm levels (Alert, Action, Cease) have the same time-and-date stamp, and so are assumed one Notification.

3.4.3 Saline Intrusion Monitoring

No triggers or actions needed

Table 18 lists the saline intrusion monitoring sites, the applicable trigger levels and the maximum electrical conductivity (daily average) recorded during this year’s reporting period compared to last year. Conductivity is used as a surrogate for salinity intrusion into the aquifer waters.

Equipment failure and operations and maintenance activities caused a small number of alarm notifications (automatically repeated to GWRC) during the year at the monitoring bores. None were indicative of actual trigger events. One event occurred during the river recharge season.

No value supplied in raw data for Table 18 represented a trigger value to report, apart from for “Sentinel #2 Deep, Hodgkins Rd” monitoring bore (5093.931 µS/cm previous-day-maximum) attributed to 15th November 2020. This is not taken as the actual reported maximum value, and the next highest value in the annual series has been noted; as can be seen from Table 20, there were three notification events relating to Salinity (Conductivity), on the late-afternoon and evening of 14th November 2020, due to a failed conductivity probe, that was then replaced by Council staff.

Table 18: Saline Intrusion Monitoring Wells Electrical Conductivity Trigger Levels

Well Name	GWRC Bore Number	Trigger Level			Max last reporting period 2018/19 (µS/cm)	Max this reporting period 2019/20 (µS/cm)	Max this reporting period 2020/21 (µS/cm)
		Alert (µS/cm)	Action (µS/cm)	Cease (µS/cm)			
Sentinel #1 Deep, Rutherford Drive	R26/6378	1500	1875	2188	986	1473	933
Sentinel #1 Intermediate, Rutherford Drive	N/A	521	651	760	462	466	461
Sentinel #2 Deep, Hodgkins Rd	N/A	1532	1915	2234	1226	1213	1397 (5094)
Sentinel #2 Intermediate, Hodgkins Rd	N/A	1699	2124	2478	925	864	879
Sentinel #3 Deep, Old WWTP	R26/6776	1342	1677	1956	1025	1179	1303
Sentinel #3 Intermediate, Old WWTP	N/A	2789	3486	4067	699	620	530
Sentinel #4 Deep, Peka Peka Rd	N/A	866	1082	1262	710	708	712
Sentinel #4 Intermediate, Peka Peka Rd	N/A	761	951	1110	719	716	732
Sentinel #5 Intermediate, Taiata St	R26/6955	3642	4553	5311	3162	3209	3318
Sentinel #5 Deep, Taiata St	N/A	5818	6518	7218	5761	5210	5066
Sentinel #6 Deep, Tamati Place	N/A	8693	9393	10093	8700	8351	7583
Sentinel #6 Intermediate, Tamati Place	N/A	1684	2105	2455	1835	1504	1514

* The value for maximum conductivity at the “Sentinel #2 Deep, Hodgkins Rd” monitoring point has been amended from the erroneous data point offered in raw data, as explained in this Section.

The number of nominal and actual triggers (nil) from the alarm notifications are shown in Table 19 below. Further analysis of all bore monitoring automatic notification events (short-term monitoring equipment failures or anomalies) is included in Section 3.4.4.

NB: a number of events automatically notified by the SCADA system are “cascade” events, where the three alarm levels (Alert, Action, Cease) have the same date-stamp, and so are assumed one notification

Table 19: Saline Intrusion Monitoring Triggers

Period	1 July 2018 - 30 June 2019	1 July 2019 - 30 June 2020
Total number of notifications	7	4
Total number of actual triggers	1	0

These notification examples are reminders of the harsh environment found at these depths of immersion in the Sentinel bores. Council commissioned a trialling exercise during FY2019/20, involving weather-proofed above-ground mounting of a conductivity monitoring instrument, with pumped sample waters from the example bore. To date these trials have not been adequately successful, offering inconsistent results, and the market for this specialist item was found to be very narrow when canvassing a wider selection of equipment suppliers.

3.4.4 Analysis of Monitoring Bore Notification Alerts (Monitoring Equipment Outages)

Table 20 summarises the automated email notifications of a trigger event for the RRwGW monitoring wells discussed in this section for the 2020/21 Season. In all cases a Council or GWRC monitoring asset was found to have failed, or it had been affected by a maintenance or power outage event. In some cases, an event occurred which could not be traced, but was accepted as an anomaly due to its extremely short duration in respect of long periods of stable values monitored.

Table 20: Summary of Notified Monitoring Point Failure Events

Monitoring Point (first Notification Alert Level)	Date	Time	Alert Levels *	Owner (GWRC/ KCDC)	RRwGW Season? (in/ out)	Additional Information
Borefield Compliance Level 1 Alert - GWRC Nga Manu Level	22/07/2020	11:15:00 a.m.	1-3	GWRC	out	GWRC confirmed they were calibrating the monitoring station, hence the alerts.
Borefield Compliance Level 1 Action - Waikanae CHP Deep Level	25/08/2020	1:30:00 p.m.	1-3	GWRC	out	
Borefield Compliance Level 1 Alert - Sentinel #3 Deep, Old WWTP Conductivity	5/10/2020	7:46:46 PM	1	KCDC	out	
Borefield Compliance Level 1 Cease - Waikanae CHP Shallow Level	22/10/2020	10:55:00 a.m.	1-3	GWRC	out	SCADA showed a dropped signal for perhaps 30mins – returned to normal
Wetland Compliance Level 1 Alert - Nga Manu Wetland Level	5/11/2020	3:30:00 p.m.	1-3	GWRC	out	
Borefield Compliance Level 1 Alert - K12 Obs Shallow - Smithfield Road Level	19/11/2020	10:12:33 a.m.	1-3	KCDC	out	Event coincided with a Council re-calibration visit to this device.
Borefield Compliance Level 1 Alert - GWRC Nga Manu Level	10/12/2020	2:15:00 p.m.	1-3	GWRC	in	

Borefield Compliance Level 1 Cease - GWRC Nga Manu Level	10/12/2020	3:00:00 p.m.	1-3	GWRC	in	
Borefield Compliance Level 1 Alert - Sentinel #1 Intermediate, Rutherford Drive Level	15/12/2020	9:45:33 AM	1-3	KCDC	in	Brief anomaly – source unknown. Recharge not underway.
Borefield Compliance Level 1 Alert - KCDC W1 Level	15/01/2021	9:45:00 a.m.	1-3	GWRC	in	GWRC might have been servicing the instrument; returned to normal for the next data point (15 mins).
Borefield Compliance Level 1 Alert - GWRC Nga Manu Level	11/02/2021	3:45:00 p.m.	1-3	GWRC	in	
Wetland Compliance Level 1 Alert - Nga Manu Wetland Level	11/02/2021	4:49:28 p.m.	1-3	GWRC	in	
Borefield Compliance Level 1 Alert - KCDC K6 Obs Shallow Level	16/04/2021	1:11:19 p.m.	1-3	KCDC	in	Each site's comms and PLC was down briefly over the afternoon. It also affected comms to KB7. Recharge not underway.
Borefield Compliance Level 1 Alert - Sentinel #2 Deep, Hodgkins Road Conductivity	14/05/2021	4:32:32 PM	1-3	KCDC	out	Council found corrosion damage to the cable connection plug and replaced both probe and cable, outright, that week.
Borefield Compliance Level 1 Alert - Sentinel #2 Deep, Hodgkins Road Conductivity	14/05/2021	5:33:12 PM	1-3	KCDC	out	
Borefield Compliance Level 1 Alert - Sentinel #2 Deep, Hodgkins Road Conductivity	14/05/2021	7:05:50 PM	1-3	KCDC	out	
Borefield Compliance Level 1 Alert - Kb1 Obs Shallow, Ngaio Road Level	24/05/2021	11:41:17 AM	1-3	KCDC	out	

* The levels of trigger alerts are: (1) Alert, (2) Action, (3) Cease. As can be seen, most events cascade to "Cease".

3.5 Bore Water Quality Monitoring

No triggers or actions needed

3.5.1 Production Bores

Bore water quality samples were taken from production bores at the start of the abstraction season, on 30 November 2020 (received 7 December 2020).

Following the approved BoMM:

- Bore water quality samples are taken from production bores at the start of the abstraction season.
- Water quality sampling is compulsory at the conclusion of the monitoring season if the abstraction from the borefield reaches 23,000m³/day for three consecutive days or reaches a volumetric measure of 540,000m³ or more, or if end-of-season sampling has not taken place in the last two years, as defined by the approved Borefield OMP.

Bore Water Quality Sampling results from Eurofins' analysis of samples taken at the start of the Season can be found in Appendix D. No non-compliance indicators are noted.

Since there was no significant recharge event, it was assumed that no end-of-season sampling was required. It is also of note that the last end-of season sample analysis results were included in the 2018/19 Report; thus, within the last two reporting years.

3.5.2 Blended Bore Water

Blended Bore Water sampling is no longer required going forward, as per the approved Borefield OMP.

3.6 Potentially Affected Existing Private Wells

Condition 7 of consent WGN130103 [35973] requires work to be undertaken to identify potentially affected existing authorised wells (and also actions (b)-(d) listed in the condition) prior to implementing each stage of the project as referenced in Condition 6. GWRC confirmed on 21 July 2016 that Council has met all requirements of Condition 7 for Stage 1.

A website provides education information, live groundwater level monitoring information and has contact details if private well users wish to discuss issues arising or make complaints. KCDC upgraded this website for 2020/21 year; now hosting live operating data, with geospatially represented bore information, on Council's own platform (it was operated for Council by consultant Beca, in the past).

Refer to the web pages found at the following address:
https://www.kapiticoast.govt.nz/services/a-z-council-services-and-facilities/waters/water-supply/where-it-comes-from/private-bores/

3.7 Complaints

There were no complaints received alleging adverse effects from, or related to, abstraction from the Waikanae Borefield in the 2020/21 year.

Condition 45 of consent WGN130103 [35973] requires Council to maintain an on-going record of any complaints received alleging adverse effects from, or related to, abstraction from the Waikanae Borefield, including complaints of any adverse effects on private bores. The Complaints Record is attached in Appendix E. This Appendix is empty if there were no complaints.

Table 20: Complaints Record

Period	1 July 2019 - 30 June 2020	1 July 2020 - 30 June 2021
Number of complaints	0	0

4 Wetlands Monitoring

No triggers or actions needed

As required by the approval of the Wetland OMP, wetland triggers are applicable to Nga Manu wetland for Stage 1. No trigger was reached in the 2020/21 period for the wetlands operating water level.

A graph presenting the Nga Manu wetland groundwater levels for the Season is presented in Figure 10, below. NB: This includes regression analysis of the trigger levels, based on district-wide shallow groundwater effects, which is now automatically applied by Council's control system (SCADA).

As can be seen the data series and Alert lines meet at two points: around 8th November 2020, and around 10th and 11th February 2021. This coincides with erroneous activity of the Nga Manu Wetland level sensor, or maintenance activity on the sensor by GWRC, as described in Table 20 "Summary of Notified Monitoring Point Failure Events" in Section 3.4.4. These are not legitimate triggers.

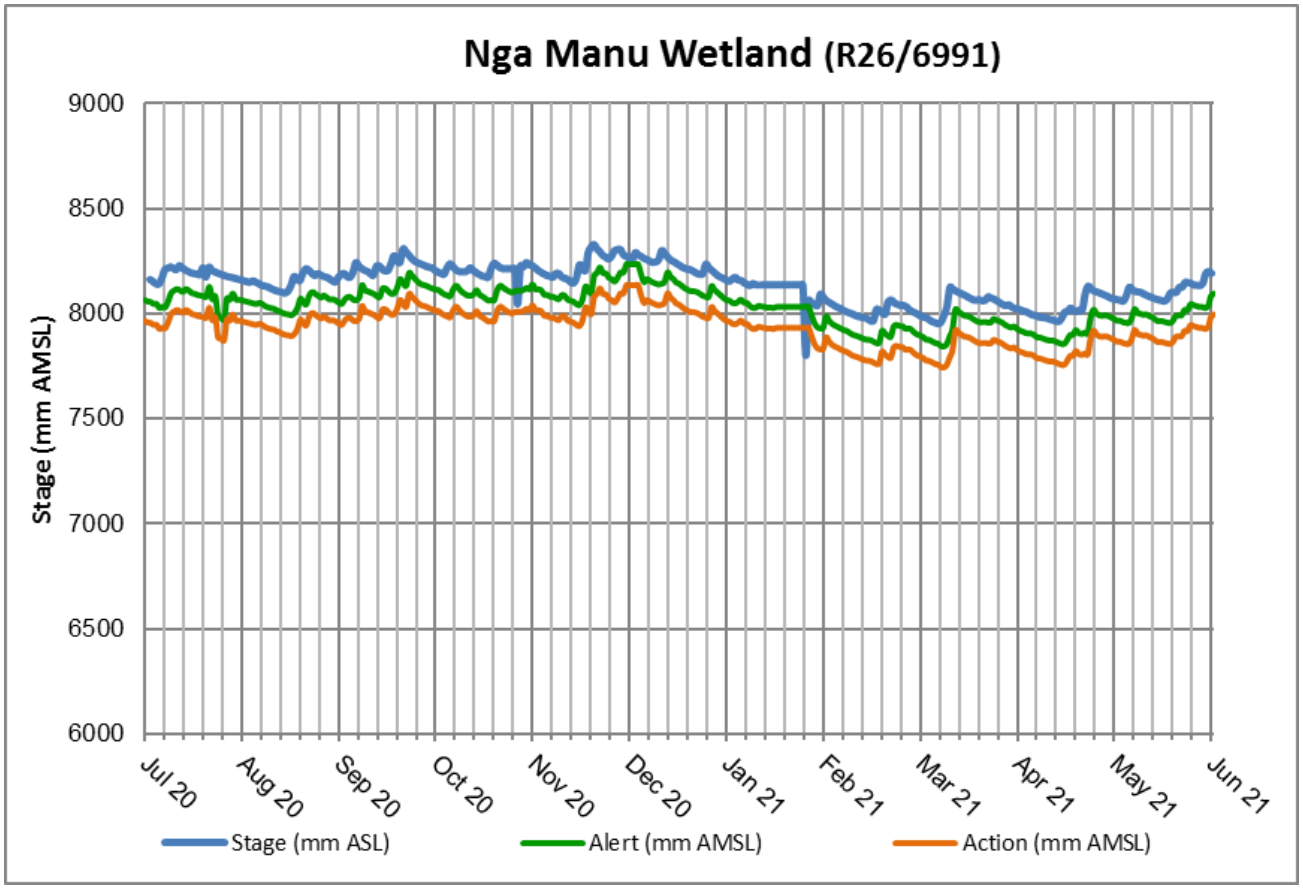


Figure 9: Nga Manu Wetland Levels and Trigger Regression Analysis

Te Harakeke wetland is to be included in an updated Wetland OMP if access can be regained. GWRC is to be advised when access is regained, and Council will implement triggers and environmental monitoring in accordance with requirements at the stage when access is regained.

Following the **Action Point 2019/20** (applying to this section of the 2019/20 Report): the Consent requires Council to carry out a three-yearly review of the environmental conditions in the wetlands (including an aerial imagery survey of species) during mid-late summer. This fell in year 2019/20 but, due to access problems

during COVID-19 restrictions, we agreed with GWRC (emails 12th and 17th June 2020) to defer the monitoring activity to the next summer season.

Attached in Appendix B is the draft three-year wetlands condition review report ("Recharge with Groundwater – Nga Manu Wetland Monitoring", Boffa Miskell, 21/7/21) for our stakeholders to review.

The report summarises the outcomes of this review and is, as a whole, positive. Boffa Miskell (as peer-reviewed by Beca) summarise as follows "In summary, the Nga Manu Wetland has not shown any concerning or unexpected ecological change since the baseline monitoring surveys. As such, the next Stage 1 monitoring round for the RRWGW consent should occur in three years' time in summer 2024".

Continuation of periodic monitoring seems prudent; as the Report indicates: "While the slight increase in pressure and decrease in condition is expected (as pressure and condition scores are catchment wide measures, not focused at the wetland scale), any further declines related directly to the wetland at the wetland scale would be of concern in future monitoring rounds".

5 Small Coastal Streams Monitoring

No triggers or actions needed

There were no triggers notified for the Ngarara coastal stream in this period.

One small coastal stream site, Ngarara Stream has been monitored this year as defined in the Small Coastal Stream OMP, approved in 2019/20 season by GWRC. The required monitoring period is from 1 December 2020 to 1 May 2021. The ground water and stream level for the small coastal stream are shown in Figure 11, below.

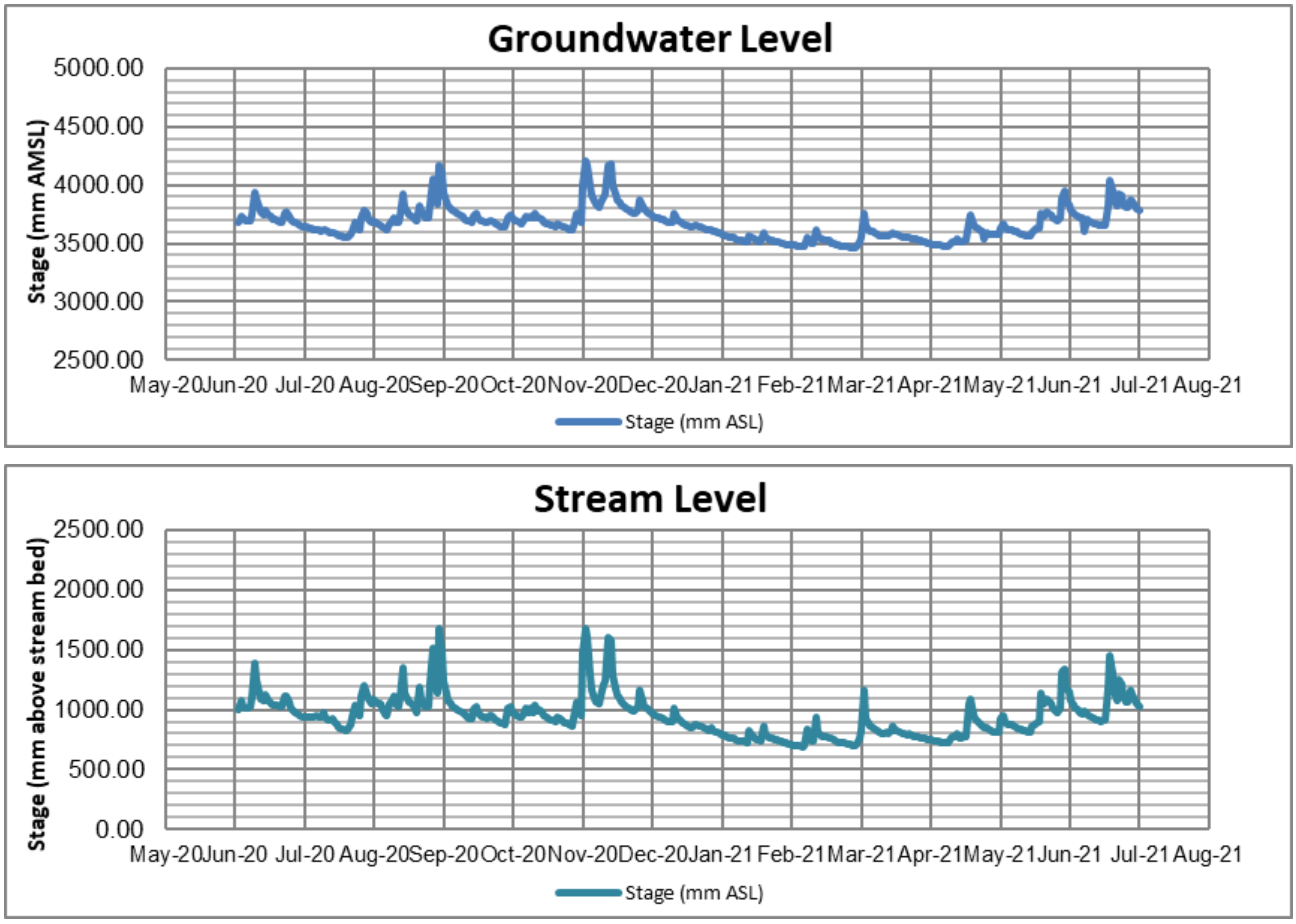


Figure 10: Groundwater & Stream levels for Ngarara Small Coastal Stream

Trigger levels apply from the 25 February 2019 approval of the Small Streams OMP. These are outlined below in Table 22. Triggers use data from both the stream and groundwater measurement points – those from the prior monitoring period are included here. The notes to Table 22 indicate that statistical conditioning, based on historical data, is to apply to the measured values. For 'Action' and 'Cease' levels the caveat "assuming at least one correlation exercise has been undertaken for the current "event" with the measured 35th percentile depth" is noted.

Table 22 Historic Trigger Levels for Small Coastal Streams

Location	Trigger Level (from 2018/19 Year)			Min Value this reporting period 2020/21
	Alert (mm -)	Action (mm -)	Cease (mm -)	(mm -)
Ngarara Groundwater Level (mm AMSL)	2550.19 *			3,465
Ngarara Stream Level (mm above stream bed)		300 #	150 +	690

* 200mm below the lowest recorded shallow groundwater level for historic monitoring results minus 15% of the range in water levels recorded.

35th percentile stream depth is less than 300mm determined from staff gauge measurement.

+ 35th percentile stream depth is less than 150mm determined from static staff gauge measurement.

The approved OMP indicates an adaptive management approach to assessment of applicable triggers, which applied this year. Trigger levels calculations benefit from the broader data set acquired from a further 24 months of field data since the 2018/19 report ("historic data" is considered as that commencing from the first viable historic data point collected; date-stamped 00:00hrs 18/06/2018). In Table 23 historic data is used to calculate the actual trigger level to be applied for this data series for this period.

Table 23 Analysis of Adaptive Management Trigger Levels - Small Coastal Streams 2020/21

Location	Minimum Level [1] (mm -)	Maximum Level [1] (mm -)	35th Percentile [2] (mm -)	Refined Trigger Level			Min or Recalculated [2] Value for period 2020/21 (mm -)
				Alert [3] (mm -)	Action (mm -)	Cease (mm -)	
Ngarara Groundwater Level (mm AMSL)	2940.34	4473.01		2510.44			3,610
Ngarara Stream Level (mm above stream bed)	610.98	2043.19	739		300	150	867

1. Data was taken from the SCADA archive for period 00:00hrs 18/06/2018 thru 23:00 30/06/2020
2. The 35th Percentile is calculated by ranking all data values in the set noted above, in order, then assessing the data point at which 35% of all points are of lesser value.
3. Trigger levels as described in Table 22 notes.

6 Operations

6.1 Operations Log and Maintenance Undertaken

Council has confirmed that its existing SCADA system together with the NCS system are an 'electronic data management system' which records and stores the information required by Condition 20 of consent WGN130103 [35973] and Condition 18 of consent WGN130103 [35974]. Borefield abstraction, river abstraction and river recharge data are automatically transmitted from Council's SCADA system to GWRC's Water Use Data Management System. Council has implemented WaterOutlook as a system to store and report data and operational information relating to the Waikanae Borefield. Council is also using WaterOutlook to store and report data and operational information relating to the Waikanae River take and recharge.

A copy of the operational maintenance visit site logs for each production bore, as stored on the SCADA system, is included in Appendix C. Further operational maintenance records can be sought, from the main operational logs held on SCADA at Waikanae WTP.

6.2 Operation and Maintenance Manuals

6.2.1 Approved Documents History

The Waikanae Borefield Operation and Maintenance Manual (BOMM) and current Waikanae River Take Operations and Maintenance Manual (ROMM) have been approved by AMG & GWRC and were last updated on 19 December 2018.

The following have also been approved by GWRC: Borefield Ongoing Mitigation Plan (OMP; dated 29 November 2018), Wetland OMP (dated 9 March 2018), SCS OMP (dated 21 February 2019), and River OMP (dated 15 October 2018).

6.2.2 Updated Documents

Council offers no document updates for AMG review in this 2020/21 Season.

7 Mitigation/Adaptive Management

The Adaptive Management Group (AMG) for the RRwGW scheme comprises members who include representatives of GWRC, Council, and Te Āti Awa ki Whakarongotai. AMG members meet annually to discuss the performance of the RRwGW programme.

The 2020/21-year monitoring activities have been completed in accordance with the approved OMPs. The annual AMG Meeting was undertaken in December 2021 to discuss the operation of the RRwGW for the year. It was postponed from its usual August timing due to the Covid-19 personnel movement controls "lockdown", and may now be undertaken as control levels have reduced.

7.1 Mitigation Plan Considerations

7.1.1 Operating Documents and Consent - active

The consents and the related operating documents were deployed as unchanged for the 2020/21 season, in the now normalised operating mode. No new consent amendments are proposed.

7.1.2 Operating Documents – revision control

7.1.2.1 Operation and Maintenance Manuals

There have been no revisions to documents this season (including BoMM, RoMM, O&M Manuals, and so on).

7.1.2.2 Operation Management Planning

Council offers no new operations management amendments for review.

7.1.3 Reports

The minutes for the Annual AMG meeting are provided in Appendix F.

7.2 Recommendations of the Adaptive Management Group

The AMG made the following recommendations:

- Update and issue final annual reports to GWRC and AMG in February
- Council to publish final reports on its website
- An Extraordinary Meeting of the AMG may be called, subject to the next steps in the development of the third-party application for a deep bore abstraction within the Waikanae Borefields.
- Council to develop with consultant Beca, later in Fin-Year 2021/22, the investigation programme to commence in 2022/23 (RRwGW Year-10), to lead into the Year-15 Review, and will report accordingly.

Appendix A

Consent Requirements and Documents

An annual Waikanae River, Recharge and Borefield report is required by Condition 42 of consent WGN130103 [35973], Condition 24 of consent WGN130103 [35974] and Condition 26 of consent WGN130103 [35975]. This report to Greater Wellington Regional Council (GWRC) covers the period from 1 July 2019 through to 30 June 2020. The requirements of these conditions are listed in the tables below (Table 23, Table 24, and Table 25) with cross-references to the relevant sections in this report.

Table 23: Requirements for Annual Waikanae River report

Condition 24 of Consent WGN130103 [35974]	Section in this Annual Report
The consent holder shall, by 30th September each year, submit an Annual Waikanae River report to the Manager, or by another date as agreed with the Manager. The annual Waikanae River report shall report on the year 1 July to 30 June inclusive, and include the following information:	
a) Records of the instantaneous rate of take (L/s), and total daily volumes (m^3);	Section 2.2
b) Flow and river recharge information to demonstrate compliance with Condition 6 (Waikanae River low flow);	Sections 2.1, 2.3 and 2.4
c) Provide information to demonstrate compliance with Condition 18 of this consent	Sections 2.1, 2.2 and Section 6.1
d) Results of all monitoring undertaken that year required by Conditions 19, 20 and 21 of this consent (if applicable), including a comprehensive analysis of the monitoring results, assessment against any relevant guidelines and comparison with previous years' results (i.e. trend analysis); *	Section 2.5 and Section 3.2
e) Details of any trigger levels or compliance limits that were reached (if occurred that year);	Section 2.5
f) Details of any actions and/or mitigation/adaptive management taken in response to trigger levels or compliance limits being reached, including an assessment of the effectiveness of these actions and/or mitigation/adaptive management;	Section 2.5 and Section 3.2
g) Any recommendations for changes to the Waikanae River Baseline Monitoring Plan or the On-going Mitigation Plan (as relevant), including triggers, compliance limits or actions and/or mitigation measures or changes to the operations and maintenance manual, including recommendations of the Adaptive Management Group (referred to in Condition 26 of this consent);	Section 6.2 and Section 7, 7.1.1 and 7.2
h) A discussion on any mitigation/adaptive management that may be required in the coming year;	Section 7
i) Summary of any maintenance undertaken.	Section 6.1
The annual Waikanae River report can be combined with the annual River Recharge report required by the conditions of discharge permit WGN130103 [35975]. The annual Waikanae River report shall be made available to the public on the Kāpiti Coast District Council website no later than 30 September each year, or by another date as agreed with the Manager. Note: The consent holder is only required to report on the listed requirements of this condition if they have occurred during that compliance year (1 July to 30 June inclusive). Note: The consent holder may request, with the Manager's approval, an extension of time to submit the annual report to the Manager and make it available to the public on the website, if the Adaptive Management Group requires more time to consider the draft annual report and provide their recommendations as required by part (g) of this condition.	Refer www.kapiticoast.govt.nz

**Conditions 19 and 20 due to completion of Baseline monitoring*

Table 21: Requirements for Annual River Recharge report

Condition 26 of Consent WGN130103 [35975]	Section in this Annual Report
The consent holder shall, no later than 30 September each year that a discharge to the river occurs, submit an annual River Recharge report to the Manager, or by another date as agreed with the Manager. The annual River Recharge report shall report on the year 1 July to 30 June inclusive, and include the following information:	
a) Records of the instantaneous rate of discharge (L/s), and total daily volumes (m^3) of discharge	Section 2.3
b) Dates, times and duration of discharge	Section 2.3
c) Information to demonstrate compliance with the rate of discharge specified in Condition 5	Section 2.3
d) Flow and river recharge information to demonstrate compliance with the Waikanae River low flow specified in Condition 12 of this consent	Section 2.4
e) Results of all monitoring undertaken that year required by Conditions 22* or 23 of this consent (if applicable), including a comprehensive analysis of the monitoring results, assessment against any relevant guidelines and comparison with previous years' results (i.e. trend analysis)	Section 2.5 and Section 3.2
f) Details of any trigger levels or compliance limits that were reached (if occurred that year)	Section 2.5
g) Details of any actions and/or mitigation/adaptive management taken in response to trigger levels or compliance limits being reached, including an assessment of the effectiveness of these actions and/or mitigation/adaptive management	Section 2.5 and Section 3.2
h) Any recommendations for changes to the Waikanae River Baseline Monitoring Plan or the On-going Mitigation Plan as relevant), including triggers, compliance limits or actions and/or mitigation measures or changes to the operations and maintenance manual, required by Condition 17 to be discussed with the Adaptive Management Group (as required by Condition 27 of this consent)	Section 6.2 and Section 7, 7.1.1 and 7.2
i) A discussion on any mitigation/adaptive management that may be required in the coming year	Section 7
j) Summary of any maintenance undertaken	Section 6.1
The annual River Recharge report may be combined with the annual Waikanae River report required by consent WGN130103 [35974]. The annual River Recharge River report shall be made available to the public on the Kāpiti Coast District Council website by 30 September each year, or by another date as agreed with the Manager. Note: The consent holder may request, with the Manager's approval, an extension of time to submit the annual report to the Manager and make it available to the public on the website, if the Adaptive Management Group requires more time to consider the draft annual report and provide their recommendations as required by part (g) of this condition.	Refer www.kapiticoast.govt.nz

**Condition 22 is not applicable due to completion of Baseline monitoring.*

Table 22: Requirements for Annual Waikanae Borefield report

Condition 42 of Consent WGN130103 [35973]	Section in this Annual Report
The consent holder shall, by 30 September each year, submit an annual Waikanae Borefield report to the Manager, or by another date as agreed with the Manager. The annual Waikanae Borefield report shall report on the year 1 July to 30 June inclusive, and include the following information:	
a) A copy of the records to demonstrate compliance with Condition 20 of this consent;	Sections 3.1 and 3.3
b) Details of the use (including daily and total volumes of groundwater abstracted) and reasons for that use of the water from the Borefield;	Section 3.1
c) A summary of Waikanae River flow gauging required by Condition 25 of this consent, if undertaken that year; *	Section 3.2
d) Results of all monitoring undertaken that year required by conditions of this consent (if applicable), including a comprehensive analysis of the monitoring results, assessment against any relevant guidelines and comparison with previous years' results (i.e. trend analysis);	Sections 3, 4 and 5
e) Results or evidence to demonstrate compliance with Condition 7 of this consent	Section 3.6
f) Details of any trigger levels or compliance limits that were reached (if occurred that year) and specifically the findings of saline monitoring compared with the 'alert', 'action' or 'cease' triggers;	Sections 3 and 4
g) Details of any actions and/or mitigation/adaptive management taken in response to trigger levels or compliance limits being reached, including an assessment of the effectiveness of these actions and/or mitigation/adaptive management;	Sections 3, 4 and 5
h) Any recommendations for changes to the monitoring plan required by conditions of this consent, including triggers, compliance limits or actions and/or mitigation measures or changes to the operations and maintenance manual, required by Condition 19 of this consent, including any recommendations of the Adaptive Management Committee (referred to in Condition 43 of this consent);	Section 6.2, Section 7.1.2, 7.1.3, 7.1.4, and 7.2
i) A discussion on any mitigation/adaptive management that may be required in the coming year;	Section 7
j) A copy of the complaints record required by Condition 45 of this consent;	Section 3.7
k) Summary of any maintenance undertaken.	Section 6.1
The annual Waikanae Borefield report shall be made available to the public on the Kāpiti Coast District Council website by 30 September each year, or by another date as agreed with the Manager. Note: The consent holder may request, with the Manager's approval, an extension of time to submit the annual report to the Manager and make it available to the public on the website, if the Adaptive Management Group requires more time to consider the draft annual report and provide their recommendations as required by part (h) of this condition.	Refer www.kapiticoast.govt.nz

** Condition that may change following S127*

In addition to the above consents, Council holds resource consent WGN050025 [33147] to abstract groundwater from two wells (PW1 and PW5) for the purpose of back up water supply for the communities of Waikanae, Paraparaumu and Raumati. Requirements of Condition 15 are discussed in Section 4.6

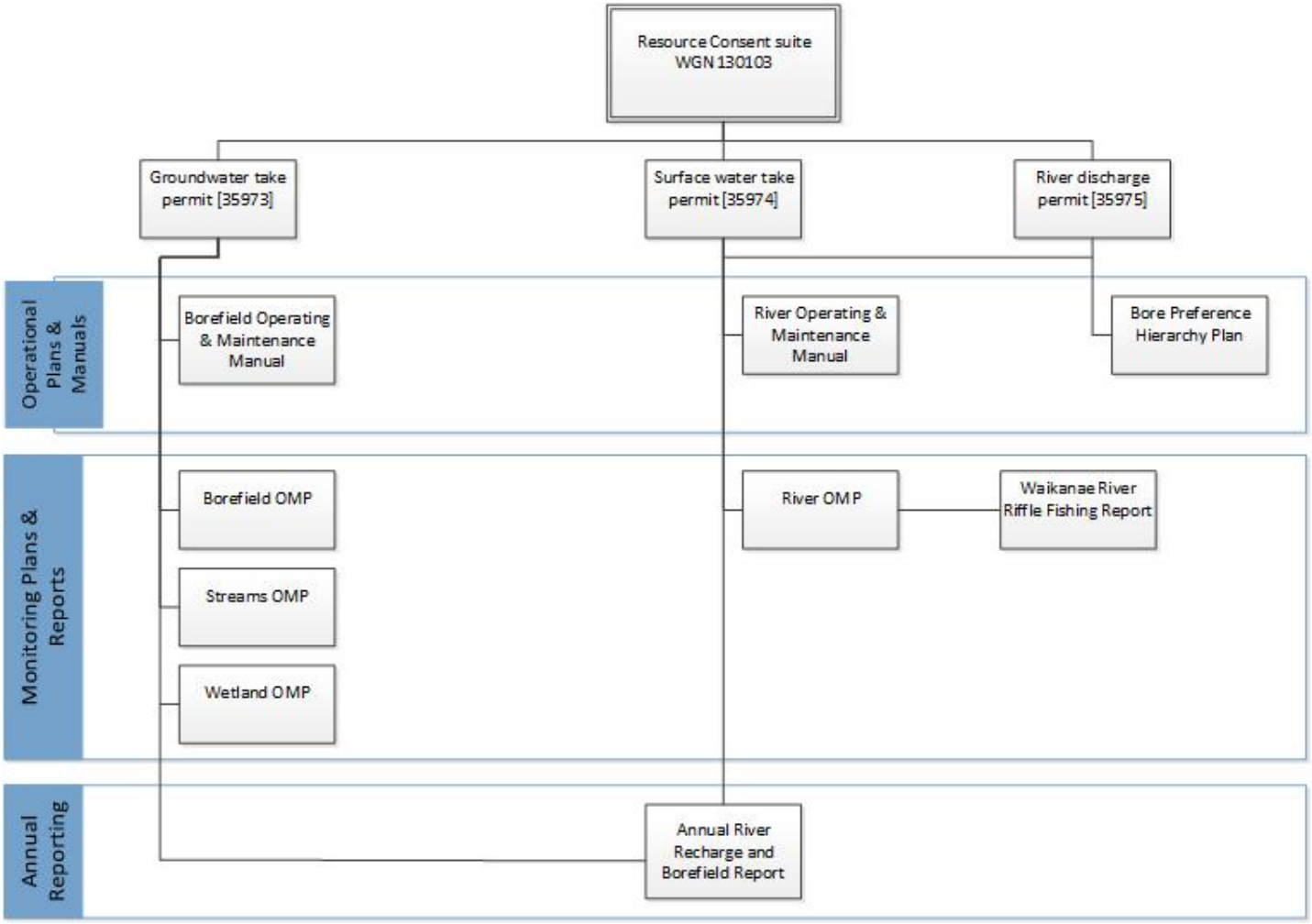


Figure 12: Key documents for RRwGW consent and ongoing monitoring

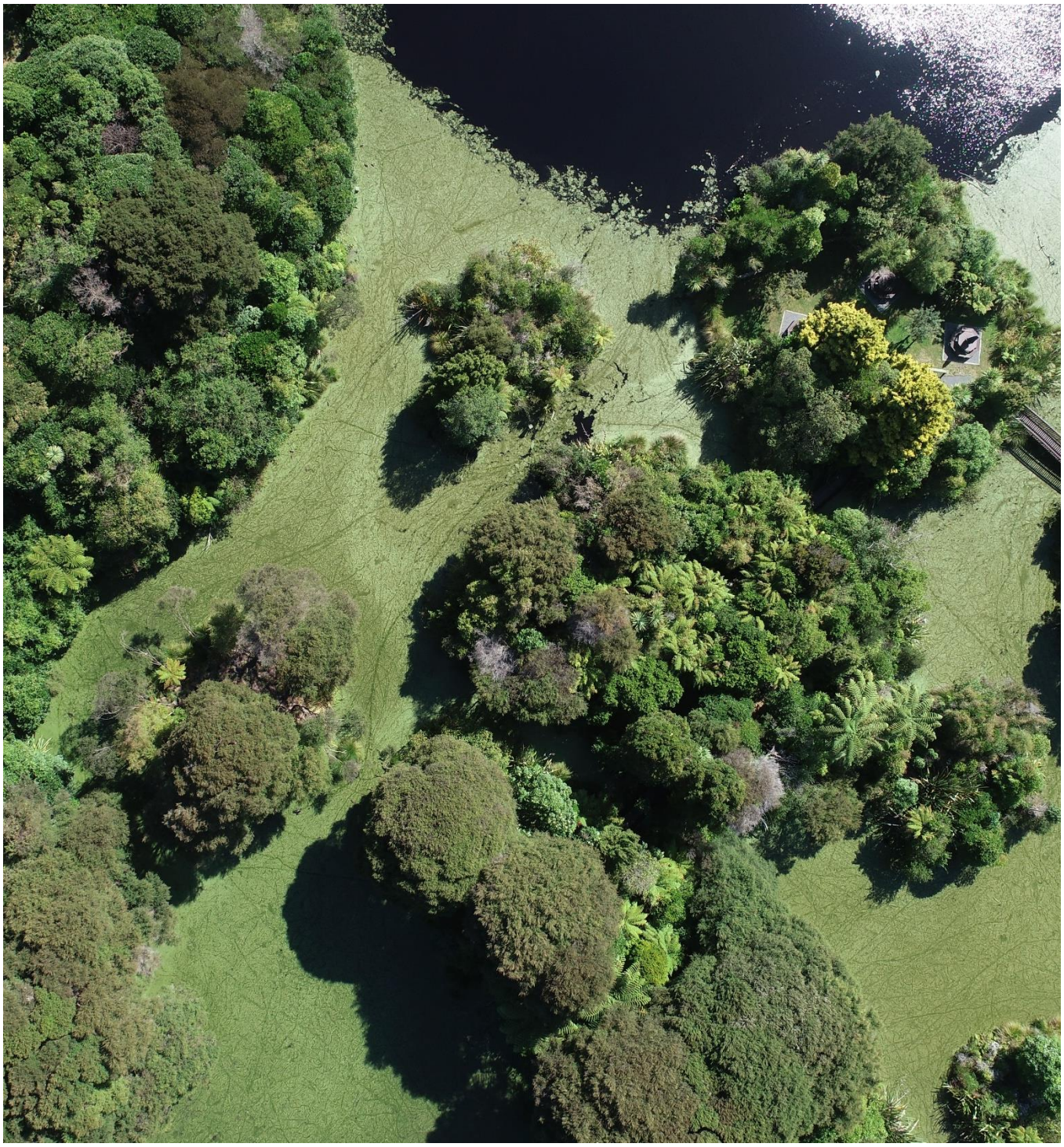
Appendix B

Nga Manu Wetland Monitoring Report (Boffa Miskell, et al)

Boffa Miskell

River Recharge with Groundwater

Nga Manu Wetland Monitoring
Prepared for BECA Ltd.
21 June 2021



Document Quality Assurance

Bibliographic reference for citation: Boffa Miskell Limited 2021. *River Recharge with Groundwater: Nga Manu Wetland Monitoring*. Report prepared by Boffa Miskell Limited for BECA Ltd.		
Prepared by:	Melanie Brown Ecologist Boffa Miskell Limited	
Reviewed by:	Vaughan Keesing Senior ecologist Boffa Miskell Limited	
Status: [Status]	Revision / version: [2]	Issue date: 21 June 2021

Template revision: 20210604 0000

File ref: W14039_NgaManu_Summer21_Monitoring_VKMB_20210618_Commentsammend.docx

Cover photograph: [A portion of the wetland system in Nga Manu Wildlife Sanctuary © BML, 2021]

CONTENTS

Appendices

1.0 Introduction

Nga Manu is a large wetland complex in Waikanae that is managed as a nature reserve. As a condition of resource consent WGN130013 [34384] for the River Recharge with Groundwater project (RRwGW), this wetland requires monitoring triennially for any potential ecological effects upon the wetlands arising from the groundwater take during Stage 1 of the RRwGW consent. Nga Manu wetland was selected for ongoing mitigation monitoring for the duration of the monitoring regime and ongoing monitoring triggers. The wetland selection process and monitoring locations, methodologies, and triggers for all stages of the RRwGW consent are outlined in the '*Wetland Ongoing Mitigation Plan: Kāpiti Water Supply Project River Recharge with Groundwater Scheme'* Published in March 2018 by CH2M Beca and Boffa Miskell. Nga Manu wetland is within the 200 – 500 mm modelled drawdown zone, making it suitable to check the influence on the wetland from the RRwGW project. There are other wetlands in the wider area for which baseline data has previously been collected but monitoring of these other wetlands is not required during Stage 1 of RRwGW unless a connection between the consented water extraction and change in wetland health is evident. This report follows on from baseline monitoring conducted across several wetlands in the RRwGW consent, summarised in the 2017 Boffa Miskell report '*Wetland Final Baseline Summary: Water Permit WGN130103 [34384]*'.

Due to COVID-19 restrictions and safeguards, last year's 2020 monitoring was unable to be carried out in the appropriate timeframe, so this current survey reflects data collected four years following the end of baseline monitoring (2017), instead of the required three year period.

The purpose of this monitoring report is to outline and identify any changes to wetland condition monitoring scores or wider vegetation community margins within the wetland since baseline monitoring started. If changes do occur, the wider team is to check for bore water take and ground water level changes. If there are correlated draw down and lowered ground water levels, adaptive management of the wetland is required.

2.0 Methods

Baseline monitoring was carried out in 2015, 2016, and 2017 prior to any consented ground water drawdown associated with the RRwGW consent. This baseline forms a reference from which to measure any potential ecological effects resulting from the water drawdown (but also other catchment effects unrelated to the consented activities). Wetland condition monitoring, a seasonal climate overview, and a drone flyover of the wetland were used to determine the results of the survey.

2.1 Climate overview

Weather monitoring includes rainfall and general climatological information.

- The source for general information is NIWA seasonal summaries (https://www.niwa.co.nz/climate/summaries/seasonal).

- The source for rainfall information is from GWRC: Environmental Monitoring and Research, at Waikanae River and Water Treatment Plant

2.2 Wetland Condition Monitoring

The methodology used followed The Handbook for Wetland Condition Monitoring (Clarkson et al., 2004). Three indices of wetland condition were assessed as follows:

- The wetland condition index is scored out of a possible 25, where the higher the score the better the wetland condition assessed. It is measured at the wetland scale, integrating scores relating to hydrological integrity, physio-chemical parameters, browsing and predation, intactness, and dominance of native species. This index requires lab analysis of soils and foliate looking at; water content, % dry weight, bulk density (g/cm^3), pH, conductivity (m^S/cm), total C %, total N % & total P mg/kg.

- The wetland pressure index is scored out of a possible total of 30, where the lower the score the better the wetland condition. It is measured at catchment scale, and integrates scores relating to modification, water quality, animal access, surrounding land use, /and weed presence.

- The indicator index is scored out of a total possible 20, where the higher the score the better the wetland condition for this indicator. It is measured at the plot scale and integrates scores relating to canopy cover, understorey, and species "health" sub-indices.

These scores set the basis for the wetland monitoring programme where an increase in wetland condition or indicator score reflect an increase in condition, and an increase in pressure reflects a decrease in condition.

In addition, changes in the type of wetland vegetation community are also recorded in condition monitoring. This uses the wetland prevalence index [1] which groups vegetation into 5 differing communities of affinity to water [2]:

- Obligate (OBL), almost always a hydrophyte;
- Facultative wetland (FACW), usually a hydrophyte;
- Facultative (FAC), commonly occurs as either a hydrophyte or non-hydrophyte;
- Facultative upland (FACU), occasionally a hydrophyte but usually occurs in uplands; and
- Obligate upland (UPL), rarely a hydrophyte, almost always in uplands.

Two 2 x 2 m vegetation plots established in the wetland during baseline surveys were used to collect data for the wetland indicator index and resulting prevalence score. The precent cover of above ground live biomass of each species within the plot is recorded and assigned to a predetermined affinity category.

[1] (Clarkson, 2013)

[2] (Clarkson et al., 2013)

2.3 Drone flyover and mapping

During baseline monitoring, a drone flyover of the wetland was undertaken in order to produce aerial photographs that allow the mapping of the outlines of vegetation communities within the wetland complex. A drone flyover was again conducted for this monitoring survey. The drone used was a DJI Inspire 2 quadcopter with an X4S 20megapixel camera. For mapping the drone had a flightpath pre-programmed and approximately 350 high resolution images were captured and processed in to the orthorectified aerial image. High resolution video was also captured to provide an overview of the site.

The vegetation communities have been mapped on to the resultant aerial to assess if there have been any changes to the margins of vegetation communities, which may be indicative of a change to the wider hydrological regime. Each wetland community was mapped on the basis of Level 4 of the New Zealand Wetland Classification framework and their associated vegetation communities using the Atkinson (1985) framework with dominant species listed in each layer.

3.0 Results

Wetland monitoring at Nga Manu Wetland was carried out as per the schedule for monitoring wetlands during Stage 1 of the bore extraction for the RRwGW consent. The wetland monitoring was undertaken by a suitably qualified ecologist on the 11th February 2021 and was also aerially surveyed by drone.

3.1 Climate summary

The summer period at the Kapiti Coast had near normal rainfall (85%) and near average temperatures (NIWA climate summary Summer 20/21). Rainfall recorded at the Waikanae River totalled 223 mm of rain between 1st December and 11th February (the date of monitoring). The peak of this period was on 12th December when 13 mm of rain fell.

3.2 Wetland condition monitoring

The results presented in Table 1 below are the wetland condition monitoring results comparing the baseline (average of the three-year baseline data) and current 2021 data. The results show that there has been a slight decrease in condition score, which is determined by several factors within the wetland itself and the immediate surrounds such as culvert presence, exotic species, and predator damage. The pressure score has increased, which indicates that change within the wetland and wider catchment has occurred in a way which may negatively affect the wetland, but which may not be related to hydrological changes.

Indicator scores, which originate from the vegetation data collected in the established 2 x 2 m plots within the wetland have remained stable throughout all monitoring. The presence of blackberry and lotus in both plots means the indicator scores remain at 18, and the extent of these species has not increased to change the scores. Prevalence scores are also calculated from plot data. Plot 1 prevalence score shows that the vegetation community is still indicative of

a wetland community (below 2). Plot 2 indicates that the vegetation has become slightly more dryland based, due to the growth of some Facultative Upland category trees (*Coprosma robusta* and *C. autumnalis (*previously *grandifolia)*) which have increased their percent coverage in the canopy of the plot. This score is not at a concerning level as the baseline score did not indicate a strong wetland community.

Refer to Appendix 1 for raw data results.

Table 1 - Wetland monitoring results for Condition score (the higher the score the healthier the wetland), Pressure score (the higher the score the worse the health of the wetland), Indicator score and Prevalence scores for each plot.

	Baseline 2015-17 (avg.)		**2021**	
Condition score /25	20.92		20.25	
Pressure score /30	12.67		14	
2 x 2 m Plots	**Plot 1**	**Plot 2**	**Plot 1**	**Plot 2**
Indicator score /20	18	18	18	18
Prevalence score 1-5 moisture rating	1.67	3.47	1.69	3.78

3.3 Vegetation mapping

As shown in Map 1 (attached) there are large visible discrepancies between current communities (coloured polygons) in comparison to the baseline (numbered polygons outlined in white). While initially it appears that these large discrepancies represent marked changes in the extent of wetland and dryland communities, they are actually a result of the experimental nature of the drone mapping method used, and the causes of these discrepancies are outlined below:

- The baseline aerial image contains a large amount of ‘stretching’, primarily in the top left corner of the image, and the baseline communities were mapped to align with that stretching. The 2021 aerial image does not contain the same level of stretching, and the vegetation communities are mapped to align with this. When they are overlaid on one another it appears there have been large changes, although this is not the case.

- Higher resolution drone imagery has enabled the identification of smaller communities which are likely to have been present throughout the baseline period.

- Change in mapping personnel has altered the subjective element of mapping, as some community extents are extended and diminished based on dominant species cover which can be perceived differently by subtle individual eyesight differences (e.g., being more receptive to yellow)

- Mapping was carried out ‘blind’ with no reference to past baseline communities, to remove bias. The downside of this is that the large shrubland community, which is least likely to be affected by wetland change (can withstand dry periods for longer than wet communities), has been mapped differently to the baseline. As the treeland/scrubland community is not the focus of the mapping, the baseline map incorporates both treeland and scrubland into one and stops short of the community outline. The current map

shows only scrubland (as the treeland is not a good indicator of subtle water level change) and extends further to incorporate more shrubland community.

- A smoothing tool was used on the baseline white lines, and this was not used in the current map. The same level of data is input which gives the appearance of a broader scale, however it is the same vertex data with no cosmetic smoothing.

Despite these mapping comparisons, the vegetation communities appear limited in change and remain stable. No concerning change has been noted.

4.0 Summary

While there have been some changes to scores during this monitoring round, there are none which are of concern from an ecological standpoint. The reduction in condition (catchment-wide measure) is attributable to a general change in weed species noted and the commencement of groundwater take in the area. This is not to say the groundwater take has shown effect, but rather acknowledges the procedure as the monitoring method asks. The increase in pressure score (catchment-wide measure) can be attributed to a range of things as well as the commencement of abstraction, including: increase in housing in the wider catchment, weed incursion and other catchment scale changes.

While the slight increase in pressure and decrease in condition is expected (as pressure and condition scores are catchment wide measures, not focused at the wetland scale), any further declines related directly to the wetland at the wetland scale would be of concern in future monitoring rounds. The smaller scale plot data relating directly to the wetland feature indicates minimal or no change. While the increase in prevalence score may be indicative of wetland reduction in some instances, the Plot 2 result is purely as a result of species growth which were already present. This does not mean there has been a reduction in wetland affiliated plants or their growth, only that the species adapted to drier conditions which were present during baseline monitoring have grown with more biomass and at a faster rate than wetland plants, as is naturally expected.

In summary, the Nga Manu Wetland has not shown any concerning or unexpected ecological change since the baseline monitoring surveys. As such, the next Stage 1 monitoring round for the RRWGW consent should occur in three years' time in summer 2024.

5.0 References

Atkinson, I. A. E. (1985). Derivation of vegetation mapping units for an ecological survey of Tongariro National Park North Island, New Zealand. *New Zealand Journal of Botany*, *23*(3), 361–378.

Clarkson, B. R. (2013). *A vegetation tool for wetland delineation in New Zealand*. Landcare Research for Meridian Energy Ltd.

Clarkson, B. R., Champion, P. D., Rance, B. D., Johnson, P. N., Bodmin, K. A., Forester, L., & Reeves, P. N. (2013). *New Zealand wetland indicator status ratings*. Landcare Research.

Clarkson, B. R., Sorrell, B. K., Reeves, P. N., Champion, P. D., Partridge, T. R., & Clarkson, B. D. (2004). *Handbook for monitoring wetland condition: Coordinated monitoring of New Zealand wetlands* (Revised). Ministry for the Environment.

Appendix 1: Raw data

WETLAND RECORD SHEET				
# of Plots sampled:	2	**Wetland name:**	Nga manu	
Date:	11/02/2021	**Region:**	Wellington	
Classification: I System	**IA Subsystem**	**II Wetland Class**	**IIA Wetland Form**	
Palustrine	Permanent	Fen	Basin	
Indicator	**Indicator components**	**Specify and Comment**	**Score 0– 5[1]**	**Mean score**
Change in hydrological integrity	Impact of manmade structures	Some drainage channels/culverting/ constructed ponds can be found within the nature reserve	4	3.67
	Water table depth (from piezometer)	I assume reduced slightly	3	
	Dryland plant invasion	Some dryland plants	4	
Change in physico-chemical parameters	Fire damage	Nil	5	4.25
	Degree of sedimentation/erosion	low = nature reserve	5	
	Nutrient levels	low , farmed surrounds	4	
	Von Post index	5	3	
Change in ecosystem intactness	Loss in area of original wetland	Originally part of a bigger complex	4	3.50
	Connectivity barriers	Fragmented by road, residential and farmland	3	
Change in browsing, predation & harvesting regimes	Damage by domestic or feral animals	Fenced. Possum control	4	4.33
	Introduced predator impacts on wildlife	controlled, althought still present in low numbers	4	
	Harvesting levels	Nil	5	
Change in dominance of native plants	Introduced plant canopy cover	Nil	5	4.50
	Introduced plant understorey cover	Lotus.	4	

Total wetland condition index /25				**20.25**

[1] Assign degree of modification as follows: 5=v. low/ none, 4=low, 3=medium, 2=high, 1=v. high, 0=extreme

Main Veg types:
Wetland Complex of: Phormium tenax, Raupo, Carex, Coprosma grandifolia, Coprosma lucida, Dacrycarpus dacrydioides
Native fauna:
Many native birds, (tui, kereru etc) and mallards.
Other comments:
diverse and high bird life (nature reserve). Large degree of management.

Pressure	**Score[2]**	**Specify and Comment**
Modifications to catchment hydrology	2	Some drainage channels, constructed ponds. Expressway to the west has modified drainage.
Water quality within the catchment	3	Farmland surrounds, large population of waterfowl
Animal access	2	Fenced, intensive trapping
Key undesirable species	3	Willow, large amounts of Blackberry, Bidens are found in the surrounding area.
% catchment in introduced vegetation	3	Mostly farmland/residential
Other landuse threats	1	New subdivision in catchment
Total wetland pressure index /30	**14**	

[2]Assign pressure scores as follows: 5=very high, 4=high, 3=medium, 2=low, 1=very low, 0=none

WETLAND PLOT SHEET 1			
Wetland name:	nga manu	**Plot no:**	1
Date:	11-Feb-21	**Structure:**	Manuka – broadleaved / flax
Plot size:	2x2	**Composition:**	

Canopy (bird's eye view)	**Subcanopy**	**Groundcover**

Species[1] (or Substrate)	**%**	**H (cm)**	**Species**	**%**	**H (cm)**	**Species**	**%**	**H (cm)**
Open water	0	0	*Muehlenbeckia australis*	3	1.2	*Rubus fruticosus*	4	0.7
Carex geminata	10	2.5	*Carex virgata*	75	1.6	*Juncus pallidus*	4	0.8
Phormium tenax	4	2.4	*Geniostoma ligustrifolium*	5	.	*Lotus pedunculatus*	3	1
Carpodetus serrata	1	4	*Pteridium esculentum*	5	2	*Coprosma lucida*	1	0.8
Typha orientalis	3	3						

[1] % = % cover: total Canopy % cover = 100%; H = maximum height in m; indicate introduced species by *

Additional species in vicinity in same vegetation type:

Histiopteris incisa, Dicksonia squarrosa, puesdopanex arboreus, Puesdopanex crassifolia, Syzygium maire, coprosma propinqua, Tui abundant

Comments:

Indicator (use plot data only)	**%**	**Score 0–5**[2]	**Specify & Comment**
Canopy: % cover introduced species	0	5	Nil
Understorey: % cover introduced spp3	3	4	Lotus bb.
Total species: % number introduced spp	8	4	Lotus bb.
Total species: overall stress/dieback	0	5	
Total /20		**18**	

[2]5=0%: none, 4=1– 24%: very low, 3=25–49%; low, 2=50–75%: medium, 1=76–99%: high, 0=100%; v. high

[3]Add subcanopy and groundcover % cover for introduced species

Field measurements:

Water table cm	n/a	**Water conductivity uS (if present)**	n/a
Water pH (if present)	n/a	**Von Post peat decomposition index**	6

WETLAND PLOT SHEET 2

Wetland name:	nga manu	**Plot no:**	2
Date:	11/2/2021	**Structure:**	carex sedgeland
Plot size:	2x2	**Composition:**	

Canopy (bird's eye view)			**Subcanopy**			**Groundcover**		
Species[1] (or Substrate)	**%**	**H (cm)**	**Species**	**%**	**H (cm)**	**Species**	**%**	**H (cm)**
Open Water	*5*	*0.3*	*Blechnum novae-zelandiae*	*1*	*0.8*	*Rubus fruticosus*	*2*	*0.3*
Coprosma Hybrid	*10*	*4*	*Carex secta*	*2*	*1*	*Carex virgata*	*1*	*0.5*
Phormium tenax	*10*	*3*	*Pseudopanax Hybrid*	*2*	*1*	*Muehlenbeckia australis*	*3*	*0.5*
Geniostoma ligustrifolium	*15*	*3*	*Melicytus ramiflorus*	*1*	*1.6*	*Rubus australis*	*1*	*0.2*
Coprosma robusta	*35*	*3.5*	*Coprosma areolata*	*2*	*1.4*			
Coprosma grandifolia	*30*	*4*						

[1] % = % cover: total Canopy % cover = 100%; H = maximum height in m; indicate introduced species by *

Additional species in vicinity in same vegetation type:
Coprosma propinquum, mahoe, Apium nodoflorum, Juncus articulatus., fantail, kereru
Comments:
10m east of track, Drainage ditch nearby

Indicator (use plot data only)	**%**	**Score 0–5**[2]	**Specify & Comment**
Canopy: % cover introduced species	0	5	Nil
Understorey: % cover introduced spp3	2	4	bb
Total species: % number introduced spp	6.60%	4	bb
Total species: overall stress/dieback	0	5	
Total /20		**18**	

[2]5=0%: none, 4=1– 24%: very low, 3=25–49%; low, 2=50–75%: medium, 1=76–99%: high, 0=100%; v. high

[3]Add subcanopy and groundcover % cover for introduced species

Field measurements:			
Water table cm	0	**Water conductivity uS (if present)**	0
Water pH (if present)	0	**Von Post peat decomposition index**	5

	B/L 2015		B/L 2016		B/L 2017	
Condition score /30	20.17		20.92		20.83	
Pressure score /15	12		12		14	
	Plot 1	**Plot 2**	**Plot 1**	**Plot 2**	**Plot 1**	**Plot 2**
Indicator score	19	18	19	18	19	18
Prevalence score	1.76	3.31	1.76	1.31	1.49	3.77

Legend

Wetland Condition Monitoring Plots

Vegetation Communities (2021)

- Flax/sedgeland
- Flaxland
- Open water
- Scrub and associated communities
- Sedge/fernland
- Sedgeland
- Shrubland
- Swamp forest

Vegetation Communities (2014)

1 - Open Water
2 - Flaxland
3 - Flax/sedgeland
4 - Scrub and associated communities
5 - Sedgeland
6 - Sedge/fernland
7 - Shrubland
8 - Swamp forest
9 - Reed/sedgeland
10 - Flax/reed/rushland
11 - Mudfield
12 - Algaefield

Boffa Miskell

www.boffamiskell.co.nz

0 40 m

1:2,500 @ A3

DRAFT

Data Sources: BML, Imagery Sourced from the LINZ Data Service and licensed for re-use under the Creative Commons Attribution 4.0 New Zealand licence

Projection: NZGD 2000 New Zealand Transverse Mercator

KĀPITI WATER SUPPLY MONITORING

Ngā Manu Vegetation Communities

Date: 12 March 2021 | Revision: 0

Plan prepared for KCDC by Boffa Miskell Limited

Project Manager: vaughan.keesing@boffamiskell.co.nz | Drawn: HHu | Checked: MBr

About Boffa Miskell

Boffa Miskell is a leading New Zealand professional services consultancy with offices in Auckland, Hamilton, Tauranga, Wellington, Christchurch, Dunedin and Queenstown. We work with a wide range of local and international private and public sector clients in the areas of planning, urban design, landscape architecture, landscape planning, ecology, biosecurity, cultural heritage, graphics and mapping. Over the past four decades we have built a reputation for professionalism, innovation and excellence. During this time we have been associated with a significant number of projects that have shaped New Zealand's environment.

---

www.boffamiskell.co.nz

Auckland	Hamilton	Tauranga	Wellington	Christchurch	Queenstown	Dunedin
+64 9 358 2526	+64 7 960 0006	+65 7 571 5511	+64 4 385 9315	+64 3 366 8891	+64 3 441 1670	+64 3 470 0460

Appendix C

Operation and Maintenance Logs Intake and Production Bores

Insert files here.

Kāpiti Coast DISTRICT COUNCIL
Me Huri Whakamuri, Ka Titiro Whakamua

K4 Operation Bore Log

Date	FY	Filled in log book?	Bore Level above Pump	Pump Run Hours	Temperature	Flow Forward	Flow Reverse	Cabinet Filter	Checked	Well-head	Well-head Security	Comment	Comments
3/01/2018	2017/2018	Yes	29	7121	27.6	1451999	71287	1 - Change	Yes				
11/01/2018	2017/2018	Yes	45	7174	14	1462634	71306	2 - Clean	Yes				
18/01/2018	2017/2018	Yes	45	7174	13.9	1462665	71335	1 - Change	Yes				
25/01/2018	2017/2018	Yes	45	7174	13.9	1462667	71336	2 - Clean	Yes				
1/02/2018	2017/2018	Yes	25	7222	29.3	1473845	71373	3 - No Action	Yes				
8/02/2018	2017/2018	Yes	29	7271	27	1483035	71384	2 - Clean	Yes				pumping
15/02/2018	2017/2018	Yes	45	7329	13.9	1496296	71393	1 - Change	Yes				
22/02/2018	2017/2018	Yes	45	7329	13.9	1496299	71398	2 - Clean	Yes				
1/03/2018	2017/2018	Yes	45	7332	14	1497093	71448	3 - No Action	Yes				
9/03/2018	2017/2018	Yes	45	7332	14	1497166	71547	2 - Clean	Yes				
15/03/2018	2017/2018	Yes	45	7332	13.8	1497207	71603	2 - Clean	Yes				
29/03/2018	2017/2018	Yes	45	7333	13.9	1497519	71719	2 - Clean	Yes				
5/04/2018	2017/2018	Yes	45	7333	13.9	1497584	71806	3 - No Action	Yes				Electrician onsite John, changing out Power meter with new smart meter
12/04/2018	2017/2018	Yes	45	7334	13.8	1497718	71878	3 - No Action	Yes				
19/04/2018	2017/2018	Yes	45	7334	13.8	1497818	72005	2 - Clean	Yes				
26/04/2018	2017/2018	Yes	45	7334	13.8	1497976	72188	3 - No Action	Yes				
3/05/2018	2017/2018	Yes	45	7337	13.8	1498840	72346	3 - No Action	Yes				
10/05/2018	2017/2018	Yes	45	7337	13.8	1498907	72447	3 - No Action	Yes				
17/05/2018	2017/2018	Yes	45	7337	13	1499046	72624	2 - Clean	Yes				
24/05/2018	2017/2018	Yes	46	7337	14	1499089	72687		Yes				
31/05/2018	2017/2018	Yes	46	7339	13.8	1499652	72768	2 - Clean	Yes				
7/06/2018	2017/2018	Yes	46	7339	13.7	1499728	72859	3 - No Action	Yes				
7/06/2018	2017/2018	Yes	46	7339	13.7	1499728	72859	3 - No Action	Yes				
14/06/2018	2017/2018	Yes	46	7339	13.8	1499908	73047	2 - Clean	Yes				
21/06/2018	2017/2018	Yes	46	7339	13.8	1500068	73218	2 - Clean	Yes				
28/06/2018	2017/2018	Yes	46	7339	13.7	1500313	73469	3 - No Action	Yes				
5/07/2018	2018/2019	Yes	46	7341	13.8	1500666	73495	2 - Clean	Yes				
12/07/2018	2018/2019	Yes	46	7341	13.7	1500701	73535	3 - No Action	Yes				
19/07/2018	2018/2019	Yes	46	7341	13	1500781	73625	3 - No Action	Yes				
26/07/2018	2018/2019	Yes	46	7341	13.7	1500850	73701	3 - No Action	Yes				
2/08/2018	2018/2019	Yes	46	7342	13.8	1501209	73766	3 - No Action	Yes				
9/08/2018	2018/2019	Yes	46	7342	13.8	1501339	73904	2 - Clean	Yes				clean cabinet filter
16/08/2018	2018/2019	Yes	46	7342	13.7	1501503	74081	2 - Clean	Yes				
23/08/2018	2018/2019	Yes	46	7342	13.7	1501703	74286	3 - No Action	Yes				
30/08/2018	2018/2019	Yes	46	7344	13.9	1502233	74355	3 - No Action	Yes				
6/09/2018	2018/2019	Yes	46	7344	14	1502338	74467	2 - Clean	Yes				oil leaking from transformer
13/09/2018	2018/2019	Yes	46	7344	13.7	1502411	74546	2 - Clean	Yes				
20/09/2018	2018/2019	Yes	46	7344	13.7	1502485	74635	2 - Clean	Yes				
24/09/2018	2018/2019	Yes	46	7344	13.7	1502586	74745	3 - No Action	Yes				Unlocked vsd and turned on
4/10/2018	2018/2019	Yes	46	7347	31.7	1503340	74915	2 - Clean	Yes				
11/10/2018	2018/2019	Yes	46	7347	13.7	1503387	74977	3 - No Action	Yes				
18/10/2018	2018/2019	Yes	46	7347	13.7	1503425	75022	3 - No Action	Yes				
25/10/2018	2018/2019	Yes	46	7347	13.8	1503538	75173	3 - No Action	Yes				
2/11/2018	2018/2019	Yes	46	7352	14	1504925	75261	2 - Clean	Yes				
15/11/2018	2018/2019	Yes	48	7352	13.8	1504983	75327	2 - Clean	Yes				
22/11/2018	2018/2019	Yes	51	7352	13.7	1505145	75522	3 - No Action	Yes				
29/11/2018	2018/2019	Yes	49	7354	13.8	1505685	75637	2 - Clean	Yes				
6/12/2018	2018/2019	Yes	48	7354	13.7	1505764	75739	3 - No Action	Yes				
13/12/2018	2018/2019	Yes	48	7354	13.8	1505907	75898	3 - No Action					
20/12/2018	2018/2019	Yes	48	7358	13.8	1506840	75992	3 - No Action	Yes				alarm doesn't turn off
27/12/2018	2018/2019	Yes	47	7360	13.8		1507496	2 - Clean					
4/01/2019	2018/2019	Yes	47	7360	13.8	1507640	76306	1 - Change	Yes				
17/01/2019	2018/2019	Yes	47	7360	13.7	1507917	76604	3 - No Action	Yes				
24/01/2019	2018/2019	Yes	47	7360	13.7	1508005	76701	3 - No Action	Yes				
31/01/2019	2018/2019	Yes	47	7362	13.9	1508565	76770	2 - Clean	Yes				
7/02/2019	2018/2019	Yes	47	7362	13.8	1508650	76866	3 - No Action	Yes				
14/02/2019	2018/2019	Yes	47	7362	13.7	1508797	77027	2 - Clean	Yes				
21/02/2019	2018/2019	Yes	47	7366	13.9	1509689	77124	3 - No Action	Yes				
28/02/2019	2018/2019	Yes	47	7366	13.7	1509846	77295	3 - No Action	Yes				

7/03/2019	2018/2019	Yes	47	7366	13.8	1509968	77440	2 - Clean	Yes		
14/03/2019	2018/2019	Yes	47	7366	13.7	1510040	77530	3 - No Action	Yes		
21/03/2019	2018/2019	Yes	47	7366	14	1510176	77675	2 - Clean	Yes		
28/03/2019	2018/2019	Yes	28	7368	30.1	1510571	77811	3 - No Action	Yes		sample taken
4/04/2019	2018/2019	Yes	48	7398	13.8	1515062	0	2 - Clean	Yes		
11/04/2019	2018/2019	Yes	57	7398	13.7	1515229	0	2 - Clean	Yes		
18/04/2019	2018/2019	Yes	56	7398	13.7	1515245	0	2 - Clean	Yes		
24/04/2019	2018/2019	Yes	56	7398	13.7	1515317	78167	2 - Clean	Yes		
30/04/2019	2018/2019	Yes	56	7399	30.3	1515716	78268	3 - No Action	Yes		
9/05/2019	2018/2019	Yes	56	7400	13.8	1515993	0.3	2 - Clean	Yes		
16/05/2019	2018/2019	Yes	56	7400	13.7	1516074	78456	2 - Clean	Yes		
23/05/2019	2018/2019	Yes	56	7400	13.7	1516232	78619	3 - No Action	Yes		
30/05/2019	2018/2019	Yes	56	7405	13.8	1517585	78715	2 - Clean	Yes		
6/06/2019	2018/2019	Yes	56	7405	13.7	1517585	78902	2 - Clean	Yes		
13/06/2019	2018/2019	Yes	56	7405	13.7	1517843	78976	2 - Clean	Yes		
20/06/2019	2018/2019	Yes	56	7405	13.7	1517933	78976	2 - Clean	Yes		
27/06/2019	2018/2019	Yes	57	7405	13.7	1517993	78976	2 - Clean	Yes		
4/07/2019	2019/2020	Yes	57	7405	13.7	1518077	79216	2 - Clean	Yes		
11/07/2019	2019/2020	Yes	57	7405	13.7	1518164	79304	3 - No Action	Yes		
18/07/2019	2019/2020	Yes	57	7405	13.7	1518190	79332	2 - Clean	Yes		
25/07/2019	2019/2020	Yes	57	7405	13.7	1518310	79453	2 - Clean	Yes		
25/07/2019	2019/2020	Yes	57	7405	13.7	1518310	79453	2 - Clean	Yes		
1/08/2019	2019/2020	Yes	57	7407	13.7	1518845	79509	2 - Clean	Yes		
8/08/2019	2019/2020	Yes	57	7407	13.7	1518900	79565	3 - No Action	Yes		
15/08/2019	2019/2020	Yes	57	7407	13.7	1518981	79648	3 - No Action	Yes	cleaned wellhead	
22/08/2019	2019/2020	Yes	57	7407	13.7	1519066	79734	3 - No Action	Yes		
5/09/2019	2019/2020	Yes	57	7410	13.7	1519986	80081	3 - No Action	Yes		Bore is now part of a construction zone. Limited access.
10/09/2019	2019/2020	Yes	57	7410	13.7	1520022	80118	2 - Clean	Yes		
19/09/2019	2019/2020	Yes	57	1520200	13.7	1520200	80302	2 - Clean	Yes		
27/09/2019	2019/2020	Yes	56	7412	30.1	1520761	80359	3 - No Action	Yes		
1/10/2019	2019/2020	Yes	56	7413	13.7	1520959	80414	2 - Clean	Yes		
8/10/2019	2019/2020	Yes	56	7413	13.8	1521082	80538	2 - Clean	Yes		
17/10/2019	2019/2020	Yes	56	7413	13.8	152123	80675	3 - No Action	Yes		
23/10/2019	2019/2020	Yes	56	7413	13	1521324	80790	2 - Clean	Yes		
31/10/2019	2019/2020	Yes	49	7416	13.8	1522309	80940	3 - No Action	Yes		
14/11/2019	2019/2020	Yes	50	7418	13.8	1522881	81141	2 - Clean	Yes		
21/11/2019	2019/2020	Yes	49	7418	13.8	1522927	81193	2 - Clean	Yes		alarm panel power cycled. running again as normal.
28/11/2019	2019/2020	Yes	49	7421	13.8	1523657	81290	2 - Clean	Yes		
6/12/2019	2019/2020	Yes	49	7421	13.7	1523775	81427	3 - No Action	Yes		
12/12/2019	2019/2020	Yes	50	7421	13.8	1523843	81502	3 - No Action	Yes		
19/12/2019	2019/2020	Yes	29	7423	30.1	1524465	81564	3 - No Action	Yes		
9/01/2020	2019/2020	Yes	49	7424	13.7	1525023	81844	3 - No Action	Yes		
16/01/2020	2019/2020	Yes	49	7424	13.7	1525073	81898	3 - No Action	Yes		
23/01/2020	2019/2020	Yes	29	7426	30	1525450	81970	3 - No Action	Yes		Sample
30/01/2020	2019/2020	Yes	49	7427	13.8	1525735	82046	3 - No Action	Yes		
7/02/2020	2019/2020	Yes	49	7427	13.7	1525829	82156	3 - No Action	Yes		
13/02/2020	2019/2020	Yes	49	7427	13.7	1525958	82294	2 - Clean	Yes		
20/02/2020	2019/2020	Yes	49	7427	13.8	1526100	82402	3 - No Action	Yes		
27/02/2020	2019/2020	Yes	29	7429	30.2	1526643	82563	3 - No Action	Yes		Sample
5/03/2020	2019/2020	Yes	49	7430	13.8	1527092	82722	3 - No Action	Yes		
12/03/2020	2019/2020	Yes	49	7430	13.7	1527207	82843	3 - No Action	Yes		
19/03/2020	2019/2020	Yes	29	7432	30.2	1527815	82895	1 - Change	Yes		
26/03/2020	2019/2020	Yes	49	7433	13.7	1528134	82955	2 - Clean	Yes		
2/04/2020	2019/2020	Yes	49	7433	13.7	1528	83015	2 - Clean	Yes		
16/04/2020	2019/2020	Yes	49	7433	13.7	1528535	83372	3 - No Action	Yes		
23/04/2020	2019/2020	Yes	49	7433	13.7	1528661	83500	2 - Clean	Yes		
30/04/2020	2019/2020	Yes	0.49	7433	13.7	1528725	83568	3 - No Action	Yes		
14/05/2020	2019/2020	Yes	49	7433	13.7	1528957	83804	2 - Clean	Yes		
21/05/2020	2019/2020	Yes	49	7433	13.7	1529210	84058	2 - Clean	Yes		
4/06/2020	2019/2020	Yes	50	7433	13.7	1529363	84212	3 - No Action	Yes		
11/06/2020	2019/2020	Yes	49	7433	13.7	1529497	84348	2 - Clean	Yes		
18/06/2020	2019/2020	Yes	49	7433	13.7	1529687	84539	2 - Clean	Yes		
29/06/2020	2019/2020	Yes	50	7433	13.7	1529891	84747	2 - Clean	Yes		VSD not working
9/07/2020	2020/2021	Yes	50	7433	13.7	1530155	85018	2 - Clean	Yes		
16/07/2020	2020/2021	Yes	49	7433	13.7	1530351	85218	3 - No Action	Yes		

23/07/2020	2020/2021	Yes	50	7434	13.7	1530436	85303	3 - No Action	Yes	air relief valve on reticle side of the bore is leaking water sample taken
28/07/2020	2020/2021	Yes	29	7436	29.6	1531120	85378	2 - Clean	Yes	air relief valve needs servicing
30/07/2020	2020/2021	Yes	49	7437	13.8	1531380	85486	3 - No Action	Yes	
6/08/2020	2020/2021	Yes	49	7437	13.7	1531585	85691	2 - Clean	Yes	
6/08/2020	2020/2021	Yes	49	7437	13.7	1531585	85691	2 - Clean	Yes	
13/08/2020	2020/2021	Yes	49	7437	13.7	1531668	85774	2 - Clean	Yes	
20/08/2020	2020/2021	Yes	50	7437	13.7	1531832	85942	3 - No Action	Yes	
27/08/2020	2020/2021	Yes	30	7438	29.5	1532294	86085	2 - Clean	Yes	sample taken
3/09/2020	2020/2021	Yes	49	7439	13.7	1532600	86203	2 - Clean	Yes	
10/09/2020	2020/2021	Yes	49	7439	13.7	1532647	86253	3 - No Action	Yes	
17/09/2020	2020/2021	Yes	49	7439	13.7	1532697	86307	3 - No Action	Yes	
24/09/2020	2020/2021	Yes	50	7439	13.7	1532729	86343	3 - No Action	Yes	
1/10/2020	2020/2021	Yes	50	7441	13.7	1533300	86458	3 - No Action	Yes	
15/10/2020	2020/2021	Yes	49	7441	13.7	1533565	86732	3 - No Action	Yes	
22/10/2020	2020/2021	Yes	49	7441	13.7	1533731	86905	3 - No Action	Yes	
30/10/2020	2020/2021	Yes	29	7444	29.7	1534446	86905	3 - No Action	Yes	
5/11/2020	2020/2021	Yes	49	7446	13.8	1534954	87092	2 - Clean	Yes	
12/11/2020	2020/2021	Yes	49	7446	13.7	1535046	87188	3 - No Action	Yes	
19/11/2020	2020/2021	Yes	49	7446	13.7	1535129	87277	3 - No Action	Yes	
26/11/2020	2020/2021	Yes	49	7446	13.7	1535256	87412	2 - Clean	Yes	
4/12/2020	2020/2021	Yes	50	7448	13.8	1535896	87468	3 - No Action	Yes	
11/12/2020	2020/2021	Yes	50	7448	13.7	1535978	87555	3 - No Action	Yes	
18/12/2020	2020/2021	Yes	50	7448	13.8	1536088	87672	2 - Clean	Yes	
31/12/2020	2020/2021	Yes	49	7452	13.8	1537290	88005	2 - Clean	Yes	
7/01/2021	2020/2021	Yes	49	7452	13.7	1537424	88148	3 - No Action	Yes	
14/01/2021	2020/2021	Yes	49	7452	13.8	1537578	88297	3 - No Action	Yes	
21/01/2021	2020/2021	Yes	49	7452	13.7	1537633	88364	3 - No Action	Yes	
28/01/2021	2020/2021	Yes	49	7454	14.4	1538218	88449	3 - No Action	Yes	
4/02/2021	2020/2021	Yes	49	7454	13.8	1538360	88600	2 - Clean	Yes	
11/02/2021	2020/2021	Yes	49	7454	13.7	1538442	88689	3 - No Action	Yes	
18/02/2021	2020/2021	Yes	49	7475	13.7	1538544	88798	1 - Change	Yes	
25/02/2021	2020/2021	Yes	49	7457	15.4	1539294	88925	2 - Clean	Yes	
3/03/2021	2020/2021	Yes	49	7457	13.8	1539386	89024	2 - Clean	Yes	estimate ups battery age 5 years
23/03/2021	2020/2021	Yes	49	7469	13.7	1541353	89024	3 - No Action	Yes	alarm not silencing wen X pressed. rest power to display and then ok.
31/03/2021	2020/2021	Yes	49	7471	13.7	1541977	89447	2 - Clean	Yes	
8/04/2021	2020/2021	Yes	49	7471	13.7	1542104	89586	2 - Clean	Yes	
22/04/2021	2020/2021	Yes	49	7475	14.8	1543247	89769	2 - Clean	Yes	
28/04/2021	2020/2021	Yes	49	7475	13.7	1543311	89838	2 - Clean	Yes	
6/05/2021	2020/2021	Yes	49	7475	13.7	1543469	89999	2 - Clean	Yes	
13/05/2021	2020/2021	Yes	49	7477	13.9	1544002	90112	1 - Change	Yes	
20/05/2021	2020/2021	Yes	49	7477	13.7	1544186	90299	3 - No Action	Yes	
3/06/2021	2020/2021	Yes	49	7477	13.7	1544566	90671	2 - Clean	Yes	
17/06/2021	2020/2021	Yes	49	7479	13.7	1545156	90859	3 - No Action	Yes	

Kāpiti Coast DISTRICT COUNCIL
Me Huri Whakamuri, Ka Titiro Whakamua

K5 Operation Bore Log

Date	FY	Filled in log book?	Bore Level above Pump	Pump Run Hours	Temperature	Flow Forward	Flow Reverse	Cabinet Filter	Checked Well-head	Well-head Security Comment	Comments
29/06/2020	2019/2020	Yes	23	5304	24.3	579246	4229	2 - Clean	Yes		
9/07/2020	2020/2021	Yes	53	5306	14.9	579506	4233	2 - Clean	Yes		
16/07/2020	2020/2021	Yes	53	5306	14.8	579506	4235	3 - No Action	Yes		
23/07/2020	2020/2021	Yes	54	5306	14.9	579506	4238	3 - No Action	Yes		
28/07/2020	2020/2021	Yes	20	5308	25.2	579856	4240	2 - Clean	Yes		sample taken
30/07/2020	2020/2021	Yes	53	5309	14.9	579925	4241	3 - No Action	Yes		
6/08/2020	2020/2021	Yes	53	5309	14.9	579925	4244	2 - Clean	Yes		
13/08/2020	2020/2021	Yes	53	5309	14.9	579925	4246	2 - Clean	Yes		
20/08/2020	2020/2021	Yes	54	5309	14.9	579925	4249	3 - No Action	Yes		
27/08/2020	2020/2021	Yes	22	5310	25.2	580121	4252	2 - Clean	Yes	Strong scent upon running bore water. Both Simon and myself stood back until smell cleared.	sample taken
3/09/2020	2020/2021	Yes	53	5311	14.9	580217	4255	2 - Clean	Yes		
10/09/2020	2020/2021	Yes	53	5311	14.9	580217	4258	3 - No Action	Yes		
17/09/2020	2020/2021	Yes	53	5311	14.9	580217	4262	3 - No Action	Yes		p.l.c panelview issue
24/09/2020	2020/2021	Yes	54	5311	14.9	580217	4264	3 - No Action	Yes		
1/10/2020	2020/2021	Yes	53	5313	14.9	580477	4267	3 - No Action	Yes		
15/10/2020	2020/2021	Yes	53	5313	14.9	580477	4272	3 - No Action	Yes		
22/10/2020	2020/2021	No	53	5313	14.9	580477	4275	3 - No Action	Yes		
30/10/2020	2020/2021	Yes	20	5316	25.3	580840	4275	3 - No Action	Yes		
5/11/2020	2020/2021	Yes	53	5318	14.9	581056	4279	2 - Clean	Yes		
12/11/2020	2020/2021	Yes	53	5318	14.9	581056	4282	3 - No Action	Yes		
19/11/2020	2020/2021	Yes	53	5318	14.9	581056	4285	3 - No Action	Yes		
26/11/2020	2020/2021	Yes	53	5318	14.9	581056	4288	2 - Clean	Yes		
4/12/2020	2020/2021	Yes	53	5320	14.9	581386	4290	3 - No Action	Yes		
11/12/2020	2020/2021	Yes	53	5320	15	581386	4293	3 - No Action	Yes		
18/12/2020	2020/2021	Yes	53	5320	15	581386	4296	2 - Clean	Yes		
31/12/2020	2020/2021	Yes	53	5324	15	581881	4302	2 - Clean	Yes		
7/01/2021	2020/2021	Yes	53	5324	14.9	581881	4304	3 - No Action	Yes		
14/01/2021	2020/2021	Yes	53	5324	15	581881	4307		Yes		
21/01/2021	2020/2021	Yes	53	5324	14.9	581881	4310	3 - No Action	Yes		
28/01/2021	2020/2021	Yes	52	5326	15.2	582166	4315	3 - No Action	Yes		
4/02/2021	2020/2021	Yes	53	5326	15	582167	4386	2 - Clean	Yes		
11/02/2021	2020/2021	Yes	53	5326	14.9	582167	4389	3 - No Action	Yes		
18/02/2021	2020/2021	Yes	53	5326	15	582167	4393	1 - Change	Yes		
25/02/2021	2020/2021	Yes	50	5329	15.7	582508	4397	2 - Clean	Yes		
3/03/2021	2020/2021	Yes	53	5329	15	582515	4401	2 - Clean	Yes		ups battery age 5 years
11/03/2021	2020/2021	Yes	49	7469	13.8	1541160	89146	3 - No Action	Yes		
11/03/2021	2020/2021	Yes	49	7469	13.8	1541160	89146	3 - No Action	Yes		
23/03/2021	2020/2021	Yes	53	582670	14.9	582670	4411	3 - No Action	Yes		rust in some areas on bore pipework
31/03/2021	2020/2021	Yes	51	5333	14.9	582983	4416	2 - Clean	Yes		

8/04/2021	2020/2021	Yes	24	5333	15	582983	4421	2 - Clean	Yes
22/04/2021	2020/2021	Yes	53	5337	15.3	470	0.71	2 - Clean	Yes
28/04/2021	2020/2021	Yes	55	5337	14.9	470	0.71	2 - Clean	Yes
6/05/2021	2020/2021	Yes	55	5337	14.9	470	0.71	2 - Clean	Yes
13/05/2021	2020/2021	Yes	55	5339	15	693	0.71	1 - Change	Yes
20/05/2021	2020/2021	Yes	55	5339	14.9	693	0.71	3 - No Action	Yes
3/06/2021	2020/2021	Yes	55	5339	14.9	693	0	2 - Clean	Yes
17/06/2021	2020/2021	Yes	56	5341	14.9	917	0.72	3 - No Action	Yes

Kāpiti Coast DISTRICT COUNCIL
Me Huri Whakamuri, Ka Titiro Whakamua

K6 Operation Bore Log

Date	FY	Filled in log book?	Bore Level above Pump	Pump Run Hours	Temperature	Flow Forward	Flow Reverse	Cabinet Filter	Checked Well-head	Compressor Service Due Date	Run compressor manually?	Well-head Security Comment	Comments
29/06/2020	2019/2020	Yes	17	7150	29.6	574769	265566	2 - Clean	Yes	24/07/2020	Yes		
9/07/2020	2020/2021	Yes	38	7152	14.2	575142	265567	2 - Clean	Yes	24/07/2020	Yes		
16/07/2020	2020/2021	Yes	38	7152	14.2	575142	265567	3 - No Action	Yes	24/07/2020	Yes		
23/07/2020	2020/2021	Yes	39	7152	14.2	575142	265568	3 - No Action	Yes	23/01/2021	Yes		
28/07/2020	2020/2021	Yes	18	7155	31	575771	265568	2 - Clean	Yes	23/01/2021	Yes		sample taken
30/07/2020	2020/2021	Yes	39	7155	14.5	575807	265568	3 - No Action	Yes	23/01/2021	Yes		
6/08/2020	2020/2021	Yes	40	7155	14.5	575807	265568	2 - Clean	Yes	23/01/2021	Yes		
13/08/2020	2020/2021	Yes	40	7155	14.5	575807	265568	2 - Clean	Yes	23/01/2021	Yes		
20/08/2020	2020/2021	Yes	41	7155	14.5	575807	265569	3 - No Action	Yes	23/01/2021	Yes		
27/08/2020	2020/2021	Yes	20	7157	31.1	576212	265569	2 - Clean	Yes	23/01/2021	Yes		sample taken
3/09/2020	2020/2021	Yes	42	7158	14.5	576268	265570	2 - Clean	Yes	23/01/2021	Yes		
10/09/2020	2020/2021	Yes	42	7158	14.4	576268	265570	3 - No Action	Yes	1/01/2021	Yes		
17/09/2020	2020/2021	Yes	42	7158	14.4	576268	265571	3 - No Action	Yes	23/01/2021	Yes		
24/09/2020	2020/2021	Yes	42	7158	14.4	576268	265571	3 - No Action	Yes	24/09/2020	Yes		
1/10/2020	2020/2021	Yes	42	7160	14.5	576685	265572	3 - No Action	Yes	1/01/2021	Yes		
15/10/2020	2020/2021	Yes	42	7160	14.5	576685	265573	3 - No Action	Yes	23/01/2021	Yes		
22/10/2020	2020/2021	Yes	42	7160	14.5	576685	265573	3 - No Action	Yes	1/01/2021	Yes		
30/10/2020	2020/2021	Yes	21	7162	31.3	577301	265574	3 - No Action	Yes	23/01/2021	Yes		
5/11/2020	2020/2021	Yes	43	7164	14.5	577615	265574	2 - Clean	Yes	23/01/2021	Yes		
12/11/2020	2020/2021	Yes	43	7164	14.5	577615	265575	3 - No Action	Yes	23/01/2022	Yes		
19/11/2020	2020/2021	Yes	42	7164	14.5	577616	265590	3 - No Action	Yes	1/01/2021	Yes		
26/11/2020	2020/2021	Yes	43	7164	14.5	577616	265592	2 - Clean	Yes	23/01/2021	Yes		
4/12/2020	2020/2021	Yes	44	7167	14.5	578141	265597	3 - No Action	Yes	23/01/2021	Yes		
11/12/2020	2020/2021	Yes	43	7167	14.5	578141	265599	3 - No Action	Yes	23/01/2021	Yes		Compressor manual control - OFF/ON Switch needs fixing or replacing. Turns itself off and spins more than it should.
18/12/2020	2020/2021	Yes	43	7167	14.5	578141	265603	2 - Clean	Yes	23/01/2020	Yes		
31/12/2020	2020/2021	Yes	44	7170	14.5	578932	265607	2 - Clean	Yes	23/01/2021	Yes		
7/01/2021	2020/2021	Yes	43	7170	14.5	578932	265610		Yes	30/01/2021	Yes		
14/01/2021	2020/2021	Yes	44	7170	14.5	578932	265613	3 - No Action	Yes	13/01/2022	Yes		
21/01/2021	2020/2021	Yes	44	7170	14.5	578932	265616	3 - No Action	Yes	13/01/2022	Yes		
28/01/2021	2020/2021	Yes	44	7172	15.1	579383	265618	3 - No Action	Yes	13/01/2022	Yes		
4/02/2021	2020/2021	Yes	45	7172	14.5	579383	265620	3 - No Action	Yes	13/01/2022	Yes		compressor manual switch needs replacement. won't stay on.
11/02/2021	2020/2021	Yes	77	7172	14.5	579383	265621	3 - No Action	Yes	13/01/2022	Yes		
18/02/2021	2020/2021	Yes	84	7172	14.5	579383	265621	1 - Change	Yes	13/07/2021	Yes		
25/02/2021	2020/2021	Yes	97	7175	16.1	579921	265623	2 - Clean	Yes	13/07/2021	Yes		
3/03/2021	2020/2021	Yes	50	7175	14.5	579921	265624	2 - Clean	Yes	12/01/2021	Yes		battery age about 5 years
11/03/2021	2020/2021	Yes	50	7176	14.6	580024	265624	3 - No Action	Yes	13/01/2022	Yes		
23/03/2021	2020/2021	Yes	50	7176	14.5	580024	265624	3 - No Action	Yes	13/08/2021	Yes		BlackBerry and weeds inside compressor compound rust on bore pipework
31/03/2021	2020/2021	Yes	50	7179	14.6	580718	265624	2 - Clean	Yes	13/07/2021	Yes		
8/04/2021	2020/2021	Yes	50	7179	14.5	580718	265624	2 - Clean	Yes	13/07/2021	Yes		
22/04/2021	2020/2021	Yes	49	7183	15.5	581605	265626	2 - Clean	Yes	13/07/2021	Yes		
28/04/2021	2020/2021	Yes	50	7183	14.5	581605	265626	2 - Clean	Yes	13/07/2021	Yes		

6/05/2021	2020/2021	Yes	50	7183	14.5	581605	265627 2 - Clean	Yes	13/07/2021	Yes
13/05/2021	2020/2021	Yes	50	7185	14.7	581985	265630 1 - Change	Yes	13/07/2021	Yes
20/05/2021	2020/2021	Yes	50	7185	14.5	581985	265631 3 - No Action	Yes	13/01/2022	Yes
3/06/2021	2020/2021	Yes	50	7185	14.5	581985	265632 2 - Clean	Yes	13/07/2021	Yes
17/06/2021	2020/2021	Yes	50	7187	14.5	582357	265633 3 - No Action	Yes	13/01/2022	Yes

Kāpiti Coast DISTRICT COUNCIL
Me Huri Whakamuri, Ka Titiro Whakamua

K10 Operational Bore Log

Date	FY	Filled in log book?	Bore Level above Pump	Pump Run Hours	Temperature	Flow Forward	Flow Reverse	Cabinet Filter	Checked Well-head	Compressor Service Due Date	Run compressor manually?	Compressor Run Hours	Well-head Security Comment	Comments
29/06/2020	2019/2020	Yes	31	4816	24	20008	111	2 - Clean	Yes	24/07/2020	Yes	174.00		
9/07/2020	2020/2021	Yes	52	4819	14.3	20150	111	2 - Clean	Yes	24/07/2020	Yes	174.00		
16/07/2020	2020/2021	Yes	52	4819	14.3	20150	111	3 - No Action	Yes	24/07/2020	Yes	174.00		
23/07/2020	2020/2021	Yes	52	4819	14.3	20150	111	3 - No Action	Yes	24/07/2020	Yes	174.00		
28/07/2020	2020/2021	Yes	30	4821	24.6	20255	111	2 - Clean	Yes	23/01/2021	Yes	174.00		sample taken
30/07/2020	2020/2021	Yes	52	4822	14.3	20350	111	3 - No Action	Yes	23/07/2021	Yes	174.00		
6/08/2020	2020/2021	Yes	52	4822	14	20350	111	2 - Clean	Yes	23/01/2021	Yes	174.00		
13/08/2020	2020/2021	Yes	52	4822	14.3	20350	111	2 - Clean	Yes	23/01/2021	Yes	174.00		
20/08/2020	2020/2021	Yes	52	4822	14.3	20350.45	111.36	3 - No Action	Yes	23/01/2021	Yes	174.00		
27/08/2020	2020/2021	Yes	32	4823	24.5	20403	111	2 - Clean	Yes	23/01/2021	Yes	175.00		sample taken
3/09/2020	2020/2021	Yes	52	4824	14.3	20484	111	2 - Clean	Yes	23/07/2021	Yes	175.00		
10/09/2020	2020/2021	Yes	52	4824	14.3	20484	111	3 - No Action	Yes	23/07/2021	Yes	175.00		
17/09/2020	2020/2021	Yes	52	4824	14.3	20484	111	2 - Clean	Yes	23/01/2021	Yes	175.00		
24/09/2020	2020/2021	Yes	52	4824	14.3	27484	111	3 - No Action	Yes	23/07/2021	Yes	175.00		
1/10/2020	2020/2021	Yes	52	4827	14.3	20607	111	3 - No Action	Yes	23/07/2021	Yes	175.00		
15/10/2020	2020/2021	Yes	52	4827	14.3	20607	111	3 - No Action	Yes	23/01/2021	Yes	175.00		lock not present on compressor shed
22/10/2020	2020/2021	Yes	52	4827	14.3	20607	111	3 - No Action	Yes	23/07/2021	Yes	175.00		
30/10/2020	2020/2021	Yes	32	4828	24.5	20715	111	3 - No Action	Yes	23/07/2021	Yes	175.00		
5/11/2020	2020/2021	Yes	52	4831	14.3	20874	111	2 - Clean	Yes	23/01/2021	Yes	175.00		
12/11/2020	2020/2021	Yes	52	4831	14.3	20874	111	3 - No Action	Yes	23/07/2021	Yes	175.00		
19/11/2020	2020/2021	Yes	52	4831	14.3	20874	111	3 - No Action	Yes	23/07/2021	Yes	175.00		
26/11/2020	2020/2021	Yes	52	4831	14.3	2087	111	2 - Clean	Yes	23/01/2021	Yes	175.00	No lock on compressor door	
3/12/2020	2020/2021	Yes	52	4834	14.3	21035	111	2 - Clean	Yes	23/01/2021	Yes	175.00		
11/12/2020	2020/2021	Yes	52	4834	14.3	21035	111	3 - No Action	Yes	23/01/2021	Yes	175.00		
18/12/2020	2020/2021	Yes	52	4834	14.3	21035	111	2 - Clean	Yes	23/01/2021	Yes	175.00		
31/12/2020	2020/2021	Yes	52	4838	14.3	21270	111	2 - Clean	Yes	23/01/2021	Yes	175.00		
7/01/2021	2020/2021	Yes	52	4838	14.3	21270	111	3 - No Action	Yes	23/07/2021	Yes	175.00		
14/01/2021	2020/2021	Yes	52	4838	14.4	21270	111	3 - No Action	Yes	23/07/2021	Yes	175.00		
21/01/2021	2020/2021	Yes	52	4838	14.3	21270	111	3 - No Action	Yes	23/07/2021	Yes	175.00		
28/01/2021	2020/2021	Yes	52	4840	15.3	21403	111	3 - No Action	Yes	23/07/2021	Yes	175.00		
4/02/2021	2020/2021	Yes	52	4840	14.3	21403	111	2 - Clean	Yes	23/07/2021	Yes	175.00		
11/02/2021	2020/2021	Yes	52	4840	14.3	21403	111	3 - No Action	Yes	23/07/2021	Yes	175.00		
18/02/2021	2020/2021	Yes	52	4840	14.3	21403	111	1 - Change	Yes	13/07/2021	Yes	175.00		
25/02/2021	2020/2021	Yes	52	4843	15.4	21562	111	2 - Clean	Yes	13/07/2021	Yes	175.00		
														checked battery age on ups but no date mentioned guess
3/03/2021	2020/2021	Yes	52	4843	14.3	21562	111	3 - No Action	Yes	23/07/2021	Yes	175.00		would be 5 years
11/03/2021	2020/2021	Yes	52	4844	14.3	21634	111	3 - No Action	Yes	23/07/2021	Yes	175.00		
23/03/2021	2020/2021	Yes	52	4844	14.3	21634	111	3 - No Action	Yes	13/07/2021	Yes	175.00		
31/03/2021	2020/2021	Yes	52	4846	14.3	21774	111	2 - Clean	Yes	13/07/2021	Yes	176.00		
8/04/2021	2020/2021	Yes	52	4846	14.3	21774	111	2 - Clean	Yes	13/07/2021	Yes	176.00		
22/04/2021	2020/2021	Yes	52	4851	14.9	22051	111	2 - Clean	Yes	13/07/2021	Yes	177.00		
28/04/2021	2020/2021	Yes	52	4851	14.3	22051	111	2 - Clean	Yes	13/07/2021	Yes	177.00		
6/05/2021	2020/2021	Yes	52	4851	14.3	22051	111	2 - Clean	Yes	13/07/2021	Yes	178.00		
13/05/2021	2020/2021	Yes	52	4853	14.3	22170	111	1 - Change	Yes	13/07/2021	Yes	178.00		
20/05/2021	2020/2021	Yes	52	4853	14.3	22170	111	3 - No Action	Yes	23/07/2021	Yes	178.00		
3/06/2021	2020/2021	Yes	52	4853	14.3	22170	111	2 - Clean	Yes	13/07/2021	Yes	178.00		
17/06/2021	2020/2021	Yes	52	4855	14.3	22277	111	3 - No Action	Yes	23/07/2021	Yes	179.00		

Kāpiti Coast DISTRICT COUNCIL
Me Huri Whakamuri, Ka Titiro Whakamua

K12 Operational Bore Log

Date	FY	Filled in log book?	Bore Level above Pump	Pump Run Hours	Temperature	Flow Forward	Flow Reverse	Cabinet Filter	Checked Well-head	Well-head Security Comment	Comments
29/06/2020	2019/2020	Yes	63	734	13	21076	54	2 - Clean	Yes		
9/07/2020	2020/2021	Yes	63.3	734	13.6	21076	54	2 - Clean	Yes		
16/07/2020	2020/2021	Yes	25	736	25.8	21125	54	2 - Clean	Yes		
23/07/2020	2020/2021	Yes	63	737	13.7	21164	54	2 - Clean	Yes		
28/07/2020	2020/2021	Yes	62.9	737	13.7	21164	54	3 - No Action	Yes		
30/07/2020	2020/2021	Yes	63.7	737	13.6	21164.16	54.49	3 - No Action	Yes		
3/08/2020	2020/2021	Yes	43.7	740	23.6	21259	54	2 - Clean	Yes		sample taken
6/08/2020	2020/2021	Yes	63.5	740	13.7	21259	54	3 - No Action	Yes		
13/08/2020	2020/2021	Yes	64	740	13.6	21259	54	2 - Clean	Yes		
20/08/2020	2020/2021	Yes	63.5	740	13.6	21259	54	2 - Clean	Yes		
27/08/2020	2020/2021	Yes	64	740	13.6	21259.94	54.49	3 - No Action	Yes		
3/09/2020	2020/2021	Yes	25.7	742	27.2	21322	54	2 - Clean	Yes		sample taken
10/09/2020	2020/2021	Yes	63	742	13.6	21324	54	2 - Clean	Yes		
17/09/2020	2020/2021	Yes	63.8	743	13.6	21324	54	3 - No Action	Yes		
24/09/2020	2020/2021	Yes	64.2	743	13.6	21324	54	3 - No Action	Yes		
1/10/2020	2020/2021	Yes	63.7	743	13.6	21324	54	3 - No Action	Yes		
15/10/2020	2020/2021	Yes	63.4	745	13.6	21381	54	3 - No Action	Yes		
22/10/2020	2020/2021	Yes	64	745	13.6	21381	54	3 - No Action	Yes		
30/10/2020	2020/2021	Yes	64.4	745	13.6	21381	54	3 - No Action	Yes		
5/11/2020	2020/2021	Yes	24.9	748	27.4	21493	54	3 - No Action	Yes		
12/11/2020	2020/2021	Yes	64.3	749	13.6	21510	54	2 - Clean	Yes		
19/11/2020	2020/2021	Yes	64	749	13.6	21510	54	3 - No Action	Yes		
26/11/2020	2020/2021	Yes	64.2	749	13.7	21510	54	3 - No Action	Yes		
4/12/2020	2020/2021	Yes	63	749	13.7	21510	54	2 - Clean	Yes		
11/12/2020	2020/2021	Yes									
18/12/2020	2020/2021	Yes	63.3	751	13.7	21582	54	3 - No Action	Yes		
31/12/2020	2020/2021	Yes	63.6	751	13.7	21582	54	2 - Clean	Yes		
7/01/2021	2020/2021	Yes	63.4	755	13.7	21696	54	2 - Clean	Yes		
14/01/2021	2020/2021	Yes	63	755	13.7	21696	54	3 - No Action	Yes		
21/01/2021	2020/2021	Yes	64	756	13.7	21699	54	3 - No Action	Yes		
28/01/2021	2020/2021	Yes	63.2	756	13.7	21699	54	3 - No Action	Yes		
4/02/2021	2020/2021	Yes	62	758	13.8	21760	54	3 - No Action	Yes		
11/02/2021	2020/2021	Yes	758	62.6	13.7	21760	54	2 - Clean	Yes		
18/02/2021	2020/2021	Yes	62.9	758	13.7	21760	54	3 - No Action	Yes		
25/02/2021	2020/2021	Yes	63	758	13.7	21760	54	1 - Change	Yes		
3/03/2021	2020/2021	Yes	61.1	761	13.9	21845	54	2 - Clean	Yes		
11/03/2021	2020/2021	Yes	60.8	779	13.7	22297	54	3 - No Action	Yes		battery 5 years plus
23/03/2021	2020/2021	Yes	61	819	13.7	23515	54	3 - No Action	Yes		
31/03/2021	2020/2021	Yes	62	819	13.7	23515	54	3 - No Action	Yes		
8/04/2021	2020/2021	Yes	62	822	13.7	23613	54	2 - Clean	Yes		
22/04/2021	2020/2021	Yes	62.2	822	13.7	23613	54	2 - Clean	Yes		

28/04/2021	2020/2021	Yes	60.8	827	13.8	23747	54	2 - Clean	Yes
6/05/2021	2020/2021	Yes	62	827	13.7	23747	54	2 - Clean	Yes
13/05/2021	2020/2021	Yes	62.1	827	13.7	23747	54	2 - Clean	Yes
20/05/2021	2020/2021	Yes	62	829	13.7	23804	54	1 - Change	Yes
3/06/2021	2020/2021	Yes	62.3	829	13.7	23804	54.49	3 - No Action	Yes
17/06/2021	2020/2021	Yes	62.4	829	13.7	23804	54	2 - Clean	Yes
			62.9	831	13.7	23858	54	3 - No Action	Yes

Kāpiti Coast DISTRICT COUNCIL
Me Huri Whakamuri, Ka Titiro Whakamua

KB4 Operational Bore Log

Date	FY	Filled in log	Bore Leve	Pump Run	Temperatu	Flow Forw	Flow Reve	Cabinet Filter	Checked	Well-head	Well-head	Comments
4/06/2020	2019/2020	Yes	33	5490	14.6	274794	4590	3 - No Action	Yes			
11/06/2020	2019/2020	Yes	33	5490	14.5	274794	4607	2 - Clean	Yes			
18/06/2020	2019/2020	Yes	33	5490	14.5	274794	4624	2 - Clean	Yes			
29/06/2020	2019/2020	Yes	26	5491	22.7	274899	4649	2 - Clean	Yes			
9/07/2020	2020/2021	Yes	33	5493	14.4	275174	4672		Yes			
16/07/2020	2020/2021	Yes	33	5493	14.5	275174	4688	3 - No Action	Yes			
23/07/2020	2020/2021	Yes	33	5493	14.6	275174	4704	3 - No Action	Yes			
28/07/2020	2020/2021	Yes	25	5495	23.3	275478	4715	2 - Clean	Yes			sample taken
30/07/2020	2020/2021	Yes	33	5496	14.5	275588	4720	3 - No Action	Yes			
6/08/2020	2020/2021	Yes	33	5496	14	275588	4739	2 - Clean	Yes			
13/08/2020	2020/2021	Yes	33	5496	14.6	275588	4752	2 - Clean	Yes			
20/08/2020	2020/2021	Yes	33	5496	14.5	275588	4768	3 - No Action	Yes			
27/08/2020	2020/2021	Yes	26	5497	23.3	275721	4784	2 - Clean	Yes			sample taken
3/09/2020	2020/2021	Yes	33	5498	14.5	275867	4800	2 - Clean	Yes			
10/09/2020	2020/2021	Yes	33	5498	14.6	275867	4816	3 - No Action	Yes			
17/09/2020	2020/2021	Yes	33	5498	14.8	275867	4833	3 - No Action	Yes			
24/09/2020	2020/2021	Yes	33	5498	14.6	275867	4849	3 - No Action	Yes			
1/10/2020	2020/2021	Yes	33	5500	14.6	276119	4865	3 - No Action	Yes			
15/10/2020	2020/2021	Yes	33	5500	14.6	276119	4896	3 - No Action	Yes			
22/10/2020	2020/2021	Yes	33	5500	14.9	276119	4912	3 - No Action	Yes			
30/10/2020	2020/2021	Yes	25	5503	23.4	276404	4930	3 - No Action	Yes			
5/11/2020	2020/2021	Yes	33	5505	14.7	276677	4944	2 - Clean	Yes			
12/11/2020	2020/2021	Yes	33	5505	14.7	276677	4960	3 - No Action	Yes			
19/11/2020	2020/2021	Yes	33	5505	14.7	276677	4976	3 - No Action	Yes			
26/11/2020	2020/2021	Yes	33	5505	14.8	276677	4992	2 - Clean	Yes			
3/12/2020	2020/2021	Yes	33	5508	14.8	277003	5007	2 - Clean	Yes			
11/12/2020	2020/2021	Yes	33	5508	14.7	277003	5026	3 - No Action	Yes			
18/12/2020	2020/2021	Yes	33	5508	14.8	277003	5043	2 - Clean	Yes			
31/12/2020	2020/2021	Yes	33	5512	14.8	277496	5073	2 - Clean	Yes			
7/01/2021	2020/2021	Yes	33	5512	14.7	277496	5089	3 - No Action	Yes			
14/01/2021	2020/2021	Yes	33	5512	14.9	277504	5105	3 - No Action	Yes			
21/01/2021	2020/2021	Yes	33	5512	14.6	277504	5121	3 - No Action	Yes			
28/01/2021	2020/2021	Yes	33	5514	15	277777	5139	3 - No Action	Yes			
4/02/2021	2020/2021	Yes	33	5514	14.8	277777	5154	2 - Clean	Yes			
11/02/2021	2020/2021	Yes	33	5514	14.7	277777	5169	3 - No Action	Yes			
18/02/2021	2020/2021	Yes	33	5514	14.7	277777	5185	1 - Change	Yes			
18/02/2021	2020/2021	Yes	33	5514	14.7	277777	5185	1 - Change	Yes			
25/02/2021	2020/2021	Yes	33	5516	15.8	278075	5207	2 - Clean	Yes			

3/03/2021	2020/2021	Yes	33	5524	14.8	278662	5220	2 - Clean	No
11/03/2021	2020/2021	Yes	0.33	5564	14.7	282679	5234	3 - No Action	Yes
23/03/2021	2020/2021	Yes	33	5564	14.7	282679	5234	3 - No Action	Yes
31/03/2021	2020/2021	Yes	33	5567	14.7	282972	5279	2 - Clean	Yes
8/04/2021	2020/2021	Yes	33	5567	14.7	282972	5297	2 - Clean	Yes
22/04/2021	2020/2021	Yes	33	5571	15.4	283529	5330	2 - Clean	Yes
28/04/2021	2020/2021	Yes	33	5571	14.5	283529	5344	2 - Clean	Yes
6/05/2021	2020/2021	Yes	33	5571	14.7	283529	5362	2 - Clean	Yes
13/05/2021	2020/2021	Yes	33	5573	14.7	283764	5377	1 - Change	Yes
20/05/2021	2020/2021	Yes	33	5573	14.7	283764	5393	3 - No Action	Yes
3/06/2021	2020/2021	Yes	33	5573	14.6	283764	5424	2 - Clean	Yes
17/06/2021	2020/2021	Yes	33	5575	14.6	283982	5454	3 - No Action	Yes

display not booting up properly. inform Tom
ups battery age about 5 years

had to reboot display as screen stuck. this was fixed by AFI a few weeks ago?

Kāpiti Coast DISTRICT COUNCIL
Me Huri Whakamuri, Ka Titiro Whakamua

KB7 Operation Bore Log

Date	FY	Filled in log book?	Bore Level above Pump	Pump Run Hours	Temperature	Flow Forward	Flow Reverse	Cabinet Filter	Checked Well-head	Well-head Security Comment	Comments
29/06/2020	2019/2020	Yes	13	1735	24.3	14662	94	2 - Clean	Yes		
9/07/2020	2020/2021	Yes	40	1737	14.1	14695	94	2 - Clean	Yes		
16/07/2020	2020/2021	Yes	40	1737	14.1	14695	94	3 - No Action	Yes		
23/07/2020	2020/2021	Yes	40	1737	14.1	14695	94.36	3 - No Action	Yes		
28/07/2020	2020/2021	Yes	12	1740	25.2	14759	94	2 - Clean	Yes		sample taken
30/07/2020	2020/2021	Yes	40	1740	14.1	14766	94	3 - No Action	Yes		
6/08/2020	2020/2021	Yes	40	1740	14	14766	94	2 - Clean	Yes		
6/08/2020	2020/2021	Yes	40	1740	14	14766	94	2 - Clean	Yes		
13/08/2020	2020/2021	Yes	40	1740	14.1	14766	94	2 - Clean	Yes		
20/08/2020	2020/2021	Yes	40	1740	14.1	14766.75	94.37	3 - No Action	Yes		
27/08/2020	2020/2021	Yes	12	1742	25.3	14804	94	2 - Clean	Yes		sample taken
3/09/2020	2020/2021	Yes	40	1742	14.1	14814	94	2 - Clean	Yes		
10/09/2020	2020/2021	Yes	40	1742	14.1	14814	94	3 - No Action	Yes		
17/09/2020	2020/2021	Yes	40	1742	14.1	14814	94	3 - No Action	Yes		
24/09/2020	2020/2021	Yes	40	1742	14.1	14814	94	3 - No Action	Yes		
1/10/2020	2020/2021	Yes	40	1744	14.1	14858	94	3 - No Action	Yes		
15/10/2020	2020/2021	Yes	40	1744	14.1	14858	94	3 - No Action	Yes		
22/10/2020	2020/2021	Yes	40	1744	14.1	14858	94	3 - No Action	Yes		
30/10/2020	2020/2021	Yes	11	1748	25.4	14936	94	3 - No Action	Yes		
5/11/2020	2020/2021	Yes	40	1749	14.1	14954	94	2 - Clean	Yes		
12/11/2020	2020/2021	Yes	40	1749	14.2	14954	94	3 - No Action	Yes		
19/11/2020	2020/2021	Yes	40	1749	14.1	14954	94	3 - No Action	Yes		
26/11/2020	2020/2021	Yes	40	1749	14.1	14954	94	2 - Clean	Yes		
4/12/2020	2020/2021	Yes	40	1751	14.1	15008	94	3 - No Action	Yes		
11/12/2020	2020/2021	Yes	40	1751	14.1	15008	94	3 - No Action	Yes		
18/12/2020	2020/2021	Yes	40	1751	14.1	15008	94	2 - Clean	Yes		
31/12/2020	2020/2021	Yes	40	1755	14.2	15094	94	2 - Clean	Yes		
7/01/2021	2020/2021	Yes	40	1755	14.1	15094	94	3 - No Action	Yes		
14/01/2021	2020/2021	Yes	40	1755	14.2	15096	94	3 - No Action	Yes		
21/01/2021	2020/2021	Yes	40	1755	14.1	15096	94	3 - No Action	Yes		
28/01/2021	2020/2021	Yes	39	1758	14.3	15143	94	3 - No Action	Yes		
4/02/2021	2020/2021	Yes	40	1758	14.2	15143	94	2 - Clean	Yes		Filter lid needs repairing. pop rivet back on
11/02/2021	2020/2021	Yes	40	1758	14.1	15143	94	3 - No Action	Yes		
18/02/2021	2020/2021	Yes	40	1758	14.1	15145	94	1 - Change	Yes		
25/02/2021	2020/2021	Yes	38	1761	14.5	15213	94	2 - Clean	Yes		
3/03/2021	2020/2021	Yes	39	1784	14.2	15717	94.41	3 - No Action	Yes		battery age about 4 years
11/03/2021	2020/2021	Yes	39	1835	14.2	16825	94	3 - No Action	Yes		
23/03/2021	2020/2021	Yes	40	1835	14.7	16825	94	3 - No Action	Yes		
31/03/2021	2020/2021	Yes	40	1838	14.1	16877	94	2 - Clean	Yes		
8/04/2021	2020/2021	Yes	40	1838	14.2	16877	94	2 - Clean	Yes		
22/04/2021	2020/2021	Yes	39	1842	14.4	16979	94	2 - Clean	Yes		
28/04/2021	2020/2021	Yes	40	1842	14.1	16979	94	2 - Clean			
6/05/2021	2020/2021	Yes	40	1842	14.1	16979	94	2 - Clean	Yes		
13/05/2021	2020/2021	Yes	40	1844	14.2	17022	94	1 - Change	Yes		

20/05/2021	2020/2021	Yes	40	1844	14.1	17022	94.42 3 - No Action	Yes
20/05/2021	2020/2021	Yes	40	1844	14.1	17022	94.42 3 - No Action	Yes
20/05/2021	2020/2021	Yes	40	1844	14.1	17022	94.42 3 - No Action	Yes
3/06/2021	2020/2021	Yes	40	1844	14.1	17022	94 2 - Clean	Yes
17/06/2021	2020/2021	Yes	40	1846	14.1	17062	94 3 - No Action	Yes

Appendix D

Bore Water Quality Sampling Results

eurofins | ELS

Eurofins ELS Limited

Kapiti Coast District Council -
Sewage Treatment Plant
Sewage Treatment Plant
Mazengarb Road
Paraparaumu 5254
Attention: Kim Wearne

Analytical Report

Report Number: 20/64344
Issue: 01-1
07 December 2020

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
20/64344-01	Kapiti Coast District Council - Supplementary Bore		30/11/2020 09:22	30/11/2020 13:27	344534

Notes: K4 204823 Box 1

	Test	Result	Units	Test Date	Signatory
0001	pH	7.4		30/11/2020	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	0.8	g/m³	01/12/2020	Amit Kumar KTP
0052	Alkalinity - Total	99	g CaCO3/m³	30/11/2020	Gordon McArthur KTP
0055	Conductivity at 25°C	48.6	mS/m	30/11/2020	Gordon McArthur KTP
0055B	Total Dissolved Solids	267	g/m³	01/12/2020	Gordon McArthur KTP
0062	Sulphide - Total	< 0.2	g/m³	01/12/2020	Jennifer Mont KTP
0073	Bicarbonate	99	g CaCO3/m³	01/12/2020	Gordon McArthur .
0076	Free CO2	8	g CO2/m³	01/12/2020	Gordon McArthur .
0590	Anion Sum	4.00 *	meq/L	04/12/2020	Yvette Ibe
0591	Cation Sum	4.60 *	meq/L	07/12/2020	Divina Lagazon KTP
0592	Ion Balance	7.06 *	%	07/12/2020	Divina Lagazon KTP
0601	Fluoride	0.20	g/m³	04/12/2020	Divina Lagazon KTP
0602	Chloride	73.9	g/m³	04/12/2020	Divina Lagazon KTP
0603	Nitrite - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0604	Bromide	0.24	g/m³	04/12/2020	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0607	Sulphate	13.5	g/m³	04/12/2020	Divina Lagazon KTP
0680	Hydrogen Sulphide	< 0.05	g/m³	04/12/2020	Jennifer Mont .
0725	Cyanide	< 0.005	g/m³	07/12/2020	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.02	g/m³	04/12/2020	Divina Lagazon KTP
1610	Calcium - Acid Soluble	3.84	g/m³	01/12/2020	Shanel Kumar KTP
1622	Magnesium - Acid Soluble	4.09	g/m³	01/12/2020	Shanel Kumar KTP
1642	Total Hardness	26	g CaCO3/m³	01/12/2020	Shanel Kumar KTP
1806	Boron - Dissolved	0.100	g/m³	01/12/2020	Amit Kumar KTP
1810	Calcium - Dissolved	3.71	g/m³	01/12/2020	Amit Kumar KTP
1819	Iron - Dissolved	0.014	g/m³	01/12/2020	Amit Kumar KTP
1822	Magnesium - Dissolved	3.99	g/m³	01/12/2020	Amit Kumar KTP
1823	Manganese - Dissolved	0.135	g/m³	01/12/2020	Amit Kumar KTP
1829	Potassium - Dissolved	1.73	g/m³	01/12/2020	Amit Kumar KTP
1834	Sodium - Dissolved	92.7	g/m³	01/12/2020	Amit Kumar KTP
2080	Total Phosphorus	0.099	g/m³	02/12/2020	Divina Lagazon KTP
2088	Dissolved Reactive Phosphorus	0.096	g/m³	04/12/2020	Divina Lagazon KTP
2127	Total Nitrogen	< 0.05	g/m³	02/12/2020	Divina Lagazon KTP
6022	Mercury - Acid Soluble	< 0.0005	g/m³	01/12/2020	Shanel Kumar KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	01/12/2020	Shuyu Zhao KTP
6711	Chromium - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6713	Copper - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6718	Lead - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6730	Silver - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6738	Zinc - Dissolved	< 0.002	g/m³	01/12/2020	Shuyu Zhao KTP
O1311	Temperature	14.6	Deg C	30/11/2020	Chen Lin .
P1859	Sample Filtration	Completed		01/12/2020	Harsimran Dhanoa .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Total Dissolved Solids	Conductivity reading in mS/m x 5.5. The result by this method should be considered approximate only.	1 g/m³
Sulphide - Total	APHA Online Edition Method 4500-S2 parts B,C and F	0.2 g/m³
Bicarbonate	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CaCO3/m³
Free CO2	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CO2/m³
Anion Sum	Calculation of the anion sum in miliequivalents per litre. The following accredited tests are used in the calculation: Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in miliequivalents per litre. The following accredited tests are used in the calculation: Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculated from laboratory accredited results following APHA Online Edition 1030E.1: (Cation Sum - Anion Sum) / (Anion Sum + Cation Sum). For this calculation the anions = Alkalinity, Chloride, Nitrate, Boron and Sulphate and the cations = Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.01 %
Fluoride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrite - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Bromide	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Hydrogen Sulphide	APHA Online Edition Method 4500-S2 part H and is calculated from Sulphide, Temperature, Total Dissolved Solids, and pH results. If temperature has not been provided a default value of 15'C will be used.	0.05 g/m³
Cyanide	Discrete Analyser. In House method based on APHA Online Edition Method 4500-CN- C & E.	0.005 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Calcium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.05 g/m³
Magnesium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Boron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified)	0.005 g/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Manganese - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Potassium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion based on APHA Online Edition 4500-P B & Wat, Res., 17 (1983).	0.005 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion based on APHA Online Edition 4500-N C & Wat, Res., 17 (1983)	0.05 g/m³
Mercury - Acid Soluble	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Onsite Observation Methodology:

Test	Methodology	Detection Limit
Temperature	Analysed on site by sampler.	0.1 Deg C

Unless otherwise stated, all tests are performed in Wellington.
The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

eurofins | ELS

Eurofins ELS Limited

Kapiti Coast District Council -
Sewage Treatment Plant
Sewage Treatment Plant
Mazengarb Road
Paraparaumu 5254
Attention: Kim Wearne

Analytical Report

Report Number: 20/64345
Issue: 01-1
07 December 2020

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
20/64345-01	Kapiti Coast District Council - Supplementary Bore		30/11/2020 09:33	30/11/2020 13:27	344534

Notes: K5 204824 Box 2

	Test	Result	Units	Test Date	Signatory
0001	pH	8.0		30/11/2020	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	0.3	g/m³	01/12/2020	Amit Kumar KTP
0052	Alkalinity - Total	225	g CaCO3/m³	30/11/2020	Gordon McArthur KTP
0055	Conductivity at 25°C	111	mS/m	30/11/2020	Gordon McArthur KTP
0055B	Total Dissolved Solids	610	g/m³	01/12/2020	Gordon McArthur KTP
0062	Sulphide - Total	< 0.2	g/m³	01/12/2020	Jennifer Mont KTP
0073	Bicarbonate	223	g CaCO3/m³	01/12/2020	Gordon McArthur .
0076	Free CO2	5	g CO2/m³	01/12/2020	Gordon McArthur .
0590	Anion Sum	9.31 *	meq/L	04/12/2020	Yvette Ibe
0591	Cation Sum	8.87 *	meq/L	07/12/2020	Divina Lagazon KTP
0592	Ion Balance	2.41 *	%	07/12/2020	Divina Lagazon KTP
0601	Fluoride	0.05	g/m³	04/12/2020	Divina Lagazon KTP
0602	Chloride	199	g/m³	04/12/2020	Divina Lagazon KTP
0603	Nitrite - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0604	Bromide	0.74	g/m³	04/12/2020	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0607	Sulphate	0.37	g/m³	04/12/2020	Divina Lagazon KTP
0680	Hydrogen Sulphide	< 0.05	g/m³	04/12/2020	Jennifer Mont .
0725	Cyanide	< 0.005	g/m³	07/12/2020	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.34	g/m³	04/12/2020	Divina Lagazon KTP
1610	Calcium - Acid Soluble	34.4	g/m³	01/12/2020	Shanel Kumar KTP
1622	Magnesium - Acid Soluble	13.9	g/m³	01/12/2020	Shanel Kumar KTP
1642	Total Hardness	143	g CaCO3/m³	01/12/2020	Shanel Kumar KTP
1806	Boron - Dissolved	0.499	g/m³	01/12/2020	Amit Kumar KTP
1810	Calcium - Dissolved	34.2	g/m³	01/12/2020	Amit Kumar KTP
1819	Iron - Dissolved	0.005	g/m³	01/12/2020	Amit Kumar KTP
1822	Magnesium - Dissolved	14.3	g/m³	01/12/2020	Amit Kumar KTP
1823	Manganese - Dissolved	0.072	g/m³	01/12/2020	Amit Kumar KTP
1829	Potassium - Dissolved	8.53	g/m³	01/12/2020	Amit Kumar KTP
1834	Sodium - Dissolved	133	g/m³	01/12/2020	Amit Kumar KTP
2080	Total Phosphorus	0.102	g/m³	02/12/2020	Divina Lagazon KTP
2088	Dissolved Reactive Phosphorus	0.099	g/m³	04/12/2020	Divina Lagazon KTP
2127	Total Nitrogen	0.31	g/m³	02/12/2020	Divina Lagazon KTP
6022	Mercury - Acid Soluble	< 0.0005	g/m³	01/12/2020	Shanel Kumar KTP
6703	Arsenic - Dissolved	0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	01/12/2020	Shuyu Zhao KTP
6711	Chromium - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6713	Copper - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6718	Lead - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6730	Silver - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6738	Zinc - Dissolved	< 0.002	g/m³	01/12/2020	Shuyu Zhao KTP
O1311	Temperature	15.3	Deg C	01/12/2020	Chen Lin .
P1859	Sample Filtration	Completed		01/12/2020	Harsimran Dhanoa .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Wellington
85 Port Road, Seaview
Lower Hutt 5045
Phone: (04) 576-5016

Rolleston
43 Detroit Drive
Rolleston 7675
Phone: (03) 343-5227

Dunedin
16 Lorne Street
South Dunedin 9012
Phone: (03) 972-7963

Email: reportselsnz@eurofins.com Website: http://www.eurofins.co.nz

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Total Dissolved Solids	Conductivity reading in mS/m x 5.5. The result by this method should be considered approximate only.	1 g/m³
Sulphide - Total	APHA Online Edition Method 4500-S2 parts B,C and F	0.2 g/m³
Bicarbonate	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CaCO3/m³
Free CO2	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CO2/m³
Anion Sum	Calculation of the anion sum in miliequivalents per litre. The following accredited tests are used in the calculation: Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in miliequivalents per litre. The following accredited tests are used in the calculation: Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculated from laboratory accredited results following APHA Online Edition 1030E.1: (Cation Sum - Anion Sum) / (Anion Sum + Cation Sum). For this calculation the anions = Alkalinity, Chloride, Nitrate, Boron and Sulphate and the cations = Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.01 %
Fluoride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrite - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Bromide	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Hydrogen Sulphide	APHA Online Edition Method 4500-S2 part H and is calculated from Sulphide, Temperature, Total Dissolved Solids, and pH results. If temperature has not been provided a default value of 15'C will be used.	0.05 g/m³
Cyanide	Discrete Analyser. In House method based on APHA Online Edition Method 4500-CN- C & E.	0.005 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Calcium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.05 g/m³
Magnesium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Boron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified)	0.005 g/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Manganese - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Potassium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion based on APHA Online Edition 4500-P B & Wat, Res., 17 (1983).	0.005 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion based on APHA Online Edition 4500-N C & Wat, Res., 17 (1983)	0.05 g/m³
Mercury - Acid Soluble	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Onsite Observation Methodology:

Test	Methodology	Detection Limit
Temperature	Analysed on site by sampler.	0.1 Deg C

Unless otherwise stated, all tests are performed in Wellington.
The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

eurofins | ELS

Eurofins ELS Limited

Kapiti Coast District Council -
Sewage Treatment Plant
Sewage Treatment Plant
Mazengarb Road
Paraparaumu 5254
Attention: Kim Wearne

Analytical Report

Report Number: 20/64346
Issue: 01-1
07 December 2020

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
20/64346-01	Kapiti Coast District Council - Supplementary Bore		30/11/2020 09:43	30/11/2020 13:27	344534

Notes: K6 204825 Box 3

	Test	Result	Units	Test Date	Signatory
0001	pH	7.8		30/11/2020	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	0.4	g/m³	01/12/2020	Amit Kumar KTP
0052	Alkalinity - Total	261	g CaCO3/m³	30/11/2020	Gordon McArthur KTP
0055	Conductivity at 25°C	112	mS/m	30/11/2020	Gordon McArthur KTP
0055B	Total Dissolved Solids	617	g/m³	01/12/2020	Gordon McArthur KTP
0062	Sulphide - Total	< 0.2	g/m³	01/12/2020	Jennifer Mont KTP
0073	Bicarbonate	260	g CaCO3/m³	01/12/2020	Gordon McArthur .
0076	Free CO2	8	g CO2/m³	01/12/2020	Gordon McArthur .
0590	Anion Sum	9.45 *	meq/L	04/12/2020	Yvette Ibe
0591	Cation Sum	9.10 *	meq/L	07/12/2020	Divina Lagazon KTP
0592	Ion Balance	1.90 *	%	07/12/2020	Divina Lagazon KTP
0601	Fluoride	0.04	g/m³	04/12/2020	Divina Lagazon KTP
0602	Chloride	182	g/m³	04/12/2020	Divina Lagazon KTP
0603	Nitrite - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0604	Bromide	0.71	g/m³	04/12/2020	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0607	Sulphate	0.27	g/m³	04/12/2020	Divina Lagazon KTP
0680	Hydrogen Sulphide	< 0.05	g/m³	04/12/2020	Jennifer Mont .
0725	Cyanide	< 0.005	g/m³	07/12/2020	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.48	g/m³	04/12/2020	Divina Lagazon KTP
1610	Calcium - Acid Soluble	34.7	g/m³	01/12/2020	Shanel Kumar KTP
1622	Magnesium - Acid Soluble	15.8	g/m³	01/12/2020	Shanel Kumar KTP
1642	Total Hardness	152	g CaCO3/m³	01/12/2020	Shanel Kumar KTP
1806	Boron - Dissolved	0.758	g/m³	01/12/2020	Amit Kumar KTP
1810	Calcium - Dissolved	35.4	g/m³	01/12/2020	Amit Kumar KTP
1819	Iron - Dissolved	< 0.005	g/m³	01/12/2020	Amit Kumar KTP
1822	Magnesium - Dissolved	16.3	g/m³	01/12/2020	Amit Kumar KTP
1823	Manganese - Dissolved	0.085	g/m³	01/12/2020	Amit Kumar KTP
1829	Potassium - Dissolved	11.0	g/m³	01/12/2020	Amit Kumar KTP
1834	Sodium - Dissolved	132	g/m³	01/12/2020	Amit Kumar KTP
2080	Total Phosphorus	0.077	g/m³	02/12/2020	Divina Lagazon KTP
2088	Dissolved Reactive Phosphorus	0.060	g/m³	04/12/2020	Divina Lagazon KTP
2127	Total Nitrogen	0.43	g/m³	02/12/2020	Divina Lagazon KTP
6022	Mercury - Acid Soluble	< 0.0005	g/m³	01/12/2020	Shanel Kumar KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	01/12/2020	Shuyu Zhao KTP
6711	Chromium - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6713	Copper - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6718	Lead - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6730	Silver - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6738	Zinc - Dissolved	< 0.002	g/m³	01/12/2020	Shuyu Zhao KTP
O1311	Temperature	15.2	Deg C	01/12/2020	Chen Lin .
P1859	Sample Filtration	Completed		01/12/2020	Harsimran Dhanoa .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Wellington
85 Port Road, Seaview
Lower Hutt 5045
Phone: (04) 576-5016

Rolleston
43 Detroit Drive
Rolleston 7675
Phone: (03) 343-5227

Dunedin
16 Lorne Street
South Dunedin 9012
Phone: (03) 972-7963

Email: reportselsnz@eurofins.com Website: http://www.eurofins.co.nz

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Total Dissolved Solids	Conductivity reading in mS/m x 5.5. The result by this method should be considered approximate only.	1 g/m³
Sulphide - Total	APHA Online Edition Method 4500-S2 parts B,C and F	0.2 g/m³
Bicarbonate	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CaCO3/m³
Free CO2	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CO2/m³
Anion Sum	Calculation of the anion sum in miliequivalents per litre. The following accredited tests are used in the calculation: Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in miliequivalents per litre. The following accredited tests are used in the calculation: Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculated from laboratory accredited results following APHA Online Edition 1030E.1: (Cation Sum - Anion Sum) / (Anion Sum + Cation Sum). For this calculation the anions = Alkalinity, Chloride, Nitrate, Boron and Sulphate and the cations = Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.01 %
Fluoride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrite - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Bromide	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Hydrogen Sulphide	APHA Online Edition Method 4500-S2 part H and is calculated from Sulphide, Temperature, Total Dissolved Solids, and pH results. If temperature has not been provided a default value of 15'C will be used.	0.05 g/m³
Cyanide	Discrete Analyser. In House method based on APHA Online Edition Method 4500-CN- C & E.	0.005 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Calcium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.05 g/m³
Magnesium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Boron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified)	0.005 g/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Manganese - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Potassium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion based on APHA Online Edition 4500-P B & Wat, Res., 17 (1983).	0.005 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion based on APHA Online Edition 4500-N C & Wat, Res., 17 (1983)	0.05 g/m³
Mercury - Acid Soluble	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Onsite Observation Methodology:

Test	Methodology	Detection Limit
Temperature	Analysed on site by sampler.	0.1 Deg C

Unless otherwise stated, all tests are performed in Wellington.
The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

eurofins | ELS

Eurofins ELS Limited

Kapiti Coast District Council -
Sewage Treatment Plant
Sewage Treatment Plant
Mazengarb Road
Paraparaumu 5254
Attention: Kim Wearne

Analytical Report

Report Number: 20/64350
Issue: 01-1
07 December 2020

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
20/64350-01	Kapiti Coast District Council - Supplementary Bore		30/11/2020 08:51	30/11/2020 13:27	344534

Notes: K10 204827 Box 5

	Test	Result	Units	Test Date	Signatory
0001	pH	7.7		30/11/2020	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	0.3	g/m³	01/12/2020	Amit Kumar KTP
0052	Alkalinity - Total	201	g CaCO3/m³	30/11/2020	Gordon McArthur KTP
0055	Conductivity at 25°C	81.6	mS/m	30/11/2020	Gordon McArthur KTP
0055B	Total Dissolved Solids	449	g/m³	01/12/2020	Gordon McArthur KTP
0062	Sulphide - Total	< 0.2	g/m³	01/12/2020	Jennifer Mont KTP
0073	Bicarbonate	200	g CaCO3/m³	01/12/2020	Gordon McArthur .
0076	Free CO2	8	g CO2/m³	01/12/2020	Gordon McArthur .
0590	Anion Sum	6.72 *	meq/L	04/12/2020	Yvette Ibe
0591	Cation Sum	8.13 *	meq/L	07/12/2020	Divina Lagazon KTP
0592	Ion Balance	9.50 *	%	07/12/2020	Divina Lagazon KTP
0601	Fluoride	0.03	g/m³	04/12/2020	Divina Lagazon KTP
0602	Chloride	122	g/m³	04/12/2020	Divina Lagazon KTP
0603	Nitrite - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0604	Bromide	0.50	g/m³	04/12/2020	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0607	Sulphate	< 0.02	g/m³	04/12/2020	Divina Lagazon KTP
0680	Hydrogen Sulphide	< 0.05	g/m³	04/12/2020	Jennifer Mont .
0725	Cyanide	< 0.005	g/m³	07/12/2020	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.23	g/m³	04/12/2020	Divina Lagazon KTP
1610	Calcium - Acid Soluble	53.0	g/m³	01/12/2020	Shanel Kumar KTP
1622	Magnesium - Acid Soluble	12.9	g/m³	01/12/2020	Shanel Kumar KTP
1642	Total Hardness	186	g CaCO3/m³	01/12/2020	Shanel Kumar KTP
1806	Boron - Dissolved	0.158	g/m³	01/12/2020	Amit Kumar KTP
1810	Calcium - Dissolved	53.9	g/m³	01/12/2020	Amit Kumar KTP
1819	Iron - Dissolved	< 0.005	g/m³	01/12/2020	Amit Kumar KTP
1822	Magnesium - Dissolved	13.4	g/m³	01/12/2020	Amit Kumar KTP
1823	Manganese - Dissolved	0.163	g/m³	01/12/2020	Amit Kumar KTP
1829	Potassium - Dissolved	8.34	g/m³	01/12/2020	Amit Kumar KTP
1834	Sodium - Dissolved	96.4	g/m³	01/12/2020	Amit Kumar KTP
2080	Total Phosphorus	0.059	g/m³	02/12/2020	Divina Lagazon KTP
2088	Dissolved Reactive Phosphorus	0.046	g/m³	04/12/2020	Divina Lagazon KTP
2127	Total Nitrogen	0.21	g/m³	02/12/2020	Divina Lagazon KTP
6022	Mercury - Acid Soluble	< 0.0005	g/m³	01/12/2020	Shanel Kumar KTP
6703	Arsenic - Dissolved	0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	01/12/2020	Shuyu Zhao KTP
6711	Chromium - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6713	Copper - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6718	Lead - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6730	Silver - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6738	Zinc - Dissolved	< 0.002	g/m³	01/12/2020	Shuyu Zhao KTP
O1311	Temperature	15.2	Deg C	01/12/2020	Chen Lin .
P1859	Sample Filtration	Completed		01/12/2020	Harsimran Dhanoa .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Wellington
85 Port Road, Seaview
Lower Hutt 5045
Phone: (04) 576-5016

Rolleston
43 Detroit Drive
Rolleston 7675
Phone: (03) 343-5227

Dunedin
16 Lorne Street
South Dunedin 9012
Phone: (03) 972-7963

Email: reportselsnz@eurofins.com Website: http://www.eurofins.co.nz

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Total Dissolved Solids	Conductivity reading in mS/m x 5.5. The result by this method should be considered approximate only.	1 g/m³
Sulphide - Total	APHA Online Edition Method 4500-S2 parts B,C and F	0.2 g/m³
Bicarbonate	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CaCO3/m³
Free CO2	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CO2/m³
Anion Sum	Calculation of the anion sum in miliequivalents per litre. The following accredited tests are used in the calculation: Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in miliequivalents per litre. The following accredited tests are used in the calculation: Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculated from laboratory accredited results following APHA Online Edition 1030E.1: (Cation Sum - Anion Sum) / (Anion Sum + Cation Sum). For this calculation the anions = Alkalinity, Chloride, Nitrate, Boron and Sulphate and the cations = Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.01 %
Fluoride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrite - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Bromide	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Hydrogen Sulphide	APHA Online Edition Method 4500-S2 part H and is calculated from Sulphide, Temperature, Total Dissolved Solids, and pH results. If temperature has not been provided a default value of 15'C will be used.	0.05 g/m³
Cyanide	Discrete Analyser. In House method based on APHA Online Edition Method 4500-CN- C & E.	0.005 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Calcium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.05 g/m³
Magnesium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Boron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified)	0.005 g/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Manganese - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Potassium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion based on APHA Online Edition 4500-P B & Wat, Res., 17 (1983).	0.005 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion based on APHA Online Edition 4500-N C & Wat, Res., 17 (1983)	0.05 g/m³
Mercury - Acid Soluble	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Onsite Observation Methodology:

Test	Methodology	Detection Limit
Temperature	Analysed on site by sampler.	0.1 Deg C

Unless otherwise stated, all tests are performed in Wellington.
The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

eurofins | ELS

Eurofins ELS Limited

Kapiti Coast District Council -
Sewage Treatment Plant
Sewage Treatment Plant
Mazengarb Road
Paraparaumu 5254
Attention: Kim Wearne

Analytical Report

Report Number: 20/64351
Issue: 01-1
07 December 2020

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
20/64351-01	Kapiti Coast District Council - Supplementary Bore		30/11/2020 10:07	30/11/2020 13:27	344534

Notes: K12 204828 Box 6

	Test	Result	Units	Test Date	Signatory
0001	pH	7.7		30/11/2020	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	0.1	g/m³	01/12/2020	Amit Kumar KTP
0052	Alkalinity - Total	83	g CaCO3/m³	30/11/2020	Gordon McArthur KTP
0055	Conductivity at 25°C	51.1	mS/m	30/11/2020	Gordon McArthur KTP
0055B	Total Dissolved Solids	281	g/m³	01/12/2020	Gordon McArthur KTP
0062	Sulphide - Total	< 0.2	g/m³	01/12/2020	Jennifer Mont KTP
0073	Bicarbonate	82	g CaCO3/m³	01/12/2020	Gordon McArthur .
0076	Free CO2	3	g CO2/m³	01/12/2020	Gordon McArthur .
0590	Anion Sum	4.23 *	meq/L	04/12/2020	Yvette Ibe
0591	Cation Sum	4.76 *	meq/L	07/12/2020	Divina Lagazon KTP
0592	Ion Balance	5.82 *	%	07/12/2020	Divina Lagazon KTP
0601	Fluoride	0.08	g/m³	04/12/2020	Divina Lagazon KTP
0602	Chloride	89.7	g/m³	04/12/2020	Divina Lagazon KTP
0603	Nitrite - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0604	Bromide	0.28	g/m³	04/12/2020	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0607	Sulphate	15.4	g/m³	04/12/2020	Divina Lagazon KTP
0680	Hydrogen Sulphide	< 0.05	g/m³	04/12/2020	Jennifer Mont .
0725	Cyanide	< 0.005	g/m³	07/12/2020	Divina Lagazon KTP
0760	Ammonia Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
1610	Calcium - Acid Soluble	17.7	g/m³	01/12/2020	Shanel Kumar KTP
1622	Magnesium - Acid Soluble	8.91	g/m³	01/12/2020	Shanel Kumar KTP
1642	Total Hardness	81	g CaCO3/m³	01/12/2020	Shanel Kumar KTP
1806	Boron - Dissolved	0.404	g/m³	01/12/2020	Amit Kumar KTP
1810	Calcium - Dissolved	17.5	g/m³	01/12/2020	Amit Kumar KTP
1819	Iron - Dissolved	0.007	g/m³	01/12/2020	Amit Kumar KTP
1822	Magnesium - Dissolved	8.94	g/m³	01/12/2020	Amit Kumar KTP
1823	Manganese - Dissolved	0.015	g/m³	01/12/2020	Amit Kumar KTP
1829	Potassium - Dissolved	1.87	g/m³	01/12/2020	Amit Kumar KTP
1834	Sodium - Dissolved	71.1	g/m³	01/12/2020	Amit Kumar KTP
2080	Total Phosphorus	0.040	g/m³	02/12/2020	Divina Lagazon KTP
2088	Dissolved Reactive Phosphorus	0.042	g/m³	04/12/2020	Divina Lagazon KTP
2127	Total Nitrogen	< 0.05	g/m³	02/12/2020	Divina Lagazon KTP
6022	Mercury - Acid Soluble	< 0.0005	g/m³	01/12/2020	Shanel Kumar KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	01/12/2020	Shuyu Zhao KTP
6711	Chromium - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6713	Copper - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6718	Lead - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6730	Silver - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6738	Zinc - Dissolved	< 0.002	g/m³	01/12/2020	Shuyu Zhao KTP
O1311	Temperature	14.8	Deg C	01/12/2020	Chen Lin .
P1859	Sample Filtration	Completed		01/12/2020	Harsimran Dhanoa .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Wellington
85 Port Road, Seaview
Lower Hutt 5045
Phone: (04) 576-5016

Rolleston
43 Detroit Drive
Rolleston 7675
Phone: (03) 343-5227

Dunedin
16 Lorne Street
South Dunedin 9012
Phone: (03) 972-7963

Email: reportselsnz@eurofins.com Website: http://www.eurofins.co.nz

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Total Dissolved Solids	Conductivity reading in mS/m x 5.5. The result by this method should be considered approximate only.	1 g/m³
Sulphide - Total	APHA Online Edition Method 4500-S2 parts B,C and F	0.2 g/m³
Bicarbonate	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CaCO3/m³
Free CO2	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CO2/m³
Anion Sum	Calculation of the anion sum in miliequivalents per litre. The following accredited tests are used in the calculation: Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in miliequivalents per litre. The following accredited tests are used in the calculation: Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculated from laboratory accredited results following APHA Online Edition 1030E.1: (Cation Sum - Anion Sum) / (Anion Sum + Cation Sum). For this calculation the anions = Alkalinity, Chloride, Nitrate, Boron and Sulphate and the cations = Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.01 %
Fluoride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrite - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Bromide	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Hydrogen Sulphide	APHA Online Edition Method 4500-S2 part H and is calculated from Sulphide, Temperature, Total Dissolved Solids, and pH results. If temperature has not been provided a default value of 15'C will be used.	0.05 g/m³
Cyanide	Discrete Analyser. In House method based on APHA Online Edition Method 4500-CN- C & E.	0.005 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Calcium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.05 g/m³
Magnesium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Boron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified)	0.005 g/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Manganese - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Potassium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion based on APHA Online Edition 4500-P B & Wat, Res., 17 (1983).	0.005 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion based on APHA Online Edition 4500-N C & Wat, Res., 17 (1983)	0.05 g/m³
Mercury - Acid Soluble	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Onsite Observation Methodology:

Test	Methodology	Detection Limit
Temperature	Analysed on site by sampler.	0.1 Deg C

Unless otherwise stated, all tests are performed in Wellington.
The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

eurofins | ELS

Eurofins ELS Limited

Kapiti Coast District Council -
Sewage Treatment Plant
Sewage Treatment Plant
Mazengarb Road
Paraparaumu 5254
Attention: Kim Wearne

Analytical Report

Report Number: 20/64347
Issue: 01-1
07 December 2020

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
20/64347-01	Kapiti Coast District Council - Supplementary Bore		30/11/2020 09:05	30/11/2020 13:27	344534

Notes: K64 204826 Box 4

	Test	Result	Units	Test Date	Signatory
0001	pH	7.7		30/11/2020	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	0.2	g/m³	01/12/2020	Amit Kumar KTP
0052	Alkalinity - Total	177	g CaCO3/m³	30/11/2020	Gordon McArthur KTP
0055	Conductivity at 25°C	126	mS/m	30/11/2020	Gordon McArthur KTP
0055B	Total Dissolved Solids	692	g/m³	01/12/2020	Gordon McArthur KTP
0062	Sulphide - Total	< 0.2	g/m³	01/12/2020	Jennifer Mont KTP
0073	Bicarbonate	176	g CaCO3/m³	01/12/2020	Gordon McArthur .
0076	Free CO2	6	g CO2/m³	01/12/2020	Gordon McArthur .
0590	Anion Sum	10.6 *	meq/L	04/12/2020	Yvette Ibe
0591	Cation Sum	10.0 *	meq/L	07/12/2020	Divina Lagazon KTP
0592	Ion Balance	2.62 *	%	07/12/2020	Divina Lagazon KTP
0601	Fluoride	0.03	g/m³	04/12/2020	Divina Lagazon KTP
0602	Chloride	270	g/m³	04/12/2020	Divina Lagazon KTP
0603	Nitrite - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0604	Bromide	1.02	g/m³	04/12/2020	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0607	Sulphate	1.88	g/m³	04/12/2020	Divina Lagazon KTP
0680	Hydrogen Sulphide	< 0.05	g/m³	04/12/2020	Jennifer Mont .
0725	Cyanide	< 0.005	g/m³	07/12/2020	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.08	g/m³	04/12/2020	Divina Lagazon KTP
1610	Calcium - Acid Soluble	41.7	g/m³	01/12/2020	Shanel Kumar KTP
1622	Magnesium - Acid Soluble	12.6	g/m³	01/12/2020	Shanel Kumar KTP
1642	Total Hardness	156	g CaCO3/m³	01/12/2020	Shanel Kumar KTP
1806	Boron - Dissolved	0.254	g/m³	01/12/2020	Amit Kumar KTP
1810	Calcium - Dissolved	42.7	g/m³	01/12/2020	Amit Kumar KTP
1819	Iron - Dissolved	< 0.005	g/m³	01/12/2020	Amit Kumar KTP
1822	Magnesium - Dissolved	13.0	g/m³	01/12/2020	Amit Kumar KTP
1823	Manganese - Dissolved	0.031	g/m³	01/12/2020	Amit Kumar KTP
1829	Potassium - Dissolved	7.76	g/m³	01/12/2020	Amit Kumar KTP
1834	Sodium - Dissolved	154	g/m³	01/12/2020	Amit Kumar KTP
2080	Total Phosphorus	0.025	g/m³	02/12/2020	Divina Lagazon KTP
2088	Dissolved Reactive Phosphorus	0.029	g/m³	04/12/2020	Divina Lagazon KTP
2127	Total Nitrogen	0.07	g/m³	02/12/2020	Divina Lagazon KTP
6022	Mercury - Acid Soluble	< 0.0005	g/m³	01/12/2020	Shanel Kumar KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	01/12/2020	Shuyu Zhao KTP
6711	Chromium - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6713	Copper - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6718	Lead - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6730	Silver - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6738	Zinc - Dissolved	< 0.002	g/m³	01/12/2020	Shuyu Zhao KTP
O1311	Temperature	14.8	Deg C	01/12/2020	Chen Lin .
P1859	Sample Filtration	Completed		01/12/2020	Harsimran Dhanoa .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Wellington
85 Port Road, Seaview
Lower Hutt 5045
Phone: (04) 576-5016

Rolleston
43 Detroit Drive
Rolleston 7675
Phone: (03) 343-5227

Dunedin
16 Lorne Street
South Dunedin 9012
Phone: (03) 972-7963

Email: reportselsnz@eurofins.com Website: http://www.eurofins.co.nz

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Total Dissolved Solids	Conductivity reading in mS/m x 5.5. The result by this method should be considered approximate only.	1 g/m³
Sulphide - Total	APHA Online Edition Method 4500-S2 parts B,C and F	0.2 g/m³
Bicarbonate	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CaCO3/m³
Free CO2	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CO2/m³
Anion Sum	Calculation of the anion sum in miliequivalents per litre. The following accredited tests are used in the calculation: Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in miliequivalents per litre. The following accredited tests are used in the calculation: Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculated from laboratory accredited results following APHA Online Edition 1030E.1: (Cation Sum - Anion Sum) / (Anion Sum + Cation Sum). For this calculation the anions = Alkalinity, Chloride, Nitrate, Boron and Sulphate and the cations = Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.01 %
Fluoride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrite - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Bromide	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Hydrogen Sulphide	APHA Online Edition Method 4500-S2 part H and is calculated from Sulphide, Temperature, Total Dissolved Solids, and pH results. If temperature has not been provided a default value of 15'C will be used.	0.05 g/m³
Cyanide	Discrete Analyser. In House method based on APHA Online Edition Method 4500-CN- C & E.	0.005 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Calcium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.05 g/m³
Magnesium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Boron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified)	0.005 g/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Manganese - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Potassium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion based on APHA Online Edition 4500-P B & Wat, Res., 17 (1983).	0.005 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion based on APHA Online Edition 4500-N C & Wat, Res., 17 (1983)	0.05 g/m³
Mercury - Acid Soluble	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Onsite Observation Methodology:

Test	Methodology	Detection Limit
Temperature	Analysed on site by sampler.	0.1 Deg C

Unless otherwise stated, all tests are performed in Wellington.
The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

eurofins | ELS

Eurofins ELS Limited

Kapiti Coast District Council -
Sewage Treatment Plant
Sewage Treatment Plant
Mazengarb Road
Paraparaumu 5254
Attention: Kim Wearne

Analytical Report

Report Number: 20/64352
Issue: 01-1
07 December 2020

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
20/64352-01	Kapiti Coast District Council - Supplementary Bore		30/11/2020 09:54	30/11/2020 13:27	344534

Notes: KB7 204829 Box 7

	Test	Result	Units	Test Date	Signatory
0001	pH	7.8		30/11/2020	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	< 0.1	g/m³	01/12/2020	Amit Kumar KTP
0052	Alkalinity - Total	93	g CaCO3/m³	30/11/2020	Gordon McArthur KTP
0055	Conductivity at 25°C	77.3	mS/m	30/11/2020	Gordon McArthur KTP
0055B	Total Dissolved Solids	425	g/m³	01/12/2020	Gordon McArthur KTP
0062	Sulphide - Total	< 0.2	g/m³	01/12/2020	Jennifer Mont KTP
0073	Bicarbonate	92	g CaCO3/m³	01/12/2020	Gordon McArthur .
0076	Free CO2	3	g CO2/m³	01/12/2020	Gordon McArthur .
0590	Anion Sum	6.48 *	meq/L	04/12/2020	Yvette Ibe
0591	Cation Sum	6.28 *	meq/L	07/12/2020	Divina Lagazon KTP
0592	Ion Balance	1.57 *	%	07/12/2020	Divina Lagazon KTP
0601	Fluoride	0.06	g/m³	04/12/2020	Divina Lagazon KTP
0602	Chloride	164	g/m³	04/12/2020	Divina Lagazon KTP
0603	Nitrite - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0604	Bromide	0.51	g/m³	04/12/2020	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0607	Sulphate	13.4	g/m³	04/12/2020	Divina Lagazon KTP
0680	Hydrogen Sulphide	< 0.05	g/m³	04/12/2020	Jennifer Mont .
0725	Cyanide	< 0.005	g/m³	07/12/2020	Divina Lagazon KTP
0760	Ammonia Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
1610	Calcium - Acid Soluble	18.2	g/m³	01/12/2020	Shanel Kumar KTP
1622	Magnesium - Acid Soluble	10.5	g/m³	01/12/2020	Shanel Kumar KTP
1642	Total Hardness	89	g CaCO3/m³	01/12/2020	Shanel Kumar KTP
1806	Boron - Dissolved	0.523	g/m³	01/12/2020	Amit Kumar KTP
1810	Calcium - Dissolved	18.2	g/m³	01/12/2020	Amit Kumar KTP
1819	Iron - Dissolved	< 0.005	g/m³	01/12/2020	Amit Kumar KTP
1822	Magnesium - Dissolved	10.6	g/m³	01/12/2020	Amit Kumar KTP
1823	Manganese - Dissolved	0.010	g/m³	01/12/2020	Amit Kumar KTP
1829	Potassium - Dissolved	3.01	g/m³	01/12/2020	Amit Kumar KTP
1834	Sodium - Dissolved	102	g/m³	01/12/2020	Amit Kumar KTP
2080	Total Phosphorus	0.027	g/m³	02/12/2020	Divina Lagazon KTP
2088	Dissolved Reactive Phosphorus	0.024	g/m³	04/12/2020	Divina Lagazon KTP
2127	Total Nitrogen	< 0.05	g/m³	02/12/2020	Divina Lagazon KTP
6022	Mercury - Acid Soluble	< 0.0005	g/m³	01/12/2020	Shanel Kumar KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	01/12/2020	Shuyu Zhao KTP
6711	Chromium - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6713	Copper - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6718	Lead - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6730	Silver - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6738	Zinc - Dissolved	< 0.002	g/m³	01/12/2020	Shuyu Zhao KTP
O1311	Temperature	15.2	Deg C	01/12/2020	Chen Lin .
P1859	Sample Filtration	Completed		01/12/2020	Harsimran Dhanoa .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Wellington
85 Port Road, Seaview
Lower Hutt 5045
Phone: (04) 576-5016

Rolleston
43 Detroit Drive
Rolleston 7675
Phone: (03) 343-5227

Dunedin
16 Lorne Street
South Dunedin 9012
Phone: (03) 972-7963

Email: reportselsnz@eurofins.com Website: http://www.eurofins.co.nz

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Total Dissolved Solids	Conductivity reading in mS/m x 5.5. The result by this method should be considered approximate only.	1 g/m³
Sulphide - Total	APHA Online Edition Method 4500-S2 parts B,C and F	0.2 g/m³
Bicarbonate	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CaCO3/m³
Free CO2	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CO2/m³
Anion Sum	Calculation of the anion sum in miliequivalents per litre. The following accredited tests are used in the calculation: Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in miliequivalents per litre. The following accredited tests are used in the calculation: Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculated from laboratory accredited results following APHA Online Edition 1030E.1: (Cation Sum - Anion Sum) / (Anion Sum + Cation Sum). For this calculation the anions = Alkalinity, Chloride, Nitrate, Boron and Sulphate and the cations = Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.01 %
Fluoride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrite - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Bromide	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Hydrogen Sulphide	APHA Online Edition Method 4500-S2 part H and is calculated from Sulphide, Temperature, Total Dissolved Solids, and pH results. If temperature has not been provided a default value of 15'C will be used.	0.05 g/m³
Cyanide	Discrete Analyser. In House method based on APHA Online Edition Method 4500-CN- C & E.	0.005 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Calcium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.05 g/m³
Magnesium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Boron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified)	0.005 g/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Manganese - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Potassium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion based on APHA Online Edition 4500-P B & Wat, Res., 17 (1983).	0.005 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion based on APHA Online Edition 4500-N C & Wat, Res., 17 (1983)	0.05 g/m³
Mercury - Acid Soluble	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Onsite Observation Methodology:

Test	Methodology	Detection Limit
Temperature	Analysed on site by sampler.	0.1 Deg C

Unless otherwise stated, all tests are performed in Wellington.
The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

eurofins | ELS

Eurofins ELS Limited

Kapiti Coast District Council -
Sewage Treatment Plant
Sewage Treatment Plant
Mazengarb Road
Paraparaumu 5254
Attention: Kim Wearne

Analytical Report

Report Number: 20/64353
Issue: 01-1
07 December 2020

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
20/64353-01	Kapiti Coast District Council - Supplementary Bore		30/11/2020 08:21	30/11/2020 13:27	344534

Notes: N2 204830 Box 8

	Test	Result	Units	Test Date	Signatory
0001	pH	7.5		30/11/2020	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	0.2	g/m³	01/12/2020	Amit Kumar KTP
0052	Alkalinity - Total	71	g CaCO3/m³	30/11/2020	Gordon McArthur KTP
0055	Conductivity at 25°C	43.4	mS/m	30/11/2020	Gordon McArthur KTP
0055B	Total Dissolved Solids	239	g/m³	01/12/2020	Gordon McArthur KTP
0062	Sulphide - Total	< 0.2	g/m³	01/12/2020	Jennifer Mont KTP
0073	Bicarbonate	71	g CaCO3/m³	01/12/2020	Gordon McArthur .
0076	Free CO2	5	g CO2/m³	01/12/2020	Gordon McArthur .
0590	Anion Sum	3.61 *	meq/L	03/12/2020	Yvette Ibe
0591	Cation Sum	4.10 *	meq/L	07/12/2020	Divina Lagazon KTP
0592	Ion Balance	6.33 *	%	07/12/2020	Divina Lagazon KTP
0601	Fluoride	0.16	g/m³	03/12/2020	Divina Lagazon KTP
0602	Chloride	72.2	g/m³	03/12/2020	Divina Lagazon KTP
0603	Nitrite - Nitrogen	< 0.01	g/m³	03/12/2020	Divina Lagazon KTP
0604	Bromide	0.23	g/m³	03/12/2020	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	03/12/2020	Divina Lagazon KTP
0607	Sulphate	19.7	g/m³	03/12/2020	Divina Lagazon KTP
0680	Hydrogen Sulphide	< 0.05	g/m³	04/12/2020	Jennifer Mont .
0725	Cyanide	< 0.005	g/m³	07/12/2020	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.05	g/m³	04/12/2020	Divina Lagazon KTP
1610	Calcium - Acid Soluble	28.9	g/m³	01/12/2020	Shanel Kumar KTP
1622	Magnesium - Acid Soluble	7.14	g/m³	01/12/2020	Shanel Kumar KTP
1642	Total Hardness	102	g CaCO3/m³	01/12/2020	Shanel Kumar KTP
1806	Boron - Dissolved	0.068	g/m³	01/12/2020	Amit Kumar KTP
1810	Calcium - Dissolved	29.6	g/m³	01/12/2020	Amit Kumar KTP
1819	Iron - Dissolved	0.010	g/m³	01/12/2020	Amit Kumar KTP
1822	Magnesium - Dissolved	7.42	g/m³	01/12/2020	Amit Kumar KTP
1823	Manganese - Dissolved	0.095	g/m³	01/12/2020	Amit Kumar KTP
1829	Potassium - Dissolved	3.13	g/m³	01/12/2020	Amit Kumar KTP
1834	Sodium - Dissolved	45.6	g/m³	01/12/2020	Amit Kumar KTP
2080	Total Phosphorus	0.128	g/m³	02/12/2020	Divina Lagazon KTP
2088	Dissolved Reactive Phosphorus	0.116	g/m³	04/12/2020	Divina Lagazon KTP
2127	Total Nitrogen	< 0.05	g/m³	02/12/2020	Divina Lagazon KTP
6022	Mercury - Acid Soluble	< 0.0005	g/m³	01/12/2020	Shanel Kumar KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	01/12/2020	Shuyu Zhao KTP
6711	Chromium - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6713	Copper - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6718	Lead - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6730	Silver - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6738	Zinc - Dissolved	< 0.002	g/m³	01/12/2020	Shuyu Zhao KTP
O1311	Temperature	14.5	Deg C	01/12/2020	Chen Lin .
P1859	Sample Filtration	Completed		01/12/2020	Harsimran Dhanoa .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Total Dissolved Solids	Conductivity reading in mS/m x 5.5. The result by this method should be considered approximate only.	1 g/m³
Sulphide - Total	APHA Online Edition Method 4500-S2 parts B,C and F	0.2 g/m³
Bicarbonate	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CaCO3/m³
Free CO2	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CO2/m³
Anion Sum	Calculation of the anion sum in miliequivalents per litre. The following accredited tests are used in the calculation: Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in miliequivalents per litre. The following accredited tests are used in the calculation: Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculated from laboratory accredited results following APHA Online Edition 1030E.1: (Cation Sum - Anion Sum) / (Anion Sum + Cation Sum). For this calculation the anions = Alkalinity, Chloride, Nitrate, Boron and Sulphate and the cations = Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.01 %
Fluoride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrite - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Bromide	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Hydrogen Sulphide	APHA Online Edition Method 4500-S2 part H and is calculated from Sulphide, Temperature, Total Dissolved Solids, and pH results. If temperature has not been provided a default value of 15'C will be used.	0.05 g/m³
Cyanide	Discrete Analyser. In House method based on APHA Online Edition Method 4500-CN- C & E.	0.005 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Calcium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.05 g/m³
Magnesium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Boron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified)	0.005 g/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Manganese - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Potassium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion based on APHA Online Edition 4500-P B & Wat, Res., 17 (1983).	0.005 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion based on APHA Online Edition 4500-N C & Wat, Res., 17 (1983)	0.05 g/m³
Mercury - Acid Soluble	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Onsite Observation Methodology:

Test	Methodology	Detection Limit
Temperature	Analysed on site by sampler.	0.1 Deg C

Unless otherwise stated, all tests are performed in Wellington.
The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

eurofins | ELS

Eurofins ELS Limited

Kapiti Coast District Council -
Sewage Treatment Plant
Sewage Treatment Plant
Mazengarb Road
Paraparaumu 5254
Attention: Kim Wearne

Analytical Report

Report Number: 20/64344
Issue: 01-1
07 December 2020

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
20/64344-01	Kapiti Coast District Council - Supplementary Bore		30/11/2020 09:22	30/11/2020 13:27	344534

Notes: K4 204823 Box 1

	Test	Result	Units	Test Date	Signatory
0001	pH	7.4		30/11/2020	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	0.8	g/m³	01/12/2020	Amit Kumar KTP
0052	Alkalinity - Total	99	g CaCO3/m³	30/11/2020	Gordon McArthur KTP
0055	Conductivity at 25°C	48.6	mS/m	30/11/2020	Gordon McArthur KTP
0055B	Total Dissolved Solids	267	g/m³	01/12/2020	Gordon McArthur KTP
0062	Sulphide - Total	< 0.2	g/m³	01/12/2020	Jennifer Mont KTP
0073	Bicarbonate	99	g CaCO3/m³	01/12/2020	Gordon McArthur .
0076	Free CO2	8	g CO2/m³	01/12/2020	Gordon McArthur .
0590	Anion Sum	4.00 *	meq/L	04/12/2020	Yvette Ibe
0591	Cation Sum	4.60 *	meq/L	07/12/2020	Divina Lagazon KTP
0592	Ion Balance	7.06 *	%	07/12/2020	Divina Lagazon KTP
0601	Fluoride	0.20	g/m³	04/12/2020	Divina Lagazon KTP
0602	Chloride	73.9	g/m³	04/12/2020	Divina Lagazon KTP
0603	Nitrite - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0604	Bromide	0.24	g/m³	04/12/2020	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0607	Sulphate	13.5	g/m³	04/12/2020	Divina Lagazon KTP
0680	Hydrogen Sulphide	< 0.05	g/m³	04/12/2020	Jennifer Mont .
0725	Cyanide	< 0.005	g/m³	07/12/2020	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.02	g/m³	04/12/2020	Divina Lagazon KTP
1610	Calcium - Acid Soluble	3.84	g/m³	01/12/2020	Shanel Kumar KTP
1622	Magnesium - Acid Soluble	4.09	g/m³	01/12/2020	Shanel Kumar KTP
1642	Total Hardness	26	g CaCO3/m³	01/12/2020	Shanel Kumar KTP
1806	Boron - Dissolved	0.100	g/m³	01/12/2020	Amit Kumar KTP
1810	Calcium - Dissolved	3.71	g/m³	01/12/2020	Amit Kumar KTP
1819	Iron - Dissolved	0.014	g/m³	01/12/2020	Amit Kumar KTP
1822	Magnesium - Dissolved	3.99	g/m³	01/12/2020	Amit Kumar KTP
1823	Manganese - Dissolved	0.135	g/m³	01/12/2020	Amit Kumar KTP
1829	Potassium - Dissolved	1.73	g/m³	01/12/2020	Amit Kumar KTP
1834	Sodium - Dissolved	92.7	g/m³	01/12/2020	Amit Kumar KTP
2080	Total Phosphorus	0.099	g/m³	02/12/2020	Divina Lagazon KTP
2088	Dissolved Reactive Phosphorus	0.096	g/m³	04/12/2020	Divina Lagazon KTP
2127	Total Nitrogen	< 0.05	g/m³	02/12/2020	Divina Lagazon KTP
6022	Mercury - Acid Soluble	< 0.0005	g/m³	01/12/2020	Shanel Kumar KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	01/12/2020	Shuyu Zhao KTP
6711	Chromium - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6713	Copper - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6718	Lead - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6730	Silver - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6738	Zinc - Dissolved	< 0.002	g/m³	01/12/2020	Shuyu Zhao KTP
O1311	Temperature	14.6	Deg C	30/11/2020	Chen Lin .
P1859	Sample Filtration	Completed		01/12/2020	Harsimran Dhanoa .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Total Dissolved Solids	Conductivity reading in mS/m x 5.5. The result by this method should be considered approximate only.	1 g/m³
Sulphide - Total	APHA Online Edition Method 4500-S2 parts B,C and F	0.2 g/m³
Bicarbonate	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CaCO3/m³
Free CO2	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CO2/m³
Anion Sum	Calculation of the anion sum in miliequivalents per litre. The following accredited tests are used in the calculation: Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in miliequivalents per litre. The following accredited tests are used in the calculation: Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculated from laboratory accredited results following APHA Online Edition 1030E.1: (Cation Sum - Anion Sum) / (Anion Sum + Cation Sum). For this calculation the anions = Alkalinity, Chloride, Nitrate, Boron and Sulphate and the cations = Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.01 %
Fluoride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrite - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Bromide	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Hydrogen Sulphide	APHA Online Edition Method 4500-S2 part H and is calculated from Sulphide, Temperature, Total Dissolved Solids, and pH results. If temperature has not been provided a default value of 15'C will be used.	0.05 g/m³
Cyanide	Discrete Analyser. In House method based on APHA Online Edition Method 4500-CN- C & E.	0.005 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Calcium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.05 g/m³
Magnesium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Boron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified)	0.005 g/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Manganese - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Potassium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion based on APHA Online Edition 4500-P B & Wat, Res., 17 (1983).	0.005 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion based on APHA Online Edition 4500-N C & Wat, Res., 17 (1983)	0.05 g/m³
Mercury - Acid Soluble	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Onsite Observation Methodology:

Test	Methodology	Detection Limit
Temperature	Analysed on site by sampler.	0.1 Deg C

Unless otherwise stated, all tests are performed in Wellington.
The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

eurofins | ELS

Eurofins ELS Limited

Kapiti Coast District Council -
Sewage Treatment Plant
Sewage Treatment Plant
Mazengarb Road
Paraparaumu 5254
Attention: Kim Wearne

Analytical Report

Report Number: 20/64345
Issue: 01-1
07 December 2020

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
20/64345-01	Kapiti Coast District Council - Supplementary Bore		30/11/2020 09:33	30/11/2020 13:27	344534

Notes: K5 204824 Box 2

	Test	Result	Units	Test Date	Signatory
0001	pH	8.0		30/11/2020	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	0.3	g/m³	01/12/2020	Amit Kumar KTP
0052	Alkalinity - Total	225	g CaCO3/m³	30/11/2020	Gordon McArthur KTP
0055	Conductivity at 25°C	111	mS/m	30/11/2020	Gordon McArthur KTP
0055B	Total Dissolved Solids	610	g/m³	01/12/2020	Gordon McArthur KTP
0062	Sulphide - Total	< 0.2	g/m³	01/12/2020	Jennifer Mont KTP
0073	Bicarbonate	223	g CaCO3/m³	01/12/2020	Gordon McArthur .
0076	Free CO2	5	g CO2/m³	01/12/2020	Gordon McArthur .
0590	Anion Sum	9.31 *	meq/L	04/12/2020	Yvette Ibe
0591	Cation Sum	8.87 *	meq/L	07/12/2020	Divina Lagazon KTP
0592	Ion Balance	2.41 *	%	07/12/2020	Divina Lagazon KTP
0601	Fluoride	0.05	g/m³	04/12/2020	Divina Lagazon KTP
0602	Chloride	199	g/m³	04/12/2020	Divina Lagazon KTP
0603	Nitrite - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0604	Bromide	0.74	g/m³	04/12/2020	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0607	Sulphate	0.37	g/m³	04/12/2020	Divina Lagazon KTP
0680	Hydrogen Sulphide	< 0.05	g/m³	04/12/2020	Jennifer Mont .
0725	Cyanide	< 0.005	g/m³	07/12/2020	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.34	g/m³	04/12/2020	Divina Lagazon KTP
1610	Calcium - Acid Soluble	34.4	g/m³	01/12/2020	Shanel Kumar KTP
1622	Magnesium - Acid Soluble	13.9	g/m³	01/12/2020	Shanel Kumar KTP
1642	Total Hardness	143	g CaCO3/m³	01/12/2020	Shanel Kumar KTP
1806	Boron - Dissolved	0.499	g/m³	01/12/2020	Amit Kumar KTP
1810	Calcium - Dissolved	34.2	g/m³	01/12/2020	Amit Kumar KTP
1819	Iron - Dissolved	0.005	g/m³	01/12/2020	Amit Kumar KTP
1822	Magnesium - Dissolved	14.3	g/m³	01/12/2020	Amit Kumar KTP
1823	Manganese - Dissolved	0.072	g/m³	01/12/2020	Amit Kumar KTP
1829	Potassium - Dissolved	8.53	g/m³	01/12/2020	Amit Kumar KTP
1834	Sodium - Dissolved	133	g/m³	01/12/2020	Amit Kumar KTP
2080	Total Phosphorus	0.102	g/m³	02/12/2020	Divina Lagazon KTP
2088	Dissolved Reactive Phosphorus	0.099	g/m³	04/12/2020	Divina Lagazon KTP
2127	Total Nitrogen	0.31	g/m³	02/12/2020	Divina Lagazon KTP
6022	Mercury - Acid Soluble	< 0.0005	g/m³	01/12/2020	Shanel Kumar KTP
6703	Arsenic - Dissolved	0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	01/12/2020	Shuyu Zhao KTP
6711	Chromium - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6713	Copper - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6718	Lead - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6730	Silver - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6738	Zinc - Dissolved	< 0.002	g/m³	01/12/2020	Shuyu Zhao KTP
O1311	Temperature	15.3	Deg C	01/12/2020	Chen Lin .
P1859	Sample Filtration	Completed		01/12/2020	Harsimran Dhanoa .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Wellington
85 Port Road, Seaview
Lower Hutt 5045
Phone: (04) 576-5016

Rolleston
43 Detroit Drive
Rolleston 7675
Phone: (03) 343-5227

Dunedin
16 Lorne Street
South Dunedin 9012
Phone: (03) 972-7963

Email: reportselsnz@eurofins.com Website: http://www.eurofins.co.nz

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Total Dissolved Solids	Conductivity reading in mS/m x 5.5. The result by this method should be considered approximate only.	1 g/m³
Sulphide - Total	APHA Online Edition Method 4500-S2 parts B,C and F	0.2 g/m³
Bicarbonate	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CaCO3/m³
Free CO2	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CO2/m³
Anion Sum	Calculation of the anion sum in miliequivalents per litre. The following accredited tests are used in the calculation: Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in miliequivalents per litre. The following accredited tests are used in the calculation: Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculated from laboratory accredited results following APHA Online Edition 1030E.1: (Cation Sum - Anion Sum) / (Anion Sum + Cation Sum). For this calculation the anions = Alkalinity, Chloride, Nitrate, Boron and Sulphate and the cations = Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.01 %
Fluoride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrite - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Bromide	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Hydrogen Sulphide	APHA Online Edition Method 4500-S2 part H and is calculated from Sulphide, Temperature, Total Dissolved Solids, and pH results. If temperature has not been provided a default value of 15'C will be used.	0.05 g/m³
Cyanide	Discrete Analyser. In House method based on APHA Online Edition Method 4500-CN- C & E.	0.005 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Calcium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.05 g/m³
Magnesium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Boron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified)	0.005 g/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Manganese - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Potassium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion based on APHA Online Edition 4500-P B & Wat, Res., 17 (1983).	0.005 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion based on APHA Online Edition 4500-N C & Wat, Res., 17 (1983)	0.05 g/m³
Mercury - Acid Soluble	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Onsite Observation Methodology:

Test	Methodology	Detection Limit
Temperature	Analysed on site by sampler.	0.1 Deg C

Unless otherwise stated, all tests are performed in Wellington.
The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

eurofins | ELS

Eurofins ELS Limited

Kapiti Coast District Council -
Sewage Treatment Plant
Sewage Treatment Plant
Mazengarb Road
Paraparaumu 5254
Attention: Kim Wearne

Analytical Report

Report Number: 20/64346
Issue: 01-1
07 December 2020

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
20/64346-01	Kapiti Coast District Council - Supplementary Bore		30/11/2020 09:43	30/11/2020 13:27	344534

Notes: K6 204825 Box 3

	Test	Result	Units	Test Date	Signatory
0001	pH	7.8		30/11/2020	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	0.4	g/m³	01/12/2020	Amit Kumar KTP
0052	Alkalinity - Total	261	g CaCO3/m³	30/11/2020	Gordon McArthur KTP
0055	Conductivity at 25°C	112	mS/m	30/11/2020	Gordon McArthur KTP
0055B	Total Dissolved Solids	617	g/m³	01/12/2020	Gordon McArthur KTP
0062	Sulphide - Total	< 0.2	g/m³	01/12/2020	Jennifer Mont KTP
0073	Bicarbonate	260	g CaCO3/m³	01/12/2020	Gordon McArthur .
0076	Free CO2	8	g CO2/m³	01/12/2020	Gordon McArthur .
0590	Anion Sum	9.45 *	meq/L	04/12/2020	Yvette Ibe
0591	Cation Sum	9.10 *	meq/L	07/12/2020	Divina Lagazon KTP
0592	Ion Balance	1.90 *	%	07/12/2020	Divina Lagazon KTP
0601	Fluoride	0.04	g/m³	04/12/2020	Divina Lagazon KTP
0602	Chloride	182	g/m³	04/12/2020	Divina Lagazon KTP
0603	Nitrite - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0604	Bromide	0.71	g/m³	04/12/2020	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0607	Sulphate	0.27	g/m³	04/12/2020	Divina Lagazon KTP
0680	Hydrogen Sulphide	< 0.05	g/m³	04/12/2020	Jennifer Mont .
0725	Cyanide	< 0.005	g/m³	07/12/2020	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.48	g/m³	04/12/2020	Divina Lagazon KTP
1610	Calcium - Acid Soluble	34.7	g/m³	01/12/2020	Shanel Kumar KTP
1622	Magnesium - Acid Soluble	15.8	g/m³	01/12/2020	Shanel Kumar KTP
1642	Total Hardness	152	g CaCO3/m³	01/12/2020	Shanel Kumar KTP
1806	Boron - Dissolved	0.758	g/m³	01/12/2020	Amit Kumar KTP
1810	Calcium - Dissolved	35.4	g/m³	01/12/2020	Amit Kumar KTP
1819	Iron - Dissolved	< 0.005	g/m³	01/12/2020	Amit Kumar KTP
1822	Magnesium - Dissolved	16.3	g/m³	01/12/2020	Amit Kumar KTP
1823	Manganese - Dissolved	0.085	g/m³	01/12/2020	Amit Kumar KTP
1829	Potassium - Dissolved	11.0	g/m³	01/12/2020	Amit Kumar KTP
1834	Sodium - Dissolved	132	g/m³	01/12/2020	Amit Kumar KTP
2080	Total Phosphorus	0.077	g/m³	02/12/2020	Divina Lagazon KTP
2088	Dissolved Reactive Phosphorus	0.060	g/m³	04/12/2020	Divina Lagazon KTP
2127	Total Nitrogen	0.43	g/m³	02/12/2020	Divina Lagazon KTP
6022	Mercury - Acid Soluble	< 0.0005	g/m³	01/12/2020	Shanel Kumar KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	01/12/2020	Shuyu Zhao KTP
6711	Chromium - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6713	Copper - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6718	Lead - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6730	Silver - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6738	Zinc - Dissolved	< 0.002	g/m³	01/12/2020	Shuyu Zhao KTP
O1311	Temperature	15.2	Deg C	01/12/2020	Chen Lin .
P1859	Sample Filtration	Completed		01/12/2020	Harsimran Dhanoa .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Wellington
85 Port Road, Seaview
Lower Hutt 5045
Phone: (04) 576-5016

Rolleston
43 Detroit Drive
Rolleston 7675
Phone: (03) 343-5227

Dunedin
16 Lorne Street
South Dunedin 9012
Phone: (03) 972-7963

Email: reportselsnz@eurofins.com Website: http://www.eurofins.co.nz

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Total Dissolved Solids	Conductivity reading in mS/m x 5.5. The result by this method should be considered approximate only.	1 g/m³
Sulphide - Total	APHA Online Edition Method 4500-S2 parts B,C and F	0.2 g/m³
Bicarbonate	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CaCO3/m³
Free CO2	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CO2/m³
Anion Sum	Calculation of the anion sum in miliequivalents per litre. The following accredited tests are used in the calculation: Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in miliequivalents per litre. The following accredited tests are used in the calculation: Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculated from laboratory accredited results following APHA Online Edition 1030E.1: (Cation Sum - Anion Sum) / (Anion Sum + Cation Sum). For this calculation the anions = Alkalinity, Chloride, Nitrate, Boron and Sulphate and the cations = Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.01 %
Fluoride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrite - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Bromide	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Hydrogen Sulphide	APHA Online Edition Method 4500-S2 part H and is calculated from Sulphide, Temperature, Total Dissolved Solids, and pH results. If temperature has not been provided a default value of 15'C will be used.	0.05 g/m³
Cyanide	Discrete Analyser. In House method based on APHA Online Edition Method 4500-CN- C & E.	0.005 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Calcium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.05 g/m³
Magnesium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Boron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified)	0.005 g/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Manganese - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Potassium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion based on APHA Online Edition 4500-P B & Wat, Res., 17 (1983).	0.005 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion based on APHA Online Edition 4500-N C & Wat, Res., 17 (1983)	0.05 g/m³
Mercury - Acid Soluble	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Onsite Observation Methodology:

Test	Methodology	Detection Limit
Temperature	Analysed on site by sampler.	0.1 Deg C

Unless otherwise stated, all tests are performed in Wellington.
The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

eurofins | ELS

Eurofins ELS Limited

Kapiti Coast District Council -
Sewage Treatment Plant
Sewage Treatment Plant
Mazengarb Road
Paraparaumu 5254
Attention: Kim Wearne

Analytical Report

Report Number: 20/64350
Issue: 01-1
07 December 2020

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
20/64350-01	Kapiti Coast District Council - Supplementary Bore		30/11/2020 08:51	30/11/2020 13:27	344534

Notes: K10 204827 Box 5

	Test	Result	Units	Test Date	Signatory
0001	pH	7.7		30/11/2020	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	0.3	g/m³	01/12/2020	Amit Kumar KTP
0052	Alkalinity - Total	201	g CaCO3/m³	30/11/2020	Gordon McArthur KTP
0055	Conductivity at 25°C	81.6	mS/m	30/11/2020	Gordon McArthur KTP
0055B	Total Dissolved Solids	449	g/m³	01/12/2020	Gordon McArthur KTP
0062	Sulphide - Total	< 0.2	g/m³	01/12/2020	Jennifer Mont KTP
0073	Bicarbonate	200	g CaCO3/m³	01/12/2020	Gordon McArthur .
0076	Free CO2	8	g CO2/m³	01/12/2020	Gordon McArthur .
0590	Anion Sum	6.72 *	meq/L	04/12/2020	Yvette Ibe
0591	Cation Sum	8.13 *	meq/L	07/12/2020	Divina Lagazon KTP
0592	Ion Balance	9.50 *	%	07/12/2020	Divina Lagazon KTP
0601	Fluoride	0.03	g/m³	04/12/2020	Divina Lagazon KTP
0602	Chloride	122	g/m³	04/12/2020	Divina Lagazon KTP
0603	Nitrite - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0604	Bromide	0.50	g/m³	04/12/2020	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0607	Sulphate	< 0.02	g/m³	04/12/2020	Divina Lagazon KTP
0680	Hydrogen Sulphide	< 0.05	g/m³	04/12/2020	Jennifer Mont .
0725	Cyanide	< 0.005	g/m³	07/12/2020	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.23	g/m³	04/12/2020	Divina Lagazon KTP
1610	Calcium - Acid Soluble	53.0	g/m³	01/12/2020	Shanel Kumar KTP
1622	Magnesium - Acid Soluble	12.9	g/m³	01/12/2020	Shanel Kumar KTP
1642	Total Hardness	186	g CaCO3/m³	01/12/2020	Shanel Kumar KTP
1806	Boron - Dissolved	0.158	g/m³	01/12/2020	Amit Kumar KTP
1810	Calcium - Dissolved	53.9	g/m³	01/12/2020	Amit Kumar KTP
1819	Iron - Dissolved	< 0.005	g/m³	01/12/2020	Amit Kumar KTP
1822	Magnesium - Dissolved	13.4	g/m³	01/12/2020	Amit Kumar KTP
1823	Manganese - Dissolved	0.163	g/m³	01/12/2020	Amit Kumar KTP
1829	Potassium - Dissolved	8.34	g/m³	01/12/2020	Amit Kumar KTP
1834	Sodium - Dissolved	96.4	g/m³	01/12/2020	Amit Kumar KTP
2080	Total Phosphorus	0.059	g/m³	02/12/2020	Divina Lagazon KTP
2088	Dissolved Reactive Phosphorus	0.046	g/m³	04/12/2020	Divina Lagazon KTP
2127	Total Nitrogen	0.21	g/m³	02/12/2020	Divina Lagazon KTP
6022	Mercury - Acid Soluble	< 0.0005	g/m³	01/12/2020	Shanel Kumar KTP
6703	Arsenic - Dissolved	0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	01/12/2020	Shuyu Zhao KTP
6711	Chromium - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6713	Copper - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6718	Lead - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6730	Silver - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6738	Zinc - Dissolved	< 0.002	g/m³	01/12/2020	Shuyu Zhao KTP
O1311	Temperature	15.2	Deg C	01/12/2020	Chen Lin .
P1859	Sample Filtration	Completed		01/12/2020	Harsimran Dhanoa .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Wellington
85 Port Road, Seaview
Lower Hutt 5045
Phone: (04) 576-5016

Rolleston
43 Detroit Drive
Rolleston 7675
Phone: (03) 343-5227

Dunedin
16 Lorne Street
South Dunedin 9012
Phone: (03) 972-7963

Email: reportselsnz@eurofins.com Website: http://www.eurofins.co.nz

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Total Dissolved Solids	Conductivity reading in mS/m x 5.5. The result by this method should be considered approximate only.	1 g/m³
Sulphide - Total	APHA Online Edition Method 4500-S2 parts B,C and F	0.2 g/m³
Bicarbonate	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CaCO3/m³
Free CO2	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CO2/m³
Anion Sum	Calculation of the anion sum in miliequivalents per litre. The following accredited tests are used in the calculation: Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in miliequivalents per litre. The following accredited tests are used in the calculation: Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculated from laboratory accredited results following APHA Online Edition 1030E.1: (Cation Sum - Anion Sum) / (Anion Sum + Cation Sum). For this calculation the anions = Alkalinity, Chloride, Nitrate, Boron and Sulphate and the cations = Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.01 %
Fluoride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrite - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Bromide	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Hydrogen Sulphide	APHA Online Edition Method 4500-S2 part H and is calculated from Sulphide, Temperature, Total Dissolved Solids, and pH results. If temperature has not been provided a default value of 15'C will be used.	0.05 g/m³
Cyanide	Discrete Analyser. In House method based on APHA Online Edition Method 4500-CN- C & E.	0.005 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Calcium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.05 g/m³
Magnesium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Boron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified)	0.005 g/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Manganese - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Potassium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion based on APHA Online Edition 4500-P B & Wat, Res., 17 (1983).	0.005 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion based on APHA Online Edition 4500-N C & Wat, Res., 17 (1983)	0.05 g/m³
Mercury - Acid Soluble	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Onsite Observation Methodology:

Test	Methodology	Detection Limit
Temperature	Analysed on site by sampler.	0.1 Deg C

Unless otherwise stated, all tests are performed in Wellington.
The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

eurofins | ELS

Eurofins ELS Limited

Kapiti Coast District Council -
Sewage Treatment Plant
Sewage Treatment Plant
Mazengarb Road
Paraparaumu 5254
Attention: Kim Wearne

Analytical Report

Report Number: 20/64351
Issue: 01-1
07 December 2020

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
20/64351-01	Kapiti Coast District Council - Supplementary Bore		30/11/2020 10:07	30/11/2020 13:27	344534

Notes: K12 204828 Box 6

	Test	Result	Units	Test Date	Signatory
0001	pH	7.7		30/11/2020	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	0.1	g/m³	01/12/2020	Amit Kumar KTP
0052	Alkalinity - Total	83	g CaCO3/m³	30/11/2020	Gordon McArthur KTP
0055	Conductivity at 25°C	51.1	mS/m	30/11/2020	Gordon McArthur KTP
0055B	Total Dissolved Solids	281	g/m³	01/12/2020	Gordon McArthur KTP
0062	Sulphide - Total	< 0.2	g/m³	01/12/2020	Jennifer Mont KTP
0073	Bicarbonate	82	g CaCO3/m³	01/12/2020	Gordon McArthur .
0076	Free CO2	3	g CO2/m³	01/12/2020	Gordon McArthur .
0590	Anion Sum	4.23 *	meq/L	04/12/2020	Yvette Ibe
0591	Cation Sum	4.76 *	meq/L	07/12/2020	Divina Lagazon KTP
0592	Ion Balance	5.82 *	%	07/12/2020	Divina Lagazon KTP
0601	Fluoride	0.08	g/m³	04/12/2020	Divina Lagazon KTP
0602	Chloride	89.7	g/m³	04/12/2020	Divina Lagazon KTP
0603	Nitrite - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0604	Bromide	0.28	g/m³	04/12/2020	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0607	Sulphate	15.4	g/m³	04/12/2020	Divina Lagazon KTP
0680	Hydrogen Sulphide	< 0.05	g/m³	04/12/2020	Jennifer Mont .
0725	Cyanide	< 0.005	g/m³	07/12/2020	Divina Lagazon KTP
0760	Ammonia Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
1610	Calcium - Acid Soluble	17.7	g/m³	01/12/2020	Shanel Kumar KTP
1622	Magnesium - Acid Soluble	8.91	g/m³	01/12/2020	Shanel Kumar KTP
1642	Total Hardness	81	g CaCO3/m³	01/12/2020	Shanel Kumar KTP
1806	Boron - Dissolved	0.404	g/m³	01/12/2020	Amit Kumar KTP
1810	Calcium - Dissolved	17.5	g/m³	01/12/2020	Amit Kumar KTP
1819	Iron - Dissolved	0.007	g/m³	01/12/2020	Amit Kumar KTP
1822	Magnesium - Dissolved	8.94	g/m³	01/12/2020	Amit Kumar KTP
1823	Manganese - Dissolved	0.015	g/m³	01/12/2020	Amit Kumar KTP
1829	Potassium - Dissolved	1.87	g/m³	01/12/2020	Amit Kumar KTP
1834	Sodium - Dissolved	71.1	g/m³	01/12/2020	Amit Kumar KTP
2080	Total Phosphorus	0.040	g/m³	02/12/2020	Divina Lagazon KTP
2088	Dissolved Reactive Phosphorus	0.042	g/m³	04/12/2020	Divina Lagazon KTP
2127	Total Nitrogen	< 0.05	g/m³	02/12/2020	Divina Lagazon KTP
6022	Mercury - Acid Soluble	< 0.0005	g/m³	01/12/2020	Shanel Kumar KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	01/12/2020	Shuyu Zhao KTP
6711	Chromium - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6713	Copper - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6718	Lead - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6730	Silver - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6738	Zinc - Dissolved	< 0.002	g/m³	01/12/2020	Shuyu Zhao KTP
O1311	Temperature	14.8	Deg C	01/12/2020	Chen Lin .
P1859	Sample Filtration	Completed		01/12/2020	Harsimran Dhanoa .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Wellington
85 Port Road, Seaview
Lower Hutt 5045
Phone: (04) 576-5016

Rolleston
43 Detroit Drive
Rolleston 7675
Phone: (03) 343-5227

Dunedin
16 Lorne Street
South Dunedin 9012
Phone: (03) 972-7963

Email: reportselsnz@eurofins.com Website: http://www.eurofins.co.nz

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Total Dissolved Solids	Conductivity reading in mS/m x 5.5. The result by this method should be considered approximate only.	1 g/m³
Sulphide - Total	APHA Online Edition Method 4500-S2 parts B,C and F	0.2 g/m³
Bicarbonate	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CaCO3/m³
Free CO2	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CO2/m³
Anion Sum	Calculation of the anion sum in miliequivalents per litre. The following accredited tests are used in the calculation: Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in miliequivalents per litre. The following accredited tests are used in the calculation: Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculated from laboratory accredited results following APHA Online Edition 1030E.1: (Cation Sum - Anion Sum) / (Anion Sum + Cation Sum). For this calculation the anions = Alkalinity, Chloride, Nitrate, Boron and Sulphate and the cations = Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.01 %
Fluoride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrite - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Bromide	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Hydrogen Sulphide	APHA Online Edition Method 4500-S2 part H and is calculated from Sulphide, Temperature, Total Dissolved Solids, and pH results. If temperature has not been provided a default value of 15'C will be used.	0.05 g/m³
Cyanide	Discrete Analyser. In House method based on APHA Online Edition Method 4500-CN- C & E.	0.005 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Calcium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.05 g/m³
Magnesium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Boron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified)	0.005 g/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Manganese - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Potassium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion based on APHA Online Edition 4500-P B & Wat, Res., 17 (1983).	0.005 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion based on APHA Online Edition 4500-N C & Wat, Res., 17 (1983)	0.05 g/m³
Mercury - Acid Soluble	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Onsite Observation Methodology:

Test	Methodology	Detection Limit
Temperature	Analysed on site by sampler.	0.1 Deg C

Unless otherwise stated, all tests are performed in Wellington.
The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

eurofins | ELS

Eurofins ELS Limited

Kapiti Coast District Council -
Sewage Treatment Plant
Sewage Treatment Plant
Mazengarb Road
Paraparaumu 5254
Attention: Kim Wearne

Analytical Report

Report Number: 20/64347
Issue: 01-1
07 December 2020

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
20/64347-01	Kapiti Coast District Council - Supplementary Bore		30/11/2020 09:05	30/11/2020 13:27	344534

Notes: K64 204826 Box 4

	Test	Result	Units	Test Date	Signatory
0001	pH	7.7		30/11/2020	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	0.2	g/m³	01/12/2020	Amit Kumar KTP
0052	Alkalinity - Total	177	g CaCO3/m³	30/11/2020	Gordon McArthur KTP
0055	Conductivity at 25°C	126	mS/m	30/11/2020	Gordon McArthur KTP
0055B	Total Dissolved Solids	692	g/m³	01/12/2020	Gordon McArthur KTP
0062	Sulphide - Total	< 0.2	g/m³	01/12/2020	Jennifer Mont KTP
0073	Bicarbonate	176	g CaCO3/m³	01/12/2020	Gordon McArthur .
0076	Free CO2	6	g CO2/m³	01/12/2020	Gordon McArthur .
0590	Anion Sum	10.6 *	meq/L	04/12/2020	Yvette Ibe
0591	Cation Sum	10.0 *	meq/L	07/12/2020	Divina Lagazon KTP
0592	Ion Balance	2.62 *	%	07/12/2020	Divina Lagazon KTP
0601	Fluoride	0.03	g/m³	04/12/2020	Divina Lagazon KTP
0602	Chloride	270	g/m³	04/12/2020	Divina Lagazon KTP
0603	Nitrite - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0604	Bromide	1.02	g/m³	04/12/2020	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0607	Sulphate	1.88	g/m³	04/12/2020	Divina Lagazon KTP
0680	Hydrogen Sulphide	< 0.05	g/m³	04/12/2020	Jennifer Mont .
0725	Cyanide	< 0.005	g/m³	07/12/2020	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.08	g/m³	04/12/2020	Divina Lagazon KTP
1610	Calcium - Acid Soluble	41.7	g/m³	01/12/2020	Shanel Kumar KTP
1622	Magnesium - Acid Soluble	12.6	g/m³	01/12/2020	Shanel Kumar KTP
1642	Total Hardness	156	g CaCO3/m³	01/12/2020	Shanel Kumar KTP
1806	Boron - Dissolved	0.254	g/m³	01/12/2020	Amit Kumar KTP
1810	Calcium - Dissolved	42.7	g/m³	01/12/2020	Amit Kumar KTP
1819	Iron - Dissolved	< 0.005	g/m³	01/12/2020	Amit Kumar KTP
1822	Magnesium - Dissolved	13.0	g/m³	01/12/2020	Amit Kumar KTP
1823	Manganese - Dissolved	0.031	g/m³	01/12/2020	Amit Kumar KTP
1829	Potassium - Dissolved	7.76	g/m³	01/12/2020	Amit Kumar KTP
1834	Sodium - Dissolved	154	g/m³	01/12/2020	Amit Kumar KTP
2080	Total Phosphorus	0.025	g/m³	02/12/2020	Divina Lagazon KTP
2088	Dissolved Reactive Phosphorus	0.029	g/m³	04/12/2020	Divina Lagazon KTP
2127	Total Nitrogen	0.07	g/m³	02/12/2020	Divina Lagazon KTP
6022	Mercury - Acid Soluble	< 0.0005	g/m³	01/12/2020	Shanel Kumar KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	01/12/2020	Shuyu Zhao KTP
6711	Chromium - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6713	Copper - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6718	Lead - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6730	Silver - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6738	Zinc - Dissolved	< 0.002	g/m³	01/12/2020	Shuyu Zhao KTP
O1311	Temperature	14.8	Deg C	01/12/2020	Chen Lin .
P1859	Sample Filtration	Completed		01/12/2020	Harsimran Dhanoa .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Wellington
85 Port Road, Seaview
Lower Hutt 5045
Phone: (04) 576-5016

Rolleston
43 Detroit Drive
Rolleston 7675
Phone: (03) 343-5227

Dunedin
16 Lorne Street
South Dunedin 9012
Phone: (03) 972-7963

Email: reportselsnz@eurofins.com Website: http://www.eurofins.co.nz

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Total Dissolved Solids	Conductivity reading in mS/m x 5.5. The result by this method should be considered approximate only.	1 g/m³
Sulphide - Total	APHA Online Edition Method 4500-S2 parts B,C and F	0.2 g/m³
Bicarbonate	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CaCO3/m³
Free CO2	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CO2/m³
Anion Sum	Calculation of the anion sum in miliequivalents per litre. The following accredited tests are used in the calculation: Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in miliequivalents per litre. The following accredited tests are used in the calculation: Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculated from laboratory accredited results following APHA Online Edition 1030E.1: (Cation Sum - Anion Sum) / (Anion Sum + Cation Sum). For this calculation the anions = Alkalinity, Chloride, Nitrate, Boron and Sulphate and the cations = Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.01 %
Fluoride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrite - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Bromide	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Hydrogen Sulphide	APHA Online Edition Method 4500-S2 part H and is calculated from Sulphide, Temperature, Total Dissolved Solids, and pH results. If temperature has not been provided a default value of 15'C will be used.	0.05 g/m³
Cyanide	Discrete Analyser. In House method based on APHA Online Edition Method 4500-CN- C & E.	0.005 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Calcium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.05 g/m³
Magnesium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Boron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified)	0.005 g/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Manganese - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Potassium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion based on APHA Online Edition 4500-P B & Wat, Res., 17 (1983).	0.005 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion based on APHA Online Edition 4500-N C & Wat, Res., 17 (1983)	0.05 g/m³
Mercury - Acid Soluble	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Onsite Observation Methodology:

Test	Methodology	Detection Limit
Temperature	Analysed on site by sampler.	0.1 Deg C

Unless otherwise stated, all tests are performed in Wellington.
The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

eurofins | ELS

Eurofins ELS Limited

Kapiti Coast District Council -
Sewage Treatment Plant
Sewage Treatment Plant
Mazengarb Road
Paraparaumu 5254
Attention: Kim Wearne

Analytical Report

Report Number: 20/64352
Issue: 01-1
07 December 2020

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
20/64352-01	Kapiti Coast District Council - Supplementary Bore		30/11/2020 09:54	30/11/2020 13:27	344534

Notes: KB7 204829 Box 7

	Test	Result	Units	Test Date	Signatory
0001	pH	7.8		30/11/2020	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	< 0.1	g/m³	01/12/2020	Amit Kumar KTP
0052	Alkalinity - Total	93	g CaCO3/m³	30/11/2020	Gordon McArthur KTP
0055	Conductivity at 25°C	77.3	mS/m	30/11/2020	Gordon McArthur KTP
0055B	Total Dissolved Solids	425	g/m³	01/12/2020	Gordon McArthur KTP
0062	Sulphide - Total	< 0.2	g/m³	01/12/2020	Jennifer Mont KTP
0073	Bicarbonate	92	g CaCO3/m³	01/12/2020	Gordon McArthur .
0076	Free CO2	3	g CO2/m³	01/12/2020	Gordon McArthur .
0590	Anion Sum	6.48 *	meq/L	04/12/2020	Yvette Ibe
0591	Cation Sum	6.28 *	meq/L	07/12/2020	Divina Lagazon KTP
0592	Ion Balance	1.57 *	%	07/12/2020	Divina Lagazon KTP
0601	Fluoride	0.06	g/m³	04/12/2020	Divina Lagazon KTP
0602	Chloride	164	g/m³	04/12/2020	Divina Lagazon KTP
0603	Nitrite - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0604	Bromide	0.51	g/m³	04/12/2020	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
0607	Sulphate	13.4	g/m³	04/12/2020	Divina Lagazon KTP
0680	Hydrogen Sulphide	< 0.05	g/m³	04/12/2020	Jennifer Mont .
0725	Cyanide	< 0.005	g/m³	07/12/2020	Divina Lagazon KTP
0760	Ammonia Nitrogen	< 0.01	g/m³	04/12/2020	Divina Lagazon KTP
1610	Calcium - Acid Soluble	18.2	g/m³	01/12/2020	Shanel Kumar KTP
1622	Magnesium - Acid Soluble	10.5	g/m³	01/12/2020	Shanel Kumar KTP
1642	Total Hardness	89	g CaCO3/m³	01/12/2020	Shanel Kumar KTP
1806	Boron - Dissolved	0.523	g/m³	01/12/2020	Amit Kumar KTP
1810	Calcium - Dissolved	18.2	g/m³	01/12/2020	Amit Kumar KTP
1819	Iron - Dissolved	< 0.005	g/m³	01/12/2020	Amit Kumar KTP
1822	Magnesium - Dissolved	10.6	g/m³	01/12/2020	Amit Kumar KTP
1823	Manganese - Dissolved	0.010	g/m³	01/12/2020	Amit Kumar KTP
1829	Potassium - Dissolved	3.01	g/m³	01/12/2020	Amit Kumar KTP
1834	Sodium - Dissolved	102	g/m³	01/12/2020	Amit Kumar KTP
2080	Total Phosphorus	0.027	g/m³	02/12/2020	Divina Lagazon KTP
2088	Dissolved Reactive Phosphorus	0.024	g/m³	04/12/2020	Divina Lagazon KTP
2127	Total Nitrogen	< 0.05	g/m³	02/12/2020	Divina Lagazon KTP
6022	Mercury - Acid Soluble	< 0.0005	g/m³	01/12/2020	Shanel Kumar KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	01/12/2020	Shuyu Zhao KTP
6711	Chromium - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6713	Copper - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6718	Lead - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6730	Silver - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6738	Zinc - Dissolved	< 0.002	g/m³	01/12/2020	Shuyu Zhao KTP
O1311	Temperature	15.2	Deg C	01/12/2020	Chen Lin .
P1859	Sample Filtration	Completed		01/12/2020	Harsimran Dhanoa .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Wellington
85 Port Road, Seaview
Lower Hutt 5045
Phone: (04) 576-5016

Rolleston
43 Detroit Drive
Rolleston 7675
Phone: (03) 343-5227

Dunedin
16 Lorne Street
South Dunedin 9012
Phone: (03) 972-7963

Email: reportselsnz@eurofins.com Website: http://www.eurofins.co.nz

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Total Dissolved Solids	Conductivity reading in mS/m x 5.5. The result by this method should be considered approximate only.	1 g/m³
Sulphide - Total	APHA Online Edition Method 4500-S2 parts B,C and F	0.2 g/m³
Bicarbonate	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CaCO3/m³
Free CO2	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CO2/m³
Anion Sum	Calculation of the anion sum in miliequivalents per litre. The following accredited tests are used in the calculation: Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in miliequivalents per litre. The following accredited tests are used in the calculation: Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculated from laboratory accredited results following APHA Online Edition 1030E.1: (Cation Sum - Anion Sum) / (Anion Sum + Cation Sum). For this calculation the anions = Alkalinity, Chloride, Nitrate, Boron and Sulphate and the cations = Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.01 %
Fluoride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrite - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Bromide	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Hydrogen Sulphide	APHA Online Edition Method 4500-S2 part H and is calculated from Sulphide, Temperature, Total Dissolved Solids, and pH results. If temperature has not been provided a default value of 15'C will be used.	0.05 g/m³
Cyanide	Discrete Analyser. In House method based on APHA Online Edition Method 4500-CN- C & E.	0.005 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Calcium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.05 g/m³
Magnesium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Boron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified)	0.005 g/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Manganese - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Potassium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion based on APHA Online Edition 4500-P B & Wat, Res., 17 (1983).	0.005 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion based on APHA Online Edition 4500-N C & Wat, Res., 17 (1983)	0.05 g/m³
Mercury - Acid Soluble	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Onsite Observation Methodology:

Test	Methodology	Detection Limit
Temperature	Analysed on site by sampler.	0.1 Deg C

Unless otherwise stated, all tests are performed in Wellington.
The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

eurofins | ELS

Eurofins ELS Limited

Kapiti Coast District Council -
Sewage Treatment Plant
Sewage Treatment Plant
Mazengarb Road
Paraparaumu 5254
Attention: Kim Wearne

Analytical Report

Report Number: 20/64353
Issue: 01-1
07 December 2020

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
20/64353-01	Kapiti Coast District Council - Supplementary Bore		30/11/2020 08:21	30/11/2020 13:27	344534

Notes: N2 204830 Box 8

	Test	Result	Units	Test Date	Signatory
0001	pH	7.5		30/11/2020	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	0.2	g/m³	01/12/2020	Amit Kumar KTP
0052	Alkalinity - Total	71	g CaCO3/m³	30/11/2020	Gordon McArthur KTP
0055	Conductivity at 25°C	43.4	mS/m	30/11/2020	Gordon McArthur KTP
0055B	Total Dissolved Solids	239	g/m³	01/12/2020	Gordon McArthur KTP
0062	Sulphide - Total	< 0.2	g/m³	01/12/2020	Jennifer Mont KTP
0073	Bicarbonate	71	g CaCO3/m³	01/12/2020	Gordon McArthur .
0076	Free CO2	5	g CO2/m³	01/12/2020	Gordon McArthur .
0590	Anion Sum	3.61 *	meq/L	03/12/2020	Yvette Ibe
0591	Cation Sum	4.10 *	meq/L	07/12/2020	Divina Lagazon KTP
0592	Ion Balance	6.33 *	%	07/12/2020	Divina Lagazon KTP
0601	Fluoride	0.16	g/m³	03/12/2020	Divina Lagazon KTP
0602	Chloride	72.2	g/m³	03/12/2020	Divina Lagazon KTP
0603	Nitrite - Nitrogen	< 0.01	g/m³	03/12/2020	Divina Lagazon KTP
0604	Bromide	0.23	g/m³	03/12/2020	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	03/12/2020	Divina Lagazon KTP
0607	Sulphate	19.7	g/m³	03/12/2020	Divina Lagazon KTP
0680	Hydrogen Sulphide	< 0.05	g/m³	04/12/2020	Jennifer Mont .
0725	Cyanide	< 0.005	g/m³	07/12/2020	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.05	g/m³	04/12/2020	Divina Lagazon KTP
1610	Calcium - Acid Soluble	28.9	g/m³	01/12/2020	Shanel Kumar KTP
1622	Magnesium - Acid Soluble	7.14	g/m³	01/12/2020	Shanel Kumar KTP
1642	Total Hardness	102	g CaCO3/m³	01/12/2020	Shanel Kumar KTP
1806	Boron - Dissolved	0.068	g/m³	01/12/2020	Amit Kumar KTP
1810	Calcium - Dissolved	29.6	g/m³	01/12/2020	Amit Kumar KTP
1819	Iron - Dissolved	0.010	g/m³	01/12/2020	Amit Kumar KTP
1822	Magnesium - Dissolved	7.42	g/m³	01/12/2020	Amit Kumar KTP
1823	Manganese - Dissolved	0.095	g/m³	01/12/2020	Amit Kumar KTP
1829	Potassium - Dissolved	3.13	g/m³	01/12/2020	Amit Kumar KTP
1834	Sodium - Dissolved	45.6	g/m³	01/12/2020	Amit Kumar KTP
2080	Total Phosphorus	0.128	g/m³	02/12/2020	Divina Lagazon KTP
2088	Dissolved Reactive Phosphorus	0.116	g/m³	04/12/2020	Divina Lagazon KTP
2127	Total Nitrogen	< 0.05	g/m³	02/12/2020	Divina Lagazon KTP
6022	Mercury - Acid Soluble	< 0.0005	g/m³	01/12/2020	Shanel Kumar KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	01/12/2020	Shuyu Zhao KTP
6711	Chromium - Dissolved	< 0.001	g/m³	01/12/2020	Shuyu Zhao KTP
6713	Copper - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6718	Lead - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6730	Silver - Dissolved	< 0.0005	g/m³	01/12/2020	Shuyu Zhao KTP
6738	Zinc - Dissolved	< 0.002	g/m³	01/12/2020	Shuyu Zhao KTP
O1311	Temperature	14.5	Deg C	01/12/2020	Chen Lin .
P1859	Sample Filtration	Completed		01/12/2020	Harsimran Dhanoa .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Total Dissolved Solids	Conductivity reading in mS/m x 5.5. The result by this method should be considered approximate only.	1 g/m³
Sulphide - Total	APHA Online Edition Method 4500-S2 parts B,C and F	0.2 g/m³
Bicarbonate	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CaCO3/m³
Free CO2	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO2. The sample TDS must be <500 g/m3 and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CO2/m³
Anion Sum	Calculation of the anion sum in miliequivalents per litre. The following accredited tests are used in the calculation: Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in miliequivalents per litre. The following accredited tests are used in the calculation: Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculated from laboratory accredited results following APHA Online Edition 1030E.1: (Cation Sum - Anion Sum) / (Anion Sum + Cation Sum). For this calculation the anions = Alkalinity, Chloride, Nitrate, Boron and Sulphate and the cations = Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.01 %
Fluoride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrite - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Bromide	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Hydrogen Sulphide	APHA Online Edition Method 4500-S2 part H and is calculated from Sulphide, Temperature, Total Dissolved Solids, and pH results. If temperature has not been provided a default value of 15'C will be used.	0.05 g/m³
Cyanide	Discrete Analyser. In House method based on APHA Online Edition Method 4500-CN- C & E.	0.005 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Calcium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.05 g/m³
Magnesium - Acid Soluble	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Boron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified)	0.005 g/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Manganese - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Potassium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Total Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G. Persulphate digestion based on APHA Online Edition 4500-P B & Wat, Res., 17 (1983).	0.005 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Total Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500-NO3 I. Persulphate digestion based on APHA Online Edition 4500-N C & Wat, Res., 17 (1983)	0.05 g/m³
Mercury - Acid Soluble	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Onsite Observation Methodology:

Test	Methodology	Detection Limit
Temperature	Analysed on site by sampler.	0.1 Deg C

Unless otherwise stated, all tests are performed in Wellington.
The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

Appendix E

Complaints Record

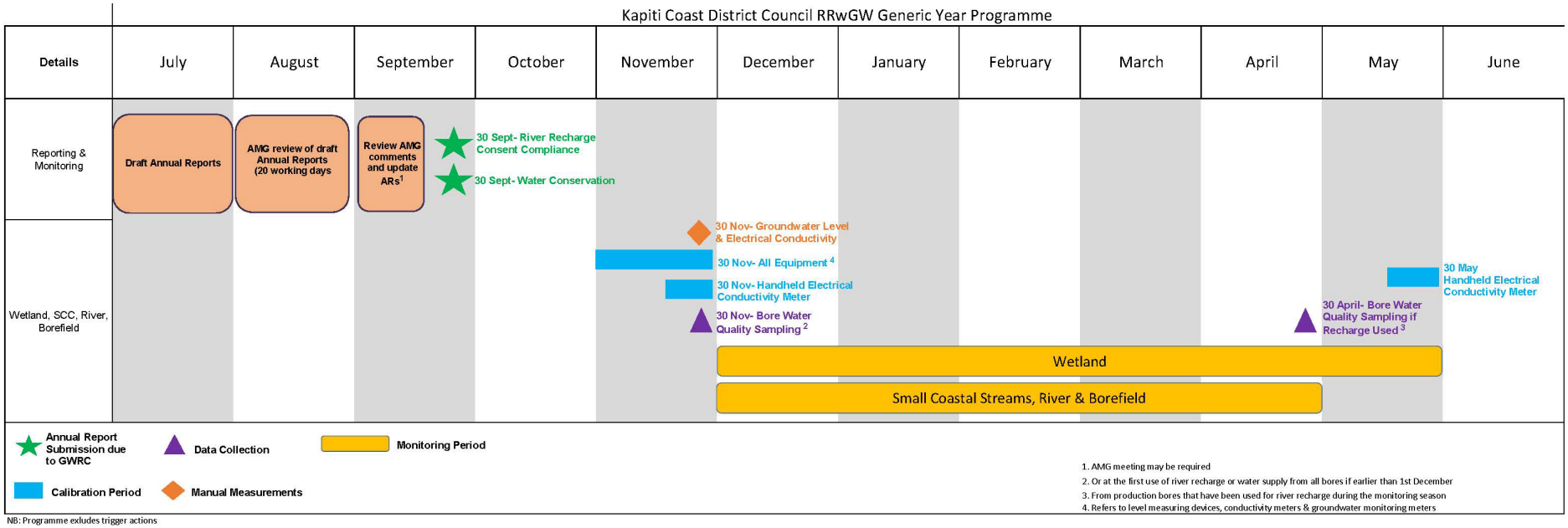
Please Note:

There is no insertion for this section, as there were no complaints during this reporting period.

Appendix F

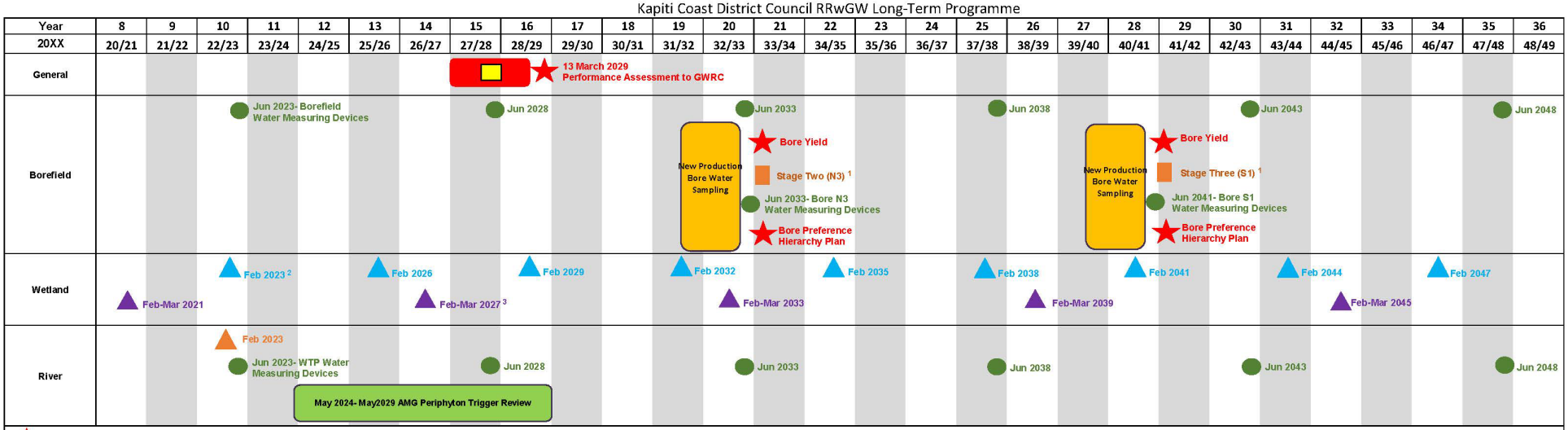
RRwGW Reporting Chart (Beca 2020)

Kapiti Coast District Council RRwGW Generic Year Programme



NB: Programme exludes trigger actions

Kapiti Coast District Council RRwGW Long-Term Programme



P:\326\326236?\160 - RRwGW

Appendix G

Minutes of AMG Meeting

Minutes of Meeting

Waikanae River Recharge and Borefields Annual Adaptive Management Group Meeting 10th December 2021

Held: 14:00hrs, 10th December 2021, Kāpiti Coast District Council Chambers & MS Teams remote.

Present:
Bill Carter (Te Āti Awa ki Whakarongotai)
Madison Davy (Te Āti Awa ki Whakarongotai)
Feriel Falconer (Friends of the Waikanae River)
Phil Teal (Wellington Regional Fish and Game)
Claire McKevitt (GWRC)
Ramesh Sharma (KCDC)
Bruce Nesbitt (KCDC)
Richard Millican (KCDC) – *chair, scribe*

Apologies:
Wayne Cameron (Kapiti Fly Fishing)
Pip Parkin (Regional Public Health)
Russell Bell (Kapi-Mana Forest & Bird)
Sean Mallon (KCDC)

Distribution: *RRwGW AMG*

Item		Action
1	**Mihi / Welcome/ Introductions** ■ Bill Carter opened the meeting with a karakia. ■ Richard Millican welcomed everyone to the meeting. ■ Ramesh Sharma was introduced, having joined KCDC in July as Asset Manager Water & Wastewater. The AMG was previously attended by Martyn Cole in this capacity. ■ Pip Parkin has confirmed that she will represent Regional Public Health, with the retirement of Campbell Gillam. ■ Claire McKevitt has returned to being the AMG's contact for GWRC. We thank Claire for her attendance at the Meeting during a non-working day. ■ Richard Millican will be leaving the employ of KCDC on Friday 14th January to join Wellington Water.	-
2	**Matters arising from previous meetings** ■ No new matters were raised regarding the previous meeting minutes (Annual AMG Meeting held 26th August 2020).	-

3 Review of annual reports

3.1 Overview

-

- The 2020/21 Season represents the third season for RRwGW under the full operating regime.
- This annual AMG Meeting was postponed from the usual August timing, normally aligned with the compliance reporting cycle, due to Covid-19 personnel movement restrictions.
- The river level/ flow rate has been low enough to require river recharge during this Season, but there have been no transgressions of ongoing environmental triggers.
- A report on the three-yearly review of the environmental conditions in the wetlands (including aerial survey of species) is included in this year's Annual Report, where this survey was postponed from last year.
- The draft RRwGW Annual Report and Annual Water Conservation Report were offered for the 2020/21 RRwGW Season for AMG review, prior to the planned AMG Meeting. Comments raised by AMG members are discussed further in Section 4.
- No changes to operational practice have occurred, nor changes to operational documents made.
- Where environmental performance triggers were notified to Council and GWRC during the year, these were automated examples triggered by false readings, and most were not during the RRwGW season.
- GWRC supplied their annual Compliance Monitoring Assessment report in November:
  - our team were awarded a *Full Compliance* (Green/ 4 star) rating
  - one Action was set: GWRC scientists had requested revisions to the Wetlands Monitoring Report (*bullet 4, above*) – the now-amended report to be included in the final version of the Report supplied with the final annual RRwGW and Bores Report.

RM

3.2 River and Borefield report 2020/21

- Due to a dry late-summer and autumn period in the District, river flows in the latter part of the monitoring period were low and occasionally dipped below the recharge trigger level. A river recharge response was required on four days during March and April. The total volume of bore water discharged to the river includes short-duration discharges for routine bore testing.

Table 1: River recharge discharges into the Waikanae River

Criterion	1 July 2020 - 30 June 2021
Number of days of river recharge	4 days - 4th to 6th March, 21st April.
Maximum river recharge discharge rate	4,507 m^3/day on 5 March 2021
Number of days of short duration discharges	14 days
Total volume of bore water discharged to the Waikanae River (river recharge and additional short-term discharges)	41,400 m^3

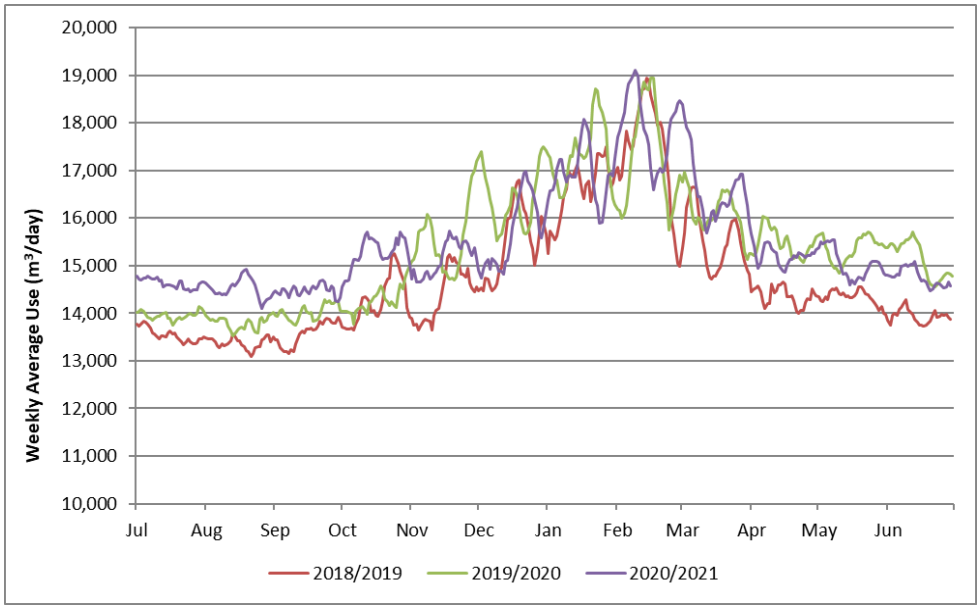
- Council holds a separate resource consent WGN050025 [33147] for two groundwater bores in Otaihanga (PW1 and PW5) for back-up water supply – these were not deployed.
- In bore management, shallow and deep drawdown level and conductivity (salinity intrusion) dynamics are monitored. No trigger level events were experienced.

- There were no public complaints received alleging adverse effects from, or related to, abstraction from the Waikanae Borefield in the 2020/21 year.
- Online wetlands monitoring returned no triggers. Boffa Miskell undertook the 3-yearly review of plant species at the example Nga Manu wetland. The report "Recharge with Groundwater – Nga Manu Wetland Monitoring" (Boffa Miskell/ Beca, 21/7/21) was attached to the annual report. The report is summarised as follows ".. the Nga Manu Wetland has not shown any concerning or unexpected ecological change since the baseline monitoring surveys. As such, the next Stage 1 monitoring round for the RRWGW consent should occur in three year's time in summer 2024".

3.3 Water conservation report 2020/21

- The District-wide peak demand target of 490 lites-per-preson-per-day (l/p/d) was achieved, with 398 being recorded for 2020/21. Sustained higher usage of water was seen this year during the Covid-19 personnel lockdown and the warm period thereafter.

Figure 12: District Water Demand



- Where the Waikanae-Paraparaumu-Raumati scheme and Paekakariki scheme indicated peak demand levels comfortable below the 490 l/p/d target, demand in Ōtaki was again higher than this target. The W-P-R scheme has this target stipulated in the water takes consent.
- A total of $1,859,500 of funding is available in 2021/22 for water conservation and demand management activities, which will include location (drone technology and on-the-ground follow-up) and repair of leaks in Ōtaki and Waikanae networks. Further work will be done to manage the main source of integrity failure, declining service connection "laterals" (generally, by installation of new rider mains and laterals for each affected street). **KCDC**
- The Council prioritised four zones for leak detection and repair, with three zones in Waikanae and the Paekākāriki network. The investigations covered 84.9km, 20.1% of the 422.3km of water networks, excluding the Hautere Scheme.
- For the *reactive* work undertaken by the Council in 2020/21 on the public networks (where leaks are resolved as they arise), the Council noted a five per cent (5%) decrease in laterals repaired or replaced from 2019/20.

4 Stakeholder Observations / feedback

Stakeholder observations were received both prior to, and during, the meeting. We thank you for your valuable input:

- Feriel Falconer raised editorial review comments, by email, on 22nd August: **RM**
  - RRwGW Annual Report:
    Refencing of tables and charts – corrected by KCDC in final report document
  - Annual Water Conservation report:
    Query regarding Section 4.3 – water leak detection and phrase "It was too cold for the drone surveying" – the answer relates to the aerial sensor requiring a differential temperature significant enough to depict leaking water (when compared with the ambient/ ground temperature).
- Ferial and Wayne Cameron requested feedback on KCDC's view of the impact of national Three Waters Reform. **RM**
- Bill Carter wished to ensure that key attendees (esp. from GWRC) were available so that we might discuss the issues of Item 7 – Water Source Protection. **RM**

5 Ongoing mitigation plan update and S127 Consent amendments

- The consents and its operating documents were deployed unchanged for the 2020/21 season, and no new consent amendments are proposed.
- The Meeting briefly discussed the master programme for RRwGW, noting consent expiry in Year-36 (2048/49); and that the Year-15 consent review is not far away (2027/28) from the point of view of the AMG-proposed commencement of collection and collation of information from Year-10 (next year). KCDC to commence a work plan for data collection relevant to the Year-15 review described in the Permit.
- The Meeting discussed the nature of the AMG and how often it should meet. It should be expected that this point will be discussed further, but it was thought in the interim that:
  - The timing of Reports review, and of the core Annual AMG Meeting for each RRwGW Season should remain as it is
  - However, as Bill and Richard raised, the AMG need not be confined to this time for discussions about related RRwGW issues; or wider environmental issues that this stakeholder group may wish to consider (comments in Section 8 – AOB).
  - Section 7 reflects a possible example of an Extraordinary Meeting of the AMG early in 2022.

6 Operating Documents & Ancillary Reports

- No new submissions to the AMG have been made to amend the operating document set, nor have any new reports been commissioned.

7 Water Source Protection (*new item*)

This new subject was added to the AMG Meeting Agenda for this year to cover the discussion of any new external risk that AMG members become aware of, and ongoing planned management projects, in the source/ catchment management area:

<u>Application for Deep Bore in the Waikanae Borefield</u>

- Bill Carter raised his concerns over a request to GWRC, with KCDC as Affected Party, for a deep bore for site irrigation/ grounds-keeping work; drilled near to a current water abstraction bore in the Waikanae Borefield, and so affecting the RRwGW programme. The bore had already been developed and the site

developer/ applicant, Summerset Group Holdings, was simply looking for endorsement of this bore, with expectation of usage at a significant flow rate.

- Bill raised strong objection to the lack of Iwi involvement in this application process. Feriel and Bill made their view clear, that the AMG are guardians of this source and the RRwGW scheme.
- BillC reflected that the RRwGW scheme at its inception was tempered around:
  - strong resistance to other water takes from this borefield area - it remains the back-up water source for the Waikanae-Paraparaumu-Raumati community water scheme
  - the risk of intrusion of salinity to the aquifer, in the event of poorly managed abstraction
  - the RRwGW concept as an interim stage, until another source (e.g. the Dam site) was in place.

  Bill reminded us that the only significant prior application by another party was when a deep bore was approved for the Golf Club – but this was by prior agreement, and at a reduced rate of abstraction.
- It was discussed that Claire was new to the application, but that there had been some confusion as to who had contacted whom for information, and for what purpose. Claire indicated that, in the round, and with Council and AMG as an Affected Party:
  - there is no time-line constraint to any review by the Affected Party
  - the onus remains on the Applicant to present a suitable case for the application.
- It was also discussed that the Beca review of the application (and related telephone enquiries) was commissioned by KCDC (and not, as it may have been thought, by the Applicant). Bruce indicated that he had also raised a letter to GWRC asking for more time to consider this important application as an Affected Party.
- The Meeting questioned the credibility of the source of the Applicant's hydrological/ technical report and considered it to be out of context with the intent of the consent approved for the takes under the RRwGW Scheme. Questions arose, such as:
  - *what was the level of professional independence of the technical report submitted by the Applicant?*
  - *what the effect on the technical report might have been, had data been collected during operation of the existing borefield bore pumps?*
  - *to what extent the Applicant had adequately considered alternative options to this approach to sourcing water for their use?*
- Thus, this application will now require further investigation, and an Extraordinary Meeting of the AMG is likely to be called by KCDC, once information for discussion is developed, with GWRC support. **KCDC/ GWRC**
- The Meeting briefly discussed contact arrangements between GWRC and KCDC regarding any new bore consent applications, where they might fall adjacent to current deep bore takes for community water supply – Ramesh will be the current Council contact.
  (*Footnote: also covered in emails CMcK and RS 14/12/21*).

<u>Management of the Waikanae Riverbed</u>

Richard raised that riverbed management was an ongoing process and highlighted two current components for discussion:

- Council has an existing consent to relocate riverbed materials, a short distance and in a small area, where it might affect the water abstraction point at the

	Waikanae Water Treatment Plant inlet works. Observations, with experience in its use: • the limit on river flow rate (for entry) was incorrect (typo we believe) – resolved in the interim by email with GWRC, but requires formal S127 amendment • similarly, the immediate area of operation needs adjustment (especially regarding relocation of materials). • The frequency of use has been around every three years (where the Consent planned for multiple uses in a year; no need to change this).	**KCDC/ GWRC**
	▪ It was raised by Richard that Council may apply for a new consent for the wider management of the riverbed – and Richard asked the AMG for permission to continue. Notably: an island of pebbles has formed upstream of the operating area of the existing riverbed management consent, but below the GWRC gauging station, Council would like to develop more innovative re-deployment of the river pebbles when relocated, and more definition is needed for any reaction to any slip/ collapse of the bank on the true-right of the river. This is an opportunity for Council and GWRC Flood Protection to work on a more joined-up programme of maintenance in this awa.	**KCDC/ GWRC**
	<u>Planned Catchment Management Workshop</u> ▪ Consultants Beca and WSP were engaged by Council to outline an agenda and process for a stakeholder workshop to discuss review catchment management in the Waikanae River. Whilst public health must sit at top of agenda, the recreational use of the "Devil's Elbow" park, personnel safety, algal growth (and so riverbed form), and the future usage of the currently naturalised woodlands adjacent to the Tuna are likely to be discussed. Council to develop the stakeholder invite list next.	**KCDC**
8	**Other Matters**	
	<u>Environmental Governance in the District</u> ▪ Bill Carter reminded the meeting of the value of the experience and historical context that this stakeholder group has in the district, and the further value of this group meeting in future to cover district-wide environmental management issues.	-
	<u>Three-waters Reform</u> ▪ A new water regulator has been formed, and named "Taumata Arowai". Initially, their focus will be on water safety and enforcement of procedures. In the longer term the body will govern conformity in the wider 3-waters space. ▪ Following a period during which central government (via DIA) indicated a period of consultation and development with territorial authorities, and that data was assimilated to indicate the effectiveness of current territorial authority operation and present and future cost to customer, the concept of formation of four aggregated three-waters management bodies was decreed by central government. ▪ In this respect the least developed concept is that of what shape transition, from the current situation to the new bodies, is. ▪ For the moment the MoH-sourced Drinking Water Standards for New Zealand at current revision will prevail, but Taumata Arowai are developing new standards. ▪ Funding to assist with investigating the effect of transition has been offered to territorial authorities. ▪ Council adopted for this 30-Year Long Term Plan (LTP-21), commencing from this financial year, a significant capital programme of asset investments in the 3-waters infrastructure space. The works include renewals, upgrades (including growth) and resilience measures. Notably, there has been no reluctance by	-

	Council to continue to invest in 3-waters assets, regardless of a future transfer of asset ownership mooted by government. ▪ Taumata Arowai and DIA will present further papers to Parliament covering what transition to the new water supply entities will entail during 2022. ▪ Notably, the current focus of Taumata Arowai remains on water supply resilience and public health, and changes to the delivery model, with the RMA consent process left in place (notwithstanding the current re-map of this process by MfE) for future consideration (thus, any new water supply entity will inherit the existing consent packages for takes and discharges, accordingly). ▪ Bill reflected that the concept of "3-waters" should really be "5-waters"; more strongly reflecting the subtleties of the marine environment, groundwaters, and surface water, as well as the obvious potable water and wastewater. <u>Growth Planning for Kapiti District</u> ▪ Council is in the process of reviewing the effect of domestic growth in the district as a result of central government requiring all territorial authorities to promote development of land for additional housing. This may supersede commitments made in the LTP-21. This will also be relevant in the lead up to the Year-15 review of the RRwGW Consent. However, it was generally concluded that current demand is not at the level envisaged for the sourcing of the District supply when considered at the time the River Recharge concept was developed.	**KCDC**
9	**Next Steps** ▪ Issue meeting minutes for comment by 28th January 2022 ▪ Update and issue Final annual reports to GWRC and AMG in February ▪ Council to publish final reports on Council's public website space ▪ An Extraordinary Meeting of the AMG may be called, subject to the next steps in the development of the third-party application for a deep bore abstraction within the Waikanae Borefields ▪ Council to develop with consultant Beca, later in Fin-Year 2021/22, the investigation programme to commence in 2022/23 (RRwGW Year-10), to lead into the Year-15 Review, and will report accordingly.	**KCDC**

Minuted by: Richard Millican, KCDC