

**Waikanae River, Recharge and Borefield
Annual Report 2019/20 -
Consent WGN130103 [35973, 35974 & 35975]**

Prepared for Greater Wellington Regional Council
by Kāpiti Coast District Council

[FINAL Post-AMG Meeting Version]

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RRwGW Reporting Chart (Beca 2020)

Appendix G

Minutes of AMG Meeting – 26th August 2020

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 2019/20 year (1 July 2019 to 30 June 2020). The locations of the eight production wells and monitoring bores are shown in Figure 1. However, without the requirement for recharge this summer period, they were not deployed for recharge.

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. A summary of Fish Monitoring is included in Appendix B. The report for this season includes a reference chart of the staged monitoring requirements; 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 2019/20 all Ongoing Mitigation Plans (OMPs) were approved and operable. This will be the second 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. A summary of compliance for the 2019/20 year is set out below, using the symbols shown in the adjacent key.

In summary:

- This report and the Water Conservation Report are offered for 2019/20 Season, for AMG Meeting discussion
- The river level/ flow rate has not fallen low enough to require river recharge this period
- There have been no transgressions of ongoing environmental triggers
- There is one noted action, at this stage, in the three-yearly review of the environmental conditions in the wetlands (including aerial survey of species). Due to access problems during COVID-19 restrictions, we agreed with GWRC to defer the monitoring activity to the next summer season (February 2021)
- With the pre-AMG Meeting version of the reports was supplied the next revision of the BOMM and ROMM, and Waikanae River OMP for review. Amendments are not significant and are described in more detail in this report.

- This report updates content supplied to stakeholders as the draft, pre-AMG Meeting Report. Amendments following comments raised by stakeholders, directly or in the AMG Meeting, and the minutes of the AMG Meeting are now included here.

Table 1: Compliance Summary

Section		Key	
River	 River Abstraction		No triggers or actions needed
	 River Recharge		Trigger or action
	 Downstream River Flows		Exceedance
	 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		



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 rating curve for the gauging station.

The upstream daily average river flow for the 2019/20 monitoring period is displayed in Figure 2, and the peak and low flow periods for the 2018/19 and 2019/20 monitoring periods are detailed in Table 2 below. As can be seen, at no time was the river recharge mechanism required, but one data point (not visible at this level of resolution) triggered a short recharge run during the Season (as described in Section 2.3).

Table 2: Upstream Waikanae River Flows

Period	1 July 2018 - 30 June 2019	1 July 2019 - 30 June 2020
Peak flow	180,991 L/s on 8 July 2018	39,858 L/s on 18 June 2020
Minimum flow	878 L/s on 31 March 2019	1,074 on 21 March 2020
Low flow periods when river recharge used	February, March and April	<i>Recharge was not used</i>

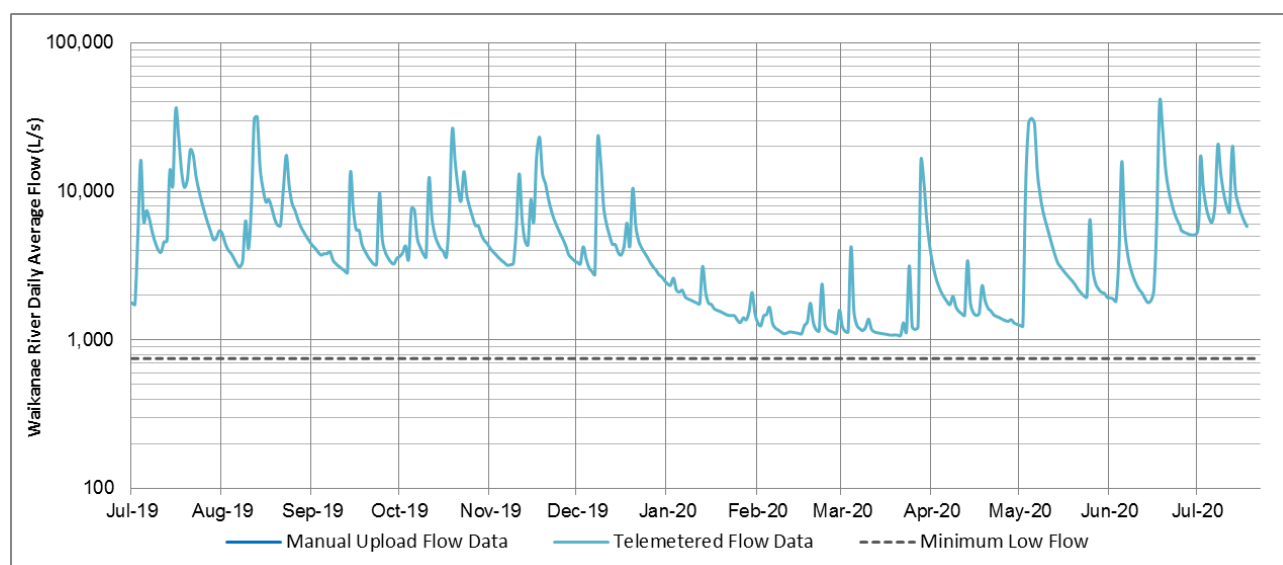


Figure 2: Waikanae River Flow at Water Treatment Plant (July 2019 – June 2020)

Upstream river flows were above 750 L/s for the 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 conditions 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 2017 - 30 June 2018	1 July 2018 - 30 June 2019	1 July 2019 - 30 June 2020
Maximum daily abstraction	16,179 m ³ /day (on 16 January 2018)	18,203 m ³ /day (on 11 July 2018)	20,537 m ³ /day (on 19 June 2020)
Maximum allowable daily volume permitted by Condition 5 of consent WGN130103 [35974]	30,700 m ³ /day	30,700 m ³ /day	30,700 m ³ /day
Total annual abstraction volume	4,234,839 m ³	4,205,329 m ³	4,345,261 m ³
Equivalent average daily abstraction	11,602 m ³ /day	11,521 m ³ /day	11,872 m ³ /day
Maximum total abstraction volume permitted by Condition 5 of consent WGN130103 [35974]	11,174,800 m ³ /year	11,174,800 m ³ /year	11,174,800 m ³ /year

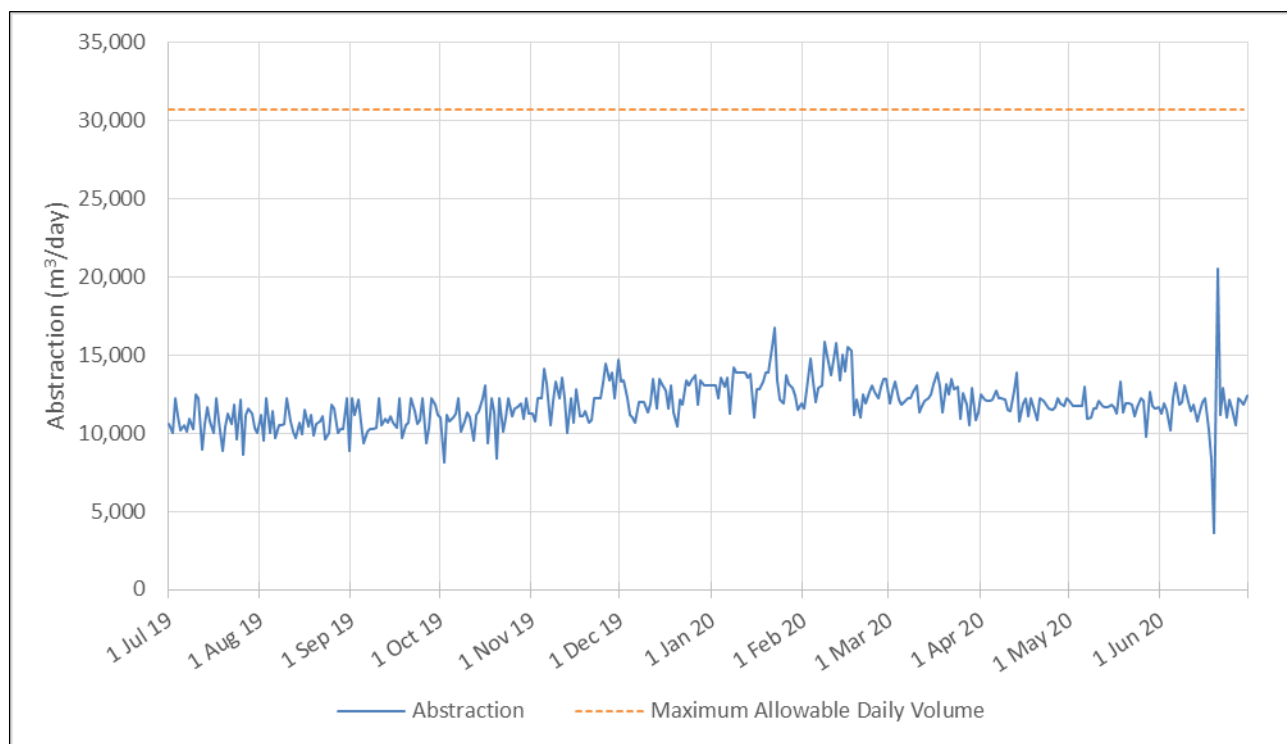


Figure 3: Waikanae WTP River Abstraction Volumes (m³/day)

No daily abstraction volumes exceeded the consent conditions in the 2019/20 period.

The instantaneous rates of abstraction (recorded at 15-minute intervals) for the reporting period are shown in Table 4 and Figure 4 below. The instantaneous abstraction rate was less than consent conditions at all times.

Table 4: Instantaneous rates of abstraction from Waikanae River

Period	1 July 2017 - 30 June 2018	1 July 2018 - 30 June 2019	1 July 2019 - 30 June 2020
Maximum abstraction rate	240 L/s on 24 July 2018	250 L/s on 10 July 2019	240 L/s on 3 January 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.

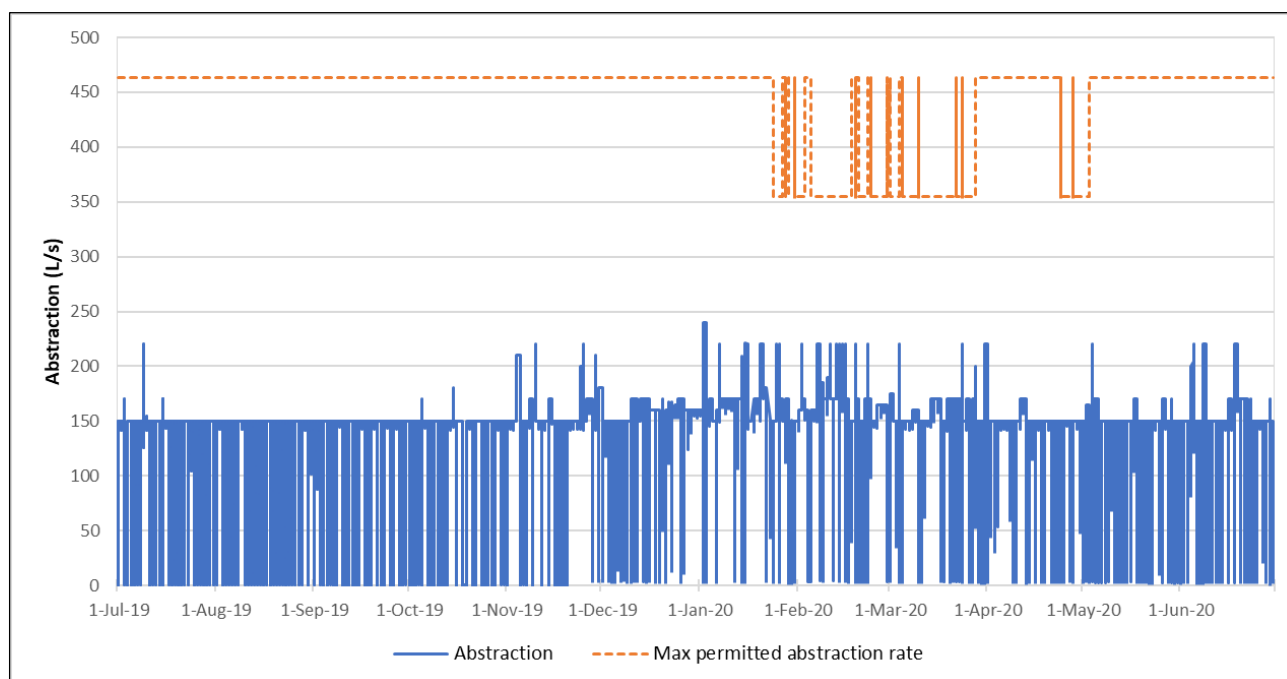


Figure 4: Waikanae WTP River Abstraction Rates (Instantaneous, L/s)

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 was no requirement for river recharge in the 2019/20 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 2017 - 30 June 2018	1 July 2018 - 30 June 2019	1 July 2019 – 30 June 2020
Number of days of river recharge	26 days in December, January and February	10 days in February, March & April	No requirement for river recharge.
Maximum river recharge discharge	17,657 m ³ /day on 3 January 2018	7,639 m ³ /day on 31 March 2019	3,011, m ³ /day on 21 March 2020 @
Ecological monitoring trigger exceeded? *	Trigger not exceeded	Trigger not exceeded	Trigger not exceeded
Number of days of short duration discharges #	17 days	12 days	19 days
Total volume of bore water discharged to the Waikanae River (river recharge and additional short-term discharges)	255,978 m ³	47,029 m ³	29,729 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. The 21 March discharge event is discussed in Section 2.3 'River Recharge'.

Due to a mild summer period in the District, river flows during the 2019/20 monitoring period remained above the recharge trigger level and so a river recharge response was not required. The total volume of bore water discharged to the river consisted of short-duration discharges for routine bore testing (Short Duration Discharges as defined by Consent WGN130103 [35975]).

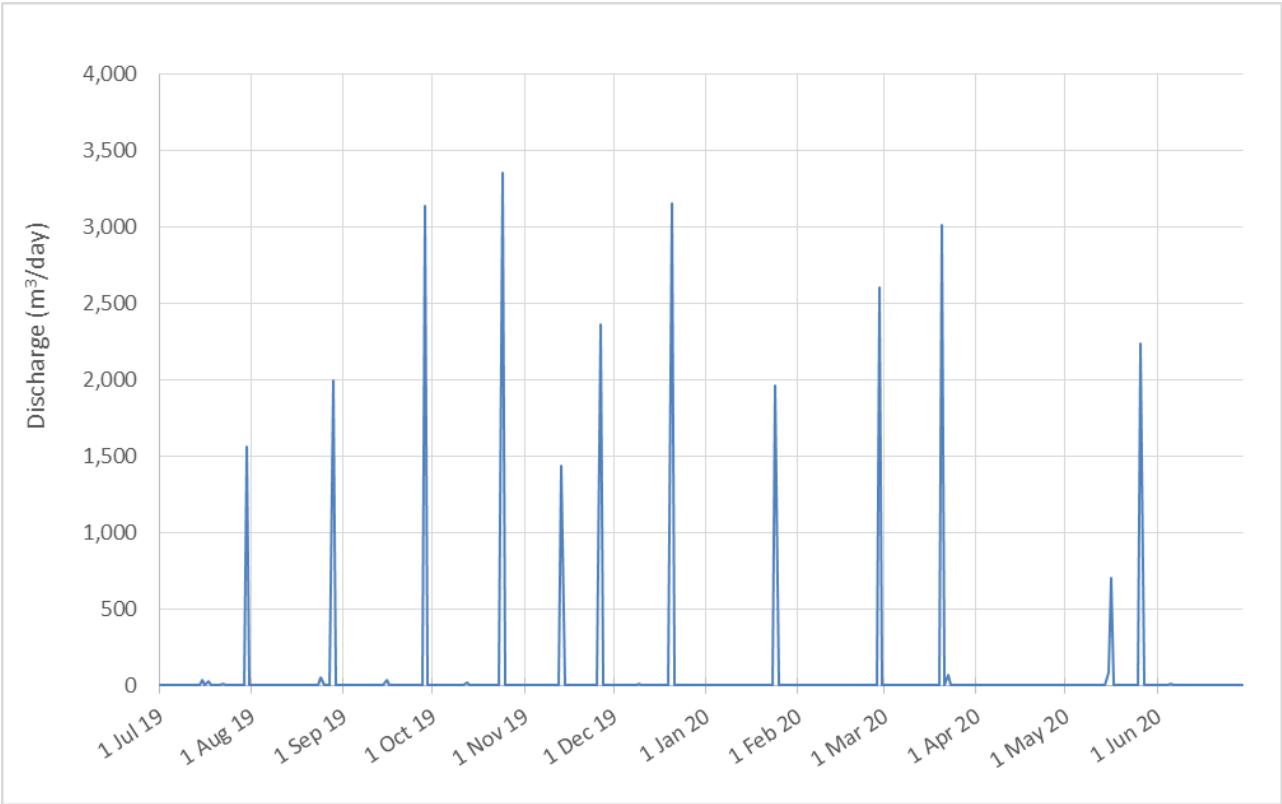


Figure 5: Daily Waikanae River Recharge (and Short Duration Discharges) for 2019/20 (m³/day)

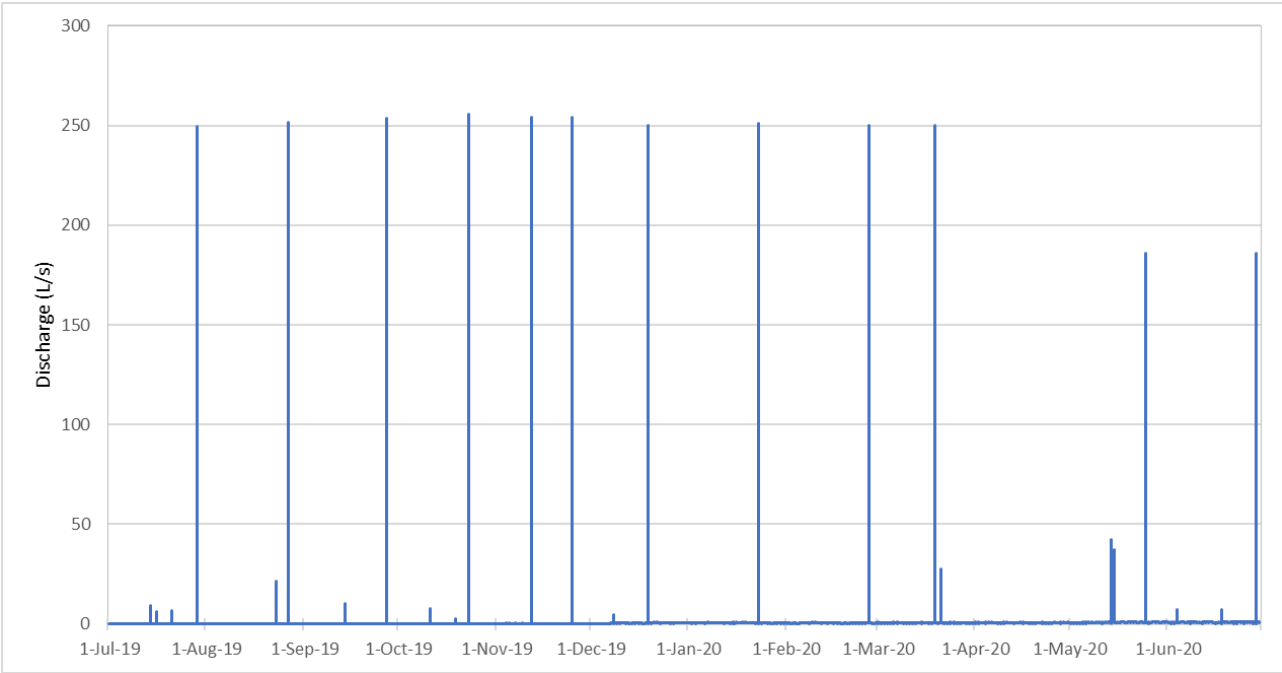


Figure 6: Instantaneous Waikanae River Recharge (and Short Duration Discharges) 2019/20 (L/s)

There was one automated deployment of river recharge discharge, due to an erroneous trigger value occurring during the time that recharge control was in automatic (standby) mode. Recharge was deployed on 21st March 2020, at around 18:00hrs; with significant recharge only underway for around 13 minutes (similar to a bore trial run). The control logic focuses on one of the two river flow values sourced from the GWRC monitor (one is hard-wired, which Council prefers as is at higher resolution, and the other via 'Hydrotel' shared telemetry). Figure 7 represents a narrow axis of around three hours applied to historic SCADA information. The 'dip' in the red line shows the erroneously low value of river flow that triggered automatic recharge operation, where the 'spike' in the orange line indicates the reaction in terms of borefield (recharge) flows. The automated process reacted well: it ramped down raw water (abstraction) pumping, then recovered from the erroneous trigger when the river flow value returned to normal.

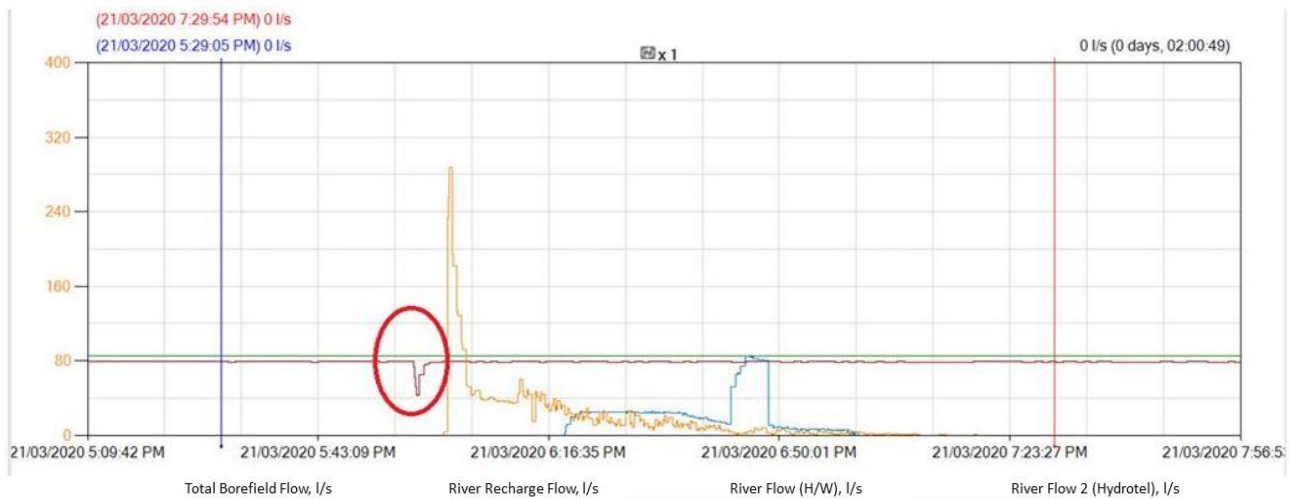


Figure 7: Instantaneous Waikanae River Recharge and Erroneous River Flow Trigger (SCADA data from 21/3/20, L/s)

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.

At no time was the downstream river flow below the trigger level, and so river recharge was not required.

Figure 8 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 2019/20 year.

Since river recharge was not automatically discharged in 2019/20, the yellow line depicts an unadjusted river abstraction rate, the purple line only shows the infrequent deployment of bore abstraction for trial runs, and the blue and grey lines never meet the orange line (low river level trigger threshold).

Table 6: Downstream Waikanae River Flows

Period	1 July 2017 - 30 June 2018	1 July 2018 - 30 June 2019	1 July 2019 - 30 June 2020
Lowest downstream river flow	596 L/s on 30 January 2018**	777 L/s on 19 February 2019	874 L/s on 16 February 2020
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	30%	24%	21% *

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

** river re-gauging undertaken on this date by GWRC

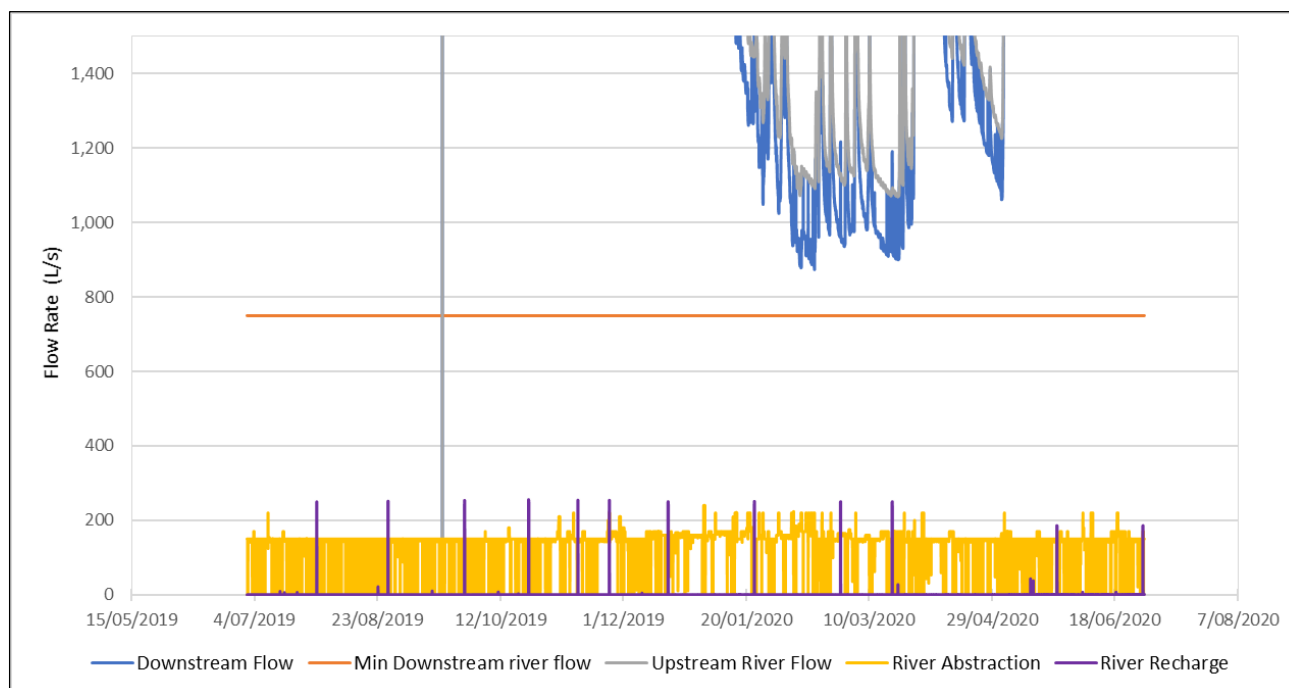


Figure 8: River flow upstream and downstream of WTP during low flow period December 2017 to February 2018.

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 2019/20 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 7 details if the ecological monitoring trigger was reached for the period, which it was not.

Table 7: River aquatic monitoring undertaken

Period	1 July 2018 - 30 June 2019	1 July 2019 - 30 June 2020
Periphyton monitoring	Not required	Not required
Water Quality Sampling- DRP	Not required	Not required
Water Quality Sampling- Conductivity	Not required	Not required
Temperature	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, is included in Appendix B.

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 2017 - 30 June 2018	1 July 2018 - 30 June 2019	1 July 2019 - 30 June 2020
Total annual volume pumped	245,941 m ³ *	43,818 m ³	30,366 m ³ +
Annual permitted volume (Condition 8 of WGN130103 [35973])	2,300,000 m ³ /year	2,300,000 m ³ /year	2,300,000 m ³ /year
Maximum total daily take volume and date	Before 31 Dec 17: 13,325 m ³ /day* on 13 December 2017 After 31 Dec 17: 16,707 m ³ /day on 1 February 2018	6,631 m ³ /day on 31 March 2019	3,359 m ³ /day on 23 October 2019 +
Maximum daily take permitted by Condition 6 of WGN130103 [35973] **	Before 31 Dec 17: 21,000 m ³ /day After 31 Dec 17: 23,600 m ³ /day	23,600 m ³ /day	23,600 m ³ /day

* These values exclude the anomaly on 13 December 2017 as a result of meter calibration works.

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

+ Total annual volume and maximum daily take were amended (post-AMG Meeting) following an audit of the data set and the reporting tool used - this is described further in the main text.

Following an AMG query about relative volumes recharged to the Waikanae River, when 2018/19 and 2019/20 are compared (see Appendix G – AMG Meeting Minutes), a data audit was undertaken. The calculated annual pumped volume and maximum daily take values declared in the pre-AMG Meeting draft of this Report were incorrect. The new values offered in Table 9, above, reflect the correct values; these values are lesser in magnitude than those of prior years where river recharge was deployed. The 2018/19 season values are correct, and the chart of spontaneous values depicted in Figure 8 also remains unaffected.

The error arose from a change in calculation method when the old performance data reports (for each of the different elements of this Report) were transposed onto the now fully-operational Water Outlook reporting tool this year.



Figure 8: Daily Abstraction Volumes from Production Wells

The total instantaneous abstraction rate from the production wells is shown in Table 11 and plotted in Figure 9.

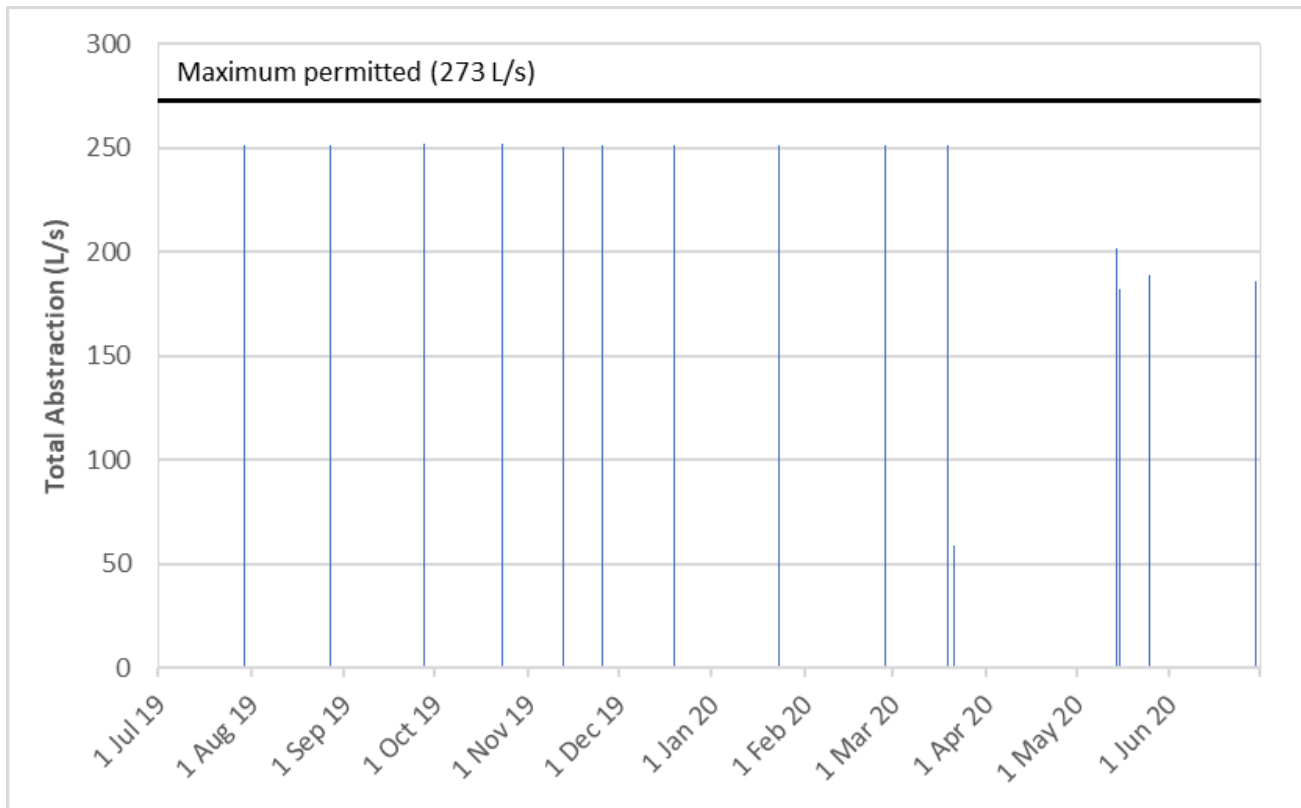


Table 10: Total instantaneous abstraction rate from production wells

Period	1 July 2017 - 30 June 2018	1 July 2018 - 30 June 2019	1 July 2019 - 30 June 2020
Maximum combined abstraction	272 L/s for 30 minutes on 29 November 2017	258 L/s for 15 minutes on 21 December 2018.	252 L/s for 15 minutes on 23 October 2019.
Maximum instantaneous abstraction permitted by Condition 8 of WGN130103 [35973].	273 L/s	273 L/s	273 L/s

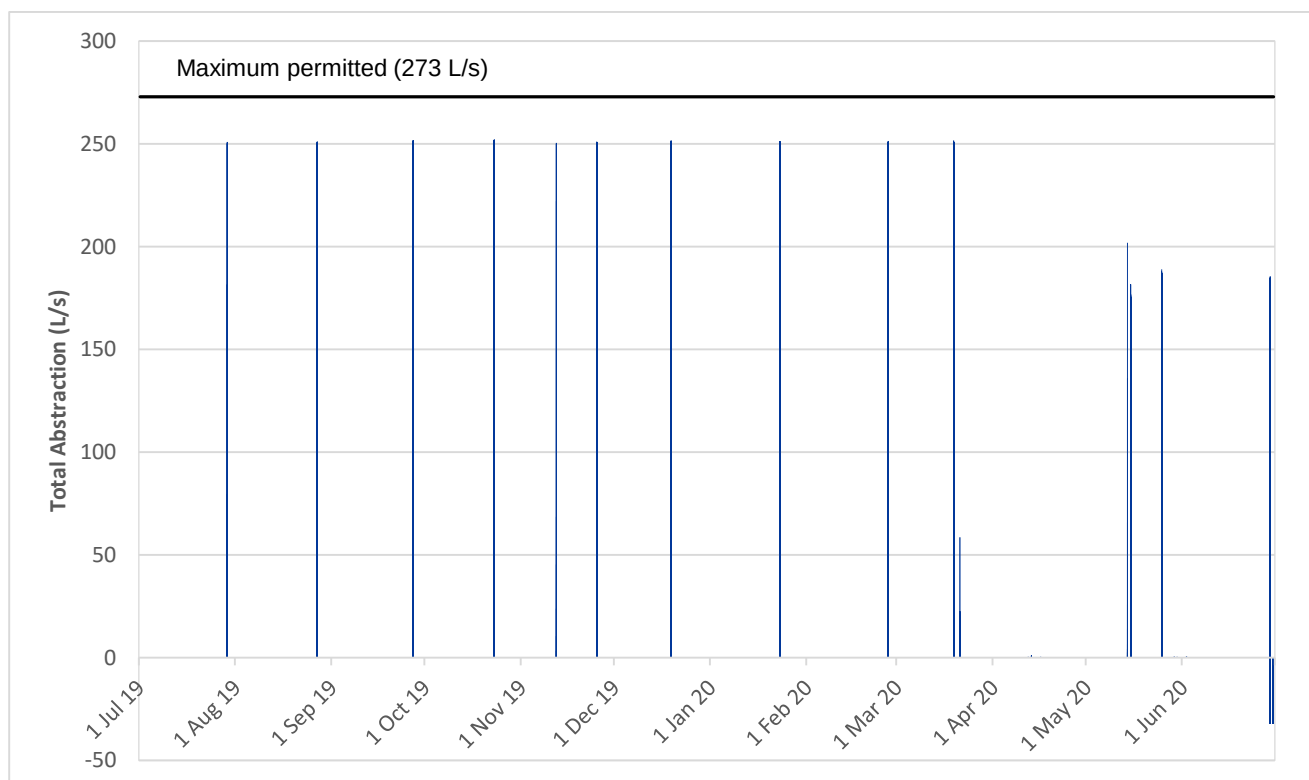


Figure 9: Total Instantaneous Abstraction from Production Wells

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 12 below.

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

Maximum instantaneous abstraction	Stage 1 Maximum yield (Condition 8 of WGN130103 [35973])	1 July 2018 - 30 June 2019 *	1 July 2019 - 30 June 2020 *
K10	36 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	8 L/s	6 L/s	6 L/s
K12	10 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 2019/20 and 2020/21 seasons is due to rounding and similarity of operating regimes; it correctly reflects historic data.

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 2019/20 period.

Table 12: Flow gauging of the Waikanae River

Period	1 July 2018 - 30 June 19	1 July 2019 - 30 June 2020
Flow Gauging Trigger Status	Borefield abstraction of 23,000 m ³ /day for a three-day period was not exceeded.	Borefield abstraction of 23,000 m ³ /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 Otaihangā (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 2019/20 period.

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

Period	1 July 2018 - 30 June 2019	1 July 2019 - 30 June 2020
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 m ³ /day	7,000 m ³ /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.

No operations and maintenance activities caused alarm notifications (normally automatically repeated to GWRC) during the year for shallow aquifer monitoring. Current trigger levels are refined by analysis of the historical data set.

Table 14: Shallow Aquifer Drawdown Monitoring Wells and Trigger Levels

Well Name	GWRC Bore Number	Trigger Level			Min level reporting period 2017/18 (mm AMSL)	Min level reporting period 2018/19 (mm AMSL)	Min level this reporting period 2019/20 (mm AMSL)
		Alert (mm AMSL)	Action (mm AMSL)	Cease (mm AMSL)			
KCDC K6 Obs Shallow	R26/6992	2180	1980	1780	3234	3188	3319
GWRC Nga Manu	R26/6991	7138	6938	6738	7917	7883	7885

Well Name	GWRC Bore Number	Trigger Level			Min level reporting period 2017/18 (mm AMSL)	Min level reporting period 2018/19 (mm AMSL)	Min level this reporting period 2019/20 (mm AMSL)
		Alert (mm AMSL)	Action (mm AMSL)	Cease (mm AMSL)			
KCDC W1	R26/7025	4350	4150	3950	4945	5025	5116
Waikanae CHP Shallow	R26/6916	1445	1245	1045	1981	2226	2227
K12 Obs Shallow, Smithfield Rd	R26/6300	5035	4835	4635	5617	5631	5674
JCMP Shallow, Jim Cooke Memorial Park	N/A	6641	6441	6241	7397	7439	7411
K3A Obs Shallow, Cemetery	R26/6290	6964	6764	6564	7903	6998	7776
Greenhill North Shallow, Greenhill Rd North	N/A	6387	6187	5987	6933	6979	6996
Greenhill South Shallow, Greenhill Rd South	N/A	11829	11629	11429	12344	12538	12621

Table 15 below summarises trigger and notification information.

Table 15: Shallow Aquifer Triggers

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

3.4.2 Deep Aquifer Drawdown Monitoring

 No triggers or actions needed

There were few alarm triggers during this monitoring period for Intermediate or Deep monitoring bore levels; none were during river recharge, and all due to system anomalies.

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 2017/18 (mm AMSL)	Min level reporting period 2018/19 (mm AMSL)	Min level this reporting period 2019/20 (mm AMSL)
		Alert [mm AMSL]	Action [mm AMSL]	Cease [mm AMSL]			
Sentinel #1 Deep, Rutherford Drive	R26/6378	-1537	-3787	-5475	1988	3324	3399
Sentinel #1 Intermediate, Rutherford Drive	N/A	-2526	-4776	-6463	1554	1876	2029
Sentinel #2 Deep, Hodgkins Rd	N/A	-898	-2698	-4048	2214	2891	2897

Well Name	GWRC Bore Number	Trigger Level			Min level reporting period 2017/18 (mm AMSL)	Min level reporting period 2018/19 (mm AMSL)	Min level this reporting period 2019/20 (mm AMSL)
		Alert [mm AMSL]	Action [mm AMSL]	Cease [mm AMSL]			
Sentinel #2 Intermediate, Hodgkins Rd	N/A	-1757	-3557	-4907	1336	1683	1832
Sentinel #3 Deep, Old WWTP	R26/6776	-2090	-4490	-6290	1354	3188	3052
Sentinel #3 Intermediate, Old WWTP	N/A	-2547	-4947	-6747	1841	2348	2466
Sentinel #4 Deep, Peka Peka Rd	N/A	1832	932	257	3650	3958	3984
Sentinel #4 Intermediate, Peka Rd	N/A	284	-616	-1291	2098	2085	2128
Sentinel #5 Intermediate, Taiata St	R26/6955	-393	-1443	-2231	1794	1825	1840
Sentinel #5 Deep, Taiata St	N/A	19	-1031	-1819	1922	2124	2139
Sentinel #6 Deep, Tamati Place	N/A	560	-190	-752	2041	2107	2175
Sentinel #6 Intermediate, Tamati Place	N/A	599	-151	-714	2069	2073	2109
Waikanae CHP Deep	R26/6594	540	-510	-1298	2432	2681	2722
Waikanae Park	R26/6284	4611	2511	936	8678	8662	8751 *

* on 7 February 2020 a value of 8371 mm was recorded, and on 28 January 2020 a value of 4,489 mm – both singular and noticeably low values. In the annual data set no other single value fell below 8,751mm, and so these are assumed anomalous points.

Table 17: Deep Aquifer Triggers

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

Notifications of trigger values from Deep monitoring were received by Council and GWRC, as follows, 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.

- Cascade Level alarms from three bores (Sentinels #4, #5, #6 – Deep) on 30 January 2020 - due to an unplanned shutdown of core data network equipment by Council's ICT team, we were forced to "re-boot" local telemetry nodes so as to re-connect to comms. The resulting false alarms were instantly resolved.
- Level alarm from one bore (Sentinel #6 – Deep) on 1 December 2019 - A short-period fault; investigation offered no obvious reason for failure. The device then operated correctly.

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.

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.

Operations and maintenance activities caused a small number of alarm notifications (automatically repeated to GWRC) during the year. None were indicative of actual trigger events.

Table 18: Saline Intrusion Monitoring Wells Electrical Conductivity Trigger Levels

Well Name	GWRC Bore Number	Trigger Level			Max last reporting period 2017/18 (µS/cm)	Max this reporting period 2018/19 (µS/cm)	Max this reporting period 2019/20 (µS/cm)
		Alert (µS/cm)	Action (µS/cm)	Cease (µS/cm)			
Sentinel #1 Deep, Rutherford Drive	R26/6378	1500	1875	2188	1496	986	1473
Sentinel #1 Intermediate, Rutherford Drive	N/A	521	651	760	485	462	466
Sentinel #2 Deep, Hodgkins Rd	N/A	1532	1915	2234	1217	1226	1213
Sentinel #2 Intermediate, Hodgkins Rd	N/A	1699	2124	2478	1034	925	864
Sentinel #3 Deep, Old WWTP	R26/6776	1342	1677	1956	1060	1025	1179
Sentinel #3 Intermediate, Old WWTP	N/A	2789	3486	4067	889	699	620
Sentinel #4 Deep, Peka Peka Rd	N/A	866	1082	1262	720	710	708
Sentinel #4 Intermediate, Peka Peka Rd	N/A	761	951	1110	794	719	716
Sentinel #5 Intermediate, Taiata St	R26/6955	3642	4553	5311	3186	3162	3209
Sentinel #5 Deep, Taiata St	N/A	5818	6518	7218	5249	5761	5210
Sentinel #6 Deep, Tamati Place	N/A	8693	9393	10093	8116	8700	8351 *
Sentinel #6 Intermediate, Tamati Place	N/A	1684	2105	2455	1440	1835	1504

* a singular value of 12,274 µS/cm was recorded on 31 July 2019 which is clearly anomalous. No other value exceeded 8,351 µS/cm in the annual data set.

The number of nominal and actual triggers (nil) from the alarm notifications are shown in Table 19 below.

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

Notifications of trigger values from Deep monitoring were received by Council and GWRC, as follows, during the current year. River recharge was not underway during these times. All events were due to monitoring system anomalies.

- Cascade Conductivity alarms from one bore (Sentinel #6 – Deep) on 7 January 2020 - The sensor had been replaced with a brand new unit which Council found (with little service time) to

have failed. The new sensor had not been assembled properly by the supplier and started to fill with water. The unit was again replaced.

- Cascade Conductivity Alarms (Sentinel #5, Deep) on 15, 18 and 19 August 2019 - Short-period faults; investigation offered no obvious reason for failure. The device then operated correctly.

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

These notification examples are reminders of the harsh environment found at these depths of immersion in 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. Council will continue to look to the market for a more resilient submerged device, in the interim.

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 19 December 2019.

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 on 19 December 2019 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 was undertaken on 28 May 2019 (results included in the 2018/19 Report).

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 groundwater level monitoring information as well as contact details if well users wish to discuss issues arising or make complaints. Refer to the web pages found at the following address: [Kāpiti Coast DC - River Recharge & Private Bores](#). KCDC plans to upgrade this website in the near future, and will offer GWRC details of the new website, for their review, before deployment.

3.7 Complaints

There were no complaints received alleging adverse effects from, or related to, abstraction from the Waikanae Borefield in the 2019/20 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 2018 - 30 June 2019	1 July 2019 - 30 June 2020
Number of complaints	0	0

4 Wetlands Monitoring

● Trigger or action 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 2019/20 period for the wetlands operating water level, although one erroneous event occurred due to sensor calibration.

A graph presenting the Nga Manu wetland groundwater levels for November 2019 to end July 2020 (thus, including the monitoring period Dec 2019 - May 2020) is presented in Figure 11, 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.

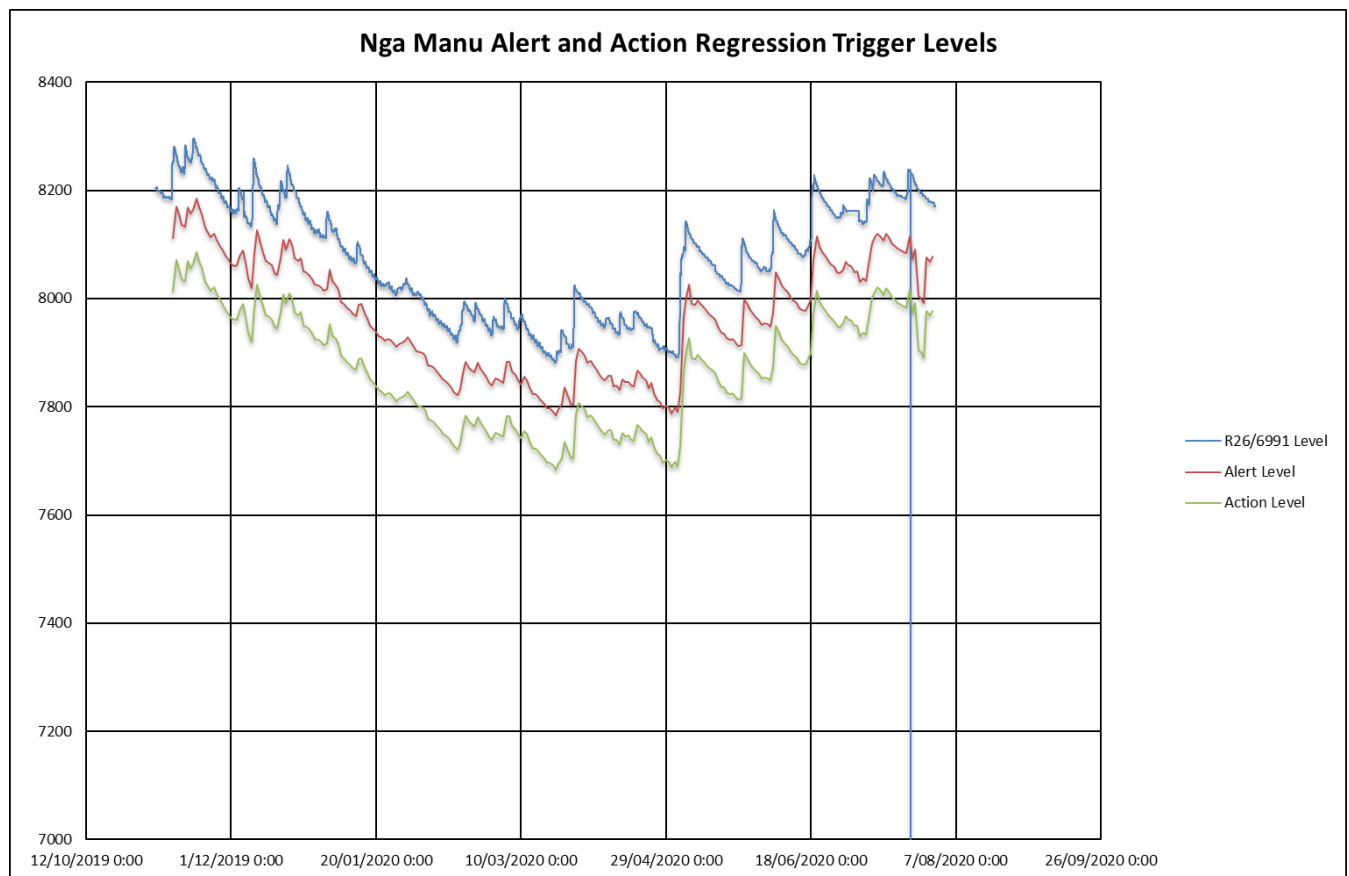


Figure 10: Nga Manu Wetland Levels and Trigger Regression Analysis

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.

An **Action Point** applies to this section of the 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 12 and 17 June 2020) to defer the monitoring activity to the next summer season (February 2021). We will report on this activity in the 2020/21 RRwGW report.

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, now approved by GWRC. The required monitoring period is from 1 December 2019 to 1 May 2020. The ground water and stream level for the small coastal stream are shown in Figure 12, below.

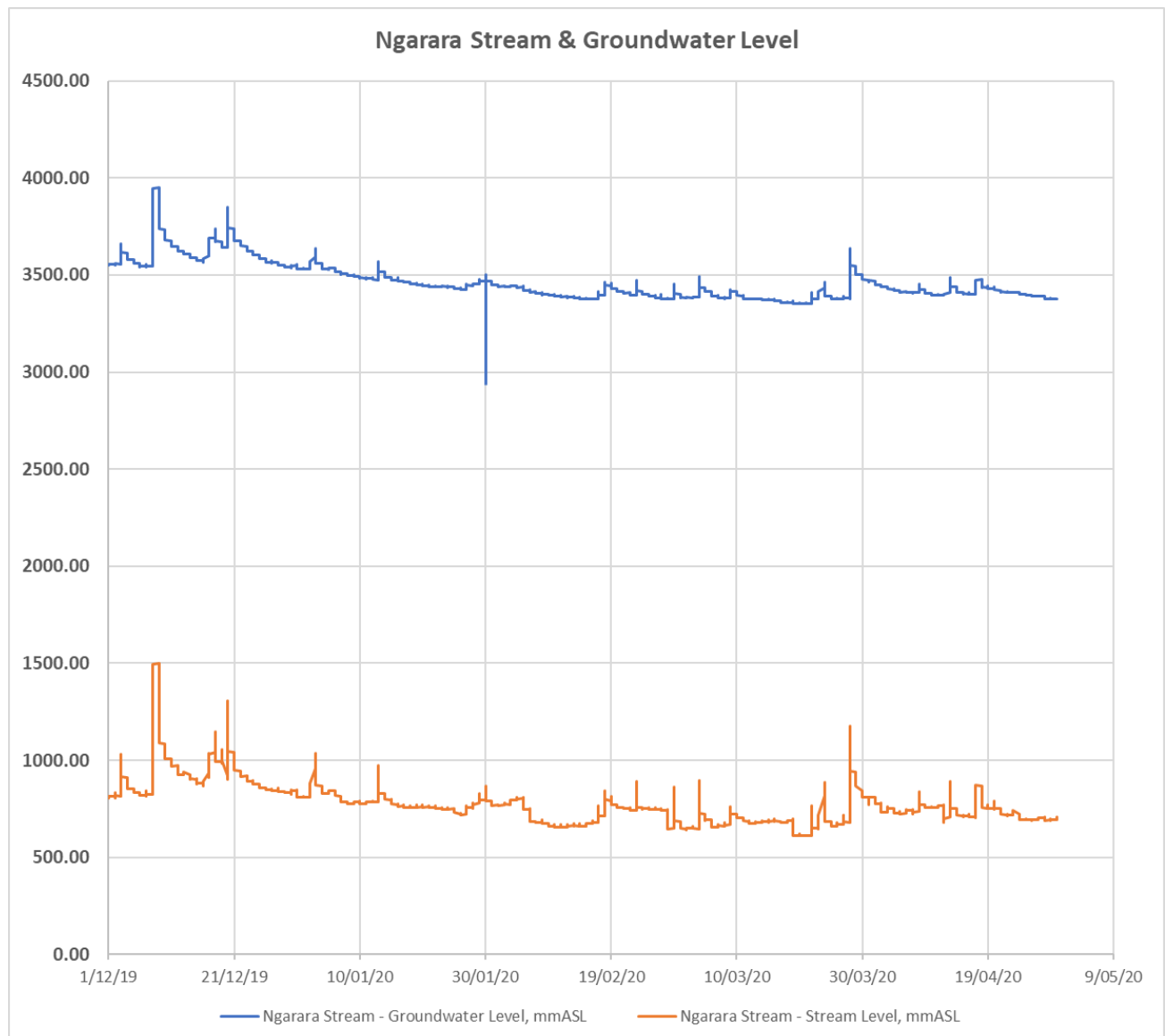


Figure 11: Ground water levels for Ngarara Small Coastal Stream

Trigger levels apply from the 25 February 2019 approval of the Small Streams OMP. These are outlined below in Table 21. Triggers use data from both the stream and groundwater measurement points – those from the prior monitoring period are included here. The notes to Table 21 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 21 Historic Trigger Levels for Small Coastal Streams

Location	Trigger Level (from 2018/19 Year)			Min Value this reporting period 2019/20 (mm -)
	Alert (mm -)	Action (mm -)	Cease (mm -)	
Ngarara Groundwater Level (mm AMSL)	2550.19 *			2,940
Ngarara Stream Level (mm above stream bed)		300 #	150 +	611

* 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 12 months of field data since the 2018/29 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 22 historic data is used to calculate the actual trigger level to be applied for this data series for this period.

Table 22 Analysis of Adaptive Management Trigger Levels - Small Coastal Streams 2019/20

Location	Minimum Level ¹ (mm -)	Maximum Level ¹ (mm -)	35 th Percentile ² (mm -)	Refined Trigger Level			Min or Recalculated ² Value for period 2019/20 (mm -)
				Alert ³ (mm -)	Action (mm -)	Cease (mm -)	
Ngarara Groundwater Level (mm AMSL)	2940.34	4473.01		2510.44			2,940
Ngarara Stream Level (mm above stream bed)	610.98	2043.19	739		300	150	759

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. Calculated as described in Table 21 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 is 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 site logs for each production bore is included in Appendix C. Appendix C also includes the Waikanae River take and recharge operational records.

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 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, for AMG information, copies of the revised BOMM and ROMM; these are supplied with the pre-AMG Meeting Reports (GWRC received copies in May 2020). They were amended with added notes to clarify a query from GWRC regarding how Council set its “buffer” values to both downstream river flow trigger level (see Section 2.3) and total borehole abstraction rate setpoint (see Section 3.1). This approach is intended to avoid *at all times* a transgression of the downstream river flow trigger value.

Council also offers a revised OMP for the Waikanae River, updated to incorporate the final Fish Monitoring report content discussed in Section 2.5.

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 2019/20 year monitoring activities have been completed in accordance with the approved OMPs. The annual AMG Meeting was undertaken in August 2020 to discuss the operation of the RRwGW for the year. The following reflects the minutes of the AMG Meeting and recommendations for refinement of practice.

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 2019/20 season, in the now normalised operating mode. No new consent amendments are proposed.

Minor changes to operating documents have been drafted for consideration.

7.1.2 Operating Documents – revision control

7.1.2.1 Operation and Maintenance Manuals

Amendments were made to the River and Borehole manuals (RoMM and BoMM) to clarify a query from GWRC regarding how Council sets its “buffer” values to both downstream river flow trigger level and total borehole abstraction rate setpoint. The AMG has been offered revised documents (supplied with AMG Meeting agenda) and has raised no new issues at this stage.

7.1.2.2 Operation Management Planning

The working revisions of the OMPs were endorsed by stakeholders and approved by GWRC in the last Season. Council offered the AMG a revised version of the Waikanae River OMP in this Season, so as to adopt the information acquired from the summary three-year riffle fishing report.

7.1.3 Additional Reports

The AMG has been supplied the summary three-year report on riffle fishing requested, and now endorsed, by GWRC. This is published as an appendix to *this* Report and will also be publicly released document on the Council website as a stand-alone document.

7.2 Recommendations of the Adaptive Management Group

The 26th August 2020 meeting raised the following notable issues. The meeting minutes (already circulated to stakeholders, and endorsed by two stakeholder representatives - on behalf of GWRC and Friends of the Waikanae River) are attached to Appendix G of this Report.

- Regarding the retirement of Dave Basset from the role of Treatment Plants Manager, the meeting acknowledged the value added by Dave in both environmental management and in public engagement.
- Council introduced Bruce Nesbitt in his new role as Water Treatment Plants Manager (and Grant Stuart as Wastewater Treatment Plants Manager).

- It was noted that, in an otherwise eventful year, the river recharge programme for 2019/20 was notably uneventful. River recharge was not required at any time for the season (December 2019 thru April 2020) due to the downstream river flow/ level remaining above trigger levels. River recharge was last deployed on 1st April 2019.
- Fish surveys were finalised for the three-year period with a summary report, included here in Appendix B, and now endorsed by GWRC. It was agreed that the report would be published on Council's public website, as a stand-alone document. GWRC acknowledged that they were aligned with the AMG recommendation from Season 2018/19 regarding the proposed triggers for further survey activity.
- Water Conservation was discussed along with the 490 l/p/d target demand (consented for Waikanae WTP, aspirational for the rest of the District), and the leak detection programme. The Paekakariki water supply scheme, and demand due to leaks, was discussed also.
- Feriel Falconer (Friends of the Waikanae River) supplied email and verbal editorial comments and technical queries on both reports. Many of the comments were discussed at the meeting and so transactions are minuted as Appendix G.
- One technical query remained in place for Council to resolve, regarding the reported river recharge volume for the season. In the pre-AMG revision it was depicted in Table 9 that for 2019/20 it was greater than in the prior season (where in prior seasons river recharge had been deployed). We have audited the data set and have corrected the summary calculation for this, and subsequent, reports. Section 3.1 describes the changes made and the reasoning for them. This returns the total volume recharged in 2019/20 to a value lesser than that recorded for prior years, as expected.
- Phil Teal (Wellington Regional Fish and Game) raised a question on behalf of local recreational fishers, involving extending river modelling and querying future recharge dynamics so as to positively affect downstream conditions for fish species. Fish species appear to have been affected by raised water temperatures and reduced water levels throughout the year. Phil Teal planned to approach Council with a more detailed submission, in due course.
- The meeting discussed governance of the environment in Kapiti District by strong stakeholder engagement. In governance planning for each river valley, considered as a whole, all considered the process valuable and showed a willingness to commence. The meeting also noted the pending Whaitua Committee process, already launched in other districts of the Greater Wellington region - Council to approach stakeholders as this process develops for this district.
- The meeting also discussed:
 - asset investment and a new national regulation body for the three waters, under development by central government
 - the Paraparaumu Wastewater Treatment Plant consents renewal programme
 - the Paekākāriki water scheme:
 - demand and leak detection programme - a particular problem with leakage in season 2019/20, though a significant leak was repaired by Council in June 2020. It was discussed that Council should publish demand data for year 2020/21 to date – this depicts the significant reduction in demand that the leak repair has made so far this year (a discussion is annexed to the meeting minutes)
 - request by local resident for GWRC to review the Council's abstraction consent (two bores and Wainui stream) – this is not currently being pursued by GWRC.

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 23: 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 24: 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

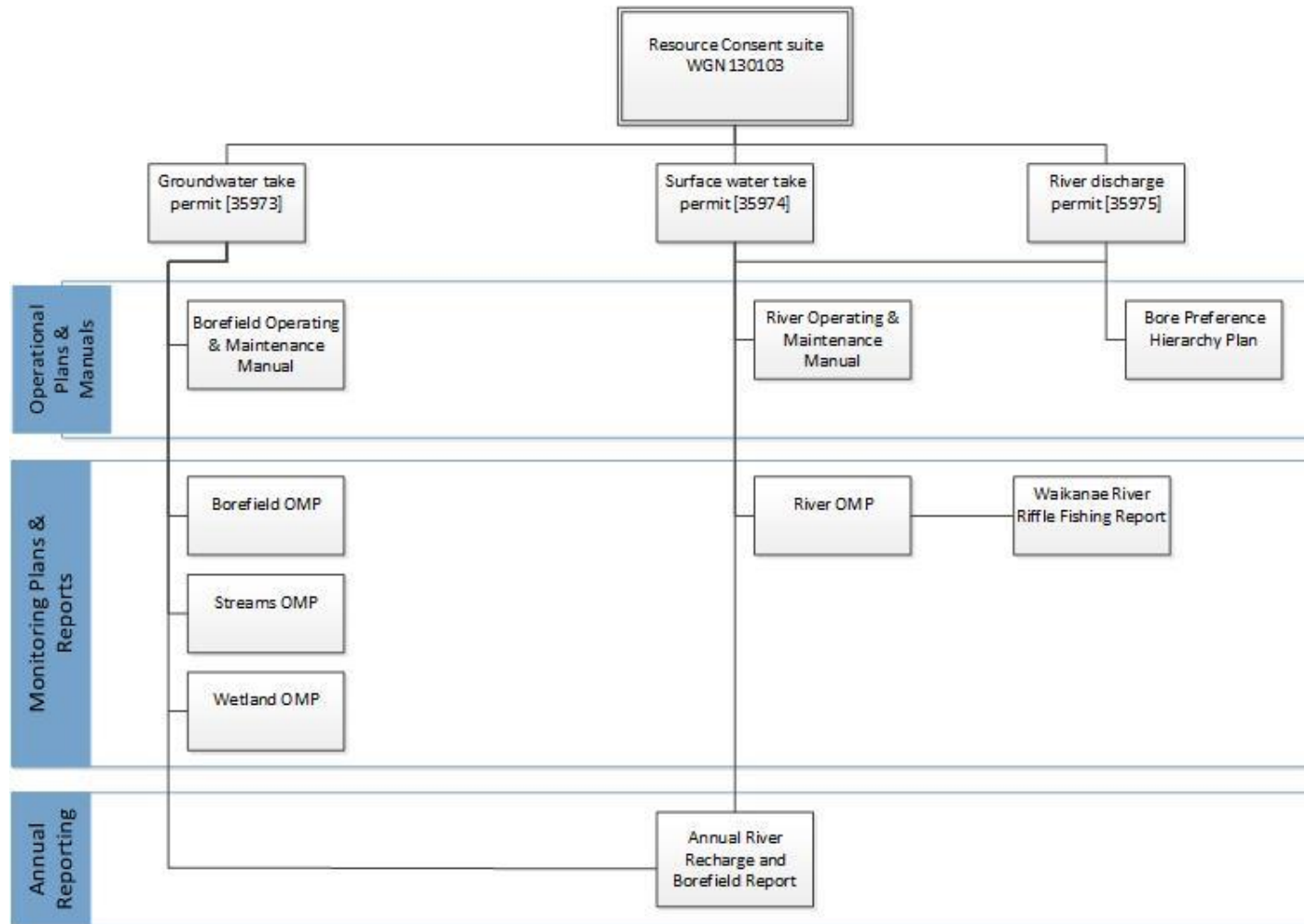


Figure 12: Key documents for RRwGW consent and ongoing monitoring



Appendix B

Waikanae River Riffle Fishing Report – 3-Year Summary



Waikanae River -Riffle Fishing

Concluding dataset assessment
Prepared for KCDC

8 April 2020



Document Quality Assurance

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Appendices

Appendix 1: Raw fish data

1.0 Introduction

This report relates to Kāpiti Coast District Council's River Recharge with Groundwater Project (RRwGW). The RRwGW Project required comparative fishing to be undertaken above and below the recharge location to ascertain if the recharge project is having an adverse effect to migrating freshwater fishes, in accordance with the Waikanae River Ongoing Mitigation Plan (River OMP).

After consultation between councils, the Adaptive Management Group, and various experts it was concluded fish surveys were to occur via surveying riffles above and below the recharge location (this differs from the consented method (monitoring upstream tributaries) as detailed in the GWRC issued *Alternative 2016-2017 Fish Monitoring Methodology for the Waikanae River* memorandum). Of concern during these discussions was the impact recharge episodes may have on migrating fish; however, recharges are highly unlikely to occur during any peak migration period(s). Therefore, a series of electric fishing (EFM) surveys (ideally between February and March) in riffle-only habitat at each of the monitoring sites (where flows allowed) between 2017 and 2019, inclusive, was settled upon to illustrate the species present. We note, these data will not form any sort of metric to indicate adverse effects and will simply provide information on fish presence at the time of each survey.

In 2017, 2018, and 2019, when flows allowed, data were collected from the two upstream "control" and three (only two in 2017 due to persistent rain and flow issues) downstream "receiving" monitoring sites on the Waikanae River.

This report is the final analysis of the full set of baseline data for fish surveys above and below the water plant. It has been made with the inclusion of technical expert GWRC input into the analysis.

Previous reports

2017 – *Waikanae River Annual Aquatic Baseline Monitoring Report: A report on 2016/2017 aquatic data collection for water permits WGN130103 [34399] & [34400]* (Boffa Miskell Ltd, 2017).

2018 – *Waikanae River Riffle Fishing Report: A River Recharge monitoring component* (Boffa Miskell Ltd, 2018).

2019 – *Waikanae River riffle fishing report: A river recharge monitoring component* (Boffa Miskell Ltd, 2019).

2.0 Methodology

2.1 Site Location

The monitoring locations were determined in the River OMP which include two 'control' sites, (C1 and C2) located upstream of the Waikanae Water Treatment Plant (WTP); and three 'receiving' sites, located at predetermined intervals downstream of the Waikanae WTP (R1, R2,

and R3) (Figure 1). R2 was not required to be surveyed by the OMP, however it has been surveyed when possible.



Figure 1: Waikanae River Monitoring locations (C1, C2, R1 and R3).

2.2 Fish Surveys

Initially a range of techniques and locations were attempted. After discussion and revision, a new “riffle” method was developed and employed. Fish surveys commenced in February each year, proceeding fortnightly, for a total of four survey occasions. Due to untimely high-flow conditions, a fortnight break between surveys was not always achievable, as flows in the Waikanae River had to be below 4 cumecs (m^3/s) to be fishable. An absence of rain was typically required to ensure water clarity did not disrupt EFM surveying. Additionally, high flows and H&S concerns rendered site R2 unfishable in 2017.

A standard EFM single pass was undertaken from bank-to-bank across riffle habitat. At each stop-net placement the EFM operator fished a 3 m run upstream. Once complete, the stop-net was moved the width of the stop-net across and reset. The process was then repeated until the transect was complete. The EFM team then moved 3 m upstream and the transect process was repeated. This was done until the all discernible riffle habitat was fished (i.e. sufficient transects were undertaken to cover all or most of the fishable riffle). The total area fished at each riffle was recorded. Fish caught were measured for size and released at least 3 m downstream of the active fishing zone.

2.3 Analyses

The following aspects were considered and fed into the analyses:

- i. Fish data were converted to densities (fish/m^2) to remove effort bias from the results. i.e. no raw/abundance data were compared. Raw fish abundance data can be misleading making it unsuitable for this analysis because the area fished varied

between sites, dates, and years. Additionally, for most of the surveys, all three 'receiving' sites were surveyed compared with only two 'control' sites. Therefore, we have placed more emphasis on density data to allow for a standardised metric to be compared (fish/m²).

- ii. Torrent fish, eels, and redfin bully where the main focus of the analysis as these taxa have juvenile movement potential across the site in or near the time of the recharge, and are also the most abundant fish.
- iii. Eels regardless of species have been grouped together as they have similar habitats and passage ability.
- iv. Only redfin were used in the comparisons as this taxa was in considerably higher abundances than all or any other bully species.
 - a. All juvenile bullies have been clumped as we assumed the vast majority are redfin and many could not be identified in the field due to small size.
- v. Species with low abundances/not observed at all sites were excluded from analyses.
- vi. Size was the primary factor used to differentiate migrating juveniles from adult residents. The following limits were used:
 - b. Juvenile eels - ≤ 150 mm
 - c. Juvenile bullies - ≤ 40 mm
 - d. Juvenile torrentfish - ≤ 60 mm

Taking into account the above, the following broad comparisons are made:

- Assessing the densities of each site through time.
- Assessing the density of each taxa/group presented across sites,
- Repeating the above analyses after combining the control and receiving site densities. This analysis excludes R3 from receiving sites due to it being clearly different (see section 4.0 for why the difference exists) and skewing the analysis when included.

2.3.1 Statistical analysis

Using excel – statistical analyses were performed. A two-tailed two sample for means t-test was used to determine if there were statistical differences between average fish densities between sites.

3.0 Results

3.1 Raw fish numbers

- In total, 937 fish were caught throughout the survey period, comprising the following ten species (raw numbers):

- 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)
- Plus, the following unidentifiable (due to size) groups:
 - Elver eel (91)
 - Juvenile bully (48; assumed majority to be redfin)

3.1.1 Pooled fish proportions

- Eel have been pooled, comprising 70% longfin, 3% shortfin, 27% elver
- Only redfin bully and juvenile bully are analysed in this report; however, the bully community comprised 73% redfin, 1% common, 1% bluegill, 25% juvenile bully

3.2 Sites through time

Torrentfish densities increased at C2, R2, and R3 in 2019; however, their presence was reasonably stable throughout the surveys at C1 and R1 (Figure 2). Overall, for torrentfish, the greatest densities were observed at R3, and the lowest were typically observed at C1. Torrentfish densities varied but were typically <0.1 fish/m², except at R3 where densities were consistently >0.15 fish/m² since March 2018.

Eels densities were highest during 2017 and the early 2018 surveys at most sites (acknowledging R2 was not surveyed in 2017), before a marked decline in the later 2018 surveys (Figure 2). Eel densities increased in 2019 at C1 and C2, but not at the receiving sites (R). Eel densities varied between sites and dates but were typically <0.1 fish/m².

There were no notable redfin trends through time at each site, with regular fluctuations (Figure 2). However, redfin bully densities were typically >0.4 fish/m².



Figure 2: Observed torrentfish, eel, and redfin bully densities at each monitoring location throughout the survey period. Note eels have been grouped to include longfin, shortfin, and elver eels and redfin bullies include unidentifiable juvenile bullies. R2 was not surveyed in 2017 due to H&S concerns.

3.3 Species per site

Torrentfish median densities were consistently <0.04 fish/m², except for R3 (0.16 fish/m²) and variability limited in the control sites and R1. Variability was greatest at R3, and there were no instances where torrentfish were not observed. Variability in density was also high at R2. The variability at R2 resulted in an average density of 0.06 fish/m² which was notably higher than the median (0.017 fish/m²).

There was a greater variation in median and mean eel densities between sites than torrentfish. Median eel densities were greatest at C1 and R3 (0.064 and 0.065 fish/m², respectively), and between 0.021 and 0.036 fish/m² at the other sites. Average eel densities were above 0.04 fish/m² at all sites other than R2 which was 0.02 fish/m².

There was little variation in redfin bully median and average densities throughout except at R3 which had a notably higher median and average density. Median densities were <0.025 fish/m².

except for R3 which was 0.065 fish/m² and average densities were <0.02 fish/m² except for R3 which was 0.07 fish/m².

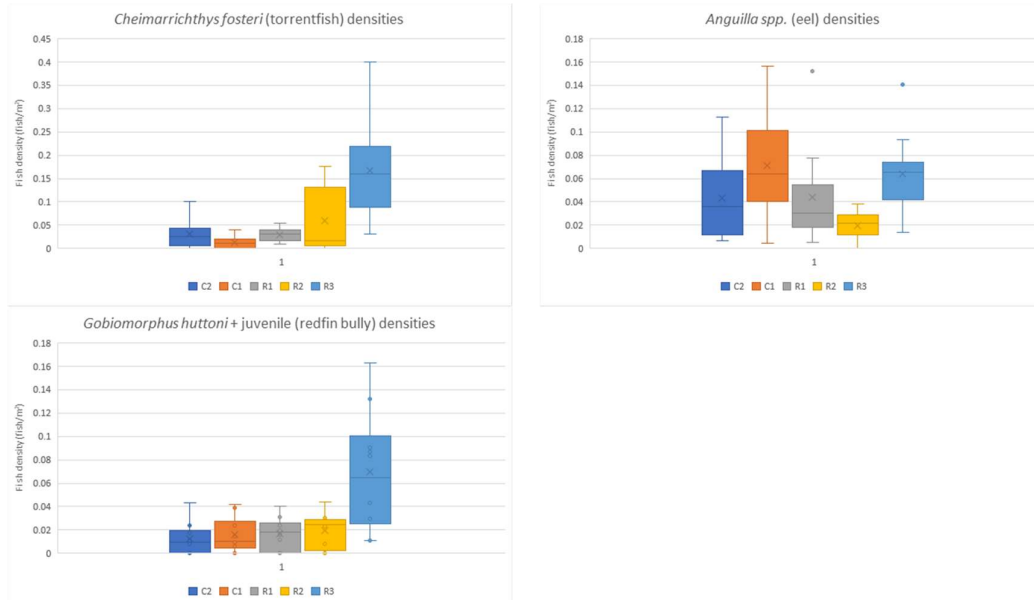


Figure 3: Torrentfish, eel, and redfin bully observed densities between sites combining all monitoring occasions. Note R2 was not surveyed during 2017 due to H&S concerns.

3.4 Above and below through time

Torrentfish densities remained relatively stable above the recharge location throughout the survey period, with a possible slight increase in 2019, whereas densities showed a marked increase below the recharge location (excluding R3) in 2019. Prior to 2019, densities below the recharge location appeared consistent. Broadly, this pattern was the inverse for eels, with a notable decline in densities since 05/02/2018 below the recharge location and since 2017 above the recharge location. There was no discernible difference in redfin bully densities above or below the recharge location through time.

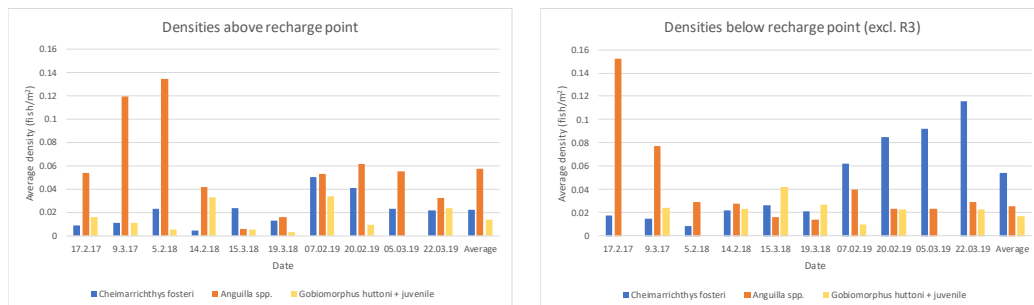


Figure 4: Monitoring sites above and below (excluding R3) combined to show average torrentfish, eel, and redfin bully densities above and below the recharge locations. Note R2 was not surveyed during 2017 due to H&S concerns.

3.5 Above and below by species

The median torrentfish densities between above and below the recharge location are between 0.022 and 0.024 fish/m² (excluding R3 data); however, there is greater variation in densities below the recharge location (Figure 5). Eel density variability is greater upstream of the recharge location, which has a corresponding greater median density (0.053 fish/m²) compared with downstream (0.028 fish/m²; excluding R3 data). The variability in redfin bully densities is comparable between upstream and downstream of the recharge location, averaging between 0.014 and 0.017 fish/m². However, the median redfin bully density is notably higher below the recharge location (0.023 fish/m²) compared with above (0.01 fish/m²).

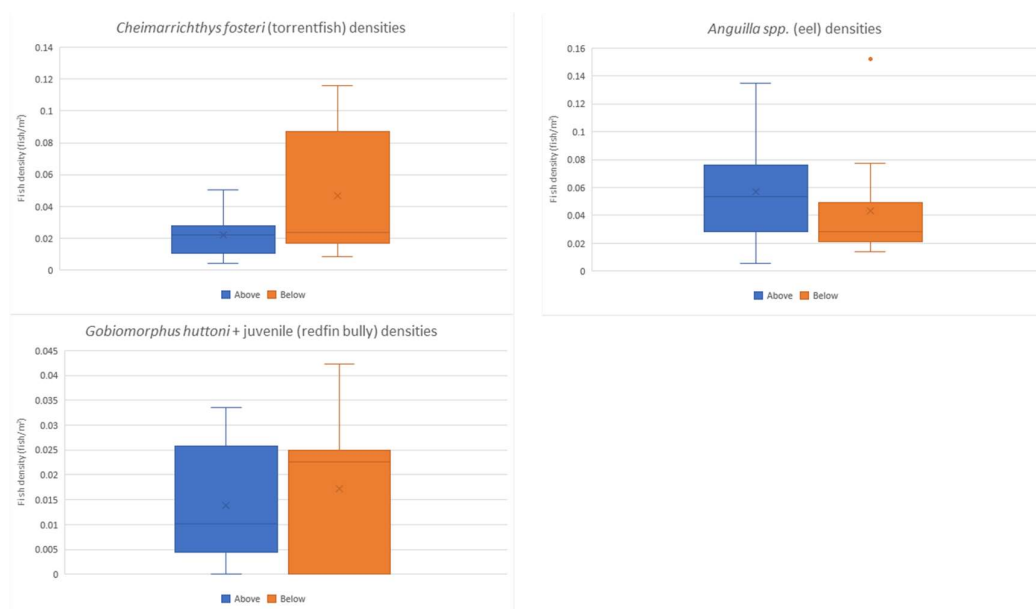


Figure 5: comparing median (-) and mean (x) densities of torrentfish, eels, and redfin bully above and below the recharge location. Note the below densities exclude R3. Eels have been grouped to include shortfin, longfin, and elver eels.

3.6 Juvenile densities

Juvenile torrentfish, redfin bully, and elver eels have been analysed in the 2019 *Waikanae River Riffle Fishing Report* (Boffa Miskell Ltd, 2019) which reports on the findings of the 2017-2019 riffle fishing survey data. That information is reproduced below. Note site R3 is included in the density comparisons and is the main contributor of difference.

3.6.1 Juvenile eel densities (≤ 150 mm)

Juvenile eel densities varied between sites but was greatest at the C1 and R3 sites (approximately 0.05 fish/m²; Figure 6). R2 had the lowest densities.

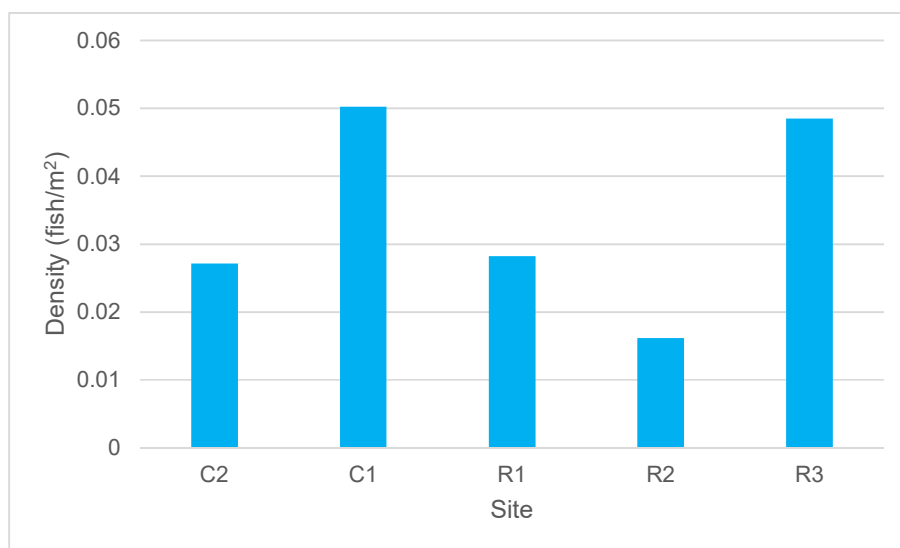


Figure 6: Average densities of juvenile eels (≤ 150 mm) at each site (2019).

Overall, juvenile eel densities were slightly higher above the recharge location (Figure 7).

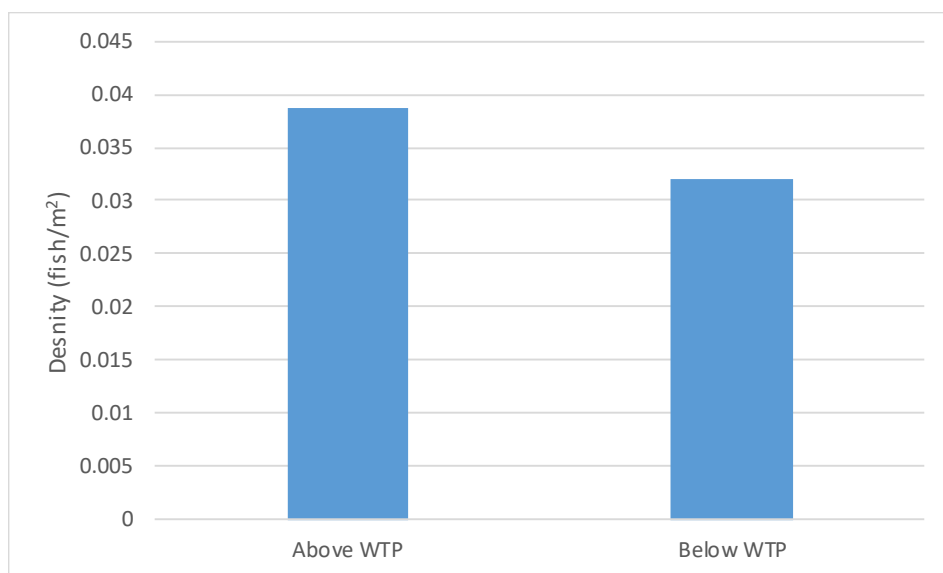


Figure 7: Average densities of juvenile eels (≤ 150 mm) above and below the water treatment plant.

3.6.1.1 Juvenile torrentfish densities (≤ 60 mm)

Juvenile torrentfish densities were notably higher at R3 site compared with no observed juveniles at C1 site (Figure 8). Densities were relatively consistent between sites R1 and R2; and were lower at C2. Site R3 is the site furthest from the recharge location (and below the SH1 armour cascade/falls). The comparatively high densities at R3 may be due to a shorter distance-from-sea, or below a swimming barrier, rather than an effect from the recharge discharge.

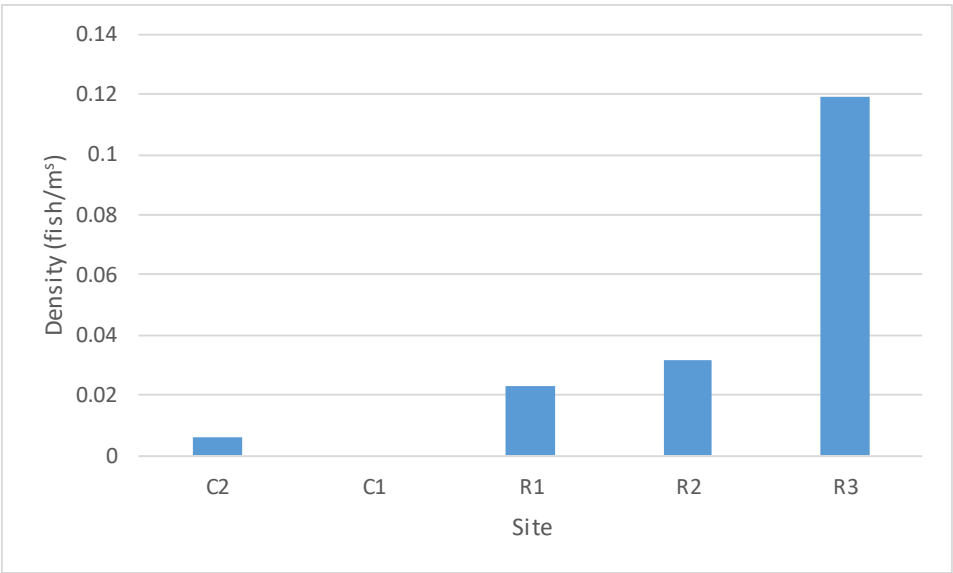


Figure 8: Average densities of juvenile torrentfish (≤60 mm) at each site.

Juvenile torrentfish densities were much higher below the recharge location; however, it is worth noting this is largely due to the comparatively high numbers observed at R3 (i.e. the site furthest from the recharge location; Figure 9).

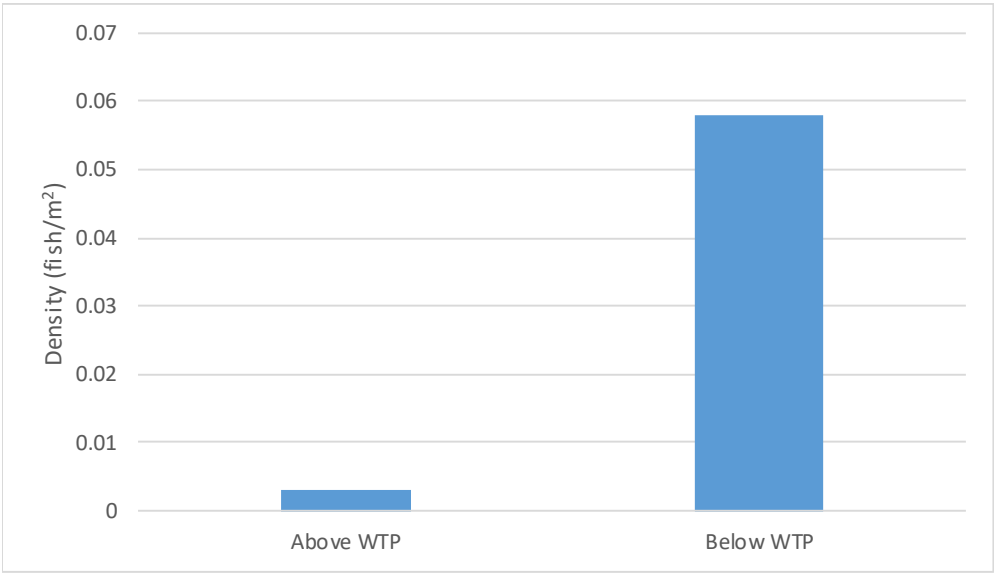


Figure 9: Average densities of juvenile torrentfish (≤60 mm) above and below the water treatment plant.

3.6.1.2 Juvenile bully (≤40 mm) densities

As with juvenile torrentfish, bully densities were notably highest at site R3 compared with all other sites (Figure 10). Densities at the remaining sites were comparable. The consistency in densities between all sites except R3 suggests the recharge is not a barrier to migrating juvenile bullies, but something does appear to be concentrating bully (and torrent fish) at R3, this pattern

was seen in previous years. It is conceivable that the sample reach is the “last” strong riffle habitat before the armouring protection under SH1 and so “accumulates” these fish.

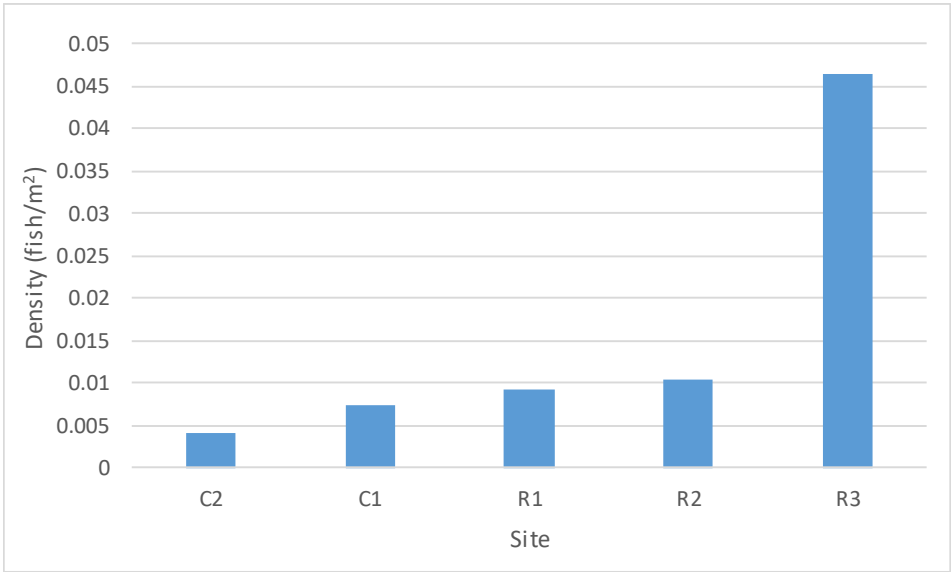


Figure 10: Average densities of juvenile bullies (≤ 40 mm) at each site.

Juvenile bully densities were considerably higher below the recharge location (Figure 11); however, this is misleading due to the higher densities at R3.

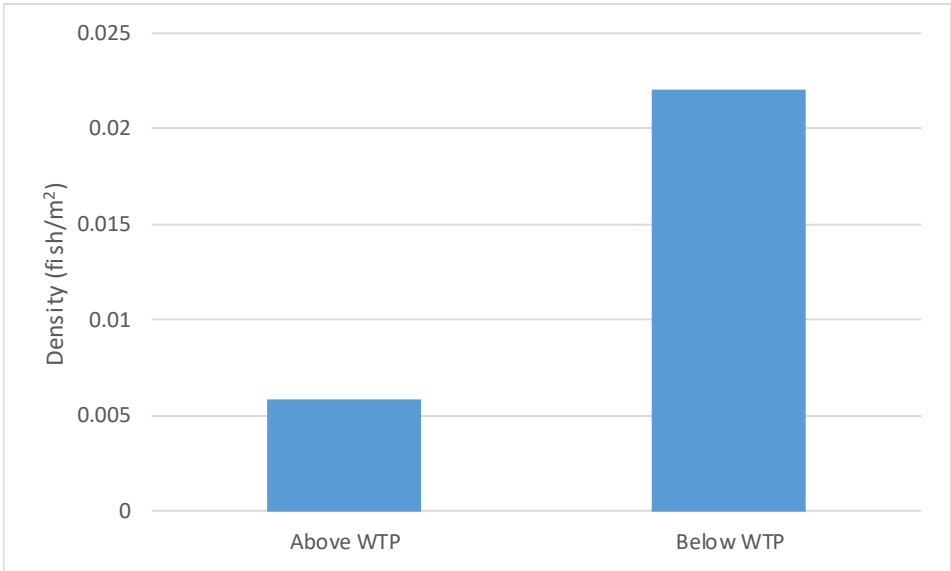


Figure 11: Average densities of juvenile bullies (≤ 40 mm) above and below the water treatment plant.

4.0 Discussion

4.1.1 Physical habitat comparisons

The considerably higher torrentfish and redfin bully densities observed at R3 compared to the other sites were likely a reflection of the different habitat conditions at this site. The two control sites, and R1 and R2 all resembled low-flow riffles with uniform flows throughout. This was particularly noticeable during low-flow conditions where the 'riffle' habitats were often difficult to discern from run habitats. At these times, substrate differences were used to define the riffle habitat, though we note there is a potential for fish taxa which prefer faster-flow environments to expand into nearby habitats. This was not the case with R3, where a marked gradient increase, coupled with the 'pinching' of flows through substrate build-up along the margins (particularly true right) ensured this area was always a discernible, isolated riffle with relatively (to the size of the river) large pools upstream and downstream. There is a chance density was greatest at this site for torrentfish and redfin bully because it was more stable as a riffle and there was less "venturing" ability into nearby habitats.

The variability in eel densities throughout the monitoring sites may be a symptom of their preference to reside in slower flowing habitats. Furthermore, there was limited habitat for large adult eels in the surveyed riffles, especially during low-flow conditions.

4.1.2 Other potential barriers

The objective of this study was to assess if the recharge programme results in a chemical barrier to migrating fish. Any potential differences in fish densities between monitoring sites may be, in part, due to other physical forms which may hinder or impede fish passage.

- i. Rock weir between R2 and R3 – An artificial rock weir has been placed downstream of the old SH1 road bridge which has the potential to provide a velocity barrier to migrating fish.
- ii. Concrete and rock weir between R1 and C1 (near the recharge location) – An artificial concrete weir has been installed adjacent to the Waikanae WWTP to assist with operations. The concrete structure results in a vertical concrete face which migrating fish will need to navigate/climb. Large boulders (>1 m) have also been placed throughout this reach which may or may not assist with fish passage (likely dependant on flow conditions at the time of migration).

4.1.3 Timing of surveys

All fish surveys were conducted in February and March each year. This coincides with the tail end of peak upward migration period of longfin and shortfin eels (Smith, 2014) and is at the tail end of the range of upward migration for redfin bully. However, peak upward migration of torrentfish occurs during late autumn and winter with no migration occurring during February and March. Therefore, any potential differences in torrentfish densities between the sites is likely a reflection of habitat differences rather than the presence of a potential chemical barrier during times of recharge.

The temporary nature of any recharge occurrence makes it difficult to measure the potential for a chemical barrier to upward migrating fish. Furthermore, the recharge location is situated on the true right side of the river meaning it is likely sufficient mixing would have occurred as the plume moved downstream before it “crosses” the river.

5.0 Conclusions

- R3 aside, there were no obvious differences in fish densities between communities above and below the recharge location.
- R3 had notably greater fish densities, but this is likely attributable to difference in physical habitat condition.
- Fish densities appeared to dip in 2018 but improved in 2019. It is unclear why this dip may have occurred, but because it was observed throughout the surveys it is highly likely a result of catchment-wide environmental/climatic changes.
- The River OMP states that fish monitoring data will be analysed to determine if an applicable trigger can be implemented. These data (the total data set 2017-2019) do not support an effect of the recharge, and do not, and cannot, be used to set any meaningful measurement trigger of fish species densities or numbers which might relate to a water discharge effect of the recharge programme.
- No further fish surveys are recommended as part of this package of works

6.0 References

- Boffa Miskell Ltd. (2017). Waikanae River Annual Aquatic Baseline Monitoring Report: A report on 2016/2017 aquatic data collection for water permits WGN130103 [34399] & [34400]. Prepared for Kāpiti Coast District Council.
- Boffa Miskell Ltd. (2018). Waikanae River Riffle Fishing Report: A River Recharge monitoring component. Prepared for Kāpiti Coast District Council.
- Boffa Miskell Ltd. (2019). Waikanae River riffle fishing report: A river recharge monitoring component (Report No. W14039). Boffa Miskell Ltd.
- Smith, J. (2014). Freshwater fish spawning and migration periods (MPI Technical Paper 2015/17). Prepared by NIWA for Ministry for Primary Industries.

Appendix 1: Raw fish data

17 February 2017

R3			
Transect	1	2	3
Length (m)	7	8	9
Width (m)	3	3	3
Area fished (m ²)	21	24	27
Torrentfish	1	4	1
Elver eel	0	1	0
Redfin bully	1	1	4

R1			
Transect	1	2	3
Length (m)	18	20	19
Width (m)	3	3	3
Area fished (m ²)	54	60	57
Torrentfish		2	1
Longfin eel	5	7	10
Elver eel	1	3	
Redfin bully	0	0	0

C1				
Transect	1	2	3	4
Length (m)	14	12	10	10
Width (m)	3	3	3	3
Area fished (m ²)	42	36	30	30
Longfin eel	5	4	0	0
Elver eel	1	0	0	0
Redfin bully	1	1	0	0
Banded kokopu	1	0	0	0

C2				
Transect	1	2	3	4
Length (m)	8	8	10	12
Width (m)	3	3	3	3
Area fished (m ²)	24	24	30	36
Torrentfish	0	2	0	0
Longfin eel	0	4	0	2
Redfin bully	0	2	0	0
Banded kokopu	1	0	0	0

09 March 2017

R3				
Transect	1	2	3	4
Length (m)	11	13	12	7
Width (m)	3	3	3	3
Area fished (m ²)	33	39	36	21
Torrentfish	5	6	2	0
Longfin eel	3	3	0	2
Elver eel	1	1	2	0
Redfin bully	6	2	1	8
Brown trout	1	0	0	0

R1				
Transect	1	2	3	4
Length (m)	15	19	18	17
Width (m)	3	3	3	3
Area fished (m ²)	45	57	54	51
Torrentfish	2	1	0	0
Longfin eel	5	4	3	0
Elver eel	1	1	2	0
Redfin bully	2	1	0	2

C1			
Transect	1	2	3
Length (m)	9	10	11
Width (m)	3	3	3
Area fished (m ²)	27	30	33
Torrentfish	0	0	2
Longfin eel	3	3	3
Elver eel	0	0	4
Redfin bully	0	0	1

C2				
Transect	1	2	3	4
Length (m)	14	15	15	16
Width (m)	3	3	3	3
Area fished (m ²)	42	45	45	48
Longfin eel	1	2	3	6
Elver eel	0	1	1	0
Redfin bully	1	0	1	0
Bluegill bully	1	1	0	0
Shortfin eel	2	0	0	1

05 February 2018

R3						
Transect	1	2	3	4	5	6
Length (m)	5.5	6.6	7.7	7.7	8.8	8.8
Width (m)	3	3	3	3	3	3
Area fished (m ²)	16.5	19.8	23.1	23.1	26.4	26.4
Torrentfish	9	5	3		2	1
Longfin eel	2	2	1			
Elver eel	8	2	3		1	
Redfin bully	0	1			1	2
Inanga	1					

R2								
Transect	1	2	3	4	5	6	7	8
Length (m)	5.5	6.6	6.6	6.6	5.5	5.5	5.5	7.7
Width (m)	3	3	3	3	3	3	3	3
Area fished (m ²)	16.5	19.8	19.8	19.8	16.5	16.5	16.5	23.1
Torrentfish	1							
Longfin eel		1						1
Elver eel		1						1
Common bully		1						

R1						
Transect	1	2	3	4	5	6
Length (m)	17.6	15.4	7.7	7.7	7.7	8.8
Width (m)	3	3	3	3	3	3
Area fished (m ²)	52.8	46.2	23.1	23.1	23.1	26.4
Torrentfish		1				1
Longfin eel		1				
Elver eel	1	1		1	2	

C1				
Transect	1	2	3	4
Length (m)	8.8	8.8	11	5.5
Width (m)	3	3	3	3
Area fished (m ²)	26.4	26.4	33	16.5
Torrentfish	3	1		
Longfin eel		4	7	1
Elver eel	1		2	1
Redfin bully				1
Brown trout	1			
Koaro	1			

C2						
Transect	1	2	3	4	5	6
Length (m)	5.5	8.8	11	6.6	6.6	8.8
Width (m)	3	3	3	3	3	3
Area fished (m ²)	16.5	26.4	33	19.8	19.8	26.4
Torrentfish					1	
Longfin eel		1	6	2		2
Elver eel			4			1

14 February 2018

R3					
Transect	1	2	3	4	5
Length (m)	11	11	11	9.9	11
Width (m)	3	3	3	3	3
Area fished (m ²)	33	33	33	29.7	33
Torrentfish	1			1	3
Longfin eel	2	1	1	2	
Elver eel	2	1	1	1	
Redfin bully	1	1		2	2
Common bully			1		
Juvenile bully					1

R2			
Transect	1	2	3
Length (m)	15.4	14.3	14.3
Width (m)	3	3	3
Area fished (m ²)	46.2	42.9	42.9
Torrentfish			1
Longfin eel			
Elver eel	1	1	
Juvenile bully			2
Redfin bully			2

R1					
Transect	1	2	3	4	5
Length (m)	15.4	15.4	16.5	17.6	17.6
Width (m)	3	3	3	3	3
Area fished (m ²)	46.2	46.2	49.5	52.8	52.8
Torrentfish	4	2	2	1	
Longfin eel	1		2	1	3
Elver eel			1		2
Redfin bully	1		1		2
Inanga			1		

C1						
Transect	1	2	3	4	5	6
Length (m)	7.7	7.7	7.7	7.7	8.8	
Width (m)	3	3	3	3	3	3
Area fished (m ²)	23.1	23.1	23.1	23.1	26.4	0
Torrentfish	1					
Longfin eel		4		2	1	
Elver eel	1				1	
Redfin bully			3	1		
Juvenile bully		1				

C2						
Transect	1	2	3	4	5	6
Length (m)	8.8	6.6	6.6	6.6	6.6	6.6
Width (m)	3	3	3	3	3	3
Area fished (m ²)	26.4	19.8	19.8	19.8	19.8	19.8
Torrentfish						
Longfin eel	1					
Elver eel						

Redfin bully			2		1	
Koaro	1					

15 March 2018

R3						
Transect	1	2	3	4	5	6
Length (m)	3	3	3	3	3	3
Width (m)	5.5	5.5	4.4	4.4	5.5	4.4
Area fished (m ²)	16.5	16.5	13.2	13.2	16.5	13.2
Torrentfish	2		2	1	2	1
Longfin eel			1			
Elver eel	2					
Shortfin eel	1					
Juvenile bully		1				

R2							
Transect	1	2	3	4	5	6	7
Length (m)	3	3	3	3	3	3	3
Width (m)	7.7	8.8	8.8	8.8	8.8	8.8	8.8
Area fished (m ²)	23.1	26.4	26.4	26.4	26.4	26.4	26.4
Torrentfish		2	1				
Longfin eel	1						
Shortfin eel		1			1	1	
Juvenile bully				1	1		1
Redfin bully			1	2		1	1

R1				
Transect	1	2	3	4
Length (m)	3	3	3	3
Width (m)	15.4	17.6	16.5	16.5
Area fished (m ²)	46.2	52.8	49.5	49.5
Torrentfish	2		1	4
Shortfin eel			1	
Longfin eel			1	
Redfin bully	2	2	1	1
Juvenile bully	1	1		

C1						
Transect	1	2	3	4	5	6
Length (m)	3	3	3	3	3	3
Width (m)	13.2	12.1	11	11	11	11
Area fished (m ²)	39.6	36.3	33	33	33	33
Torrentfish	2	1				
Redfin bully			1	1		
Shortfin eel				1		

C2							
Transect	1	2	3	4	5	6	7
Length (m)	3	3	3	3	3	3	3
Width (m)	6.6	7.7	7.7	4.4	5.5	7.7	11
Area fished (m ²)	19.8	23.1	23.1	13.2	16.5	23.1	33
Torrentfish				1		4	
Longfin eel					1		

19 March 2018

R3						
Transect	1	2	3	4	5	6
Length (m)	3	3	3	3	3	3
Width (m)	4.4	5.5	4.4	4.4	4.4	7.7
Area fished (m ²)	13.2	16.5	13.2	13.2	13.2	23.1
Torrentfish	2	3	2	3	1	5
Longfin eel		1	1			1
Redfin bully						1

R2							
Transect	1	2	3	4	5	6	7
Length (m)	3	3	3	3	3	3	3
Width (m)	7.7	8.8	7.7	7.7	7.7	8.8	8.8
Area fished (m ²)	23.1	26.4	23.1	23.1	23.1	26.4	26.4
Torrentfish	1			1		1	
Longfin eel						1	
Elver eel				2		1	
Juvenile bully			2				
Redfin bully	1		1				

R1						
Transect	1	2	3	4	5	6
Length (m)	3	3	3	3	3	3
Width (m)	7.7	11	11	11	11	13.2
Area fished (m ²)	23.1	33	33	33	33	39.6
Torrentfish		2	2		1	
Redfin bully		1	2		1	2
Elver eel						1

C1					
Transect	1	2	3	4	5
Length (m)	3	3	3	3	3
Width (m)	13.2	11	11	9.9	9.9
Area fished (m ²)	39.6	33	33	29.7	29.7
Longfin eel		1			
Elver eel	1				1
Juvenile bully					1

C2						
Transect	1	2	3	4	5	6
Length (m)	3	3	3	3	3	3
Width (m)	6.6	7.7	8.8	8.8	8.8	9.9
Area fished (m ²)	19.8	23.1	26.4	26.4	26.4	29.7
Torrentfish		1			1	2
Longfin eel			1		1	

07 February 2019

R3										
Transect	1	2	3	4	5	6	7	8	9	10
Length (m)	3	3	3	3	3	3	3	3	3	3
Width (m)	4.4	4.4	4.4	5.5	5.5	5.5	5.5	5.5	5.5	5.5

Area fished (m²)	13.2	13.2	13.2	16.5	16.5	16.5	16.5	16.5	16.5	16.5
Torrentfish	5	6	5	1	6	3	1	2		
Redfin bully	3		1	1		3	2	1	1	2
Longfin eel	3			1	1		1			
Elver eel				1		1				

R2										
Transect	1	2	3	4	5	6	7	8		
Length (m)	3	3	3	3	3	3	3	3	3	3
Width (m)	4.4	4.4	4.4	4.4	5.5	5.5	5.5	5.5	5.5	5.5
Area fished (m²)	13.2	13.2	13.2	13.2	16.5	16.5	16.5	16.5	16.5	16.5
Torrentfish		1	3	1		5				2
Elver eel			1							
Longfin eel					2	1				
Redfin bully							1			

R1										
Transect	1	2	3	4	5					
Length (m)	3	3	3	3	3					
Width (m)	4.4	5.5	5.5	5.5	6.6	6.6				
Area fished (m²)	13.2	16.5	16.5	16.5	19.8	19.8				
Elver eel		1		1						
Torrentfish				1					1	
Redfin bully				1						
Longfin eel					2					

C1										
Transect	1	2	3	4	5	6				
Length (m)	3	3	3	3	3	3				
Width (m)	6.6	6.6	7.7	7.7	6.6	6.6				
Area fished (m²)	19.8	19.8	23.1	23.1	19.8	19.8				
Longfin eel	2				1	2				
Elver eel		1								
Redfin bully				1	1	1				

C2										
Transect	1	2	3							
Length (m)	3	3	3							
Width (m)	9.9	8.8	4.4							
Area fished (m²)	29.7	26.4	13.2							
Longfin eel	2	1								
Torrentfish	4	2	1							
Redfin bully	1	2								
Elver eel	1									

20 February 2020

R3										
Transect	1	2	3	4	5	6	7	8	9	10
Length (m)	3	3	3	3	3	3	3	3	3	3
Width (m)	5.5	4.4	5.5	5.5	5.5	6.6	6.6	6.6	6.6	6.6
Area fished (m²)	16.5	13.2	16.5	16.5	16.5	19.8	19.8	19.8	19.8	19.8
Torrentfish		5	11	6	1	5	5	3	1	1
Redfin bully	2	3	1		1	1	3	1	1	3

Longfin eel				1	3	1		3	1	2
Elver eel									1	
Inanga				1						
Juvenile bully		3	4	2		1	1	1	1	

R2									
Transect	1	2	3	4	5				
Length (m)	3	3	3	3	3				
Width (m)	4.4	5.5	7.7	11	11				
Area fished (m ²)	13.2	16.5	23.1	33	33				
Torrentfish	3	1		8	3				
Juvenile bully	1	1							
Longfin eel				1	1				
Redfin bully				1					

R1									
Transect	1	2	3	4	5	6	7	8	9
Length (m)	3	3	3	3	3	3	3	3	3
Width (m)	6.6	6.6	8.8	6.6	7.7	7.7	7.7	7.7	8.8
Area fished (m ²)	19.8	19.8	26.4	19.8	23.1	23.1	23.1	23.1	26.4
Inanga				1	1				
Torrentfish	1	1	1	1		1	2		1
Redfin bully					1		1	1	
Longfin eel			1				1	1	3
Juvenile bully							1		

C1					
Transect	1	2	3	4	
Length (m)	3	3	3	3	
Width (m)	11	9.9	9.9	7.7	
Area fished (m ²)	33	29.7	29.7	23.1	
Longfin eel	2	1	4	1	
Elver eel			1		
Redfin bully	1				
Torrentfish		2			

C2					
Transect	1	2	3	4	5
Length (m)	3	3	3	3	3
Width (m)	8.8	8.8	7.7	6.6	4.4
Area fished (m ²)	26.4	26.4	23.1	19.8	13.2
Longfin eel	3	1			
Torrentfish	4	1	1	1	
Redfin bully			1		
Juvenile bully	1				

05 March 2019

R3									
Transect	1	2	3	4	5	6	7	8	9
Length (m)	3	3	3	3	3	3	3	3	3
Width (m)	6.6	5.5	5.5	5.5	6.6	6.6	6.6	7.7	7.7
Area fished (m ²)	19.8	16.5	16.5	16.5	19.8	19.8	19.8	23.1	23.1
Torrentfish	6	14	6	8	13	5	9	6	3

Redfin bully	2			1			1		
Longfin eel	1	3	1				1	1	1
Juvenile bully	1	1	1			1			
Elver eel					1	2			

R2					
Transect	1	2	3	4	5
Length (m)	3	3	3	3	3
Width (m)	5.5	5.5	7.7	7.7	5.5
Area fished (m²)	16.5	16.5	23.1	23.1	16.5
Torrentfish	4	7	1	1	1
Longfin eel				2	

R1				
Transect	1	2	3	4
Length (m)	3	3	3	3
Width (m)	6.6	6.6	6.6	6.6
Area fished (m²)	19.8	19.8	19.8	19.8
Torrentfish	1	2		
Elver eel	1	1		

C1				
Transect	1	2	3	4
Length (m)	3	3	3	3
Width (m)	9.9	8.8	8.8	8.8
Area fished (m²)	29.7	26.4	26.4	26.4
Longfin eel	1	1	2	
Elver eel	1			1
Torrentfish			1	

C2				
Transect	1	2	3	4
Length (m)	3	3	3	3
Width (m)	11	8.8	8.8	7.7
Area fished (m²)	33	26.4	26.4	23.1
Longfin eel	1			2
Torrentfish	2	2		
Elver eel	1	1		1

22 March 2019

R3								
Transect	1	2	3	4	5	6	7	8
Length (m)	3	3	3	3	3	3	3	3
Width (m)	5.5	5.5	5.5	6.6	7.7	7.7	7.7	7.7
Area fished (m²)	16.5	16.5	16.5	19.8	23.1	23.1	23.1	23.1
Torrentfish	5	3	11	3	6	4	3	3
Redfin bully	2	1	1				3	1
Longfin eel		2	1		1	4		
Juvenile bully	2	3					1	
Elver eel	2		1					
Brown trout							1	

R2				
Transect	1	2	3	4

Length (m)	3	3	3	3
Width (m)	5.5	6.6	6.6	7.7
Area fished (m ²)	16.5	19.8	19.8	23.1
Torrentfish	6	6	2	
Juvenile bully	2			
Longfin eel	1	2		

R1				
Transect	1	2	3	4
Length (m)	3	3	3	3
Width (m)	12.1	12.1	12.1	12.1
Area fished (m ²)	36.3	36.3	36.3	36.3
Longfin eel		2		
Torrentfish	5	2		1
Elver eel	1			
Juvenile bully	1		1	1

C1					
Transect	1	2	3	4	5
Length (m)	3	3	3	3	3
Width (m)	7.7	8.8	8.8	8.8	8.8
Area fished (m ²)	23.1	26.4	26.4	26.4	26.4
Longfin eel	2	2	1		
Juvenile bully	2		1		
Redfin bully					1
Torrentfish				1	1

C2				
Transect	1	2	3	4
Length (m)	3	3	3	3
Width (m)	11	11	11	9.9
Area fished (m ²)	33	33	33	29.7
Longfin eel	1		1	
Torrentfish	1	1	1	
Redfin bully	1			

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.

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Appendix C

Operation and Maintenance Logs Intake and Production Bores

K10

[illegible]

07/05/2018	10:10:00	Yes	28/12/2017	13:01:00	52	31/05/2018	10:10:00	4751	03/01/2018	14:51:00	24.6	28/12/2017	13:01:00	6293	28/12/2017	13:01:00	10.9	28/12/2017	13:01:00	13:01:00	3- No Action	01/02/2018	13:05:00	Yes	03/05/2018	13:48:00	43262	01/02/2018	13:05:00	Yes	18/01/2018	11:07:00	80
07/05/2018	11:23:00	Yes	28/12/2017	14:51:00	52	31/05/2018	11:23:00	4751	11/01/2018	11:07:00	14	03/01/2018	14:51:00	8993	03/01/2018	14:51:00	10.94	03/01/2018	14:51:00	14:51:00	3- No Action	06/02/2018	11:23:00	Yes	10/05/2018	11:41:00	43262	06/02/2018	11:23:00	Yes	18/01/2018	12:55:00	80.28
21/06/2018	11:46:00	Yes	28/12/2017	11:07:00	52	31/05/2018	11:46:00	4751	11/07/2018	11:07:00	14	14/05/2018	11:07:00	14	14/05/2018	11:07:00	10.94	14/05/2018	11:07:00	11:07:00	3- No Action	01/02/2018	11:23:00	Yes	21/06/2018	11:46:00	43262	01/02/2018	11:23:00	Yes	18/01/2018	12:55:00	81
28/06/2018	12:50:00	Yes	28/12/2017	12:50:00	52	31/05/2018	12:50:00	4751	25/01/2018	11:24:00	14	18/01/2018	12:50:00	10677	18/01/2018	12:50:00	10.94	18/01/2018	12:50:00	12:50:00	1- Change	22/02/2018	11:23:00	Yes	24/05/2018	11:03:00	43262	22/02/2018	11:23:00	Yes	18/01/2018	12:55:00	81
28/06/2018	12:50:00	Yes	28/12/2017	12:50:00	52	31/05/2018	12:50:00	4751	25/01/2018	11:24:00	14	18/01/2018	12:50:00	10677	18/01/2018	12:50:00	10.94	18/01/2018	12:50:00	12:50:00	1- Change	22/02/2018	11:23:00	Yes	24/05/2018	11:03:00	43262	22/02/2018	11:23:00	Yes	18/01/2018	12:55:00	81
12/07/2018	10:39:00	Yes	08/02/2018	11:21:00	52	31/05/2018	10:39:00	4752	15/02/2018	10:57:00	14	08/02/2018	11:21:00	13711	08/02/2018	11:21:00	10.94	08/02/2018	11:21:00	11:21:00	1- Change	15/03/2018	12:42:00	Yes	16/08/2018	09:56:00	43262	15/03/2018	12:42:00	Yes	22/02/2018	11:23:00	81
19/07/2018	11:08:00	Yes	15/02/2018	10:57:00	52	31/05/2018	11:08:00	4752	22/02/2018	11:23:00	14	15/02/2018	10:57:00	15513	15/02/2018	10:57:00	10.94	15/02/2018	10:57:00	10:57:00	1- Change	22/03/2018	13:03:00	Yes	31/05/2018	10:10:00	43262	09/03/2018	10:27:00	Yes	06/02/2018	11:21:00	81
02/08/2018	10:46:00	Yes	01/03/2018	14:40:00	52	31/05/2018	10:46:00	4752	09/03/2018	10:27:00	14	01/03/2018	14:40:00	15705	01/03/2018	14:40:00	10.94	01/03/2018	14:40:00	14:40:00	3- No Action	05/04/2018	10:24:00	Yes	06/09/2018	10:10:00	43262	29/03/2018	11:07:00	Yes	22/02/2018	11:23:00	81
09/08/2018	09:05:00	Yes	09/08/2018	10:27:00	52	31/05/2018	09:05:00	4754	15/03/2018	12:42:00	14	09/08/2018	10:27:00	15705	09/08/2018	10:27:00	10.94	09/08/2018	10:27:00	10:27:00	1- Change	12/04/2018	10:24:00	Yes	04/10/2018	10:41:00	43262	05/04/2018	10:24:00	Yes	12/04/2018	10:29:00	86
26/08/2018	10:50:00	Yes	23/03/2018	13:03:00	52	31/05/2018	10:50:00	4756	09/04/2018	08:45:00	14	23/03/2018	13:03:00	15705	23/03/2018	13:03:00	10.94	23/03/2018	13:03:00	13:03:00	1- Change	26/04/2018	11:26:00	Yes	25/10/2018	10:37:00	43262	10/05/2018	11:41:00	Yes	26/04/2018	11:26:00	86
30/08/2018	11:11:00	Yes	30/08/2018	11:07:00	52	31/05/2018	30/08/2018	4756	09/04/2018	08:45:00	14	30/08/2018	11:07:00	15705	30/08/2018	11:07:00	10.94	30/08/2018	11:07:00	11:07:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
16/09/2018	10:10:00	Yes	16/09/2018	10:10:00	52	31/05/2018	16/09/2018	4756	09/04/2018	08:45:00	14	16/09/2018	10:10:00	15705	16/09/2018	10:10:00	10.94	16/09/2018	10:10:00	10:10:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
13/09/2018	11:27:00	Yes	12/04/2018	10:29:00	52	31/05/2018	11:27:00	4756	19/04/2018	10:25:00	14	13/09/2018	11:27:00	15803	13/09/2018	11:27:00	10.94	13/09/2018	11:27:00	11:27:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
20/09/2018	10:17:00	Yes	19/04/2018	10:25:00	52	31/05/2018	20/09/2018	4756	26/04/2018	11:26:00	14	20/09/2018	10:17:00	15803	20/09/2018	10:17:00	10.94	20/09/2018	10:17:00	10:17:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
24/09/2018	10:29:00	Yes	24/09/2018	10:29:00	52	31/05/2018	24/09/2018	4756	26/04/2018	11:26:00	14	24/09/2018	10:29:00	15803	24/09/2018	10:29:00	10.94	24/09/2018	10:29:00	10:29:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
04/10/2018	10:41:00	Yes	03/05/2018	13:48:00	52	31/05/2018	04/10/2018	4756	26/04/2018	11:26:00	14	04/10/2018	10:41:00	15803	04/10/2018	10:41:00	10.94	04/10/2018	10:41:00	10:41:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
18/10/2018	11:03:00	Yes	18/10/2018	11:03:00	52	31/05/2018	18/10/2018	4756	26/04/2018	11:26:00	14	18/10/2018	11:03:00	15803	18/10/2018	11:03:00	10.94	18/10/2018	11:03:00	11:03:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
18/10/2018	11:03:00	Yes	18/10/2018	11:03:00	52	31/05/2018	18/10/2018	4756	26/04/2018	11:26:00	14	18/10/2018	11:03:00	15803	18/10/2018	11:03:00	10.94	18/10/2018	11:03:00	11:03:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
25/10/2018	10:37:00	Yes	24/05/2018	11:03:00	52	31/05/2018	25/10/2018	4756	26/04/2018	11:26:00	14	25/10/2018	10:37:00	15803	25/10/2018	10:37:00	10.94	25/10/2018	10:37:00	10:37:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
02/11/2018	10:10:00	Yes	02/11/2018	10:10:00	52	31/05/2018	02/11/2018	4756	26/04/2018	11:26:00	14	02/11/2018	10:10:00	15803	02/11/2018	10:10:00	10.94	02/11/2018	10:10:00	10:10:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
08/11/2018	11:26:00	Yes	08/11/2018	11:26:00	52	31/05/2018	08/11/2018	4756	26/04/2018	11:26:00	14	08/11/2018	11:26:00	15803	08/11/2018	11:26:00	10.94	08/11/2018	11:26:00	11:26:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
15/11/2018	10:01:00	Yes	14/06/2018	11:08:00	52	31/05/2018	15/11/2018	4756	26/04/2018	11:26:00	14	15/11/2018	10:01:00	15803	15/11/2018	10:01:00	10.94	15/11/2018	10:01:00	10:01:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
02/12/2018	10:10:00	Yes	02/12/2018	10:10:00	52	31/05/2018	02/12/2018	4756	26/04/2018	11:26:00	14	02/12/2018	10:10:00	15803	02/12/2018	10:10:00	10.94	02/12/2018	10:10:00	10:10:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
29/11/2018	09:08:00	Yes	29/11/2018	09:08:00	52	31/05/2018	29/11/2018	4756	26/04/2018	11:26:00	14	29/11/2018	09:08:00	15803	29/11/2018	09:08:00	10.94	29/11/2018	09:08:00	09:08:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
06/12/2018	13:29:00	Yes	12/07/2018	10:39:00	52	31/05/2018	06/12/2018	4756	26/04/2018	11:26:00	14	06/12/2018	13:29:00	15803	06/12/2018	13:29:00	10.94	06/12/2018	13:29:00	13:29:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
20/12/2018	11:23:00	Yes	20/12/2018	11:23:00	52	31/05/2018	20/12/2018	4756	26/04/2018	11:26:00	14	20/12/2018	11:23:00	15803	20/12/2018	11:23:00	10.94	20/12/2018	11:23:00	11:23:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
27/12/2018	10:44:00	Yes	02/08/2018	10:46:00	52	31/05/2018	27/12/2018	4756	26/04/2018	11:26:00	14	27/12/2018	10:44:00	15803	27/12/2018	10:44:00	10.94	27/12/2018	10:44:00	10:44:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
10/01/2019	10:34:00	Yes	02/08/2018	10:46:00	52	31/05/2018	10/01/2019	4756	26/04/2018	11:26:00	14	10/01/2019	10:34:00	15803	10/01/2019	10:34:00	10.94	10/01/2019	10:34:00	10:34:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
31/01/2019	12:37:00	Yes	23/08/2018	10:50:00	52	31/05/2018	31/01/2019	4756	26/04/2018	11:26:00	14	31/01/2019	12:37:00	15803	31/01/2019	12:37:00	10.94	31/01/2019	12:37:00	12:37:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	83
17/02/2019	10:13:00	Yes	23/08/2018	10:50:00	52	31/05/2018	17/02/2019	4756	26/04/2018	11:26:00	14	17/02/2019	10:13:00	15803	17/02/2019	10:13:00	10.94	17/02/2019	10:13:00	10:13:00	3- No Action	03/05/2018	13:48:00	Yes	02/11/2018	10:37:00	43262	17/05/2018	11:08:00	Yes	03/05/2018	13:48:00	

04/06/2020	09:08:00	52	04/06/2020	09:08:00	14.3	25/05/2020	09:04:00	19772	25/05/2020	09:04:00	111	11/06/2020	10:45:00	2 - Clean	29/06/2020	08:09:00	Yes	23/07/2020	10:34:00	Yes
11/06/2020	10:45:00	52	11/06/2020	10:45:00	14.3	04/06/2020	09:08:00	19969	04/06/2020	09:08:00	111	18/06/2020	10:42:00	2 - Clean	09/07/2020	11:15:00	Yes	28/07/2020	09:51:00	Yes
18/06/2020	10:42:00	52	18/06/2020	10:42:00	14.3	11/06/2020	10:45:00	19969	11/06/2020	10:45:00	111	29/06/2020	08:09:00	2 - Clean	16/07/2020	10:24:00	Yes	30/07/2020	10:22:00	Yes
29/06/2020	08:09:00	31	29/06/2020	08:09:00	24	18/06/2020	10:42:00	19969	18/06/2020	10:42:00	111	09/07/2020	11:15:00	2 - Clean	23/07/2020	10:34:00	Yes	06/08/2020	10:51:00	Yes
09/07/2020	11:15:00	52	09/07/2020	11:15:00	14.3	29/06/2020	08:09:00	20008	29/06/2020	08:09:00	111	16/07/2020	10:24:00	3 - No Action	29/07/2020	09:51:00	Yes			
16/07/2020	10:24:00	52	16/07/2020	10:24:00	14.3	09/07/2020	11:15:00	20150	09/07/2020	11:15:00	111	23/07/2020	10:34:00	3 - No Action	30/07/2020	10:22:00	Yes			
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28/07/2020	09:51:00	30	28/07/2020	09:51:00	24.6	23/07/2020	10:34:00	20150	23/07/2020	10:34:00	111	30/07/2020	10:22:00	3 - No Action						
30/07/2020	10:22:00	52	30/07/2020	10:22:00	14.3	28/07/2020	09:51:00	20255	28/07/2020	09:51:00	111	06/08/2020	10:51:00	2 - Clean						
06/08/2020	10:51:00	52	06/08/2020	10:51:00	14	30/07/2020	10:22:00	20350	30/07/2020	10:22:00	111									
						06/08/2020	10:51:00	20350	06/08/2020	10:51:00	111									

KB4

Tab	KB4	KB4	KB4	KB4	KB4	KB4	KB4	KB4	KB4	KB4	KB4	KB4	KB4
Subgroup	KB4	KB4	KB4	KB4	KB4	KB4	KB4	KB4	KB4	KB4	KB4	KB4	KB4
Parameter	Parameter	Parameter	Parameter	Parameter	Parameter	Parameter	Parameter	Parameter	Parameter	Parameter	Parameter	Parameter	Parameter
Tag	Filled in log book?												
Units		m			°C	m³	m³						
Operations Min													
Operations Max													
Trigger Min													
Trigger Max													
92% Min													
92% Max													
95% Min													
95% Max													
98% Min													
98% Max													
99% Min													
99% Max													
Medium Min													
Medium Max													
Sample Months													
Days Between Samples													
Description													
Parameter ID	11406	11407	11408	11409	11410	11411	11412	11413	11414	11415			

	Time	Value	Date	Time	Value	Date	Time	Value	Date	Time	Value	Date	Time	Value	Date	Time	Value	Date	Time	Value	Date	Time	Value
19/10/2017	14:15:00	Yes	19/05/2017	11:10:00	33	19/05/2017	11:10:00	4881	19/05/2017	11:10:00	14.4	19/05/2017	11:10:00	201147	19/05/2017	11:10:00	2433	19/05/2017	11:10:00	3 - No Action	15/06/2017	13:00:00	Yes
28/10/2017	11:51:00	Yes	25/05/2017	09:51:00	33	25/05/2017	09:51:00	4881	25/05/2017	09:51:00	14.4	25/05/2017	09:51:00	201147	25/05/2017	09:51:00	2443	25/05/2017	09:51:00	3 - No Action	22/06/2017	09:45:00	Yes
02/11/2017	11:33:00	Yes	02/06/2017	13:12:00	33	02/06/2017	13:12:00	4886	02/06/2017	13:12:00	14.5	02/06/2017	13:12:00	201820	02/06/2017	13:12:00	2456	02/06/2017	13:12:00	2 - Clean	28/06/2017	08:50:00	Yes
09/11/2017	08:02:00	Yes	07/06/2017	14:47:00	33	07/06/2017	14:47:00	4886	07/06/2017	14:47:00	14.4	07/06/2017	14:47:00	201820	07/06/2017	14:47:00	2464	07/06/2017	14:47:00	2 - Clean	06/07/2017	13:30:00	Yes
16/11/2017	11:17:00	Yes	15/06/2017	13:00:00	33	15/06/2017	13:00:00	4886	15/06/2017	13:00:00	14.4	15/06/2017	13:00:00	201820	15/06/2017	13:00:00	2478	15/06/2017	13:00:00	3 - No Action	14/07/2017	10:47:00	Yes
23/11/2017	10:57:00	Yes	22/06/2017	09:45:00	33	22/06/2017	09:45:00	4886	22/06/2017	09:45:00	14.4	22/06/2017	09:45:00	201820	22/06/2017	09:45:00	2489	22/06/2017	09:45:00	1 - Change	20/07/2017	14:00:00	Yes
01/12/2017	10:01:00	Yes	28/06/2017	08:50:00	26	28/06/2017	08:50:00	4887	06/07/2017	13:30:00	14.4	28/06/2017	08:50:00	201916	28/06/2017	08:50:00	2498	28/06/2017	08:50:00	3 - No Action	26/07/2017	11:39:00	Yes
07/12/2017	11:35:00	Yes	06/07/2017	13:30:00	33	06/07/2017	13:30:00	4888	14/07/2017	10:47:00	14.3	06/07/2017	13:30:00	202106	06/07/2017	13:30:00	2512	06/07/2017	13:30:00	2 - Clean	03/08/2017	11:15:00	Yes
14/12/2017	11:46:00	Yes	14/07/2017	10:47:00	33	14/07/2017	10:47:00	4888	20/07/2017	14:00:00	14.6	14/07/2017	10:47:00	202106	14/07/2017	10:47:00	2525	14/07/2017	10:47:00	3 - No Action	10/08/2017	12:57:00	Yes
21/12/2017	11:54:00	Yes	20/07/2017	14:00:00	33	20/07/2017	14:00:00	4888	26/07/2017	11:39:00	15.7	20/07/2017	14:00:00	202106	20/07/2017	14:00:00	2536	20/07/2017	14:00:00	2 - Clean	17/08/2017	11:55:00	Yes
28/12/2017	13:06:00	Yes	26/07/2017	11:39:00	33	26/07/2017	11:39:00	4891	03/08/2017	11:15:00	14.4	26/07/2017	11:39:00	202403	26/07/2017	11:39:00	2546	26/07/2017	11:39:00	3 - No Action	24/08/2017	11:15:00	Yes
03/01/2018	14:40:00	Yes	03/08/2017	11:15:00	33	03/08/2017	11:15:00	4891	10/08/2017	12:57:00	11.5	03/08/2017	11:15:00	202403	03/08/2017	11:15:00	2563	03/08/2017	11:15:00	3 - No Action	31/08/2017	12:20:00	Yes
11/01/2018	11:36:00	Yes	10/08/2017	12:57:00	33	10/08/2017	12:57:00	4891	17/08/2017	11:55:00	14.5	10/08/2017	12:57:00	202403	10/08/2017	12:57:00	2579	10/08/2017	12:57:00	3 - No Action	07/09/2017	13:15:00	Yes
18/01/2018	12:45:00	Yes	17/08/2017	11:55:00	33	17/08/2017	11:55:00	4891	24/08/2017	11:55:00	14.5	17/08/2017	11:55:00	202405	17/08/2017	11:55:00	2592	17/08/2017	11:55:00	3 - No Action	14/09/2017	13:20:00	Yes
25/01/2018	12:08:00	Yes	24/08/2017	11:15:00	33	24/08/2017	11:15:00	4891	31/08/2017	12:20:00	15.2	24/08/2017	11:15:00	202405	24/08/2017	11:15:00	2604	24/08/2017	11:15:00	3 - No Action	28/09/2017	11:45:00	Yes
01/02/2018	13:25:00	Yes	31/08/2017	12:20:00	33	31/08/2017	12:20:00	4892	07/09/2017	13:15:00	14.6	31/08/2017	12:20:00	202585	31/08/2017	12:20:00	2617	31/08/2017	12:20:00	3 - No Action	05/10/2017	13:45:00	Yes
08/02/2018	11:49:00	Yes	07/09/2017	13:15:00	33	07/09/2017	13:15:00	4892	14/09/2017	13:20:00	14.5	07/09/2017	13:15:00	202585	07/09/2017	13:15:00	2629	07/09/2017	13:15:00	3 - No Action	12/10/2017	11:35:00	Yes
15/02/2018	11:37:00	Yes	14/09/2017	13:20:00	33	14/09/2017	13:20:00	4892	21/09/2017	14:21:00	14.5	14/09/2017	13:20:00	202585	14/09/2017	13:20:00	2641	14/09/2017	13:20:00	1 - Change	19/10/2017	14:15:00	Yes
22/02/2018	11:54:00	Yes	21/09/2017	14:21:00	33	21/09/2017	14:21:00	4892	28/09/2017	11:45:00	15.5	21/09/2017	14:21:00	202585	21/09/2017	14:21:00	2652	21/09/2017	14:21:00	2 - Clean	26/10/2017	11:51:00	Yes
01/03/2018	14:50:00	Yes	28/09/2017	11:45:00	33	28/09/2017	11:45:00	4894	05/10/2017	13:45:00	14.5	28/09/2017	11:45:00	202785	28/09/2017	11:45:00	2665	28/09/2017	11:45:00	3 - No Action	02/11/2017	11:33:00	Yes
09/03/2018	10:37:00	Yes	05/10/2017	13:45:00	33	05/10/2017	13:45:00	4894	12/10/2017	11:35:00	14.6	05/10/2017	13:45:00	202785	05/10/2017	13:45:00	2678	05/10/2017	13:45:00	1 - Change	09/11/2017	08:02:00	Yes
15/03/2018	13:01:00	Yes	12/10/2017	11:35:00	33	12/10/2017	11:35:00	4894	19/10/2017	14:15:00	14.4	12/10/2017	11:35:00	202785	12/10/2017	11:35:00	2694	12/10/2017	11:35:00	1 - Change	16/11/2017	11:17:00	Yes
29/03/2018	12:35:00	Yes	19/10/2017	14:15:00	33	19/10/2017	14:15:00	4894	26/10/2017	11:51:00	23	19/10/2017	14:15:00	202785	19/10/2017	14:15:00	2706	19/10/2017	14:15:00	2 - Clean	23/11/2017	10:57:00	Yes
05/04/2018	21:05:00	Yes	26/10/2017	11:51:00	26	26/10/2017	11:51:00	4894	02/11/2017	11:33:00	14.7	26/10/2017	11:51:00	202840	26/10/2017	11:51:00	2718	26/10/2017	11:51:00	2 - Clean	01/12/2017	10:01:00	Yes
12/04/2018	10:57:00	Yes	02/11/2017	11:33:00	33	02/11/2017	11:33:00	4895	09/11/2017	08:02:00	14.5	02/11/2017	11:33:00	203005	02/11/2017	11:33:00	2731	02/11/2017	11:33:00	1 - Change	07/12/2017	11:35:00	Yes
19/04/2018	10:57:00	Yes	09/11/2017	08:02:00	33	09/11/2017	08:02:00	4895	16/11/2017	11:17:00	14.4	09/11/2017	08:02:00	203005	09/11/2017	08:02:00	2746	09/11/2017	08:02:00	3 - No Action	14/12/2017	11:46:00	Yes
26/04/2018	11:45:00	Yes	16/11/2017	11:17:00	33	16/11/2017	11:17:00	4895	23/11/2017	10:57:00	14.7	16/11/2017	11:17:00	203005	16/11/2017	11:17:00	2760	16/11/2017	11:17:00	2 - Clean	21/12/2017	11:54:00	Yes
03/05/2018	14:23:00	Yes	23/11/2017	10:57:00	33	23/11/2017	10:57:00	4895	01/12/2017	10:01:00	14.8	23/11/2017	10:57:00	203005	23/11/2017	10:57:00	2772	23/11/2017	10:57:00	1 - Change	28/12/2017	13:06:00	Yes
10/05/2018	13:30:00	Yes	01/12/2017	10:01:00	33	01/12/2017	10:01:00	4898	07/12/2017	11:35:00	14.8	01/12/2017	10:01:00	203284	01/12/2017	10:01:00	2786	01/12/2017	10:01:00	1 - Change	03/01/2018	14:40:00	Yes
17/05/2018	11:46:00	Yes	07/12/2017	11:35:00	33	07/12/2017	11:35:00	4898	14/12/2017	11:46:00	14.4	07/12/2017	11:35:00	203284	07/12/2017	11:35:00	2797	07/12/2017	11:35:00	2 - Clean	11/01/2018	11:36:00	Yes
24/05/2018	11:31:00	Yes	14/12/2017	11:46:00	33	14/12/2017	11:46:00	4898	21/12/2017	11:54:00	22.5	14/12/2017	11:46:00	203286	14/12/2017	11:46:00	2812	14/12/2017	11:46:00	2 - Clean	18/01/2018	12:45:00	Yes
31/05/2018	10:55:00	Yes	21/12/2017	11:54:00	24	21/12/2017	11:54:00	4930	28/12/2017	13:06:00	14.6	21/12/2017	11:54:00	207297	21/12/2017	11:54:00	2822	21/12/2017	11:54:00	1 - Change	25/01/2018	12:08:00	Yes
07/06/2018	11:46:00	Yes	28/12/2017	13:06:00	33	28/12/2017	13:06:00	5032	03/01/2018	14:40:00	23	28/12/2017	13:06:00	219922	28/12/2017	13:06:00	2822	28/12/2017	13:06:00	3 - No Action	01/02/2018	13:25:00	Yes
14/06/2018	11:30:00	Yes	03/01/2018	14:40:00	23	03/01/2018	14:40:00	5136	11/01/2018	11:36:00	14.4	03/01/2018	14:40:00	232911	03/01/2018	14:40:00	2830	03/01/2018	14:40:00	1 - Change	08/02/2018	11:49:00	Yes
21/06/2018	12:29:00	Yes	11/01/2018	11:36:00	32	11/01/2018	11:36:00	5191	18/01/2018	12:45:00	14.7	11/01/2018	11:36:00	239570	11/01/2018	11:36:00	2839	11/01/2018	11:36:00	2 - Clean	15/02/2018	11:37:00	Yes
28/06/2018	11:25:00	Yes	18/01/2018	12:45:00	33	18/01/2018	12:45:00	2852	25/01/2018	12:08:00	14.7	18/01/2018	12:45:00	239641	18/01/2018	12:45:00	2852	25/01/2018	12:08:00	1 - Change	22/02/2018	11:37:00	Yes
05/07/2018	11:10:00	Yes	25/01/2018	12:08:00	33	25/01/2018	12:08:00	5192	01/02/2018	13:25:00	22.8	25/01/2018	12:08:00	239641	25/01/2018	12:08:00	2865	25/01/2018	12:08:00	1 - Change	01/03/2018	14:50:00	Yes
12/07/2018	11:42:00	Yes	01/02/2018	13:25:00	33	01/02/2018	13:25:00	5240	08/02/2018	11:49:00	22	01/02/2018	13:25:00	245613	01/02/2018	13:25:00	2874	01/02/2018	13:25:00	3 - No Action	09/03/2018	10:37:00	Yes
19/07/2018	11:35:00	Yes	08/02/2018	11:49:00	33	08/02/2018	11:49:00	5296	15/02/2018	11:37:00	14.7	08/02/2018	11:49:00	252215	08/02/2018	11:49:00	2882	08/02/2018	11:49:00	2 - Clean	15/03/2018	11:30:00	Yes
26/07/2018	11:37:00	Yes	15/02/2018	11:37:00	33	15/02/2018	11:37:00	5305	22/02/2018	11:54:00	15.3	15/02/2018	11:37:00	252215	15/02/2018	11:37:00	2890	15/02/2018	11:37:00	1 - Change	26/03/2018	11:23:00	Yes
02/08/2018	11:42:00	Yes	22/02/2018	11:54:00	33	22/02/2018	11:54:00	5356	01/03/2018	14:50:00	14.4	22/02/2018	11:54:00	259975	22/02/2018	11:54:00	2903	22/02/2018	11:54:00	2 - Clean	05/04/2018	21:05:00	Yes
09/08/2018																							

21/02/2019	12:21:00	Yes	24/09/2018	13:04:00	33	24/09/2018	13:04:00	5370	04/10/2018	11:09:00	14	24/09/2018	13:04:00	261398	24/09/2018	13:04:00	3306	04/10/2018	11:09:00	2	Clean	02/11/2018	11:05:00	Yes
28/02/2019	09:38:00	Yes	04/10/2018	11:09:00	33	04/10/2018	11:09:00	5372	11/10/2018	13:18:00	14.5	04/10/2018	11:09:00	261698	04/10/2018	11:09:00	3324	11/10/2018	13:18:00	3	No Action	08/11/2018	12:08:00	Yes
07/03/2019	12:45:00	Yes	11/10/2018	13:18:00	33	11/10/2018	13:18:00	5372	18/10/2018	11:45:00	14.6	18/10/2018	13:18:00	261698	11/10/2018	13:18:00	3337	18/10/2018	11:45:00	3	No Action	15/11/2018	11:54:00	Yes
21/03/2019	11:47:00	Yes	18/10/2018	11:45:00	33	18/10/2018	11:45:00	5372	25/10/2018	11:09:00	14.6	18/10/2018	11:45:00	261698	18/10/2018	11:45:00	3350	25/10/2018	11:09:00	3	No Action	22/11/2018	12:05:00	Yes
28/03/2019	08:46:00	Yes	25/10/2018	11:09:00	33	25/10/2018	11:09:00	5372	02/11/2018	11:05:00	14	25/10/2018	11:09:00	261698	25/10/2018	11:09:00	3363	02/11/2018	11:05:00	2	Clean	29/11/2018	10:22:00	Yes
04/04/2019	13:12:00	Yes	02/11/2018	11:05:00	33	02/11/2018	11:05:00	5375	08/11/2018	12:08:00	14.6	02/11/2018	11:05:00	261972	02/11/2018	11:05:00	3378	08/11/2018	12:08:00	3	No Action	06/12/2018	13:43:00	Yes
11/04/2019	12:34:00	Yes	08/11/2018	12:08:00	33	08/11/2018	12:08:00	5375	15/11/2018	11:54:00	14.7	08/11/2018	12:08:00	261972	08/11/2018	12:08:00	3390	15/11/2018	11:54:00	1	- Change	13/12/2018	11:11:00	Yes
19/04/2019	12:07:00	Yes	15/11/2018	11:54:00	33	15/11/2018	11:54:00	5375	22/11/2018	12:05:00	14.5	15/11/2018	11:54:00	261972	15/11/2018	11:54:00	3405	22/11/2018	12:05:00	3	No Action	20/12/2018	14:32:00	Yes
24/04/2019	13:00:00	Yes	22/11/2018	12:05:00	33	22/11/2018	12:05:00	5375	29/11/2018	10:22:00	14.6	22/11/2018	12:05:00	261972	22/11/2018	12:05:00	3418	29/11/2018	10:22:00	2	Clean	04/01/2019	11:08:00	Yes
30/04/2019	09:26:00	Yes	29/11/2018	10:22:00	33	29/11/2018	10:22:00	5377	06/12/2018	13:43:00	14.6	29/11/2018	10:22:00	262208	29/11/2018	10:22:00	3432	06/12/2018	13:43:00	3	No Action	10/01/2019	10:54:00	Yes
09/05/2019	11:45:00	Yes	06/12/2018	13:43:00	33	06/12/2018	13:43:00	5377	13/12/2018	11:11:00	14.6	06/12/2018	13:43:00	262208	06/12/2018	13:43:00	3446	13/12/2018	11:11:00	3	No Action	10/01/2019	11:05:00	Yes
16/05/2019	10:48:00	Yes	13/12/2018	11:11:00	33	13/12/2018	11:11:00	5377	20/12/2018	11:45:00	14.7	13/12/2018	11:11:00	262208	13/12/2018	11:11:00	3460	20/12/2018	11:45:00	1	- Change	17/01/2019	12:05:00	Yes
23/05/2019	13:59:00	Yes	20/12/2018	14:32:00	33	20/12/2018	14:32:00	5380	27/12/2018	11:08:00	14	20/12/2018	14:32:00	262663	20/12/2018	14:32:00	3473	27/12/2018	11:08:00	2	Clean	24/01/2019	10:27:00	Yes
30/05/2019	11:03:00	Yes	27/12/2018	11:08:00	33	27/12/2018	11:08:00	5382	04/01/2019	11:08:00	14.8	27/12/2018	11:08:00	262939	27/12/2018	11:08:00	3487	04/01/2019	11:08:00	1	- Change	31/01/2019	11:25:00	Yes
06/06/2019	13:10:00	Yes	04/01/2019	11:08:00	33	04/01/2019	11:08:00	5382	10/01/2019	10:54:00	14	04/01/2019	11:08:00	262939	04/01/2019	11:08:00	3502	10/01/2019	10:54:00	2	Clean	07/02/2019	10:54:00	Yes
13/06/2019	10:21:00	Yes	10/01/2019	10:54:00	33	10/01/2019	10:54:00	5382	16/01/2019	11:05:00	13.7	10/01/2019	10:54:00	262939	10/01/2019	10:54:00	3514	16/01/2019	11:05:00	2	Clean	14/02/2019	14:10:00	Yes
20/06/2019	13:05:00	Yes	10/01/2019	11:05:00	47	10/01/2019	11:05:00	7360	17/01/2019	12:35:00	14.7	10/01/2019	11:05:00	1507766	10/01/2019	11:05:00	76441	17/01/2019	12:35:00	3	No Action	21/02/2019	10:21:00	Yes
27/06/2019	13:36:00	Yes	17/01/2019	12:35:00	33	17/01/2019	12:35:00	5382	24/01/2019	10:27:00	14.6	17/01/2019	12:35:00	262939	17/01/2019	12:35:00	3528	24/01/2019	10:27:00	3	No Action	28/02/2019	09:38:00	Yes
04/07/2019	10:39:00	Yes	24/01/2019	10:27:00	33	24/01/2019	10:27:00	5382	31/01/2019	11:25:00	14.9	24/01/2019	10:27:00	262939	24/01/2019	10:27:00	3542	31/01/2019	11:25:00	1	- Change	07/03/2019	12:45:00	Yes
11/07/2019	14:45:00	Yes	31/01/2019	11:25:00	33	31/01/2019	11:25:00	5385	07/02/2019	10:54:00	14.7	31/01/2019	11:25:00	263219	31/01/2019	11:25:00	3558	07/02/2019	10:54:00	3	No Action	14/03/2019	11:29:00	Yes
19/07/2019	13:35:00	Yes	07/02/2019	10:54:00	33	07/02/2019	10:54:00	5385	14/02/2019	12:21:00	14.8	07/02/2019	10:54:00	263219	07/02/2019	10:54:00	3558	14/02/2019	12:21:00	2	Clean	21/03/2019	11:47:00	Yes
25/07/2019	10:37:00	Yes	14/02/2019	14:10:00	33	14/02/2019	14:10:00	5385	21/02/2019	12:21:00	14.9	14/02/2019	14:10:00	263219	14/02/2019	14:10:00	3585	21/02/2019	12:21:00	3	No Action	28/03/2019	08:46:00	Yes
01/08/2019	15:12:00	Yes	21/02/2019	12:21:00	33	21/02/2019	12:21:00	5388	28/02/2019	09:38:00	14.6	21/02/2019	12:21:00	263535	21/02/2019	12:21:00	3595	28/02/2019	09:38:00	3	No Action	04/04/2019	13:12:00	Yes
08/08/2019	11:44:00	Yes	28/02/2019	09:38:00	33	28/02/2019	09:38:00	5388	07/03/2019	12:45:00	14.7	28/02/2019	09:38:00	263535	28/02/2019	09:38:00	3613	07/03/2019	12:45:00	2	Clean	11/04/2019	12:34:00	Yes
15/08/2019	13:34:00	Yes	07/03/2019	12:45:00	33	07/03/2019	12:45:00	5388	14/03/2019	11:29:00	14.5	07/03/2019	12:45:00	263535	07/03/2019	12:45:00	3627	14/03/2019	11:29:00	2	Clean	18/04/2019	12:07:00	Yes
22/08/2019	10:55:00	Yes	14/03/2019	11:29:00	0.33	14/03/2019	11:29:00	5388	21/03/2019	11:47:00	14	14/03/2019	11:29:00	263535	14/03/2019	11:29:00	3640	21/03/2019	11:47:00	2	Clean	24/04/2019	13:00:00	Yes
29/08/2019	11:04:00	Yes	21/03/2019	11:47:00	33	21/03/2019	11:47:00	5388	28/03/2019	08:46:00	23.1	21/03/2019	11:47:00	263535	21/03/2019	11:47:00	3654	28/03/2019	08:46:00	3	No Action	30/04/2019	09:26:00	Yes
29/08/2019	11:05:00	Yes	28/03/2019	08:46:00	26	28/03/2019	08:46:00	5405	04/04/2019	13:12:00	14.6	28/03/2019	08:46:00	263535	28/03/2019	08:46:00	3666	04/04/2019	13:12:00	2	Clean	09/05/2019	11:45:00	Yes
05/09/2019	11:36:00	Yes	28/03/2019	08:46:00	33	28/03/2019	08:46:00	5405	11/04/2019	12:34:00	14.5	28/03/2019	08:46:00	263535	28/03/2019	08:46:00	3677	11/04/2019	12:34:00	0	No Action	16/05/2019	10:59:00	Yes
10/09/2019	11:00:00	Yes	11/04/2019	12:34:00	33	11/04/2019	12:34:00	549	18/04/2019	12:07:00	14.6	11/04/2019	12:34:00	263747	11/04/2019	12:34:00	0	24/04/2019	13:00:00	1	- Change	23/05/2019	13:59:00	Yes
19/09/2019	11:18:00	Yes	18/04/2019	12:07:00	33	18/04/2019	12:07:00	5449	24/04/2019	13:00:00	14.7	18/04/2019	12:07:00	263747	18/04/2019	12:07:00	0	30/04/2019	09:26:00	3	No Action	30/05/2019	11:03:00	Yes
27/09/2019	12:26:00	Yes	24/04/2019	13:00:00	33	24/04/2019	13:00:00	5449	30/04/2019	09:26:00	23.4	24/04/2019	13:00:00	263747	24/04/2019	13:00:00	3717	09/05/2019	11:45:00	2	Clean	06/06/2019	13:10:00	Yes
10/10/2019	13:07:00	Yes	30/04/2019	09:26:00	26	30/04/2019	09:26:00	5450	09/05/2019	11:45:00	14.6	30/04/2019	09:26:00	263885	30/04/2019	09:26:00	3728	16/05/2019	10:48:00	2	Clean	13/06/2019	14:21:00	Yes
08/10/2019	14:52:00	Yes	09/05/2019	11:45:00	33	09/05/2019	11:45:00	5451	16/05/2019	10:48:00	14	09/05/2019	11:45:00	270006	09/05/2019	11:45:00	0	23/05/2019	13:59:00	0	No Action	30/05/2019	11:03:00	Yes
17/10/2019	11:54:00	Yes	16/05/2019	10:48:00	33	16/05/2019	10:48:00	5451	30/05/2019	11:03:00	14	16/05/2019	10:48:00	270006	16/05/2019	10:48:00	3782	06/06/2019	13:10:00	2	Clean	18/07/2019	10:37:00	Yes
23/10/2019	08:52:00	Yes	23/05/2019	13:59:00	33	23/05/2019	13:59:00	5451	30/05/2019	11:03:00	14	23/05/2019	13:59:00	270006	23/05/2019	13:59:00	3782	06/06/2019	13:10:00	2	Clean	18/07/2019	10:37:00	Yes
31/10/2019	11:19:00	Yes	30/05/2019	11:03:00	33	30/05/2019	11:03:00	5456	06/06/2019	13:10:00	14.6	30/05/2019	11:03:00	270674	30/05/2019	11:03:00	3797	13/06/2019	14:21:00	2	Clean	25/07/2019	10:35:00	Yes
07/11/2019	10:54:00	Yes	06/06/2019	13:10:00	33	06/06/2019	13:10:00	5456	13/06/2019	14:21:00	14.6	06/06/2019	13:10:00	270674	06/06/2019	13:10:00	3797	13/06/2019	14:21:00	2	Clean	25/07/2019	10:35:00	Yes
07/11/2019	11:05:00	Yes	13/06/2019	10:21:00	33	13/06/2019	10:21:00	5456	20/06/2019	13:05:00	14.5	13/06/2019	10:21:00	270674	13/06/2019	10:21:00	3826	27/06/2019	11:05:00	2	Clean	08/08/2019	11:40:00	Yes
14/11/2019	11:27:00	Yes	20/06/2019	13:05:00	33	20/06/2019	13:05:00	5456	27/06/2019	10:39:00	14.5	20/06/2019	13:05:00	270674	20/06/2019	13:05:00	3826	27/06/2019	11:05:00	2	Clean	08/08/2019	11:40:00	Yes
21/11/2019	13:18:00	Yes	27/06/2019	10:39:00	33	27/06/2019	10:39:00	5456	04/07/2019	10:39:00	14.6	27/06/2019	10:39:00	270674	27/06/2019	10:39:00	3826	11/07/2019	14:45:00	3	No Action	22/08/2019	10:55:00	Yes
28/11/2019	11:05:00	Yes	04/07/2019	10:39:00																				

14/02/2019	14:16:00	Yes	06/09/2018	11:01:00	46	06/09/2018	11:01:00	7344	06/09/2018	11:01:00	14	06/09/2018	11:01:00	1502338	06/09/2018	11:01:00	74467	13/09/2018	12:01:00	2 - Clean	04/10/2018	11:18:00	Yes
12/02/2019	12:23:00	Yes	13/09/2018	12:01:00	46	13/09/2018	12:01:00	7344	13/09/2018	12:01:00	13.7	13/09/2018	12:01:00	1502411	13/09/2018	12:01:00	74546	20/09/2018	10:57:00	2 - Clean	11/10/2018	13:23:00	Yes
28/02/2019	09:45:00	Yes	20/09/2018	10:57:00	46	20/09/2018	10:57:00	7344	20/09/2018	10:57:00	13.7	20/09/2018	10:57:00	1502485	20/09/2018	10:57:00	74635	24/09/2018	13:13:00	3 - No Actio	18/10/2018	11:49:00	Yes
07/03/2019	12:52:00	Yes	24/09/2018	13:13:00	46	24/09/2018	13:13:00	7344	24/09/2018	13:13:00	13.7	24/09/2018	13:13:00	1502586	24/09/2018	13:13:00	74745	04/10/2018	11:18:00	2 - Clean	25/10/2018	11:00:00	Yes
14/03/2019	11:39:00	Yes	04/10/2018	11:18:00	46	04/10/2018	11:18:00	7347	04/10/2018	11:18:00	31.7	04/10/2018	11:18:00	1503340	04/10/2018	11:18:00	74915	11/10/2018	13:23:00	3 - No Actio	02/11/2018	11:19:00	Yes
21/03/2019	13:05:00	Yes	11/10/2018	13:23:00	46	11/10/2018	13:23:00	7347	11/10/2018	13:23:00	13.7	11/10/2018	13:23:00	1503387	11/10/2018	13:23:00	74977	18/10/2018	11:49:00	3 - No Actio	15/11/2018	12:06:00	Yes
28/03/2019	08:56:00	Yes	18/10/2018	11:49:00	46	18/10/2018	11:49:00	7347	18/10/2018	11:49:00	13.7	18/10/2018	11:49:00	1503425	18/10/2018	11:49:00	75022	25/10/2018	11:17:00	3 - No Actio	22/11/2018	13:06:00	Yes
04/04/2019	13:23:00	Yes	11/11/2018	11:17:00	46	25/10/2018	11:17:00	7347	25/10/2018	11:17:00	13.8	25/10/2018	11:17:00	1503573	25/10/2018	11:17:00	75173	02/11/2018	10:57:00	2 - Clean	29/11/2018	13:33:00	Yes
11/04/2019	12:53:00	Yes	02/11/2018	11:19:00	46	02/11/2018	11:19:00	7352	02/11/2018	11:19:00	14	02/11/2018	11:19:00	1504925	02/11/2018	11:19:00	75261	15/11/2018	12:06:00	2 - Clean	06/12/2018	13:46:00	Yes
18/04/2019	12:23:00	Yes	15/11/2018	12:06:00	46	15/11/2018	12:06:00	7352	15/11/2018	12:06:00	13.8	15/11/2018	12:06:00	1504983	15/11/2018	12:06:00	75327	22/11/2018	13:06:00	3 - No Actio	20/12/2018	14:38:00	Yes
24/04/2019	13:10:00	Yes	22/11/2018	13:06:00	51	22/11/2018	13:06:00	7352	22/11/2018	13:06:00	13.7	22/11/2018	13:06:00	1505145	22/11/2018	13:06:00	75522	29/11/2018	10:33:00	2 - Clean	04/01/2019	11:19:00	Yes
30/04/2019	09:36:00	Yes	29/11/2018	10:33:00	49	29/11/2018	10:33:00	7354	29/11/2018	10:33:00	13.8	29/11/2018	10:33:00	1505685	29/11/2018	10:33:00	75637	06/12/2018	13:46:00	3 - No Actio	17/01/2019	12:43:00	Yes
03/05/2019	13:46:00	Yes	06/12/2018	13:46:00	46	06/12/2018	13:46:00	7354	06/12/2018	13:46:00	13.7	06/12/2018	13:46:00	1505764	06/12/2018	13:46:00	75743	13/12/2018	11:23:00	3 - No Actio	30/01/2019	10:38:00	Yes
10/05/2019	10:56:00	Yes	13/12/2018	11:23:00	46	13/12/2018	11:23:00	7354	13/12/2018	11:23:00	13.8	13/12/2018	11:23:00	1505907	13/12/2018	11:23:00	75868	20/12/2018	14:38:00	3 - No Actio	31/01/2019	11:31:00	Yes
23/05/2019	14:08:00	Yes	20/12/2018	14:38:00	46	20/12/2018	14:38:00	7358	20/12/2018	14:38:00	13.8	20/12/2018	14:38:00	1506840	20/12/2018	14:38:00	75992	27/12/2018	11:17:00	2 - Clean	07/02/2019	11:02:00	Yes
30/05/2019	11:05:00	Yes	27/12/2018	11:17:00	47	27/12/2018	11:17:00	7360	27/12/2018	11:17:00	13.8	04/01/2019	11:19:00	1507640	27/12/2018	11:17:00	1507496	04/01/2019	11:19:00	1 - Change	14/02/2019	14:16:00	Yes
06/06/2019	13:20:00	Yes	04/01/2019	11:19:00	47	04/01/2019	11:19:00	7360	04/01/2019	11:19:00	13.8	17/01/2019	12:43:00	1507917	04/01/2019	11:19:00	76306	17/01/2019	12:43:00	3 - No Actio	21/02/2019	12:23:00	Yes
13/06/2019	10:30:00	Yes	17/01/2019	12:43:00	47	17/01/2019	12:43:00	7360	17/01/2019	12:43:00	13.7	24/01/2019	10:38:00	1508005	17/01/2019	12:43:00	76604	24/01/2019	10:38:00	3 - No Actio	28/02/2019	09:45:00	Yes
20/06/2019	13:18:00	Yes	24/01/2019	10:38:00	47	24/01/2019	10:38:00	7360	24/01/2019	10:38:00	13.8	31/01/2019	11:31:00	1508555	24/01/2019	10:38:00	76701	31/01/2019	11:31:00	2 - Clean	07/03/2019	12:52:00	Yes
27/06/2019	13:44:00	Yes	31/01/2019	11:31:00	47	31/01/2019	11:31:00	7362	31/01/2019	11:31:00	13.9	07/02/2019	11:02:00	1508650	31/01/2019	11:31:00	76770	07/02/2019	11:02:00	3 - No Actio	14/03/2019	11:39:00	Yes
04/07/2019	10:48:00	Yes	07/02/2019	11:02:00	47	07/02/2019	11:02:00	7362	07/02/2019	11:02:00	13.8	14/02/2019	14:16:00	1508797	07/02/2019	11:02:00	76866	14/02/2019	14:16:00	2 - Clean	21/03/2019	13:05:00	Yes
11/07/2019	14:51:00	Yes	14/02/2019	14:16:00	47	14/02/2019	14:16:00	7362	14/02/2019	14:16:00	13.7	21/02/2019	12:23:00	1509689	14/02/2019	14:16:00	77027	21/02/2019	12:23:00	3 - No Actio	28/03/2019	08:56:00	Yes
18/07/2019	13:41:00	Yes	21/02/2019	12:23:00	47	21/02/2019	12:23:00	7366	21/02/2019	12:23:00	13.9	28/02/2019	09:45:00	1509846	21/02/2019	12:23:00	77124	28/02/2019	09:45:00	3 - No Actio	04/04/2019	13:23:00	Yes
25/07/2019	10:48:00	Yes	28/02/2019	09:45:00	47	28/02/2019	09:45:00	7366	28/02/2019	09:45:00	13.7	07/03/2019	12:52:00	1509968	28/02/2019	09:45:00	77295	07/03/2019	12:52:00	2 - Clean	11/04/2019	12:53:00	Yes
25/07/2019	10:56:00	Yes	07/03/2019	12:52:00	47	07/03/2019	12:52:00	7366	07/03/2019	12:52:00	13.8	14/03/2019	11:39:00	1510040	07/03/2019	12:52:00	77440	14/03/2019	11:39:00	3 - No Actio	18/04/2019	12:23:00	Yes
01/08/2019	15:20:00	Yes	14/03/2019	11:39:00	47	14/03/2019	11:39:00	7366	14/03/2019	11:39:00	13.7	21/03/2019	13:05:00	1510176	14/03/2019	11:39:00	77530	21/03/2019	13:05:00	2 - Clean	24/04/2019	13:10:00	Yes
08/08/2019	11:58:00	Yes	21/03/2019	13:05:00	47	21/03/2019	13:05:00	7366	21/03/2019	13:05:00	14	28/03/2019	08:56:00	1510571	21/03/2019	13:05:00	77675	28/03/2019	08:56:00	3 - No Actio	30/04/2019	09:36:00	Yes
15/08/2019	13:56:00	Yes	28/03/2019	08:56:00	28	28/03/2019	08:56:00	7368	28/03/2019	08:56:00	30.1	04/04/2019	13:23:00	1515062	28/03/2019	08:56:00	77811	04/04/2019	13:23:00	2 - Clean	09/05/2019	13:09:00	Yes
22/08/2019	11:13:00	Yes	04/04/2019	13:23:00	58	04/04/2019	13:23:00	7398	04/04/2019	13:23:00	13.8	11/04/2019	12:53:00	1515229	04/04/2019	13:23:00	0	11/04/2019	12:53:00	2 - Clean	16/05/2019	10:56:00	Yes
05/09/2019	11:53:00	Yes	11/04/2019	12:53:00	57	11/04/2019	12:53:00	7398	11/04/2019	12:53:00	13.7	18/04/2019	12:23:00	1515245	11/04/2019	12:53:00	0	18/04/2019	12:23:00	2 - Clean	23/05/2019	14:08:00	Yes
10/09/2019	11:33:00	Yes	18/04/2019	12:23:00	56	18/04/2019	12:23:00	7398	18/04/2019	12:23:00	15	24/04/2019	13:10:00	1515317	18/04/2019	12:23:00	0	24/04/2019	13:10:00	2 - Clean	30/05/2019	11:05:00	Yes
19/09/2019	11:28:00	Yes	24/04/2019	13:10:00	58	24/04/2019	13:10:00	7398	24/04/2019	13:10:00	13.7	30/04/2019	09:36:00	1515716	24/04/2019	13:10:00	78167	30/04/2019	09:36:00	3 - No Actio	06/06/2019	13:20:00	Yes
27/09/2019	12:34:00	Yes	30/04/2019	09:36:00	56	30/04/2019	09:36:00	7399	30/04/2019	09:36:00	30.3	09/05/2019	13:09:00	1515993	30/04/2019	09:36:00	78268	09/05/2019	13:09:00	2 - Clean	13/06/2019	10:30:00	Yes
01/10/2019	13:14:00	Yes	09/05/2019	13:09:00	56	09/05/2019	13:09:00	7400	09/05/2019	13:09:00	13.8	16/05/2019	10:56:00	1516074	09/05/2019	13:09:00	0.3	16/05/2019	10:56:00	2 - Clean	20/06/2019	13:18:00	Yes
08/10/2019	15:00:00	Yes	16/05/2019	10:56:00	56	16/05/2019	10:56:00	7400	16/05/2019	10:56:00	13.7	23/05/2019	14:08:00	1516232	16/05/2019	10:56:00	78456	23/05/2019	14:08:00	3 - No Actio	27/06/2019	13:44:00	Yes
17/10/2019	11:55:00	Yes	23/05/2019	14:08:00	56	23/05/2019	14:08:00	7400	23/05/2019	14:08:00	13.7	30/05/2019	11:05:00	1517285	23/05/2019	14:08:00	78619	30/05/2019	11:05:00	2 - Clean	04/07/2019	10:48:00	Yes
23/10/2019	09:05:00	Yes	30/05/2019	11:05:00	56	30/05/2019	11:05:00	7405	30/05/2019	11:05:00	13.8	06/06/2019	13:20:00	1517585	30/05/2019	11:05:00	78715	06/06/2019	13:20:00	2 - Clean	11/07/2019	14:51:00	Yes
31/10/2019	11:27:00	Yes	06/06/2019	13:20:00	56	06/06/2019	13:20:00	7405	06/06/2019	13:20:00	13.7	13/06/2019	10:30:00	1517843	06/06/2019	13:20:00	78902	13/06/2019	10:30:00	2 - Clean	18/07/2019	13:41:00	Yes
14/11/2019	11:36:00	Yes	13/06/2019	10:30:00	56	13/06/2019	10:30:00	7405	13/06/2019	10:30:00	13.7	20/06/2019	13:18:00	1517933	13/06/2019	10:30:00	78976	20/06/2019	13:18:00	2 - Clean	25/07/2019	10:48:00	Yes
21/11/2019	13:30:00	Yes	20/06/2019	13:18:00	7405	20/06/2019	13:18:00	7405	20/06/2019	13:18:00	13.7	27/06/2019	13:44:00	1517993	20/06/2019	13:18:00	78976	27/06/2019	13:44:00	2 - Clean	25/07/2019	10:56:00	Yes
28/11/2019	11:24:00	Yes	27/06/2019	13:44:00	57	27/06/2019	13:44:00	7405	27/06/2019	13:44:00	13.7	04/07/2019	14:51:00	1517993	27/06/2019	13:44:00	78976	04/07/2019	14:51:00	2 - Clean	01/08/2019	11:28:00	Yes
06/12/2019	14:18:00	Yes	04/07/2019	14:51:00	57	04/07/2019	14:51:00	7405	0														

07/03/2019	12:56:00	Yes	11/10/2018	13:30:00	65	11/10/2018	13:30:00	5246	18/10/2018	11:55:00	14.9	11/10/2018	13:30:00	571798	11/10/2018	13:30:00	4083	11/10/2018	13:30:00	3 - No Action	22/11/2018	13:08:00	Yes
14/03/2019	11:44:00	Yes	18/10/2018	11:55:00	65	18/10/2018	11:55:00	5246	25/10/2018	11:21:00	14.9	18/10/2018	11:55:00	571798	18/10/2018	11:55:00	4084	18/10/2018	11:55:00	3 - No Action	29/11/2018	10:36:00	Yes
21/03/2019	13:10:00	Yes	25/10/2018	11:21:00	65	25/10/2018	11:21:00	5246	02/11/2018	11:24:00	15	25/10/2018	11:21:00	571798	25/10/2018	11:21:00	4085	02/11/2018	11:24:00	3 - No Action	06/12/2018	11:24:00	Yes
28/03/2019	09:04:00	Yes	02/11/2018	11:24:00	65	02/11/2018	11:24:00	5246	08/11/2018	12:28:00	15	02/11/2018	11:24:00	572090	02/11/2018	11:24:00	4086	08/11/2018	12:28:00	3 - No Action	13/12/2018	11:29:00	Yes
04/04/2019	13:29:00	Yes	08/11/2018	12:28:00	65	08/11/2018	12:28:00	5248	15/11/2018	12:12:00	15	08/11/2018	12:28:00	572090	08/11/2018	12:28:00	4086	15/11/2018	12:12:00	2 - Clean	20/12/2018	14:42:00	Yes
11/04/2019	13:00:00	Yes	15/11/2018	12:12:00	65	15/11/2018	12:12:00	5248	22/11/2018	13:08:00	14.9	15/11/2018	12:12:00	572090	15/11/2018	12:12:00	4087	22/11/2018	13:08:00	3 - No Action	04/01/2019	11:25:00	Yes
18/04/2019	12:29:00	Yes	22/11/2018	13:08:00	65	22/11/2018	13:08:00	5248	29/11/2018	10:36:00	14.9	22/11/2018	13:08:00	572090	22/11/2018	13:08:00	4087	29/11/2018	10:36:00	2 - Clean	10/01/2019	11:11:00	Yes
24/04/2019	13:16:00	Yes	29/11/2018	10:36:00	65	29/11/2018	10:36:00	5250	06/12/2018	14:05:00	14.9	29/11/2018	10:36:00	572343	29/11/2018	10:36:00	4088	06/12/2018	14:05:00	3 - No Action	17/01/2019	12:53:00	Yes
30/04/2019	09:44:00	Yes	06/12/2018	14:05:00	65	06/12/2018	14:05:00	5258	13/12/2018	11:29:00	15	06/12/2018	14:05:00	572343	06/12/2018	14:05:00	4089	13/12/2018	11:29:00	3 - No Action	24/01/2019	10:42:00	Yes
09/05/2019	13:15:00	Yes	13/12/2018	11:29:00	65	13/12/2018	11:29:00	5260	20/12/2018	14:42:00	14.9	13/12/2018	11:29:00	572343	13/12/2018	11:29:00	4090	20/12/2018	14:42:00	3 - No Action	31/01/2019	11:41:00	Yes
16/05/2019	11:01:00	Yes	20/12/2018	14:42:00	65	20/12/2018	14:42:00	5264	27/12/2018	11:24:00	14.9	20/12/2018	14:42:00	573107	27/12/2018	11:24:00	4091	27/12/2018	11:24:00	2 - Clean	07/02/2019	12:56:00	Yes
23/05/2019	14:11:00	Yes	27/12/2018	11:24:00	65	27/12/2018	11:24:00	5265	04/01/2019	11:25:00	15	27/12/2018	11:24:00	573107	27/12/2018	11:24:00	4091	04/01/2019	11:25:00	1 - Change	14/02/2019	14:20:00	Yes
30/05/2019	11:17:00	Yes	04/01/2019	11:25:00	65	04/01/2019	11:25:00	5266	10/01/2019	11:11:00	15	04/01/2019	11:25:00	573107	04/01/2019	11:25:00	4092	10/01/2019	11:11:00	2 - Clean	21/02/2019	12:50:00	Yes
06/06/2019	13:22:00	Yes	10/01/2019	11:11:00	65	10/01/2019	11:11:00	5266	17/01/2019	12:53:00	14.9	10/01/2019	11:11:00	573107	10/01/2019	11:11:00	4093	17/01/2019	12:53:00	3 - No Action	28/02/2019	09:48:00	Yes
13/06/2019	10:32:00	Yes	17/01/2019	12:53:00	65	17/01/2019	12:53:00	5266	24/01/2019	10:42:00	14.9	17/01/2019	12:53:00	573107	17/01/2019	12:53:00	4094	24/01/2019	10:42:00	3 - No Action	07/03/2019	12:56:00	Yes
20/06/2019	13:22:00	Yes	24/01/2019	10:42:00	65	24/01/2019	10:42:00	5266	31/01/2019	11:41:00	15.1	24/01/2019	10:42:00	573107	24/01/2019	10:42:00	4094	31/01/2019	11:41:00	1 - Change	14/03/2019	11:44:00	Yes
27/06/2019	13:49:00	Yes	31/01/2019	11:41:00	65	31/01/2019	11:41:00	5268	07/02/2019	11:07:00	14.9	31/01/2019	11:41:00	573375	31/01/2019	11:41:00	4095	07/02/2019	11:07:00	3 - No Action	28/03/2019	09:04:00	Yes
04/07/2019	10:58:00	Yes	07/02/2019	11:07:00	65	07/02/2019	11:07:00	5268	14/02/2019	14:20:00	15	07/02/2019	11:07:00	573375	07/02/2019	11:07:00	4095	14/02/2019	14:20:00	2 - Clean	04/04/2019	13:29:00	Yes
11/07/2019	14:54:00	Yes	14/02/2019	14:20:00	65	14/02/2019	14:20:00	5268	21/02/2019	12:50:00	14.9	14/02/2019	14:20:00	573614	21/02/2019	12:50:00	4097	21/02/2019	12:50:00	3 - No Action	11/04/2019	13:00:00	Yes
18/07/2019	13:47:00	Yes	21/02/2019	12:50:00	65	21/02/2019	12:50:00	5280	28/02/2019	09:48:00	14.9	21/02/2019	12:50:00	573614	21/02/2019	12:50:00	4097	28/02/2019	09:48:00	3 - No Action	18/04/2019	12:29:00	Yes
25/07/2019	11:00:00	Yes	28/02/2019	09:48:00	65	28/02/2019	09:48:00	5280	07/03/2019	12:56:00	15	28/02/2019	09:48:00	573614	28/02/2019	09:48:00	4098	07/03/2019	12:56:00	2 - Clean	24/04/2019	13:16:00	Yes
01/08/2019	15:24:00	Yes	07/03/2019	12:56:00	65	07/03/2019	12:56:00	5280	14/03/2019	11:44:00	14.9	07/03/2019	12:56:00	573614	07/03/2019	12:56:00	4099	14/03/2019	11:44:00	3 - No Action	30/04/2019	09:44:00	Yes
08/08/2019	11:55:00	Yes	14/03/2019	11:44:00	65	14/03/2019	11:44:00	5280	21/03/2019	09:04:00	25.2	14/03/2019	11:44:00	573614	21/03/2019	09:04:00	4100	21/03/2019	09:04:00	1 - Change	09/05/2019	13:15:00	Yes
15/08/2019	14:21:00	Yes	21/03/2019	09:04:00	65	21/03/2019	09:04:00	5280	28/03/2019	13:29:00	14.9	21/03/2019	09:04:00	573783	28/03/2019	13:29:00	4100	28/03/2019	09:04:00	3 - No Action	16/05/2019	11:01:00	Yes
22/08/2019	11:15:00	Yes	28/03/2019	09:04:00	65	28/03/2019	09:04:00	5281	04/04/2019	13:29:00	15	28/03/2019	09:04:00	573783	28/03/2019	13:29:00	4101	04/04/2019	13:29:00	2 - Clean	23/05/2019	14:11:00	Yes
29/08/2019	11:30:00	Yes	04/04/2019	13:29:00	65	04/04/2019	13:29:00	5282	11/04/2019	13:00:00	14.9	04/04/2019	13:29:00	573901	11/04/2019	13:29:00	0	11/04/2019	13:00:00	2 - Clean	30/05/2019	11:17:00	Yes
05/09/2019	12:00:00	Yes	11/04/2019	13:00:00	65	11/04/2019	13:00:00	5282	18/04/2019	12:29:00	14.9	11/04/2019	13:00:00	573901	18/04/2019	12:29:00	0	18/04/2019	12:29:00	2 - Clean	06/06/2019	14:22:00	Yes
12/09/2019	14:55:00	Yes	18/04/2019	12:29:00	65	18/04/2019	12:29:00	5282	24/04/2019	13:16:00	14.9	18/04/2019	12:29:00	573901	24/04/2019	13:16:00	0	24/04/2019	13:16:00	2 - Clean	13/06/2019	10:32:00	Yes
19/09/2019	11:29:00	Yes	24/04/2019	13:16:00	65	24/04/2019	13:16:00	5282	30/04/2019	09:44:00	25.3	24/04/2019	13:16:00	573901	30/04/2019	13:16:00	4122	30/04/2019	09:44:00	3 - No Action	20/06/2019	13:22:00	Yes
27/09/2019	12:43:00	Yes	30/04/2019	09:44:00	65	30/04/2019	09:44:00	5283	09/05/2019	13:15:00	15	30/04/2019	09:44:00	574084	09/05/2019	09:44:00	4123	09/05/2019	13:15:00	2 - Clean	04/07/2019	10:58:00	Yes
04/10/2019	13:22:00	Yes	09/05/2019	13:15:00	65	09/05/2019	13:15:00	5284	16/05/2019	11:01:00	14.9	09/05/2019	13:15:00	574165	16/05/2019	13:15:00	0	16/05/2019	11:01:00	2 - Clean	11/07/2019	14:54:00	Yes
08/10/2019	15:03:00	Yes	16/05/2019	11:01:00	65	16/05/2019	11:01:00	5284	23/05/2019	14:11:00	14.9	16/05/2019	11:01:00	574165	23/05/2019	11:01:00	4125	23/05/2019	14:11:00	3 - No Action	18/07/2019	13:47:00	Yes
17/10/2019	12:07:00	Yes	23/05/2019	14:11:00	65	23/05/2019	14:11:00	5284	30/05/2019	11:17:00	14.9	23/05/2019	14:11:00	574165	30/05/2019	14:11:00	4126	30/05/2019	11:17:00	2 - Clean	25/07/2019	11:00:00	Yes
23/10/2019	09:16:00	Yes	30/05/2019	11:17:00	65	30/05/2019	11:17:00	5270	06/06/2019	13:22:00	14.8	30/05/2019	11:17:00	574869	30/05/2019	11:17:00	4128	06/06/2019	13:22:00	2 - Clean	01/08/2019	15:24:00	Yes
31/10/2019	11:43:00	Yes	06/06/2019	13:22:00	65	06/06/2019	13:22:00	5270	13/06/2019	10:32:00	14.9	06/06/2019	13:22:00	574869	06/06/2019	13:22:00	4130	13/06/2019	10:32:00	2 - Clean	08/08/2019	11:55:00	Yes
07/11/2019	11:15:00	Yes	13/06/2019	10:32:00	65	13/06/2019	10:32:00	5270	20/06/2019	13:49:00	14.9	13/06/2019	10:32:00	574869	20/06/2019	13:49:00	4131	20/06/2019	13:49:00	2 - Clean	15/08/2019	14:21:00	Yes
14/11/2019	13:02:00	Yes	20/06/2019	13:49:00	65	20/06/2019	13:49:00	5270	27/06/2019	10:58:00	14.9	20/06/2019	13:49:00	574869	27/06/2019	13:49:00	4132	27/06/2019	10:58:00	2 - Clean	22/08/2019	11:15:00	Yes
21/11/2019	13:46:00	Yes	27/06/2019	10:58:00	65	27/06/2019	10:58:00	5270	04/07/2019	10:58:00	14.9	27/06/2019	10:58:00	574869	04/07/2019	10:58:00	4132	04/07/2019	10:58:00	2 - Clean	29/08/2019	11:30:00	Yes
28/11/2019	11:26:00	Yes	04/07/2019	10:58:00	65	04/07/2019	10:58:00	5270	11/07/2019	14:54:00	14.9	04/07/2019	10:58:00	574869	11/07/2019	14:54:00	4134	11/07/2019	14:54:00	3 - No Action	05/09/2019	12:00:00	Yes
06/12/2019	14:24:00	Yes	11/07/2019	14:54:00	65	11/07/2019	14:54:00	5270	18/07/2019	13:47:00	14.9	11/07/2019	14:54:00	574869	18/07/2019	14:54:00	4136	18/07/2019	13:47:00	2 - Clean	12/09/2019	14:55:00	Yes
12/12/2019	12:44:00	Yes	18/07/2019	13:47:00	65	18/07/2019	13:47:00	5270	25/07/2019	11:00:00	14.9	18/07/2019	13:47:00	574869	25/07/2019	11:00:00	4137	25/07/2019	11:00:00	2 - Clean	19/09/2019	11:29:00	Yes
19/12/2019	07:30:00	Yes	25/07/2019	11:00:00	65	25/07/2019	11:00:00	5270	01/08/2019	15:24:00	14.9	25/07/2019	11:00:00	574869	01/08/2019	11:00:00	4138	01/08/					

K5

Tab	K5	K5	K5	K5	K5	K5	K5	K5	K5	K5	K5	K5	K5	K5
Subgroup	K5	K5	K5	K5	K5	K5	K5	K5	K5	K5	K5	K5	K5	K5
Parameter	Filled in loc book?													
Tao		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
Operations Min		m		°C	m³	m³								
Operations Max														
Trigger Min														
Trigger Max														
92% Min														
92% Max														
95% Min														
95% Max														
98% Min														
98% Max														
99% Min														
99% Max														
Medium Min														
Medium Max														
Sarekh Months														
Days Between Samples														
Description														
Parameter ID	11436	11437	11438	11439	11440	11441	11442	11443	11444	11445	11446	11447	11448	

[illegible]

12/12/2019	12:55:00	Yes	18/07/2019	13:50:00	46	28/11/2019	11:32:00	7133	01/08/2019	15:30:00	14.5	25/07/2019	11:02:00	567668	18/07/2019	13:50:00	265519	18/07/2019	13:50:00	2 - Clean	15/08/2019	14:22:00	Yes	29/06/2020	08:47:00	44036	01/08/2019	15:30:00	Yes	22/08/2019	11:20:00	276
19/12/2019	07:34:00	Yes	25/07/2019	11:02:00	46	06/12/2019	14:30:00	7133	08/08/2019	11:59:00	14.5	01/08/2019	15:30:00	568596	25/07/2019	11:02:00	265519	25/07/2019	11:02:00	2 - Clean	22/08/2019	11:20:00	Yes	09/07/2020	11:41:00	44036	08/08/2019	11:59:00	Yes	28/08/2019	11:40:00	277
09/01/2020	13:50:00	Yes	01/08/2019	15:30:00	45	12/12/2019	12:55:00	7133	15/08/2019	14:22:00	14.5	08/08/2019	11:59:00	568088	01/08/2019	15:30:00	265519	01/08/2019	15:30:00	2 - Clean	29/08/2019	11:40:00	Yes	16/07/2020	11:25:00	44036	15/08/2019	14:22:00	Yes	10/09/2019	11:51:00	277
16/01/2020	13:08:00	Yes	08/08/2019	11:59:00	44	19/12/2019	07:34:00	7136	22/08/2019	11:20:00	14.5	15/08/2019	14:22:00	568088	08/08/2019	11:59:00	265519	08/08/2019	11:59:00	3 - No Acto	05/09/2019	12:08:00	Yes	23/07/2020	11:36:00	44219	22/08/2019	11:20:00	Yes	19/09/2019	13:17:00	278
23/01/2020	09:54:00	Yes	15/09/2019	14:22:00	45	09/01/2020	13:50:00	7137	29/08/2019	11:40:00	14.5	22/08/2019	11:20:00	568088	15/09/2019	14:22:00	265519	15/09/2019	14:22:00	3 - No Acto	10/09/2019	11:51:00	Yes	28/07/2020	11:31:00	44219	29/08/2019	11:40:00	Yes	27/09/2019	12:52:00	279
30/01/2020	11:30:00	Yes	22/08/2019	11:20:00	44	16/01/2020	13:08:00	7139	05/09/2019	12:08:00	14.5	29/08/2019	11:40:00	568596	22/08/2019	11:20:00	265519	22/08/2019	11:20:00	3 - No Acto	19/09/2019	13:17:00	Yes	30/07/2020	11:22:00	44219	05/09/2019	12:08:00	Yes	01/10/2019	13:31:00	279
07/02/2020	09:42:00	Yes	29/08/2019	11:40:00	45	23/01/2020	09:04:00	7138	10/09/2019	11:51:00	14.5	05/09/2019	12:08:00	568596	29/08/2019	11:40:00	265519	29/08/2019	11:40:00	2 - Clean	27/09/2019	12:52:00	Yes	06/08/2020	13:13:00	44219	10/09/2019	11:51:00	Yes	08/10/2019	15:06:00	279
13/02/2020	13:06:00	Yes	05/09/2019	12:08:00	45	30/01/2020	11:30:00	7139	18/09/2019	13:17:00	14.5	10/09/2019	11:51:00	568596	05/09/2019	12:08:00	265519	05/09/2019	12:08:00	3 - No Acto	01/10/2019	13:31:00	Yes				19/09/2019	13:17:00	Yes	23/10/2019	10:15:00	279
20/02/2020	12:36:00	Yes	10/09/2019	11:51:00	45	07/02/2020	09:42:00	7139	27/09/2019	12:52:00	30.0	18/09/2019	13:17:00	568596	10/09/2019	11:51:00	265520	10/09/2019	11:51:00	2 - Clean	01/10/2019	14:26:00	Yes				27/09/2019	12:52:00	Yes	31/10/2019	11:44:00	280
27/02/2020	10:36:00	Yes	19/09/2019	11:51:00	44	13/02/2020	13:06:00	7139	01/10/2019	13:31:00	14.5	17/09/2019	12:52:00	568596	19/09/2019	13:17:00	265520	19/09/2019	13:17:00	2 - Clean	08/10/2019	15:06:00	Yes				01/10/2019	13:31:00	Yes	14/11/2019	13:03:00	282
05/03/2020	12:58:00	Yes	27/09/2019	12:52:00	26	27/02/2020	10:36:00	7139	08/10/2019	13:06:00	14.5	01/10/2019	13:31:00	568439	27/09/2019	12:52:00	265521	27/09/2019	12:52:00	3 - No Acto	17/10/2019	12:13:00	Yes				09/10/2019	15:06:00	Yes	21/11/2019	13:51:00	282
12/03/2020	11:16:00	Yes	01/10/2019	13:31:00	45	17/02/2020	10:36:00	7141	17/10/2019	12:13:00	14.5	08/10/2019	15:06:00	568439	01/10/2019	13:31:00	265521	01/10/2019	13:31:00	2 - Clean	23/10/2019	10:15:00	Yes				17/10/2019	12:13:00	Yes	28/11/2019	11:22:00	286
19/03/2020	11:00:00	Yes	09/10/2019	13:06:00	45	05/03/2020	12:58:00	7142	23/10/2019	10:15:00	14.5	17/10/2019	12:13:00	568439	09/10/2019	15:06:00	265521	09/10/2019	15:06:00	2 - Clean	31/10/2019	11:44:00	Yes				06/12/2019	14:30:00	Yes	06/12/2019	14:30:00	289
26/03/2020	08:52:00	Yes	17/10/2019	12:13:00	45	12/03/2020	11:16:00	7142	31/10/2019	11:44:00	14.5	23/10/2019	10:15:00	568439	17/10/2019	12:13:00	265522	17/10/2019	12:13:00	3 - No Acto	07/11/2019	11:22:00	Yes				31/10/2019	11:44:00	Yes	12/12/2019	12:55:00	291
02/04/2020	09:03:00	Yes	23/10/2019	10:15:00	45	19/03/2020	11:06:00	7146	07/11/2019	11:22:00	14.5	31/10/2019	11:44:00	570279	23/10/2019	10:15:00	265522	23/10/2019	10:15:00	2 - Clean	14/11/2019	13:03:00	Yes				07/11/2019	11:22:00	Yes	19/12/2019	07:34:00	293
16/04/2020	10:53:00	Yes	31/10/2019	11:44:00	45	30/03/2020	08:52:00	7146	14/11/2019	13:03:00	14.5	07/11/2019	11:22:00	570279	31/10/2019	11:44:00	265523	31/10/2019	11:44:00	3 - No Acto	21/11/2019	13:51:00	Yes				14/11/2019	13:03:00	No	09/01/2020	13:06:00	293
23/04/2020	10:53:00	Yes	07/11/2019	11:22:00	45	02/04/2020	09:03:00	7146	21/11/2019	13:51:00	14.5	14/11/2019	13:03:00	570622	07/11/2019	11:22:00	265523	07/11/2019	11:22:00	3 - No Acto	28/11/2019	11:32:00	Yes				21/11/2019	13:51:00	Yes	16/01/2020	13:08:00	293
30/04/2020	09:50:00	Yes	14/11/2019	13:03:00	47	16/04/2020	10:53:00	7146	28/11/2019	11:32:00	14.5	21/11/2019	13:51:00	570622	14/11/2019	13:03:00	265524	14/11/2019	13:03:00	2 - Clean	08/12/2019	14:30:00	Yes				28/11/2019	11:32:00	Yes	23/01/2020	09:04:00	295
14/05/2020	11:54:00	Yes	21/11/2019	13:51:00	47	23/04/2020	10:53:00	7146	08/12/2019	14:30:00	14.5	28/11/2019	11:32:00	571183	21/11/2019	13:51:00	265524	21/11/2019	13:51:00	2 - Clean	12/12/2019	12:55:00	Yes				06/12/2019	14:30:00	Yes	30/01/2020	11:30:00	295
21/05/2020	15:53:00	Yes	28/11/2019	11:32:00	47	30/04/2020	09:50:00	7146	12/12/2019	12:55:00	14.5	08/12/2019	14:30:00	571183	28/11/2019	11:32:00	265526	28/11/2019	11:32:00	2 - Clean	19/12/2019	07:34:00	Yes				12/12/2019	12:55:00	Yes	07/02/2020	09:42:00	295
25/05/2020	10:32:00	Yes	08/12/2019	14:30:00	47	14/05/2020	11:54:00	7146	19/12/2019	07:34:00	30.0	12/12/2019	12:55:00	571183	08/12/2019	14:30:00	265530	08/12/2019	14:30:00	3 - No Acto	09/01/2020	13:50:00	Yes				19/12/2019	07:34:00	Yes	13/02/2020	13:06:00	295
04/06/2020	11:10:00	Yes	12/12/2019	12:55:00	48	21/05/2020	15:53:00	7146	09/01/2020	13:50:00	14.5	19/12/2019	07:34:00	571785	12/12/2019	12:55:00	265535	12/12/2019	12:55:00	3 - No Acto	16/01/2020	13:08:00	Yes				09/01/2020	13:50:00	Yes	20/02/2020	12:36:00	295
11/06/2020	13:28:00	Yes	19/12/2019	07:34:00	31	20/05/2020	10:32:00	7147	16/01/2020	13:08:00	14.5	09/01/2020	13:50:00	571936	19/12/2019	07:34:00	265537	19/12/2019	07:34:00	3 - No Acto	23/01/2020	09:04:00	Yes				16/01/2020	13:08:00	Yes	27/02/2020	10:36:00	297
18/06/2020	15:23:00	Yes	09/01/2020	13:50:00	47	04/06/2020	11:10:00	7149	23/01/2020	09:04:00	30.7	16/01/2020	13:08:00	571936	09/01/2020	13:50:00	265549	09/01/2020	13:50:00	3 - No Acto	30/01/2020	11:30:00	Yes				23/01/2020	09:04:00	Yes	05/03/2020	12:58:00	297
29/06/2020	08:47:00	Yes	16/01/2020	13:08:00	47	11/06/2020	13:28:00	7149	30/01/2020	11:30:00	14.5	23/01/2020	09:04:00	572297	16/01/2020	13:08:00	265550	16/01/2020	13:08:00	3 - No Acto	07/02/2020	09:42:00	Yes				30/01/2020	11:30:00	Yes	12/03/2020	11:16:00	298
09/07/2020	11:41:00	Yes	23/01/2020	09:04:00	33	18/06/2020	15:23:00	7149	07/02/2020	09:42:00	14.5	30/01/2020	11:30:00	572446	23/01/2020	09:04:00	265554	23/01/2020	09:04:00	3 - No Acto	13/02/2020	13:06:00	Yes				07/02/2020	09:42:00	Yes	19/03/2020	11:06:00	299
16/07/2020	11:20:00	Yes	30/01/2020	11:30:00	48	29/06/2020	08:47:00	7150	13/02/2020	13:06:00	14.5	07/02/2020	09:42:00	572446	30/01/2020	11:30:00	265555	30/01/2020	11:30:00	3 - No Acto	20/02/2020	12:36:00	Yes				13/02/2020	13:06:00	Yes	26/03/2020	09:50:00	299
29/07/2020	11:36:00	Yes	07/02/2020	09:42:00	44	09/07/2020	11:41:00	7152	29/02/2020	12:36:00	14.5	13/02/2020	13:06:00	572466	07/02/2020	09:42:00	265556	07/02/2020	09:42:00	3 - No Acto	27/02/2020	10:36:00	Yes				29/02/2020	12:36:00	Yes	02/04/2020	09:03:00	300
28/07/2020	11:31:00	Yes	13/02/2020	13:06:00	46	16/07/2020	11:20:00	7152	27/02/2020	10:36:00	14.5	20/02/2020	12:36:00	572466	13/02/2020	13:06:00	265558	13/02/2020	13:06:00	2 - Clean	05/03/2020	12:58:00	Yes				27/02/2020	10:36:00	Yes	16/04/2020	10:53:00	300
30/07/2020	11:22:00	Yes	20/02/2020	12:36:00	45	23/07/2020	11:36:00	7152	05/03/2020	12:58:00	14.5	27/02/2020	10:36:00	572502	20/02/2020	12:36:00	265560	20/02/2020	12:36:00	3 - No Acto	10/03/2020	11:16:00	Yes				05/03/2020	12:58:00	Yes	23/04/2020	10:53:00	300
06/08/2020	13:13:00	Yes	27/02/2020	10:36:00	25	28/07/2020	11:31:00	7155	12/03/2020	11:16:00	14.5	05/03/2020	12:58:00	573081	27/02/2020	10:36:00	265561	27/02/2020	10:36:00	3 - No Acto	19/03/2020	11:06:00	Yes				12/03/2020	11:16:00	Yes	30/04/2020	09:50:00	300
			05/03/2020	12:58:00	43	30/07/2020	11:22:00	7155	19/03/2020	11:06:00	30.0	12/03/2020	11:16:00	573091	05/03/2020	12:58:00	265562	05/03/2020	12:58:00	3 - No Acto	26/03/2020	09:52:00	Yes				19/03/2020	11:06:00	Yes	14/05/2020	11:54:00	300
			12/03/2020	11:16:00	4																											

12/07/2018	13:34:00	Yes	01/02/2018	14:50:00	3	08/02/2018	13:17:00	24	01/02/2018	14:50:00	8192	01/02/2018	14:50:00	4.09	01/02/2018	14:50:00	3 - No Action	01/03/2018	15:20:00	Yes
19/07/2018	12:10:00	Yes	08/02/2018	13:17:00	3	15/02/2018	12:05:00	1529	15/02/2018	12:05:00	8943	08/02/2018	13:17:00	4.31	08/02/2018	13:17:00	2 - Clean	09/03/2018	11:07:00	Yes
26/07/2018	12:10:00	Yes	15/02/2018	12:05:00	38	22/02/2018	12:56:00	1529	22/02/2018	12:56:00	9927	15/02/2018	12:05:00	4	15/02/2018	12:05:00	1 - Change	15/03/2018	13:36:00	Yes
02/08/2018	13:46:00	Yes	22/02/2018	12:56:00	39	01/03/2018	15:20:00	1531	01/03/2018	15:20:00	9927	22/02/2018	12:56:00	4	22/02/2018	12:56:00	2 - Clean	28/03/2018	13:05:00	Yes
09/08/2018	11:25:00	Yes	01/03/2018	15:20:00	39	09/03/2018	11:07:00	1531	09/03/2018	11:07:00	9987	01/03/2018	15:20:00	4.31	01/03/2018	15:20:00	3 - No Action	05/04/2018	22:40:00	Yes
16/08/2018	10:53:00	Yes	09/03/2018	11:07:00	40	15/03/2018	13:36:00	1531	15/03/2018	13:36:00	9987	09/03/2018	11:07:00	4	09/03/2018	11:07:00	2 - Clean	12/04/2018	11:23:00	Yes
23/08/2018	12:00:00	Yes	15/03/2018	13:36:00	40	29/03/2018	13:05:00	1533	29/03/2018	13:05:00	9987	15/03/2018	13:36:00	4	15/03/2018	13:36:00	2 - Clean	19/04/2018	11:35:00	Yes
30/08/2018	13:25:00	Yes	29/03/2018	13:05:00	40	05/04/2018	22:40:00	1533	05/04/2018	22:40:00	10014	29/03/2018	13:05:00	4.53	29/03/2018	13:05:00	3 - No Action	26/04/2018	13:24:00	Yes
12/09/2018	11:22:00	Yes	05/04/2018	22:40:00	40	11/23/2018	11:35:00	1533	11/23/2018	11:35:00	10014	12/04/2018	22:40:00	4.53	12/04/2018	11:23:00	3 - No Action	24/05/2018	14:56:00	Yes
13/09/2018	12:19:00	Yes	12/04/2018	11:23:00	40	19/04/2018	11:35:00	1533	19/04/2018	11:35:00	10014	12/04/2018	11:23:00	4.53	12/04/2018	11:23:00	2 - Clean	10/05/2018	13:05:00	Yes
20/09/2018	11:15:00	Yes	19/04/2018	11:35:00	40	26/04/2018	13:24:00	1533	26/04/2018	13:24:00	10014	19/04/2018	11:35:00	4	19/04/2018	11:35:00	2 - Clean	17/05/2018	13:26:00	Yes
24/09/2018	13:37:00	Yes	26/04/2018	13:24:00	40	04/05/2018	14:58:00	1536	04/05/2018	14:58:00	10018	26/04/2018	13:24:00	5.99	26/04/2018	13:24:00	3 - No Action	24/05/2018	13:26:00	Yes
04/10/2018	11:44:00	Yes	04/05/2018	14:58:00	40	10/05/2018	13:05:00	1536	10/05/2018	13:05:00	10087	04/05/2018	14:58:00	5.99	04/05/2018	14:58:00	2 - Clean	31/05/2018	11:32:00	Yes
11/10/2018	13:36:00	Yes	10/05/2018	13:05:00	40	17/05/2018	13:26:00	1536	17/05/2018	13:26:00	10087	34	10/05/2018	6.28	10/05/2018	13:05:00	3 - No Action	07/06/2018	14:47:00	Yes
18/10/2018	12:03:00	Yes	17/05/2018	13:26:00	40	24/05/2018	13:26:00	1536	24/05/2018	13:26:00	10087	17/05/2018	13:26:00	6	17/05/2018	13:26:00	2 - Clean	14/06/2018	13:19:00	Yes
25/10/2018	14:39:00	Yes	24/05/2018	13:26:00	40	31/05/2018	11:32:00	1538	31/05/2018	11:32:00	10087	24/05/2018	13:26:00	6	24/05/2018	13:26:00	2 - Clean	21/06/2018	12:57:00	Yes
02/11/2018	11:36:00	Yes	31/05/2018	11:32:00	40	07/06/2018	14:47:00	1538	07/06/2018	14:47:00	10130	31/05/2018	11:32:00	6	31/05/2018	11:32:00	2 - Clean	28/06/2018	11:55:00	Yes
08/11/2018	12:53:00	Yes	07/06/2018	14:47:00	40	14/06/2018	13:19:00	1538	14/06/2018	13:19:00	10130	07/06/2018	14:47:00	6.28	07/06/2018	14:47:00	3 - No Action	05/07/2018	14:44:00	Yes
15/11/2018	12:21:00	Yes	14/06/2018	13:19:00	40	21/06/2018	12:57:00	1538	21/06/2018	12:57:00	10131	14/06/2018	13:19:00	6.75	14/06/2018	13:19:00	2 - Clean	12/07/2018	13:34:00	Yes
22/11/2018	12:01:00	Yes	21/06/2018	12:57:00	40	28/06/2018	11:55:00	1538	28/06/2018	11:55:00	10131	21/06/2018	12:57:00	6	21/06/2018	12:57:00	2 - Clean	19/07/2018	12:10:00	Yes
29/11/2018	10:51:00	Yes	28/06/2018	11:55:00	40	05/07/2018	14:44:00	1539	05/07/2018	14:44:00	10132	28/06/2018	11:55:00	7	28/06/2018	11:55:00	3 - No Action	26/07/2018	12:10:00	Yes
06/12/2018	13:58:00	Yes	05/07/2018	14:44:00	40	12/07/2018	13:34:00	1539	12/07/2018	13:34:00	10163	05/07/2018	14:44:00	10	05/07/2018	14:44:00	3 - No Action	02/08/2018	13:46:00	Yes
13/12/2018	11:14:00	Yes	12/07/2018	13:34:00	40	19/07/2018	12:10:00	1539	19/07/2018	12:10:00	10167	12/07/2018	13:34:00	11.16	12/07/2018	13:34:00	3 - No Action	09/08/2018	11:25:00	Yes
20/12/2018	14:51:00	Yes	19/07/2018	12:10:00	40	26/07/2018	12:10:00	1539	26/07/2018	12:10:00	10170	19/07/2018	12:10:00	11	19/07/2018	12:10:00	3 - No Action	16/08/2018	10:53:00	Yes
27/12/2018	11:47:00	Yes	26/07/2018	12:10:00	40	02/08/2018	13:46:00	1540	02/08/2018	13:46:00	10171	26/07/2018	12:10:00	12.72	26/07/2018	12:10:00	3 - No Action	23/08/2018	13:05:00	Yes
04/01/2019	11:41:00	Yes	02/08/2018	13:46:00	40	09/08/2018	11:25:00	1540	09/08/2018	11:25:00	10197	02/08/2018	13:46:00	12.72	02/08/2018	13:46:00	3 - No Action	30/08/2018	13:25:00	Yes
10/01/2019	11:23:00	Yes	09/08/2018	11:25:00	40	16/08/2018	10:53:00	1540	16/08/2018	10:53:00	10198	09/08/2018	11:25:00	12.72	09/08/2018	11:25:00	2 - Clean	06/09/2018	11:22:00	Yes
17/01/2019	13:00:00	Yes	16/08/2018	10:53:00	40	23/08/2018	12:00:00	1540	23/08/2018	12:00:00	10200	16/08/2018	10:53:00	12	16/08/2018	10:53:00	2 - Clean	13/09/2018	12:19:00	Yes
24/01/2019	10:55:00	Yes	23/08/2018	12:00:00	40	30/08/2018	13:25:00	1542	30/08/2018	13:25:00	10202	23/08/2018	12:00:00	12	23/08/2018	12:00:00	3 - No Action	20/09/2018	11:15:00	Yes
31/01/2019	11:41:00	Yes	30/08/2018	13:25:00	40	06/09/2018	11:22:00	1542	06/09/2018	11:22:00	10246	30/08/2018	12:00:00	12.72	30/08/2018	12:00:00	3 - No Action	24/09/2018	14:59:00	Yes
07/02/2019	11:26:00	Yes	06/09/2018	11:22:00	40	13/09/2018	12:19:00	1542	13/09/2018	12:19:00	10246	06/09/2018	11:22:00	12	06/09/2018	11:22:00	2 - Clean	04/10/2018	11:44:00	Yes
14/02/2019	14:27:00	Yes	13/09/2018	12:19:00	40	20/09/2018	11:15:00	1542	20/09/2018	11:15:00	10246	13/09/2018	12:19:00	12	13/09/2018	12:19:00	3 - No Action	11/10/2018	13:36:00	Yes
21/02/2019	13:13:00	Yes	20/09/2018	11:15:00	40	24/09/2018	13:37:00	1542	24/09/2018	13:37:00	10246	20/09/2018	11:15:00	12	20/09/2018	11:15:00	2 - Clean	18/10/2018	12:03:00	Yes
07/03/2019	13:03:00	Yes	24/09/2018	13:37:00	40	04/10/2018	11:44:00	1545	04/10/2018	11:44:00	10246	24/09/2018	13:37:00	12	24/09/2018	13:37:00	3 - No Action	25/10/2018	14:39:00	Yes
14/03/2019	11:58:00	Yes	04/10/2018	11:44:00	40	18/10/2018	12:03:00	1545	18/10/2018	12:03:00	10306	04/10/2018	11:44:00	13	04/10/2018	11:44:00	2 - Clean	08/11/2018	12:53:00	Yes
21/03/2019	13:30:00	Yes	18/10/2018	12:03:00	40	25/10/2018	14:39:00	1545	25/10/2018	14:39:00	10306	18/10/2018	12:03:00	13	18/10/2018	12:03:00	3 - No Action	15/11/2018	12:21:00	Yes
28/03/2019	09:40:00	Yes	25/10/2018	14:39:00	40	02/11/2018	11:36:00	1547	02/11/2018	11:36:00	10308	25/10/2018	14:39:00	14.26	25/10/2018	14:39:00	3 - No Action	22/11/2018	13:20:00	Yes
04/04/2019	13:48:00	Yes	02/11/2018	11:36:00	40	08/11/2018	12:53:00	1547	08/11/2018	12:53:00	10358	02/11/2018	11:36:00	17	02/11/2018	11:36:00	2 - Clean	29/11/2018	10:51:00	Yes
11/04/2019	13:18:00	Yes	08/11/2018	12:53:00	40	15/11/2018	13:20:00	1547	15/11/2018	13:20:00	10358	08/11/2018	12:53:00	17	08/11/2018	12:53:00	3 - No Action	06/12/2018	13:58:00	Yes
18/04/2019	12:47:00	Yes	15/11/2018	13:20:00	40	22/11/2018	13:20:00	1547	22/11/2018	13:20:00	10358	15/11/2018	13:20:00	17	15/11/2018	13:20:00	2 - Clean	13/12/2018	12:11:00	Yes
24/04/2019	13:30:00	Yes	22/11/2018	13:20:00	40	29/11/2018	10:51:00	1549	29/11/2018	10:51:00	10359	22/11/2018	13:20:00	17.77	22/11/2018	13:20:00	3 - No Action	20/12/2018	14:51:00	Yes
24/04/2019	13:40:00	Yes	29/11/2018	10:51:00	40	06/12/2018	13:58:00	1549	06/12/2018	13:58:00	10400	29/11/2018	10:51:00	17	29/11/2018	10:51:00	2 - Clean	27/12/2018	11:41:00	Yes
08/05/2019	10:00:00	Yes	06/12/2018	13:58:00	40	13/12/2018	11:14:00	1549	13/12/2018	11:14:00	10400	06/12/2018	13:58:00	17	06/12/2018	13:58:00	3 - No Action	04/01/2019	11:41:00	Yes
30/05/2019	13:26:00	Yes	13/12/2018	11:14:00	40	20/12/2018	14:51:00	1553	20/12/2018	14:51:00	10400	13/12/2018	11:14:00	18	13/12/2018	11:14:00	2 - Clean	10/01/2019	11:23:00	Yes
06/06/2019	13:28:00	Yes	20/12/2018	14:51:00	40	27/12/2018	11:41:00	1555	27/12/2018	11:41:00	10400	20/12/2018	14:51:00	18	20/12/2018	14:51:00	3 - No Action	17/01/2019	13:00:00	Yes
16/05/2019	11:12:00	Yes	27/12/2018	11:41:00	40	04/01/2019	11:41:00	1555	04/01/2019	11:41:00	10540	27/12/2018	11:41:00	18	27/12/2018	11:41:00	2 - Clean	24/01/2019	10:55:00	Yes
16/05/2019	11:13:00	Yes	04/01/2019	11:41:00	40	10/01/2019	11:23:00	1555	10/01/2019	11:23:00	10540	04/01/2019	11:41:00	18	04/01/2019	11:41:00	1 - Change	31/01/2019	11:48:00	Yes
23/05/2019	14:34:00	Yes	10/01/2019	11:23:00	40	17/01/2019	13:00:00	1555	17/01/2019	13:00:00	10540	10/01/2019	11:23:00	18	10/01/2019	11:23:00	2 - Clean	31/01/2019	11:52:00	Yes
30/05/2019	11:32:00																			

11/06/2020	13:31:00	Yes	19/12/2019	07:51:00	12	09/01/2020	13:58:00	1721	09/01/2020	13:58:00	14.2	19/12/2019	07:51:00	14331	19/12/2019	07:51:00	85	09/01/2020	13:58:00	3 - No Action	30/01/2020	11:35:00	Yes
18/06/2020	15:20:00	Yes	09/01/2020	13:58:00	40	16/01/2020	13:05:00	1721	16/01/2020	13:05:00	14.2	09/01/2020	13:58:00	14342	09/01/2020	13:58:00	85	16/01/2020	13:05:00	3 - No Action	07/02/2020	09:46:00	Yes
29/06/2020	08:58:00	Yes	16/01/2020	13:05:00	40	23/01/2020	09:13:00	1723	23/01/2020	09:13:00	25.1	16/01/2020	13:05:00	14342	16/01/2020	13:05:00	85	23/01/2020	09:13:00	3 - No Action	13/02/2020	13:02:00	Yes
09/07/2020	13:06:00	Yes	23/01/2020	09:13:00	12	30/01/2020	11:35:00	1724	30/01/2020	11:35:00	14.3	23/01/2020	09:13:00	14381	23/01/2020	09:13:00	85	30/01/2020	11:35:00	3 - No Action	20/02/2020	12:42:00	Yes
16/07/2020	11:32:00	Yes	30/01/2020	11:35:00	40	07/02/2020	09:46:00	1724	07/02/2020	09:46:00	14.1	30/01/2020	11:35:00	14392	30/01/2020	11:35:00	85	07/02/2020	09:46:00	3 - No Action	27/02/2020	11:13:00	Yes
23/07/2020	11:44:00	Yes	07/02/2020	09:46:00	40	13/02/2020	13:02:00	1724	13/02/2020	13:02:00	14.1	07/02/2020	09:46:00	14392	07/02/2020	09:46:00	85	13/02/2020	13:02:00	2 - Clean	05/03/2020	13:04:00	Yes
28/07/2020	11:22:00	Yes	13/02/2020	13:02:00	40	20/02/2020	12:42:00	1724	20/02/2020	12:42:00	14.2	13/02/2020	13:02:00	14394	13/02/2020	13:02:00	85	20/02/2020	12:42:00	3 - No Action	12/03/2020	11:21:00	Yes
30/07/2020	11:27:00	Yes	20/02/2020	12:42:00	40	27/02/2020	11:13:00	1727	27/02/2020	11:13:00	25.3	20/02/2020	12:42:00	14401	20/02/2020	12:42:00	85	27/02/2020	11:13:00	3 - No Action	19/03/2020	11:18:00	Yes
06/08/2020	13:20:00	Yes	27/02/2020	11:13:00	12	05/03/2020	13:04:00	1727	05/03/2020	13:04:00	14.7	27/02/2020	11:13:00	14459	27/02/2020	11:13:00	85	05/03/2020	13:04:00	3 - No Action	19/03/2020	11:29:00	Yes
06/08/2020	13:28:00	Yes	05/03/2020	13:04:00	40	12/03/2020	11:21:00	1727	12/03/2020	11:21:00	14.1	05/03/2020	13:04:00	14465	05/03/2020	13:04:00	85	12/03/2020	11:21:00	3 - No Action	26/03/2020	08:55:00	Yes
			12/03/2020	11:21:00	40	19/03/2020	11:18:00	1730	19/03/2020	11:18:00	25.3	12/03/2020	11:21:00	14470	12/03/2020	11:21:00	87	19/03/2020	11:18:00	2 - Clean	02/04/2020	09:11:00	Yes
			19/03/2020	11:18:00	12	19/03/2020	11:29:00	1730	19/03/2020	11:29:00	27.2	19/03/2020	11:18:00	14534	19/03/2020	11:18:00	87	19/03/2020	11:29:00	2 - Clean	23/04/2020	11:04:00	Yes
			19/03/2020	11:29:00	24.5	26/03/2020	08:55:00	1730	26/03/2020	08:55:00	14.1	19/03/2020	11:29:00	20970	19/03/2020	11:29:00	54	26/03/2020	08:55:00	2 - Clean	30/04/2020	09:59:00	Yes
			26/03/2020	08:55:00	40	02/04/2020	09:11:00	1730	02/04/2020	09:11:00	14.1	26/03/2020	08:55:00	14548	26/03/2020	08:55:00	87	02/04/2020	09:11:00	2 - Clean	14/05/2020	11:59:00	Yes
			02/04/2020	09:11:00	40	23/04/2020	11:04:00	1730	23/04/2020	11:04:00	14	02/04/2020	09:11:00	14548	02/04/2020	09:11:00	87	23/04/2020	11:04:00	2 - Clean	21/05/2020	15:45:00	Yes
			23/04/2020	11:04:00	40	30/04/2020	09:59:00	1730	30/04/2020	09:59:00	14.1	23/04/2020	11:04:00	14551	23/04/2020	11:04:00	90	30/04/2020	09:59:00	3 - No Action	25/05/2020	10:40:00	Yes
			30/04/2020	09:59:00	40	14/05/2020	11:59:00	1730	14/05/2020	11:59:00	14.1	30/04/2020	09:59:00	14552	30/04/2020	09:59:00	92	14/05/2020	11:59:00	2 - Clean	04/06/2020	11:16:00	Yes
			14/05/2020	11:59:00	40	21/05/2020	15:45:00	1730	21/05/2020	15:45:00	14.1	14/05/2020	11:59:00	14552	14/05/2020	11:59:00	92	21/05/2020	15:45:00	2 - Clean	11/06/2020	13:31:00	Yes
			21/05/2020	15:45:00	40	25/05/2020	10:40:00	1732	25/05/2020	10:40:00	24.3	21/05/2020	15:45:00	14556	21/05/2020	15:45:00	93	25/05/2020	10:40:00	3 - No Action	18/06/2020	15:20:00	Yes
			25/05/2020	10:40:00	12	04/06/2020	11:16:00	1734	04/06/2020	11:16:00	14.1	25/05/2020	10:40:00	14594	25/05/2020	10:40:00	93	04/06/2020	11:16:00	3 - No Action	29/06/2020	09:13:00	Yes
			04/06/2020	11:16:00	40	11/06/2020	13:31:00	1743	11/06/2020	13:31:00	14	04/06/2020	11:16:00	14629	04/06/2020	11:16:00	94	11/06/2020	13:31:00	2 - Clean	09/07/2020	13:06:00	Yes
			11/06/2020	13:31:00	40	18/06/2020	15:20:00	1734	18/06/2020	15:20:00	14.2	11/06/2020	13:31:00	14629	11/06/2020	13:31:00	94	18/06/2020	15:20:00	2 - Clean	16/07/2020	11:32:00	Yes
			18/06/2020	15:20:00	40	29/06/2020	08:58:00	1735	29/06/2020	08:58:00	24.3	18/06/2020	15:20:00	14629	18/06/2020	15:20:00	94	29/06/2020	08:58:00	2 - Clean	23/07/2020	11:44:00	Yes
			29/06/2020	08:58:00	13	09/07/2020	13:06:00	1737	09/07/2020	13:06:00	14.1	29/06/2020	08:58:00	14662	29/06/2020	08:58:00	94	09/07/2020	13:06:00	2 - Clean	28/07/2020	11:22:00	Yes
			09/07/2020	13:06:00	40	16/07/2020	11:32:00	1737	16/07/2020	11:32:00	14.1	09/07/2020	13:06:00	14695	09/07/2020	13:06:00	94	16/07/2020	11:32:00	3 - No Action	30/07/2020	11:27:00	Yes
			16/07/2020	11:32:00	40	23/07/2020	11:44:00	1737	23/07/2020	11:44:00	14.1	16/07/2020	11:32:00	14695	16/07/2020	11:32:00	94	23/07/2020	11:44:00	3 - No Action	06/08/2020	13:20:00	Yes
			23/07/2020	11:44:00	40	28/07/2020	11:22:00	1740	28/07/2020	11:22:00	25.2	23/07/2020	11:44:00	14695	23/07/2020	11:44:00	94.36	28/07/2020	11:22:00	2 - Clean	06/08/2020	13:28:00	Yes
			28/07/2020	11:22:00	12	30/07/2020	11:27:00	1740	30/07/2020	11:27:00	14.1	28/07/2020	11:22:00	14759	28/07/2020	11:22:00	94	30/07/2020	11:27:00	3 - No Action			
			30/07/2020	11:27:00	40	06/08/2020	13:20:00	1740	06/08/2020	13:20:00	14	30/07/2020	11:27:00	14766	30/07/2020	11:27:00	94	06/08/2020	13:20:00	2 - Clean			
			06/08/2020	13:20:00	40	06/08/2020	13:28:00	1740	06/08/2020	13:28:00	13.6	06/08/2020	13:20:00	14766	06/08/2020	13:20:00	94	06/08/2020	13:28:00	2 - Clean			
			06/08/2020	13:28:00	63							06/08/2020	13:28:00	21259	06/08/2020	13:28:00	54						

Data Powered by:

wateroutlook 

17/01/2019	13:05:00	Yes	23/08/2018	12:05:00	63	23/08/2018	12:05:00	571	30/08/2018	13:31:00	13.7	23/08/2018	12:05:00	16600	23/08/2018	12:05:00	45	23/08/2018	12:05:00	3 - No Action	04/10/2018	11:51:00	Yes
24/01/2019	11:08:00	Yes	30/08/2018	13:31:00	63.4	30/08/2018	13:31:00	573	06/09/2018	11:29:00	14	30/08/2018	13:31:00	16660.38	30/08/2018	13:31:00	47.09	30/08/2018	13:31:00	3 - No Action	11/10/2018	13:39:00	Yes
31/01/2019	11:57:00	Yes	06/09/2018	11:29:00	63	06/09/2018	11:29:00	573	13/09/2018	12:26:00	13.7	06/09/2018	11:29:00	16660	06/09/2018	11:29:00	47	06/09/2018	11:29:00	2 - Clean	18/10/2018	12:10:00	Yes
07/02/2019	11:35:00	Yes	13/09/2018	12:26:00	63	13/09/2018	12:26:00	573	20/09/2018	11:18:00	14	13/09/2018	12:26:00	16660	13/09/2018	12:26:00	47	13/09/2018	12:26:00	3 - No Action	25/10/2018	14:44:00	Yes
14/02/2019	14:32:00	Yes	20/09/2018	11:18:00	63.9	20/09/2018	11:18:00	573	24/09/2018	13:45:00	13.7	20/09/2018	11:18:00	16660	20/09/2018	11:18:00	47	20/09/2018	11:18:00	2 - Clean	02/11/2018	11:42:00	Yes
21/02/2019	13:14:00	Yes	24/09/2018	13:45:00	63.5	24/09/2018	13:45:00	573	04/10/2018	11:51:00	13	24/09/2018	13:45:00	16660	24/09/2018	13:45:00	47	24/09/2018	13:45:00	3 - No Action	08/11/2018	12:57:00	Yes
07/03/2019	13:19:00	Yes	04/10/2018	11:51:00	62	04/10/2018	11:51:00	575	11/10/2018	13:39:00	13.7	04/10/2018	11:51:00	16735	04/10/2018	11:51:00	48	04/10/2018	11:51:00	2 - Clean	15/11/2018	13:27:00	Yes
14/03/2019	12:05:00	Yes	11/10/2018	13:39:00	63	11/10/2018	13:39:00	575	18/10/2018	12:10:00	13.7	11/10/2018	13:39:00	16738	11/10/2018	13:39:00	48	11/10/2018	13:39:00	3 - No Action	22/11/2018	13:27:00	Yes
21/03/2019	13:26:00	Yes	18/10/2018	12:10:00	63	18/10/2018	12:10:00	575	25/10/2018	14:44:00	13.7	18/10/2018	12:10:00	16740	18/10/2018	12:10:00	53	18/10/2018	12:10:00	3 - No Action	29/11/2018	10:58:00	Yes
28/03/2019	09:57:00	Yes	25/10/2018	14:44:00	63.2	25/10/2018	14:44:00	575	02/11/2018	11:42:00	14	25/10/2018	14:44:00	16742	25/10/2018	14:44:00	50.2	25/10/2018	14:44:00	3 - No Action	06/12/2018	14:01:00	Yes
04/04/2019	14:01:00	Yes	02/11/2018	11:42:00	63	02/11/2018	11:42:00	577	08/11/2018	12:57:00	13.7	02/11/2018	11:42:00	16807	02/11/2018	11:42:00	51	02/11/2018	11:42:00	2 - Clean	13/12/2018	11:04:00	Yes
11/04/2019	14:22:00	Yes	08/11/2018	12:57:00	63	08/11/2018	12:57:00	577	15/11/2018	12:27:00	13.7	08/11/2018	12:57:00	16809	08/11/2018	12:57:00	51	08/11/2018	12:57:00	3 - No Action	20/12/2018	14:56:00	Yes
18/04/2019	12:59:00	Yes	15/11/2018	12:27:00	63	15/11/2018	12:27:00	577	22/11/2018	13:27:00	13.7	15/11/2018	12:27:00	16810	15/11/2018	12:27:00	52	15/11/2018	12:27:00	2 - Clean	04/01/2019	11:51:00	Yes
18/04/2019	13:00:00	Yes	22/11/2018	13:27:00	62.9	22/11/2018	13:27:00	577	29/11/2018	10:58:00	13.7	22/11/2018	13:27:00	16812	22/11/2018	13:27:00	53.07	22/11/2018	13:27:00	3 - No Action	10/01/2019	11:29:00	Yes
30/04/2019	10:57:00	Yes	29/11/2018	10:58:00	63	29/11/2018	10:58:00	579	06/12/2018	14:01:00	13.7	29/11/2018	10:58:00	16859	29/11/2018	10:58:00	53	29/11/2018	10:58:00	2 - Clean	10/01/2019	11:30:00	Yes
09/05/2019	13:37:00	Yes	06/12/2018	14:01:00	63	06/12/2018	14:01:00	579	13/12/2018	11:04:00	13.7	06/12/2018	14:01:00	16860	06/12/2018	14:01:00	54	06/12/2018	14:01:00	3 - No Action	17/01/2019	13:05:00	Yes
23/05/2019	14:40:00	Yes	13/12/2018	11:04:00	63	13/12/2018	11:04:00	579	20/12/2018	14:56:00	13.7	13/12/2018	11:04:00	16861	13/12/2018	11:04:00	54	13/12/2018	11:04:00	2 - Clean	24/01/2019	11:08:00	Yes
30/05/2019	11:38:00	Yes	20/12/2018	14:56:00	62.7	20/12/2018	14:56:00	583	27/12/2018	11:47:00	13.7	20/12/2018	14:56:00	16984	20/12/2018	14:56:00	54	20/12/2018	14:56:00	3 - No Action	31/01/2019	11:57:00	Yes
06/06/2019	13:44:00	Yes	27/12/2018	11:47:00	62	27/12/2018	11:47:00	585	04/01/2019	11:51:00	13.7	27/12/2018	11:47:00	17048	27/12/2018	11:47:00	54	27/12/2018	11:47:00	2 - Clean	07/02/2019	11:35:00	Yes
25/07/2019	11:58:00	Yes	04/01/2019	11:51:00	62.7	04/01/2019	11:51:00	585	10/01/2019	11:29:00	13.7	04/01/2019	11:51:00	17048	04/01/2019	11:51:00	54	04/01/2019	11:51:00	1 - Change	14/02/2019	14:32:00	Yes
27/06/2019	14:09:00	Yes	10/01/2019	11:29:00	62	10/01/2019	11:29:00	585	10/01/2019	11:30:00	13	10/01/2019	11:29:00	17048	10/01/2019	11:29:00	54	10/01/2019	11:29:00	2 - Clean	21/02/2019	13:14:00	Yes
04/07/2019	11:21:00	Yes	10/01/2019	11:30:00	43	10/01/2019	11:30:00	454	17/01/2019	13:05:00	13.7	10/01/2019	11:30:00	17048	10/01/2019	11:30:00	9	10/01/2019	11:30:00	2 - Clean	07/03/2019	13:19:00	Yes
11/07/2019	15:07:00	Yes	17/01/2019	13:05:00	62.9	17/01/2019	13:05:00	585	24/01/2019	11:08:00	13.7	17/01/2019	13:05:00	17048	17/01/2019	13:05:00	54	17/01/2019	13:05:00	3 - No Action	14/03/2019	12:05:00	Yes
18/07/2019	14:07:00	Yes	24/01/2019	11:08:00	63	24/01/2019	11:08:00	585	31/01/2019	11:57:00	13.7	24/01/2019	11:08:00	17048	24/01/2019	11:08:00	54	24/01/2019	11:08:00	3 - No Action	28/03/2019	09:52:00	Yes
25/07/2019	11:14:00	Yes	31/01/2019	11:57:00	62.2	31/01/2019	11:57:00	587	07/02/2019	14:32:00	13.7	31/01/2019	11:57:00	17101	31/01/2019	11:57:00	54	31/01/2019	11:57:00	1 - Change	04/04/2019	14:38:00	Yes
01/08/2019	15:40:00	Yes	07/02/2019	11:35:00	62.5	07/02/2019	11:35:00	587	14/02/2019	14:32:00	13.6	07/02/2019	11:35:00	17106	07/02/2019	11:35:00	54	07/02/2019	11:35:00	3 - No Action	11/04/2019	14:22:00	Yes
08/08/2019	12:11:00	Yes	14/02/2019	14:32:00	62.8	14/02/2019	14:32:00	587	21/02/2019	13:14:00	13.8	14/02/2019	14:32:00	17106	14/02/2019	14:32:00	54	14/02/2019	14:32:00	2 - Clean	18/04/2019	12:59:00	Yes
15/08/2019	14:38:00	Yes	21/02/2019	13:14:00	57.3	21/02/2019	13:14:00	614	07/03/2019	13:19:00	13.7	21/02/2019	13:14:00	17707	21/02/2019	13:14:00	54	21/02/2019	13:14:00	3 - No Action	18/04/2019	13:00:00	Yes
22/08/2019	11:30:00	Yes	07/03/2019	13:19:00	61.8	07/03/2019	13:19:00	624	14/03/2019	12:05:00	13.7	07/03/2019	13:19:00	17958	07/03/2019	13:19:00	54	07/03/2019	13:19:00	2 - Clean	30/04/2019	10:08:00	Yes
29/08/2019	11:58:00	Yes	14/03/2019	12:05:00	61.9	14/03/2019	12:05:00	624	21/03/2019	13:38:00	27.4	14/03/2019	12:05:00	17958	21/03/2019	13:38:00	54.48	21/03/2019	13:38:00	3 - No Action	06/05/2019	13:37:00	Yes
05/09/2019	12:18:00	Yes	21/03/2019	13:38:00	61.9	21/03/2019	13:38:00	624	28/03/2019	09:52:00	13.7	21/03/2019	13:38:00	18602	28/03/2019	09:52:00	54	28/03/2019	09:52:00	3 - No Action	30/05/2019	11:38:00	Yes
12/09/2019	15:04:00	Yes	28/03/2019	09:52:00	22.4	28/03/2019	09:52:00	648	04/04/2019	14:01:00	13.7	28/03/2019	09:52:00	18602	04/04/2019	14:01:00	54.48	04/04/2019	14:01:00	2 - Clean	06/06/2019	13:44:00	Yes
19/09/2019	13:26:00	Yes	04/04/2019	14:01:00	60	04/04/2019	14:01:00	694	11/04/2019	14:22:00	13.7	04/04/2019	14:01:00	19907	11/04/2019	14:22:00	0	11/04/2019	14:22:00	2 - Clean	13/06/2019	10:57:00	Yes
27/09/2019	13:06:00	Yes	11/04/2019	14:22:00	61.7	11/04/2019	14:22:00	694	18/04/2019	12:59:00	13.7	11/04/2019	14:22:00	19907	11/04/2019	14:22:00	0	18/04/2019	12:59:00	2 - Clean	04/07/2019	11:21:00	Yes
04/10/2019	13:47:00	Yes	18/04/2019	12:59:00	61.8	18/04/2019	12:59:00	694	25/04/2019	13:00:00	13.6	18/04/2019	12:59:00	19907	25/04/2019	13:00:00	0	25/04/2019	13:00:00	2 - Clean	11/07/2019	15:07:00	Yes
08/10/2019	15:12:00	Yes	25/04/2019	13:00:00	42.8	18/04/2019	13:00:00	463	30/04/2019	10:08:00	27.4	18/04/2019	13:00:00	42129	18/04/2019	13:00:00	0	30/04/2019	10:08:00	2 - Clean	11/07/2019	15:07:00	Yes
17/10/2019	12:28:00	Yes	30/04/2019	10:08:00	24	30/04/2019	10:08:00	696	09/05/2019	13:37:00	13.7	30/04/2019	10:08:00	19960	30/04/2019	10:08:00	54	30/04/2019	10:08:00	3 - No Action	18/07/2019	14:07:00	Yes
23/10/2019	10:36:00	Yes	09/05/2019	13:37:00	62	09/05/2019	13:37:00	696	23/05/2019	14:40:00	13.7	09/05/2019	13:37:00	19965	09/05/2019	13:37:00	54	09/05/2019	13:37:00	2 - Clean	25/07/2019	11:14:00	Yes
31/10/2019	11:55:00	Yes	23/05/2019	14:40:00	62	23/05/2019	14:40:00	696	30/05/2019	11:38:00	13.7	23/05/2019	14:40:00	19965	23/05/2019	14:40:00	54	23/05/2019	14:40:00	3 - No Action	01/08/2019	15:40:00	Yes
07/11/2019	11:38:00	Yes	30/05/2019	11:38:00	61	30/05/2019	11:38:00	696	06/06/2019	13:44:00	13.7	30/05/2019	11:38:00	19965	06/06/2019	13:44:00	54	30/05/2019	11:38:00	2 - Clean	08/08/2019	12:11:00	Yes
14/11/2019	13:16:00	Yes	06/06/2019	13:44:00	701	06/06/2019	13:44:00	701	13/06/2019	10:57:00	13.6	06/06/2019	13:44:00	20118	06/06/2019	13:44:00	54	06/06/2019	13:44:00	2 - Clean	15/08/2019	14:38:00	Yes
14/11/2019	13:23:00	Yes	13/06/2019	10:57:00	62	13/06/2019	10:57:00	701	27/06/2019	14:09:00	13.7	13/06/2019	10:57:00	20118	13/06/2019	10:57:00	54	13/06/2019	10:57:00	2 - Clean	22/08/2019	11:30:00	Yes
21/11/2019	14:15:00	Yes	27/0																				

Data Powered by:

14/02/2019	14:49:00	Yes	23/08/2018	12:20:00	43	23/08/2018	12:20:00	433	30/08/2018	10:52:00	13.1	23/08/2018	12:20:00	39111	23/08/2018	12:20:00	9.37	30/08/2018	10:52:00	3 - No Actio	24/09/2018	14:15:00	Yes
21/02/2019	13:51:00	Yes	30/08/2018	10:52:00	43.6	30/08/2018	10:52:00	435	06/09/2018	11:54:00	13	30/08/2018	10:52:00	39343	30/08/2018	10:52:00	9.38	06/09/2018	11:54:00	2 - Clean	04/10/2018	13:05:00	Yes
07/03/2019	13:37:00	Yes	06/09/2018	11:54:00	43.5	06/09/2018	11:54:00	435	13/09/2018	12:51:00	13	06/09/2018	11:54:00	39343	06/09/2018	11:54:00	9.38	13/09/2018	12:51:00	3 - No Actio	11/10/2018	13:59:00	Yes
14/03/2019	12:28:00	Yes	13/09/2018	12:51:00	43	13/09/2018	12:51:00	435	20/09/2018	11:23:00	13	13/09/2018	12:51:00	39343	13/09/2018	12:51:00	9	20/09/2018	11:23:00	2 - Clean	18/10/2018	07:50:00	Yes
21/03/2019	14:02:00	Yes	20/09/2018	11:23:00	43.5	20/09/2018	11:23:00	435	24/09/2018	14:15:00	13	20/09/2018	11:23:00	39343	20/09/2018	11:23:00	9	24/09/2018	14:15:00	3 - No Actio	25/10/2018	14:20:00	Yes
28/03/2019	08:07:00	Yes	24/09/2018	14:15:00	43.4	24/09/2018	14:15:00	435	04/10/2018	13:05:00	13	24/09/2018	14:15:00	39343	24/09/2018	14:15:00	9	04/10/2018	13:05:00	2 - Clean	02/11/2018	13:03:00	Yes
04/04/2019	14:48:00	Yes	13/10/2018	13:05:00	43.4	04/10/2018	13:05:00	444	11/10/2018	13:59:00	13	04/10/2018	13:05:00	40034	04/10/2018	13:05:00	9.38	11/10/2018	13:59:00	3 - No Actio	08/11/2018	13:42:00	Yes
11/04/2019	13:51:00	Yes	11/10/2018	13:59:00	43	11/10/2018	13:59:00	444	18/10/2018	07:50:00	13	11/10/2018	13:59:00	40041	11/10/2018	13:59:00	9	18/10/2018	07:50:00	3 - No Actio	15/11/2018	12:46:00	Yes
24/04/2019	14:02:00	Yes	07/10/2018	13:59:00	43	07/10/2018	13:59:00	444	25/10/2018	14:20:00	13	07/10/2018	13:59:00	40057	25/10/2018	14:20:00	9.38	25/10/2018	14:20:00	2 - Clean	29/11/2018	11:21:00	Yes
30/04/2019	08:43:00	Yes	25/10/2018	14:20:00	43.3	25/10/2018	14:20:00	444	02/11/2018	13:03:00	13	25/10/2018	14:20:00	40057	25/10/2018	14:20:00	9.38	02/11/2018	13:03:00	2 - Clean	29/11/2018	11:21:00	Yes
09/05/2019	14:10:00	Yes	02/11/2018	13:03:00	43	02/11/2018	13:03:00	446	08/11/2018	13:42:00	13	02/11/2018	13:03:00	40255	02/11/2018	13:03:00	9	08/11/2018	13:42:00	3 - No Actio	06/12/2018	14:22:00	Yes
16/05/2019	11:37:00	Yes	08/11/2018	13:42:00	43	08/11/2018	13:42:00	446	15/11/2018	12:46:00	13	08/11/2018	13:42:00	40255	08/11/2018	13:42:00	9	15/11/2018	12:46:00	2 - Clean	20/12/2018	14:11:00	Yes
23/05/2019	15:25:00	Yes	15/11/2018	12:46:00	43.3	15/11/2018	12:46:00	446	22/11/2018	13:49:00	13	15/11/2018	12:46:00	40256	15/11/2018	12:46:00	9	22/11/2018	13:49:00	3 - No Actio	04/01/2019	12:41:00	Yes
30/05/2019	13:20:00	Yes	22/11/2018	13:49:00	43.3	22/11/2018	13:49:00	446	29/11/2018	14:22:00	13	22/11/2018	13:49:00	40257	22/11/2018	13:49:00	9.38	29/11/2018	14:22:00	2 - Clean	17/01/2019	12:05:00	Yes
06/06/2019	14:05:00	Yes	29/11/2018	11:21:00	43	29/11/2018	11:21:00	447	06/12/2018	14:22:00	13	29/11/2018	11:21:00	40402	29/11/2018	11:21:00	9	06/12/2018	14:22:00	3 - No Actio	24/01/2019	11:26:00	Yes
13/06/2019	11:23:00	Yes	06/12/2018	14:22:00	43	06/12/2018	14:22:00	448	13/12/2018	10:38:00	13	06/12/2018	14:22:00	40403	06/12/2018	14:22:00	9	13/12/2018	10:38:00	2 - Clean	31/01/2019	14:05:00	Yes
20/06/2019	14:30:00	Yes	13/12/2018	10:38:00	43	13/12/2018	10:38:00	447	20/12/2018	14:11:00	13	13/12/2018	10:38:00	40404	13/12/2018	10:38:00	9	20/12/2018	14:11:00	3 - No Actio	07/02/2019	11:54:00	Yes
27/06/2019	14:44:00	Yes	20/12/2018	14:11:00	43.1	20/12/2018	14:11:00	452	27/12/2018	12:06:00	13	20/12/2018	14:11:00	40843	20/12/2018	14:11:00	9	27/12/2018	12:06:00	2 - Clean	14/02/2019	14:49:00	Yes
27/06/2019	11:42:00	Yes	27/12/2018	12:06:00	454	04/01/2019	12:41:00	454	04/01/2019	12:41:00	13	27/12/2018	12:06:00	41030	27/12/2018	12:06:00	9	04/01/2019	12:41:00	1 - Change	21/02/2019	13:51:00	Yes
11/07/2019	15:28:00	Yes	04/01/2019	12:41:00	43.1	04/01/2019	12:41:00	454	17/01/2019	12:05:00	13	04/01/2019	12:41:00	41030	04/01/2019	12:41:00	9	17/01/2019	12:05:00	2 - Clean	07/03/2019	13:37:00	Yes
18/07/2019	11:15:00	Yes	17/01/2019	12:05:00	43.1	17/01/2019	12:05:00	454	24/01/2019	11:26:00	13	17/01/2019	12:05:00	41071	17/01/2019	12:05:00	9	24/01/2019	11:26:00	3 - No Actio	14/03/2019	12:28:00	Yes
25/07/2019	12:49:00	Yes	24/01/2019	11:26:00	43	24/01/2019	11:26:00	454	31/01/2019	14:05:00	13.1	24/01/2019	11:26:00	41133	24/01/2019	11:26:00	9.75	31/01/2019	14:05:00	2 - Clean	28/03/2019	08:07:00	Yes
01/08/2019	14:51:00	Yes	31/01/2019	14:05:00	42	31/01/2019	14:05:00	456	07/02/2019	11:54:00	13	31/01/2019	14:05:00	41366	31/01/2019	14:05:00	9	07/02/2019	11:54:00	3 - No Actio	04/04/2019	14:48:00	Yes
08/08/2019	13:08:00	Yes	07/02/2019	11:54:00	42.8	07/02/2019	11:54:00	456	14/02/2019	14:49:00	13	07/02/2019	11:54:00	41408	07/02/2019	11:54:00	9	14/02/2019	14:49:00	2 - Clean	11/04/2019	13:51:00	Yes
15/08/2019	14:53:00	Yes	14/02/2019	14:49:00	42.8	14/02/2019	14:49:00	456	21/02/2019	13:51:00	13.1	14/02/2019	14:49:00	41408	21/02/2019	13:51:00	9	21/02/2019	13:51:00	3 - No Actio	04/04/2019	13:08:00	Yes
22/08/2019	11:55:00	Yes	21/02/2019	13:51:00	42.6	21/02/2019	13:51:00	458	07/03/2019	13:37:00	13	21/02/2019	13:51:00	41670	21/02/2019	13:51:00	9	07/03/2019	13:37:00	2 - Clean	30/04/2019	08:43:00	Yes
29/08/2019	13:59:00	Yes	07/03/2019	13:37:00	42.7	07/03/2019	13:37:00	461	14/03/2019	12:28:00	13	07/03/2019	13:37:00	41913	07/03/2019	13:37:00	9	14/03/2019	12:28:00	3 - No Actio	09/05/2019	14:10:00	Yes
05/09/2019	12:50:00	Yes	14/03/2019	12:28:00	42.7	14/03/2019	12:28:00	461	21/03/2019	14:02:00	13	14/03/2019	12:28:00	41913	14/03/2019	12:28:00	9	21/03/2019	14:02:00	2 - Clean	16/05/2019	11:37:00	Yes
10/09/2019	13:14:00	Yes	21/03/2019	14:02:00	42.7	21/03/2019	14:02:00	461	28/03/2019	08:07:00	27.7	21/03/2019	14:02:00	41913	21/03/2019	14:02:00	9.95	28/03/2019	08:07:00	3 - No Actio	23/05/2019	15:25:00	Yes
13/09/2019	13:48:00	Yes	28/03/2019	08:07:00	42.7	28/03/2019	08:07:00	461	04/04/2019	13:51:00	13	28/03/2019	08:07:00	41913	28/03/2019	08:07:00	9	04/04/2019	13:51:00	2 - Clean	08/06/2019	13:25:00	Yes
27/09/2019	11:58:00	Yes	04/04/2019	13:51:00	42.8	04/04/2019	13:51:00	463	11/04/2019	14:08:00	13	04/04/2019	13:51:00	42128	11/04/2019	13:51:00	9.95	11/04/2019	14:08:00	2 - Clean	08/06/2019	14:05:00	Yes
01/10/2019	14:06:00	Yes	11/04/2019	13:51:00	42.8	11/04/2019	13:51:00	463	18/04/2019	14:08:00	27.7	11/04/2019	14:08:00	42128	11/04/2019	13:51:00	9	18/04/2019	14:08:00	2 - Clean	13/06/2019	11:23:00	Yes
08/10/2019	14:24:00	Yes	24/04/2019	14:08:00	463	30/04/2019	08:43:00	463	30/04/2019	08:43:00	13	24/04/2019	14:08:00	42128	24/04/2019	14:08:00	9	30/04/2019	08:43:00	3 - No Actio	20/06/2019	14:30:00	Yes
17/10/2019	13:01:00	Yes	30/04/2019	08:43:00	37.9	30/04/2019	08:43:00	465	09/05/2019	14:10:00	13	30/04/2019	08:43:00	42166	30/04/2019	08:43:00	9	09/05/2019	14:10:00	2 - Clean	27/06/2019	14:44:00	Yes
23/10/2019	11:05:00	Yes	09/05/2019	14:10:00	42.9	09/05/2019	14:10:00	465	16/05/2019	13:37:00	13	09/05/2019	14:10:00	42308	16/05/2019	13:37:00	9	16/05/2019	13:37:00	2 - Clean	08/07/2019	11:42:00	Yes
31/10/2019	13:36:00	Yes	16/05/2019	13:37:00	43	16/05/2019	13:37:00	465	23/05/2019	15:25:00	13	16/05/2019	13:37:00	42308	16/05/2019	13:37:00	9.95	23/05/2019	15:25:00	3 - No Actio	11/07/2019	15:28:00	Yes
07/11/2019	13:05:00	Yes	23/05/2019	15:25:00	465	30/05/2019	13:20:00	465	30/05/2019	13:20:00	13.1	23/05/2019	15:25:00	42308	23/05/2019	15:25:00	9	30/05/2019	13:20:00	2 - Clean	18/07/2019	11:15:00	Yes
21/11/2019	14:45:00	Yes	30/05/2019	13:20:00	42	30/05/2019	13:20:00	470	06/06/2019	14:05:00	13	30/05/2019	13:20:00	42785	30/05/2019	13:20:00	9.95	06/06/2019	14:05:00	2 - Clean	25/07/2019	12:49:00	Yes
28/11/2019	12:04:00	Yes	06/06/2019	14:05:00	43	06/06/2019	14:05:00	470	13/06/2019	11:23:00	13	06/06/2019	14:05:00	42785	06/06/2019	14:05:00	9.95	13/06/2019	11:23:00	2 - Clean	01/08/2019	14:51:00	Yes
05/12/2019	14:29:00	Yes	13/06/2019	11:23:00	42.8	13/06/2019	11:23:00	470	20/06/2019	14:44:00	13	13/06/2019	11:23:00	42785	13/06/2019	11:23:00	9	20/06/2019	14:44:00	2 - Clean	08/08/2019	13:08:00	Yes
12/12/2019	13:15:00	Yes	20/06/2019	14:44:00	43	20/06/2019	14:44:00	470	27/06/2019	11:42:00	13	20/06/2019	14:44:00	42785	20/06/2019	14:44:00	9.98	27/06/2019	11:42:00	2 - Clean	15/08/2019	14:53:00	Yes
19/12/2019	05:59:00	Yes	27/06/2019	11:42:00	43	27/06/2019	11:42:00	470	04/07/2019	11:42:00	13	27/06/2019	11:42:00	42785	27/06/2019	11:42:00	9.95	04/07/2019	11:42:00	2 - Clean	22/08/2019	11:55:00	Yes
09/01/2020	14:29:00	Yes	04/07/2019	11:42:00	47																		



Appendix D

Bore Water Quality Sampling Results

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

Analytical Report

Report Number: 19/68956

Issue: 01-1
27 December 2019

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
19/68956-01	Kapiti Coast District Council - Supplementary Bore		19/12/2019 07:15	20/12/2019 09:30	334779
Notes: Supplementary Bore K4 - 195500					
Test	Result	Units	Test Date	Signatory	
0001 pH	7.6		20/12/2019	Jennifer Mont KTP	
0040 Total (NP) Organic Carbon	0.9	g/m ³	21/12/2019	Sharon van Soest KTP	
0052 Alkalinity - Total	103	g CaCO ₃ /m ³	20/12/2019	Jennifer Mont KTP	
0055 Conductivity at 25°C	52.7	mS/m	20/12/2019	Jennifer Mont KTP	
0055B Total Dissolved Solids	290	g/m ³	21/12/2019	Jennifer Mont KTP	
0062 Sulphide - Total	< 0.2	g/m ³	20/12/2019	Gordon McArthur KTP	
0073 Bicarbonate	102	g CaCO ₃ /m ³	21/12/2019	Marylou Cabral .	
0076 Free CO ₂	5	g CO ₂ /m ³	21/12/2019	Marylou Cabral .	
0590 Anion Sum	4.32	meq/L	24/12/2019	Divina Lagazon KTP	
0591 Cation Sum	5.51	meq/L	23/12/2019	Amit Kumar KTP	
0592 Ion Balance	12.1	%	24/12/2019	Divina Lagazon KTP	
0601 Fluoride	0.18	g/m ³	20/12/2019	Amit Kumar KTP	
0602 Chloride	82.3	g/m ³	20/12/2019	Amit Kumar KTP	
0603 Nitrite - Nitrogen	< 0.01	g/m ³	20/12/2019	Amit Kumar KTP	
0604 Bromide	0.27	g/m ³	20/12/2019	Amit Kumar KTP	
0605 Nitrate - Nitrogen	< 0.01	g/m ³	20/12/2019	Amit Kumar KTP	
0607 Sulphate	15.1	g/m ³	20/12/2019	Amit Kumar KTP	
0680 Hydrogen Sulphide	< 0.05	g/m ³	20/12/2019	Gordon McArthur .	
0725 Cyanide	< 0.005	g/m ³	23/12/2019	Divina Lagazon KTP	
0760 Ammonia Nitrogen	0.02	g/m ³	21/12/2019	Divina Lagazon KTP	
1642 Total Hardness	29	g CaCO ₃ /m ³	20/12/2019	Shuyu Zhao KTP	
1806 Boron - Dissolved	0.108	g/m ³	20/12/2019	Shuyu Zhao KTP	
1810 Calcium - Dissolved	4.08	g/m ³	20/12/2019	Shuyu Zhao KTP	
1819 Iron - Dissolved	0.008	g/m ³	20/12/2019	Shuyu Zhao KTP	
1822 Magnesium - Dissolved	4.57	g/m ³	20/12/2019	Shuyu Zhao KTP	
1823 Manganese - Dissolved	0.148	g/m ³	20/12/2019	Shuyu Zhao KTP	
1829 Potassium - Dissolved	2.03	g/m ³	20/12/2019	Shuyu Zhao KTP	
1834 Sodium - Dissolved	112	g/m ³	20/12/2019	Shuyu Zhao KTP	
2080 Total Phosphorus	0.098	g/m ³	24/12/2019	Divina Lagazon KTP	
2088 Dissolved Reactive Phosphorus	0.100	g/m ³	21/12/2019	Divina Lagazon KTP	
2127 Total Nitrogen	< 0.05	g/m ³	24/12/2019	Divina Lagazon KTP	
6022 Mercury - Acid Soluble	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6703 Arsenic - Dissolved	< 0.001	g/m ³	20/12/2019	Sharon van Soest KTP	
6708 Cadmium - Dissolved	< 0.0002	g/m ³	20/12/2019	Sharon van Soest KTP	
6711 Chromium - Dissolved	< 0.001	g/m ³	20/12/2019	Sharon van Soest KTP	
6713 Copper - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6718 Lead - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6724 Nickel - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6730 Silver - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6738 Zinc - Dissolved	< 0.002	g/m ³	20/12/2019	Sharon van Soest KTP	
O1311 Temperature	14.6	Deg C	20/12/2019	Gordon McArthur Transcribed by	
P1859 Sample Filtration	Completed		20/12/2019	Daniel Fitzpatrick	

Comments:

Sampled by customer using ELS approved containers.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500 H.	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 CaCO ₃ /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 CaCO ₃ /m³
Free CO ₂	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 CO ₂ /m³
Anion Sum	Calculation of the anion sum in milliequivalents per litre. Tests used are Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in milliequivalents per litre. Tests used are Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculation 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 NH ₃ -H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO ₃ /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 follows APHA Online Edition 4500-P B.	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-NO ₃ I. Persulphate digestion follows APHA Online Edition 4500-N C.	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

Test	Methodology	Detection Limit
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.

"<" 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.

g/m3 is the equivalent to mg/L and 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 IANZ", which are outside the scope of this laboratory's accreditation.

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Page 3 of 3
Report Number: 19/68956-01-1 ELS
27 December 2019 19:50:10

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

Analytical Report

Report Number: 19/68956

Issue: 02-1
27 December 2019

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
19/68956-02	Kapiti Coast District Council - Supplementary Bore		19/12/2019 07:30	20/12/2019 09:30	334779
Notes: Supplementary Bore K5- 195501					
Test	Result	Units	Test Date	Signatory	
0001 pH	8.1		20/12/2019	Jennifer Mont KTP	
0040 Total (NP) Organic Carbon	0.6	g/m ³	21/12/2019	Sharon van Soest KTP	
0052 Alkalinity - Total	222	g CaCO ₃ /m ³	20/12/2019	Jennifer Mont KTP	
0055 Conductivity at 25°C	108	mS/m	20/12/2019	Jennifer Mont KTP	
0055B Total Dissolved Solids	595	g/m ³	21/12/2019	Jennifer Mont KTP	
0062 Sulphide - Total	< 0.2	g/m ³	20/12/2019	Gordon McArthur KTP	
0073 Bicarbonate	219	g CaCO ₃ /m ³	21/12/2019	Marylou Cabral .	
0076 Free CO ₂	3	g CO ₂ /m ³	21/12/2019	Marylou Cabral .	
0590 Anion Sum	9.03	meq/L	24/12/2019	Divina Lagazon KTP	
0591 Cation Sum	10.8	meq/L	23/12/2019	Amit Kumar KTP	
0592 Ion Balance	8.86	%	24/12/2019	Divina Lagazon KTP	
0601 Fluoride	0.05	g/m ³	20/12/2019	Amit Kumar KTP	
0602 Chloride	191	g/m ³	20/12/2019	Amit Kumar KTP	
0603 Nitrite - Nitrogen	< 0.01	g/m ³	24/12/2019	Amit Kumar KTP	
0604 Bromide	0.69	g/m ³	20/12/2019	Amit Kumar KTP	
0605 Nitrate - Nitrogen	< 0.01	g/m ³	20/12/2019	Amit Kumar KTP	
0607 Sulphate	0.42	g/m ³	20/12/2019	Amit Kumar KTP	
0680 Hydrogen Sulphide	< 0.05	g/m ³	20/12/2019	Gordon McArthur .	
0725 Cyanide	< 0.005	g/m ³	23/12/2019	Divina Lagazon KTP	
0760 Ammonia Nitrogen	0.33	g/m ³	21/12/2019	Divina Lagazon KTP	
1642 Total Hardness	135	g CaCO ₃ /m ³	20/12/2019	Shuyu Zhao KTP	
1806 Boron - Dissolved	0.473	g/m ³	20/12/2019	Shuyu Zhao KTP	
1810 Calcium - Dissolved	31.2	g/m ³	20/12/2019	Shuyu Zhao KTP	
1819 Iron - Dissolved	0.006	g/m ³	20/12/2019	Shuyu Zhao KTP	
1822 Magnesium - Dissolved	13.8	g/m ³	20/12/2019	Shuyu Zhao KTP	
1823 Manganese - Dissolved	0.071	g/m ³	20/12/2019	Shuyu Zhao KTP	
1829 Potassium - Dissolved	8.05	g/m ³	20/12/2019	Shuyu Zhao KTP	
1834 Sodium - Dissolved	181	g/m ³	20/12/2019	Shuyu Zhao KTP	
2080 Total Phosphorus	0.124	g/m ³	24/12/2019	Divina Lagazon KTP	
2088 Dissolved Reactive Phosphorus	0.110	g/m ³	21/12/2019	Divina Lagazon KTP	
2127 Total Nitrogen	0.33	g/m ³	24/12/2019	Divina Lagazon KTP	
6022 Mercury - Acid Soluble	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6703 Arsenic - Dissolved	0.001	g/m ³	20/12/2019	Sharon van Soest KTP	
6708 Cadmium - Dissolved	< 0.0002	g/m ³	20/12/2019	Sharon van Soest KTP	
6711 Chromium - Dissolved	< 0.001	g/m ³	20/12/2019	Sharon van Soest KTP	
6713 Copper - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6718 Lead - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6724 Nickel - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6730 Silver - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6738 Zinc - Dissolved	< 0.002	g/m ³	20/12/2019	Sharon van Soest KTP	
O1311 Temperature	15.3	Deg C	20/12/2019	Gordon McArthur Transcribed by	
P1859 Sample Filtration	Completed		20/12/2019	Daniel Fitzpatrick	

Comments:

Sampled by customer using ELS approved containers.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500 H.	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 CaCO ₃ /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 CaCO ₃ /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 CO ₂ /m³
Anion Sum	Calculation of the anion sum in milliequivalents per litre. Tests used are Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in milliequivalents per litre. Tests used are Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculation 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 NH ₃ -H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO ₃ /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 follows APHA Online Edition 4500-P B.	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-NO ₃ I. Persulphate digestion follows APHA Online Edition 4500-N C.	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

Test	Methodology	Detection Limit
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m ³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m ³
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.

"<" 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.

g/m³ is the equivalent to mg/L and ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

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 IANZ", which are outside the scope of this laboratory's accreditation.

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Report Released By
Rob Deacon

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

Analytical Report

Report Number: 19/68956

Issue: 03-1

27 December 2019

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
19/68956-03	Kapiti Coast District Council - Supplementary Bore		19/12/2019 07:47	20/12/2019 09:30	334779
Notes: Supplementary Bore K6- 195502					
Test	Result	Units	Test Date	Signatory	
0001 pH	7.9		20/12/2019	Jennifer Mont KTP	
0040 Total (NP) Organic Carbon	0.4	g/m ³	21/12/2019	Sharon van Soest KTP	
0052 Alkalinity - Total	267	g CaCO ₃ /m ³	20/12/2019	Jennifer Mont KTP	
0055 Conductivity at 25°C	113	mS/m	20/12/2019	Jennifer Mont KTP	
0055B Total Dissolved Solids	619	g/m ³	21/12/2019	Jennifer Mont KTP	
0062 Sulphide - Total	< 0.2	g/m ³	20/12/2019	Gordon McArthur KTP	
0073 Bicarbonate	265	g CaCO ₃ /m ³	21/12/2019	Marylou Cabral .	
0076 Free CO ₂	7	g CO ₂ /m ³	21/12/2019	Marylou Cabral .	
0590 Anion Sum	9.74	meq/L	24/12/2019	Divina Lagazon KTP	
0591 Cation Sum	11.6	meq/L	23/12/2019	Amit Kumar KTP	
0592 Ion Balance	8.75	%	24/12/2019	Divina Lagazon KTP	
0601 Fluoride	0.03	g/m ³	20/12/2019	Amit Kumar KTP	
0602 Chloride	181	g/m ³	20/12/2019	Amit Kumar KTP	
0603 Nitrite - Nitrogen	< 0.01	g/m ³	24/12/2019	Amit Kumar KTP	
0604 Bromide	0.69	g/m ³	20/12/2019	Amit Kumar KTP	
0605 Nitrate - Nitrogen	3.11	g/m ³	20/12/2019	Amit Kumar KTP	
0607 Sulphate	0.38	g/m ³	20/12/2019	Amit Kumar KTP	
0680 Hydrogen Sulphide	< 0.05	g/m ³	20/12/2019	Gordon McArthur .	
0725 Cyanide	< 0.005	g/m ³	23/12/2019	Divina Lagazon KTP	
0760 Ammonia Nitrogen	0.48	g/m ³	21/12/2019	Divina Lagazon KTP	
1642 Total Hardness	154	g CaCO ₃ /m ³	20/12/2019	Shuyu Zhao KTP	
1806 Boron - Dissolved	0.724	g/m ³	20/12/2019	Shuyu Zhao KTP	
1810 Calcium - Dissolved	34.3	g/m ³	20/12/2019	Shuyu Zhao KTP	
1819 Iron - Dissolved	< 0.005	g/m ³	20/12/2019	Shuyu Zhao KTP	
1822 Magnesium - Dissolved	16.6	g/m ³	20/12/2019	Shuyu Zhao KTP	
1823 Manganese - Dissolved	0.083	g/m ³	20/12/2019	Shuyu Zhao KTP	
1829 Potassium - Dissolved	11.3	g/m ³	20/12/2019	Shuyu Zhao KTP	
1834 Sodium - Dissolved	189	g/m ³	20/12/2019	Shuyu Zhao KTP	
2080 Total Phosphorus	0.069	g/m ³	24/12/2019	Divina Lagazon KTP	
2088 Dissolved Reactive Phosphorus	0.062	g/m ³	21/12/2019	Divina Lagazon KTP	
2127 Total Nitrogen	0.47	g/m ³	24/12/2019	Divina Lagazon KTP	
6022 Mercury - Acid Soluble	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6703 Arsenic - Dissolved	< 0.001	g/m ³	20/12/2019	Sharon van Soest KTP	
6708 Cadmium - Dissolved	< 0.0002	g/m ³	20/12/2019	Sharon van Soest KTP	
6711 Chromium - Dissolved	< 0.001	g/m ³	20/12/2019	Sharon van Soest KTP	
6713 Copper - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6718 Lead - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6724 Nickel - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6730 Silver - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6738 Zinc - Dissolved	0.003	g/m ³	20/12/2019	Sharon van Soest KTP	
O1311 Temperature	15.2	Deg C	20/12/2019	Gordon McArthur Transcribed by	
P1859 Sample Filtration	Completed		20/12/2019	Daniel Fitzpatrick	

Comments:

Sampled by customer using ELS approved containers.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500 H.	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 CaCO ₃ /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 CaCO ₃ /m³
Free CO ₂	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 CO ₂ /m³
Anion Sum	Calculation of the anion sum in milliequivalents per litre. Tests used are Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in milliequivalents per litre. Tests used are Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculation 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 NH ₃ -H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO ₃ /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 follows APHA Online Edition 4500-P B.	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-NO ₃ I. Persulphate digestion follows APHA Online Edition 4500-N C.	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

Test	Methodology	Detection Limit
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m ³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m ³
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.

"<" 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.

g/m³ is the equivalent to mg/L and ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

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 IANZ", which are outside the scope of this laboratory's accreditation.

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Report Released By
Rob Deacon

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

Analytical Report

Report Number: 19/68956

Issue: 05-1
27 December 2019

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
19/68956-05	Kapiti Coast District Council - Supplementary Bore		19/12/2019 06:40	20/12/2019 09:30	334779
Notes: Supplementary Bore K10 - 195504					
Test	Result	Units	Test Date	Signatory	
0001 pH	7.7		20/12/2019	Jennifer Mont KTP	
0040 Total (NP) Organic Carbon	0.4	g/m ³	21/12/2019	Sharon van Soest KTP	
0052 Alkalinity - Total	207	g CaCO ₃ /m ³	20/12/2019	Jennifer Mont KTP	
0055 Conductivity at 25°C	82.2	mS/m	20/12/2019	Jennifer Mont KTP	
0055B Total Dissolved Solids	452	g/m ³	21/12/2019	Jennifer Mont KTP	
0062 Sulphide - Total	< 0.2	g/m ³	20/12/2019	Gordon McArthur KTP	
0073 Bicarbonate	205	g CaCO ₃ /m ³	21/12/2019	Marylou Cabral .	
0076 Free CO ₂	8	g CO ₂ /m ³	21/12/2019	Marylou Cabral .	
0590 Anion Sum	6.78	meq/L	24/12/2019	Divina Lagazon KTP	
0591 Cation Sum	8.71	meq/L	23/12/2019	Amit Kumar KTP	
0592 Ion Balance	12.4	%	24/12/2019	Divina Lagazon KTP	
0601 Fluoride	0.03	g/m ³	20/12/2019	Amit Kumar KTP	
0602 Chloride	121	g/m ³	20/12/2019	Amit Kumar KTP	
0603 Nitrite - Nitrogen	< 0.01	g/m ³	20/12/2019	Amit Kumar KTP	
0604 Bromide	0.47	g/m ³	20/12/2019	Amit Kumar KTP	
0605 Nitrate - Nitrogen	< 0.01	g/m ³	20/12/2019	Amit Kumar KTP	
0607 Sulphate	< 0.02	g/m ³	20/12/2019	Amit Kumar KTP	
0680 Hydrogen Sulphide	< 0.05	g/m ³	20/12/2019	Gordon McArthur .	
0725 Cyanide	< 0.005	g/m ³	27/12/2019	Divina Lagazon KTP	
0760 Ammonia Nitrogen	0.24	g/m ³	21/12/2019	Divina Lagazon KTP	
1642 Total Hardness	186	g CaCO ₃ /m ³	20/12/2019	Shuyu Zhao KTP	
1806 Boron - Dissolved	0.170	g/m ³	20/12/2019	Shuyu Zhao KTP	
1810 Calcium - Dissolved	52.0	g/m ³	20/12/2019	Shuyu Zhao KTP	
1819 Iron - Dissolved	< 0.005	g/m ³	20/12/2019	Shuyu Zhao KTP	
1822 Magnesium - Dissolved	13.7	g/m ³	20/12/2019	Shuyu Zhao KTP	
1823 Manganese - Dissolved	0.159	g/m ³	20/12/2019	Shuyu Zhao KTP	
1829 Potassium - Dissolved	8.34	g/m ³	20/12/2019	Shuyu Zhao KTP	
1834 Sodium - Dissolved	109	g/m ³	20/12/2019	Shuyu Zhao KTP	
2080 Total Phosphorus	0.062	g/m ³	24/12/2019	Divina Lagazon KTP	
2088 Dissolved Reactive Phosphorus	0.046	g/m ³	21/12/2019	Divina Lagazon KTP	
2127 Total Nitrogen	0.25	g/m ³	24/12/2019	Divina Lagazon KTP	
6022 Mercury - Acid Soluble	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6703 Arsenic - Dissolved	0.001	g/m ³	20/12/2019	Sharon van Soest KTP	
6708 Cadmium - Dissolved	< 0.0002	g/m ³	20/12/2019	Sharon van Soest KTP	
6711 Chromium - Dissolved	< 0.001	g/m ³	20/12/2019	Sharon van Soest KTP	
6713 Copper - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6718 Lead - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6724 Nickel - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6730 Silver - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6738 Zinc - Dissolved	< 0.002	g/m ³	20/12/2019	Sharon van Soest KTP	
O1311 Temperature	15.1	Deg C	20/12/2019	Gordon McArthur Transcribed by	
P1859 Sample Filtration	Completed		20/12/2019	Daniel Fitzpatrick	

Comments:

Sampled by customer using ELS approved containers.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500 H.	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 CaCO ₃ /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 CaCO ₃ /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 CO ₂ /m³
Anion Sum	Calculation of the anion sum in milliequivalents per litre. Tests used are Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in milliequivalents per litre. Tests used are Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculation 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 NH ₃ -H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO ₃ /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 follows APHA Online Edition 4500-P B.	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-NO ₃ I. Persulphate digestion follows APHA Online Edition 4500-N C.	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

Test	Methodology	Detection Limit
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

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"<" 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.

g/m3 is the equivalent to mg/L and ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

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Report Released By
Rob Deacon

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

Analytical Report

Report Number: 19/68956

Issue: 06-1
27 December 2019

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
19/68956-06	Kapiti Coast District Council - Supplementary Bore		19/12/2019 08:14	20/12/2019 09:30	334779
Notes: Supplementary Bore K12 - 195505					
Test	Result	Units	Test Date	Signatory	
0001 pH	7.8		20/12/2019	Jennifer Mont KTP	
0040 Total (NP) Organic Carbon	0.2	g/m ³	21/12/2019	Sharon van Soest KTP	
0052 Alkalinity - Total	82	g CaCO ₃ /m ³	20/12/2019	Jennifer Mont KTP	
0055 Conductivity at 25°C	51.2	mS/m	20/12/2019	Jennifer Mont KTP	
0055B Total Dissolved Solids	282	g/m ³	21/12/2019	Jennifer Mont KTP	
0062 Sulphide - Total	< 0.2	g/m ³	20/12/2019	Gordon McArthur KTP	
0073 Bicarbonate	82	g CaCO ₃ /m ³	21/12/2019	Marylou Cabral .	
0076 Free CO ₂	2	g CO ₂ /m ³	21/12/2019	Marylou Cabral .	
0590 Anion Sum	4.21	meq/L	24/12/2019	Divina Lagazon KTP	
0591 Cation Sum	4.83	meq/L	23/12/2019	Amit Kumar KTP	
0592 Ion Balance	6.88	%	24/12/2019	Divina Lagazon KTP	
0601 Fluoride	0.07	g/m ³	20/12/2019	Amit Kumar KTP	
0602 Chloride	89.2	g/m ³	20/12/2019	Amit Kumar KTP	
0603 Nitrite - Nitrogen	< 0.01	g/m ³	20/12/2019	Amit Kumar KTP	
0604 Bromide	0.27	g/m ³	20/12/2019	Amit Kumar KTP	
0605 Nitrate - Nitrogen	< 0.01	g/m ³	20/12/2019	Amit Kumar KTP	
0607 Sulphate	15.6	g/m ³	20/12/2019	Amit Kumar KTP	
0680 Hydrogen Sulphide	< 0.05	g/m ³	20/12/2019	Gordon McArthur .	
0725 Cyanide	< 0.005	g/m ³	27/12/2019	Divina Lagazon KTP	
0760 Ammonia Nitrogen	< 0.01	g/m ³	21/12/2019	Divina Lagazon KTP	
1642 Total Hardness	81	g CaCO ₃ /m ³	20/12/2019	Shuyu Zhao KTP	
1806 Boron - Dissolved	0.411	g/m ³	20/12/2019	Shuyu Zhao KTP	
1810 Calcium - Dissolved	17.1	g/m ³	20/12/2019	Shuyu Zhao KTP	
1819 Iron - Dissolved	< 0.005	g/m ³	20/12/2019	Shuyu Zhao KTP	
1822 Magnesium - Dissolved	9.31	g/m ³	20/12/2019	Shuyu Zhao KTP	
1823 Manganese - Dissolved	0.016	g/m ³	20/12/2019	Shuyu Zhao KTP	
1829 Potassium - Dissolved	2.13	g/m ³	20/12/2019	Shuyu Zhao KTP	
1834 Sodium - Dissolved	72.7	g/m ³	20/12/2019	Shuyu Zhao KTP	
2080 Total Phosphorus	0.041	g/m ³	24/12/2019	Divina Lagazon KTP	
2088 Dissolved Reactive Phosphorus	0.039	g/m ³	21/12/2019	Divina Lagazon KTP	
2127 Total Nitrogen	< 0.05	g/m ³	24/12/2019	Divina Lagazon KTP	
6022 Mercury - Acid Soluble	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6703 Arsenic - Dissolved	< 0.001	g/m ³	20/12/2019	Sharon van Soest KTP	
6708 Cadmium - Dissolved	< 0.0002	g/m ³	20/12/2019	Sharon van Soest KTP	
6711 Chromium - Dissolved	< 0.001	g/m ³	20/12/2019	Sharon van Soest KTP	
6713 Copper - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6718 Lead - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6724 Nickel - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6730 Silver - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6738 Zinc - Dissolved	< 0.002	g/m ³	20/12/2019	Sharon van Soest KTP	
O1311 Temperature	14.9	Deg C	20/12/2019	Gordon McArthur Transcribed by	
P1859 Sample Filtration	Completed		20/12/2019	Daniel Fitzpatrick	

Comments:

Sampled by customer using ELS approved containers.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500 H.	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 CaCO ₃ /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 CaCO ₃ /m³
Free CO ₂	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 CO ₂ /m³
Anion Sum	Calculation of the anion sum in milliequivalents per litre. Tests used are Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in milliequivalents per litre. Tests used are Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculation 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 NH ₃ -H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO ₃ /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 follows APHA Online Edition 4500-P B.	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-NO ₃ I. Persulphate digestion follows APHA Online Edition 4500-N C.	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

Test	Methodology	Detection Limit
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m ³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m ³
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

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"<" 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.

g/m³ is the equivalent to mg/L and ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

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Report Released By
Rob Deacon

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

Analytical Report

Report Number: 19/68956

Issue: 04-1

27 December 2019

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
19/68956-04	Kapiti Coast District Council - Supplementary Bore		19/12/2019 07:00	20/12/2019 09:30	334779
Notes: Supplementary Bore KB4 - 195503					
Test	Result	Units	Test Date	Signatory	
0001 pH	8.0		20/12/2019	Jennifer Mont KTP	
0040 Total (NP) Organic Carbon	0.3	g/m ³	21/12/2019	Sharon van Soest KTP	
0052 Alkalinity - Total	191	g CaCO ₃ /m ³	20/12/2019	Jennifer Mont KTP	
0055 Conductivity at 25°C	115	mS/m	20/12/2019	Jennifer Mont KTP	
0055B Total Dissolved Solids	635	g/m ³	21/12/2019	Jennifer Mont KTP	
0062 Sulphide - Total	< 0.2	g/m ³	20/12/2019	Gordon McArthur KTP	
0073 Bicarbonate	190	g CaCO ₃ /m ³	21/12/2019	Marylou Cabral .	
0076 Free CO ₂	4	g CO ₂ /m ³	21/12/2019	Marylou Cabral .	
0590 Anion Sum	9.61	meq/L	24/12/2019	Divina Lagazon KTP	
0591 Cation Sum	11.2	meq/L	23/12/2019	Amit Kumar KTP	
0592 Ion Balance	7.77	%	24/12/2019	Divina Lagazon KTP	
0601 Fluoride	0.03	g/m ³	20/12/2019	Amit Kumar KTP	
0602 Chloride	229	g/m ³	20/12/2019	Amit Kumar KTP	
0603 Nitrite - Nitrogen	< 0.01	g/m ³	24/12/2019	Amit Kumar KTP	
0604 Bromide	< 0.02	g/m ³	20/12/2019	Amit Kumar KTP	
0605 Nitrate - Nitrogen	< 0.01	g/m ³	20/12/2019	Amit Kumar KTP	
0607 Sulphate	1.57	g/m ³	20/12/2019	Amit Kumar KTP	
0680 Hydrogen Sulphide	< 0.05	g/m ³	20/12/2019	Gordon McArthur .	
0725 Cyanide	< 0.005	g/m ³	23/12/2019	Divina Lagazon KTP	
0760 Ammonia Nitrogen	0.07	g/m ³	21/12/2019	Divina Lagazon KTP	
1642 Total Hardness	148	g CaCO ₃ /m ³	20/12/2019	Shuyu Zhao KTP	
1806 Boron - Dissolved	0.279	g/m ³	20/12/2019	Shuyu Zhao KTP	
1810 Calcium - Dissolved	38.3	g/m ³	20/12/2019	Shuyu Zhao KTP	
1819 Iron - Dissolved	< 0.005	g/m ³	20/12/2019	Shuyu Zhao KTP	
1822 Magnesium - Dissolved	12.6	g/m ³	20/12/2019	Shuyu Zhao KTP	
1823 Manganese - Dissolved	0.027	g/m ³	20/12/2019	Shuyu Zhao KTP	
1829 Potassium - Dissolved	7.28	g/m ³	20/12/2019	Shuyu Zhao KTP	
1834 Sodium - Dissolved	186	g/m ³	20/12/2019	Shuyu Zhao KTP	
2080 Total Phosphorus	0.028	g/m ³	24/12/2019	Divina Lagazon KTP	
2088 Dissolved Reactive Phosphorus	0.030	g/m ³	21/12/2019	Divina Lagazon KTP	
2127 Total Nitrogen	0.07	g/m ³	24/12/2019	Divina Lagazon KTP	
6022 Mercury - Acid Soluble	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6703 Arsenic - Dissolved	< 0.001	g/m ³	20/12/2019	Sharon van Soest KTP	
6708 Cadmium - Dissolved	< 0.0002	g/m ³	20/12/2019	Sharon van Soest KTP	
6711 Chromium - Dissolved	< 0.001	g/m ³	20/12/2019	Sharon van Soest KTP	
6713 Copper - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6718 Lead - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6724 Nickel - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6730 Silver - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6738 Zinc - Dissolved	< 0.002	g/m ³	20/12/2019	Sharon van Soest KTP	
O1311 Temperature	14.8	Deg C	20/12/2019	Gordon McArthur Transcribed by	
P1859 Sample Filtration	Completed		20/12/2019	Daniel Fitzpatrick	

Comments:

Sampled by customer using ELS approved containers.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500 H.	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 CaCO ₃ /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 CaCO ₃ /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 CO ₂ /m³
Anion Sum	Calculation of the anion sum in milliequivalents per litre. Tests used are Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in milliequivalents per litre. Tests used are Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculation 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
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO ₃ /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 follows APHA Online Edition 4500-P B.	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 follows APHA Online Edition 4500-N C.	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

Test	Methodology	Detection Limit
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m ³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m ³
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.

"<" 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.

g/m³ is the equivalent to mg/L and ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

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 IANZ", which are outside the scope of this laboratory's accreditation.

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Report Released By
Rob Deacon

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

Analytical Report

Report Number: 19/68956

Issue: 07-1
27 December 2019

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
19/68956-07	Kapiti Coast District Council - Supplementary Bore		19/12/2019 08:00	20/12/2019 09:30	334779
Notes: Supplementary Bore KB7 - 195506					
Test	Result	Units	Test Date	Signatory	
0001 pH	8.0		20/12/2019	Jennifer Mont KTP	
0040 Total (NP) Organic Carbon	0.2	g/m ³	21/12/2019	Sharon van Soest KTP	
0052 Alkalinity - Total	92	g CaCO ₃ /m ³	20/12/2019	Jennifer Mont KTP	
0055 Conductivity at 25°C	77.5	mS/m	20/12/2019	Jennifer Mont KTP	
0055B Total Dissolved Solids	426	g/m ³	21/12/2019	Jennifer Mont KTP	
0062 Sulphide - Total	< 0.2	g/m ³	20/12/2019	Gordon McArthur KTP	
0073 Bicarbonate	91	g CaCO ₃ /m ³	21/12/2019	Marylou Cabral .	
0076 Free CO ₂	2	g CO ₂ /m ³	21/12/2019	Marylou Cabral .	
0590 Anion Sum	6.39	meq/L	24/12/2019	Divina Lagazon KTP	
0591 Cation Sum	7.46	meq/L	23/12/2019	Amit Kumar KTP	
0592 Ion Balance	7.75	%	24/12/2019	Divina Lagazon KTP	
0601 Fluoride	0.05	g/m ³	20/12/2019	Amit Kumar KTP	
0602 Chloride	162	g/m ³	20/12/2019	Amit Kumar KTP	
0603 Nitrite - Nitrogen	< 0.01	g/m ³	24/12/2019	Amit Kumar KTP	
0604 Bromide	0.48	g/m ³	20/12/2019	Amit Kumar KTP	
0605 Nitrate - Nitrogen	< 0.01	g/m ³	20/12/2019	Amit Kumar KTP	
0607 Sulphate	13.6	g/m ³	20/12/2019	Amit Kumar KTP	
0680 Hydrogen Sulphide	< 0.05	g/m ³	20/12/2019	Gordon McArthur .	
0725 Cyanide	< 0.005	g/m ³	27/12/2019	Divina Lagazon KTP	
0760 Ammonia Nitrogen	< 0.01	g/m ³	21/12/2019	Divina Lagazon KTP	
1642 Total Hardness	91	g CaCO ₃ /m ³	20/12/2019	Shuyu Zhao KTP	
1806 Boron - Dissolved	0.524	g/m ³	20/12/2019	Shuyu Zhao KTP	
1810 Calcium - Dissolved	18.2	g/m ³	20/12/2019	Shuyu Zhao KTP	
1819 Iron - Dissolved	< 0.005	g/m ³	20/12/2019	Shuyu Zhao KTP	
1822 Magnesium - Dissolved	11.1	g/m ³	20/12/2019	Shuyu Zhao KTP	
1823 Manganese - Dissolved	0.010	g/m ³	20/12/2019	Shuyu Zhao KTP	
1829 Potassium - Dissolved	3.38	g/m ³	20/12/2019	Shuyu Zhao KTP	
1834 Sodium - Dissolved	128	g/m ³	20/12/2019	Shuyu Zhao KTP	
2080 Total Phosphorus	0.029	g/m ³	24/12/2019	Divina Lagazon KTP	
2088 Dissolved Reactive Phosphorus	0.026	g/m ³	21/12/2019	Divina Lagazon KTP	
2127 Total Nitrogen	< 0.05	g/m ³	24/12/2019	Divina Lagazon KTP	
6022 Mercury - Acid Soluble	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6703 Arsenic - Dissolved	< 0.001	g/m ³	20/12/2019	Sharon van Soest KTP	
6708 Cadmium - Dissolved	< 0.0002	g/m ³	20/12/2019	Sharon van Soest KTP	
6711 Chromium - Dissolved	< 0.001	g/m ³	20/12/2019	Sharon van Soest KTP	
6713 Copper - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6718 Lead - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6724 Nickel - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6730 Silver - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6738 Zinc - Dissolved	< 0.002	g/m ³	20/12/2019	Sharon van Soest KTP	
O1311 Temperature	15.1	Deg C	20/12/2019	Gordon McArthur Transcribed by	
P1859 Sample Filtration	Completed		20/12/2019	Daniel Fitzpatrick	

Comments:

Sampled by customer using ELS approved containers.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500 H.	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 CaCO ₃ /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-CO ₂ . The sample TDS must be <500 g/m³ and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CaCO ₃ /m³
Free CO ₂	Calculated from alkalinity and pH following APHA Online Edition Method 4500-CO ₂ . The sample TDS must be <500 g/m³ and all alkalinity derived from hydroxides, carbonates or bicarbonates.	1 g CO ₂ /m³
Anion Sum	Calculation of the anion sum in milliequivalents per litre. Tests used are Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in milliequivalents per litre. Tests used are Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculation 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 NH ₃ -H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO ₃ /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 follows APHA Online Edition 4500-P B.	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-NO ₃ I. Persulphate digestion follows APHA Online Edition 4500-N C.	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

Test	Methodology	Detection Limit
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m ³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m ³
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.

"<" 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.

g/m³ is the equivalent to mg/L and ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

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 IANZ", which are outside the scope of this laboratory's accreditation.

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Report Released By
Rob Deacon

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

Analytical Report

Report Number: 19/68956

Issue: 08-1
27 December 2019

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
19/68956-08	Kapiti Coast District Council - Supplementary Bore		19/12/2019 06:00	20/12/2019 09:30	334779
Notes: Supplementary Bore NZ - 195507					
Test	Result	Units	Test Date	Signatory	
0001 pH	7.7		20/12/2019	Jennifer Mont KTP	
0040 Total (NP) Organic Carbon	0.3	g/m ³	21/12/2019	Sharon van Soest KTP	
0052 Alkalinity - Total	70	g CaCO ₃ /m ³	20/12/2019	Jennifer Mont KTP	
0055 Conductivity at 25°C	44.5	mS/m	20/12/2019	Jennifer Mont KTP	
0055B Total Dissolved Solids	245	g/m ³	21/12/2019	Jennifer Mont KTP	
0062 Sulphide - Total	< 0.2	g/m ³	20/12/2019	Gordon McArthur KTP	
0073 Bicarbonate	70	g CaCO ₃ /m ³	21/12/2019	Marylou Cabral .	
0076 Free CO ₂	3	g CO ₂ /m ³	21/12/2019	Marylou Cabral .	
0590 Anion Sum	3.64	meq/L	24/12/2019	Divina Lagazon KTP	
0591 Cation Sum	4.08	meq/L	23/12/2019	Amit Kumar KTP	
0592 Ion Balance	5.69	%	24/12/2019	Divina Lagazon KTP	
0601 Fluoride	0.14	g/m ³	20/12/2019	Amit Kumar KTP	
0602 Chloride	73.5	g/m ³	20/12/2019	Amit Kumar KTP	
0603 Nitrite - Nitrogen	< 0.01	g/m ³	20/12/2019	Amit Kumar KTP	
0604 Bromide	0.22	g/m ³	20/12/2019	Amit Kumar KTP	
0605 Nitrate - Nitrogen	< 0.01	g/m ³	20/12/2019	Amit Kumar KTP	
0607 Sulphate	19.9	g/m ³	20/12/2019	Amit Kumar KTP	
0680 Hydrogen Sulphide	< 0.05	g/m ³	20/12/2019	Gordon McArthur .	
0725 Cyanide	< 0.005	g/m ³	27/12/2019	Divina Lagazon KTP	
0760 Ammonia Nitrogen	0.06	g/m ³	21/12/2019	Divina Lagazon KTP	
1642 Total Hardness	97	g CaCO ₃ /m ³	20/12/2019	Shuyu Zhao KTP	
1806 Boron - Dissolved	0.062	g/m ³	20/12/2019	Shuyu Zhao KTP	
1810 Calcium - Dissolved	27.0	g/m ³	20/12/2019	Shuyu Zhao KTP	
1819 Iron - Dissolved	0.009	g/m ³	20/12/2019	Shuyu Zhao KTP	
1822 Magnesium - Dissolved	7.07	g/m ³	20/12/2019	Shuyu Zhao KTP	
1823 Manganese - Dissolved	0.095	g/m ³	20/12/2019	Shuyu Zhao KTP	
1829 Potassium - Dissolved	3.02	g/m ³	20/12/2019	Shuyu Zhao KTP	
1834 Sodium - Dissolved	47.5	g/m ³	20/12/2019	Shuyu Zhao KTP	
2080 Total Phosphorus	0.130	g/m ³	24/12/2019	Divina Lagazon KTP	
2088 Dissolved Reactive Phosphorus	0.123	g/m ³	21/12/2019	Divina Lagazon KTP	
2127 Total Nitrogen	0.05	g/m ³	24/12/2019	Divina Lagazon KTP	
6022 Mercury - Acid Soluble	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6703 Arsenic - Dissolved	< 0.001	g/m ³	20/12/2019	Sharon van Soest KTP	
6708 Cadmium - Dissolved	< 0.0002	g/m ³	20/12/2019	Sharon van Soest KTP	
6711 Chromium - Dissolved	< 0.001	g/m ³	20/12/2019	Sharon van Soest KTP	
6713 Copper - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6718 Lead - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6724 Nickel - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6730 Silver - Dissolved	< 0.0005	g/m ³	20/12/2019	Sharon van Soest KTP	
6738 Zinc - Dissolved	< 0.002	g/m ³	20/12/2019	Sharon van Soest KTP	
O1311 Temperature	14.4	Deg C	20/12/2019	Gordon McArthur Transcribed by	
P1859 Sample Filtration	Completed		20/12/2019	Daniel Fitzpatrick	

Comments:

Sampled by customer using ELS approved containers.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500 H.	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 CaCO ₃ /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 CaCO ₃ /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 CO ₂ /m³
Anion Sum	Calculation of the anion sum in milliequivalents per litre. Tests used are Alkalinity, Chloride, Nitrate, Boron and Sulphate.	0.001 meq/L
Cation Sum	Calculation of the cation sum in milliequivalents per litre. Tests used are Ammonia, Iron, Sodium, Potassium, Calcium, and Magnesium.	0.001 meq/L
Ion Balance	Calculation 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 NH ₃ -H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO ₃ /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 follows APHA Online Edition 4500-P B.	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-NO ₃ I. Persulphate digestion follows APHA Online Edition 4500-N C.	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

Test	Methodology	Detection Limit
Silver - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.0005 g/m ³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m ³
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.

"<" 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.

g/m³ is the equivalent to mg/L and ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

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 IANZ", which are outside the scope of this laboratory's accreditation.

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Report Released By
Rob Deacon

Appendix E

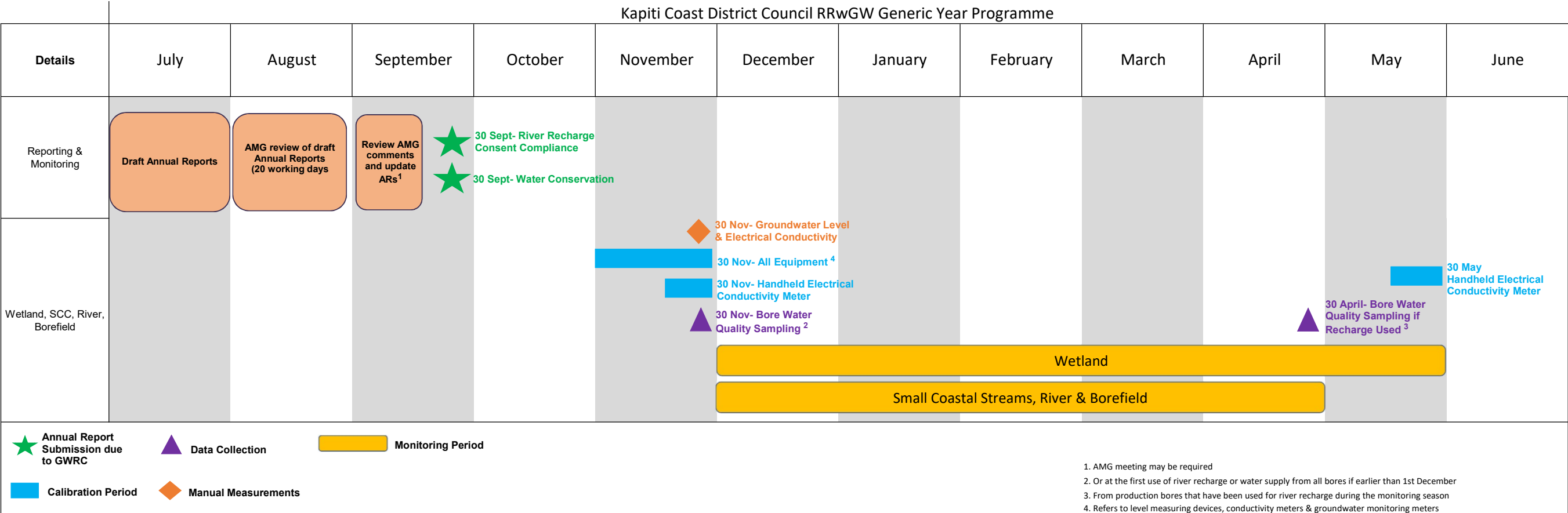
Complaints Record

Please Note:

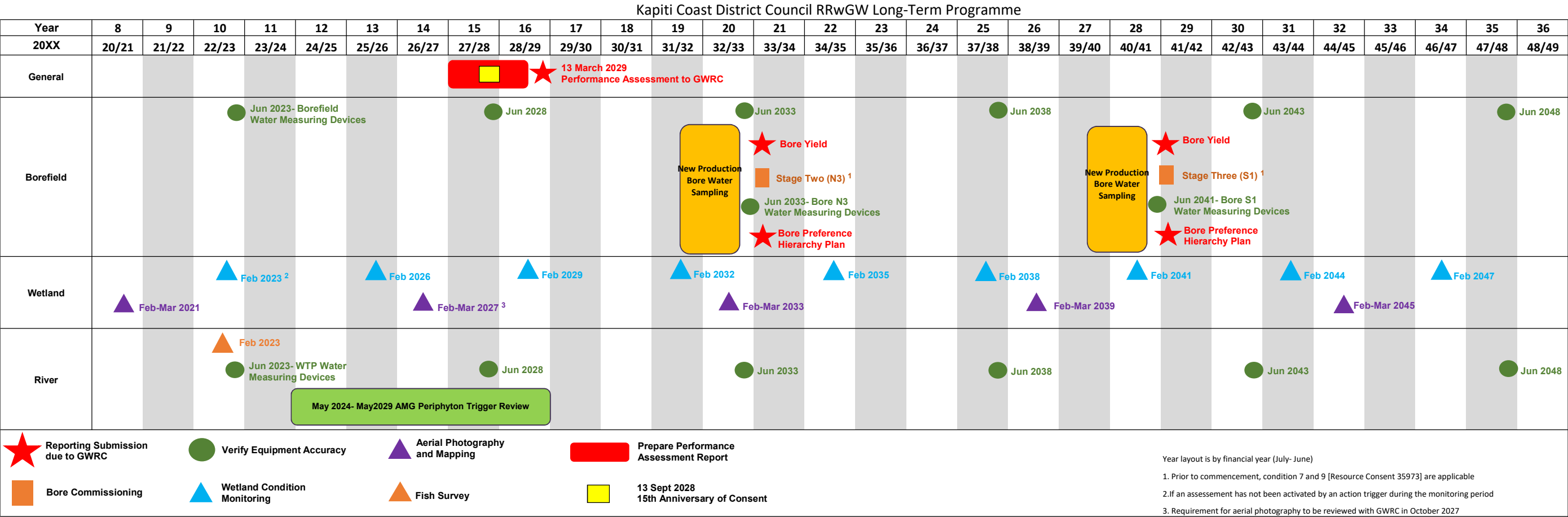
There is no insertion for this section, as there were no complaints during this reporting period.

Appendix F

RRwGW Reporting Chart (Beca 2020)



NB: Programme excludes trigger actions



Appendix G

Minutes of AMG Meeting –
26th August 2020



Minutes of Meeting

AMG Meeting 26th August 2020 Minutes

Held on the 26th of August 2020 at 9:30am at Kāpiti Coast District Council (Nikau Meeting Room).

Present:

Bill Carter (Te Āti Awa ki Whakarongotai)
 Ferial Falconer (Friends of the Waikanae River)
 Phil Teal (Wellington Regional Fish and Game)
 Claire McKeivitt (GWRC)
 Martyn Cole (KCDC)
 Bruce Nesbitt (KCDC)
 Richard Millican (KCDC) – *chair, scribe*

Apologies:

Campbell Gillam (Regional Public Health)
 Wayne Cameron (Kapiti Fly Fishing)
 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, and introductions to KCDC staff were made. - With the retirement of Dave Bassett as KCDC Treatment Plants Manager, KCDC advised of its new Treatment Plants Managers (<i>two roles</i>): Bruce Nesbitt (<i>present</i>) for Water (based at Waikanae WTP), and Grant Stuart for Wastewater (based at Paraparaumu WWTP). - Bill Carter opened a discussion about the valuable service that Dave Bassett had performed during his time with KCDC, and wished it noted for the record the extent of Dave's efforts in community engagement and in environmental management.	
2 Matters arising from previous meetings No new matters were raised.	
3 Review of annual reports 3.1 Overview - An overview of the year's activities in brief were included in Appendix 1 of the Agenda. - It was noted that, in an otherwise eventful year, the river recharge programme for 2019/20 was notably uneventful. River recharge was not required at any time for the season (December 2019 thru April 2020) due to the downstream river flow/ level remaining above trigger levels. River recharge was last deployed on 1st April 2019.	

- Only trial-period bore operation cycles were undertaken. - Monitoring triggers were limited to a small number of off-season events related to monitoring equipment faults at the bores. - Comments raised by AMG members are discussed further in Section 4.	RM
3.2 River and Borefield report 2019/20 - Reported content reflected on a year of mild weather and no requirement for river recharge. A small automated recharge occurred for one monitoring cycle (around 15 mins.), due to an erroneous (but un-repeated) low river flow level signal. - All core aspects of operation were declared as compliant; but an action was raised against KCDC under Wetlands Monitoring since KCDC's consultant had not undertaken the three-yearly wetlands health review (including aerial imagery) early enough in the summer season to miss COVID-19 restrictions. It was agreed with GWRC that KCDC would perform this survey in the 2020/21 summer season. - The fish surveys (Wainanae river riffle fishing) were discussed; reports had concluded that recharge records and fish surveys don't show a pattern of effect from recharge on fish presence. GWRC had acknowledged this and requested a summary report from KCDC for the three-year survey period (supplied). Claire McKevitt confirmed that GWRC (Alton) reviewed the summary report and it is accepted.	KCDC
3.3 Water conservation report 2019/20 - The level of leakage was discussed, noting that high water losses in Paekākāriki were a continued theme. Consideration was given to potential sensitivity of the small scheme to leakage, the aging pipework and the condition assessment and asset management programme underway. Martyn Cole confirmed that the innovative approach to leak detection discussed last year – drone-mounted thermal imaging - was undertaken, with positive results. - A significant leak was discovered by Council in June 2020, representing around a third of instantaneous demand, but too late to effect summary leak reporting for this year. Richard Millican proposed the extension of reporting of demand for the Paekākāriki scheme to illustrate the projected demand reduction, as we enter 2020/21 year. <i>Post-meeting Note:</i> the demand profile for the first part of 2020/21 year is discussed in Appendix 2 of these minutes. - Martyn Cole updated the meeting on the catchment management programme, including the Maungakotukutuku Dam Covenant area. The planting and pest control programme continued in 2019/20 year, with 2020/21 plans enabled by the completion of the forestry track reinstatement. Council submitted a One Billion Tree (1BT) application for supplementary funding towards further reforestation.	RM KCDC
4 Stakeholder Observations / feed back - Stakeholder observations were received both prior to, and during, the meeting. - Feriel Falconer raised comments, by email on 18th August and by telephone on the 25th. The comments, and interim responses, are covered in Appendix 1 to these minutes, but were also discussed in the meeting.	RM

- Phil Teal raised on behalf of local recreational fishers the issue of declining fish numbers and/or health, possibly related to reduced river levels and raised water temperatures downstream of the water treatment plant. He raised in outline the queries he had received regarding: - modelling of flow dynamics in the river, and the possibility that increased flows may improve conditions for fish - the possibility for increased recharge flows to support downstream flow. Bruce Nesbitt indicated that, historically, operation of the RRwGW system had a 1:1 volumetric relationship (bore water recharge vs. river take by Plant). Phil indicated that he would consult his members and would approach KCDC with a more detailed query statement.	PT
5 Ongoing mitigation plan update and S127 Consent amendments - The consents and its operating documents were deployed unchanged this year for the 2019/20 season, in normalised operating mode, and no new consent amendments are proposed. - Minor changes to operating documents have been drafted for consideration – see <i>Section 6</i>.	RM
6 Operating Documents & Ancillary Reports - Council supplied, with the pre-AMG Meeting Reports, revised versions of the Waikanae Borefield Operation and Maintenance Manual (BOMM) and Waikanae River Take Operations and Maintenance Manual (ROMM). Amendments were made to clarify a query from GWRC regarding how Council set its “buffer” values to both downstream river flow trigger level and total borehole abstraction rate setpoint. Comments are welcomed from AMG members on this content. - Council also offered a revised OMP for the Waikanae River, updated to incorporate the final Fish Monitoring report content. Comments are welcomed from AMG members about this content. <i>Post-meeting note:</i> GWRC have approved the Waikanae River OMP at v1.8 (Email CMcK 31/8/20). - Phil Teal proposed that the three-year summary fish monitoring report be released publicly, and as separate from the annual river and bore reports. RM to circulate, and to make available on the Council website. - Feriel Falconer requested a paper set of BoMM and RoMM documents (possibly stripped of appendices to reduce size).	All All RM RM
7 Other Matters <u>Environmental Governance in the District</u> - Bill Carter opened a discussion around governance of the environment in Kapiti District, by strong stakeholder engagement in governance planning for each river valley considered as a whole. All considered the process valuable and showed a willingness to commence – but also noted the pending Whaitua Committee process, already launched in other districts for Greater Wellington region. Council to approach stakeholders as this process develops.	KCDC

■ 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.	All
■ <u>Paraparaumu Wastewater Treatment Plant Discharge Consents Renewal Programme</u> ■ Richard Millican outlined what is involved in the renewal of five discharge consents, under the RMA, from the Paraparaumu wastewater plant (to surface waters and air) that will expire in March 2022. Currently a draft Long List of treatment plant improvement and discharge options is being finalised.	KCDC
■ Richard Millican pointed out the now short time to consent expiry and that Council were considering an interim, short-term application to extend the existing consents, so as to allow a more refined approach to future discharge optioneering. ■ Bill Carter indicated his keenness to engage with the process of developing discharge options, the review on their effect on the environment, and in reflection of the values of our community.	KCDC
■ <u>Three-waters Asset Investment and New National Regulation</u> ■ Council are entering the three-yearly asset management planning phase, leading to the 30-year Long Term Plan to be published in 2021 ■ Martyn Cole summarised the current national position regarding the new three waters Regulator and its effect on current Council asset planning: • A new three-waters regulator (new crown entity under the Taumata Arowai - the Water Services Regulator Act) is being developed, and will initially focus on drinking water safety (with the RMA process to manage wastewater and stormwater in the meantime) • The Regulator, and national approaches to capacity and capability, are expected to be in place in as little as two years from now • A MoU committing Council to sharing asset information and to discussing national aggregation options has just been signed; and for this stage there is no commitment to aggregation • Money is being made available for additional water asset investment for those authorities committing to information sharing for national service planning. • NB: "shovel ready" project funding does not now duplicate funding by Govt. for water projects.	KCDC
■ Bill Carter raised a concern about the likely aggregation of KCDC assets and skilled personnel into a new water authority. He suggested that it would result in a re-prioritisation of asset investment programmes; with the risk that, unless Kapiti Coast District was committed to an advanced investment programme, spending may be directed elsewhere.	KCDC
■ <u>Paekākāriki Water Scheme Demand</u> ■ The meeting discussed the issue initially raised by Feriel Falconer (and also by Claire McKevitt) – high demand in Paekākāriki for drinking water, likely due to leaks. <i>See other points in these minutes for further detail.</i>	

■ Claire McKevitt raised that a member of the local community in Paekākāriki had approached GWRC to ask them to amend the consent held by KCDC that allows abstraction of water from the bores (and stream) at the water plant – the concern was around reduction of the flow in the Wainui stream, its effect on the environment, and of connectivity between bores and stream flows. Claire indicated that: • GWRC are not intending to amend the consent in the near future • A testing regime was not practical in the light of the 8-hour window offered by KCDC to ensure that the Paekākāriki service reservoir remained adequately filled. Martyn Cole and Bruce Nesbitt indicated that: • Demand for the treatment plant was a fraction of consented abstraction (from the stream and/or two bores) • The stream has not been used as a raw water source for some time • Connectivity of the bore sources with the stream was documented during the consent application process.	
8 Next Steps ■ 8 September Issue meeting minutes for comment by 16 September ■ 30 September update and issue Final annual reports to GWRC and AMG	RM/ AMG

Minuted by: Richard Millican

Appendix 1:

AMG Member Comment Submissions – Review of Draft River & Borehole Report and Water Conservation Reports 2019/20.

Feriel Falconer (FoWR)

The following review notes in Feriel's email of 18th August are annotated with comments by RM in response. These questions and further ones were also discussed in a telephone conversation of the 25th. Both questions sets were discussed in the 26th September AMG Meeting.

- Email (FF) 18th August 2020):

" .. Thank you for the paper copies of the Water Conservation and the River, Recharge and Borefield Reports. Could you please send me the Revised River OMP, BOMM & ROMM as paper copies too."

KCDC notes:

Revised River OMP supplied, but RM was concerned about document size when publishing the BoMM and RoMM – RM to strip the documents of excess content (perhaps low-value appendices).

"I have a few queries/comments from the ones I have got, below.

Kapiti Coast Water Conservation Report 2019/20

P 5. Would it give us a better insight into water use if we had the rainfall shown on the same graph?

P. 6. 3. 2. 2. Dates on the Graph look wrong – colours don't match other graphs.

Table 11. What does DMA and BCR stand for."

KCDC notes:

The above points have been collected by the Report's author, and so will be incorporated into the final revision of the Water Conservation Report 2019/20. We have considered rainfall on the same graph, but this may look cluttered and so for the moment we include an adjacent chart for the rainfall profile.

" .. Annual Report 2019/20

P. 11. 2. 5. What was the result of GWRC's consideration of the AMG proposal re fish monitoring.

p.12. Table 9. Why is total annual volume pumped greater for year when no recharge took place than for year when recharge took place."

KCDC notes:

GWRC are generally accepting of the plan to consider fish monitoring again, should river recharge flow rates approach maximum and as we approach the 15-year review phase. Claire McKeivitt confirmed this in the AMG Meeting.

RM to review the data set to resolve the question about pumped bore tests volumes in 2019/20 exceeding 2018/19 season flows (including test and recharge flows).

- Telecon pm 25/8/20 (FF, RM) – comments on draft Water Conservation Report 2019/20:
 - The Report shows a significant leaks increase, such that the national rating moves Council to B-Band
- KCDC notes:
- Water supply network leaks (especially regarding Paekākāriki supply scheme) were discussed in the AMG Meeting (please see notes in Minutes, Section 3.3).*

- The Report outlines community communication methods (Report Section 4.1, p9) - the use of local newspaper(s) to interact with the community seems now outmoded, also affected by the unreliable nature of local newspaper delivery

KCDC notes:

Council's communications and engagement team are constantly looking at the customer information space and what outlets are best to use. For the moment local newspapers remain a part of a wider portfolio of information outlets.

- The Report indicates that the annual budget for meter management is around \$215,000, where that for leak monitoring is around \$55,000.

KCDC notes:

During the AMG Meeting MC indicated in broad terms that the large part of the cost to Council for meter management is in billing costs such as bill printing and postage, and meter reading and customer charging queries. The sums budgeted for FY2020/21 are similar.

During the AMG Meeting, RM promised a breakdown of costs – please note the summary table below for Financial Year 2019/20.

Table 1 – KCDC Meter Management Budget 2019/20 – summary of approximate values in NZD

Meter Reading Contract (<i>third party</i>)	\$95,000
Postage (<i>NZ Post</i>)	\$27,000
Bill design and printing (<i>third party</i>)	\$25,000
Network repairs and asset information (<i>KCDC</i>)	\$25,000
Customer Support Officer (<i>KCDC</i>) - <i>leaks, mis-reads etc.</i>	\$30,000
In-house operating costs – billing etc. (<i>KCDC</i>)	\$7,000
Sundry costs	\$6,000
Total Annual Budget, KCDC Water Meter Management	\$215,000

Appendix 2:

Review of Recent Water Demand Trends – Paekākāriki Water Supply Scheme – Leak Detection 2019/20

The 26/8/20 RRwGW AMG meeting agreed that one approach to monitoring the effect of the significant network leak found by KCDC in the latter part of the 2019/20 reporting period to 30th June 2020, was to review the trend log from 1st July to date, since the effect on reduced demand is seen only in late June in the Water Conservation report (Section 3.2.4, Figure 5).

Figure 1, below, depicts annual trends in water demand for the Paekākāriki Water Supply scheme, now including a trend line for the current 2020/21 year. As can be seen, the effect of reduced demand is seen only late in the 2019/20 year (green line), but is significant to the 2020/21 year (blue line). Notably demand is now at around, or below, the 490 l/p/d District target.

Figure 1 – Annual Demand for Drinking Water, Paekākāriki Water Scheme (2018-2020)

