



Waikato, Waikato 50 & Waikato A Water Treatment Plants

2024-2025 Annual Report



Final - September 2025

Watercare 


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REVISION HISTORY

Rev	Revision Date	Name	Position	Signature
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APPROVED

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29/09/2025	Michiel Jonker	Environmental Care Manager	

CONSENT CHANGE AND MONITORING HISTORY

Change type	Description	Effective date	Reference/condition	Reporting / monitoring implications
Management plan update	Resource consent management plan update in accordance with AUTH960089.01.05, AUTH131259.01.02, AUTH137497.02.01, AUTH960092.01.04 and AUTH142778.01.01.	July 2023	See consents (conditions requiring management plans)	Next iteration due 2025
Management plan update	Discharge management plan update in accordance with AUTH137497.01.01 and AUTH142778.01.01	December 2024	Condition 10 (AUTH142778.01.01); equivalent condition in AUTH137497.01.01	Next iteration due 2026

EXECUTIVE SUMMARY

Watercare's Waikato Water Treatment Plant (WTP) is the second largest potable water treatment plant in Auckland and takes its water from the Waikato River. The adjacent Waikato 50 Water Treatment Plant became operational in July 2021. A third water treatment plant at the site, Waikato A, has been consented and is in the planning and design phases.

This report is the annual compliance report for the discharge, water take, diversion of water and land use consents associated with the Waikato, Waikato 50 and Waikato A WTPs.

The Waikato WTP exceeded the total suspended solids discharge limit specified in AUTH137497.01.01 during routine sampling on six occasions, with investigations finding causes were the thickener 3 valve, the wastewater recycle tank or unknown causes. Three additional instances occurred over two days during a Biological Activated Carbon (BAC) 3 media replacement project, where total suspended solids exceeded the discharge limit before entering the off-spec pipeline. These instances were detected through non-routine onsite sampling. These exceedances were unlikely to have caused any adverse effects due to their relatively short duration and the relatively large background variation in total suspended solids in the receiving environment.

Discharge volume exceedances at the Waikato WTP occurred on 10 days throughout the reporting period, with a maximum discharge of 28,315 m³ on 6 April 2025, primarily related to the BAC 3 media replacement. Additional discharge exceedances occurred at the Waikato 50 WTP, caused by the run to waste process and a fault with an inlet valve.

The treatment plants were fully compliant across all other consents for the conditions considered in this report.

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1 INTRODUCTION

1.1 Background

The Waikato Water Treatment Plant (WTP) is Watercare's second largest WTP and has a second, smaller water treatment plant, Waikato 50 WTP on the same site. Waikato A WTP is to be constructed, with the associated resource consent in effect from January 2023. To operate, the WTPs hold resource consents to permit raw water take from the Waikato River, discharges of treated off-spec water, stormwater, and process discharges. The resource consents and numbers of the respective conditions which require an annual report are presented in Table 1-1.

Table 1-1: Resource consent conditions requiring an annual report

Resource Consent	Resource consent type	Condition
AUTH960089.01.05	Water Take (from Waikato River)	20
AUTH131259.01.02	Water Take (from Waikato River)	B, P
960090	Diversion of Water (from culverts of an unnamed tributary through the intake and Waikato treatment plant)	18
AUTH960092.01.04	Works in a Watercourse (intake structure and discharges)	25
AUTH137497.01.01	Discharge to Water (process water discharges into the Waikato River)	14
AUTH142778.01.01	Discharge to Water (off-spec and process water from STW50 into the Waikato River)	13

1.2 Scope

The report is for the 1 July 2024 to 30 June 2025 reporting year and covers the matters required by the consent conditions listed in Table 1-1. These matters include:

- A summary and analysis of monitoring data collected in accordance with the Monitoring Plan, including:
 - Quality of raw water taken from the Waikato River
 - Waikato River flow at the site
 - Intake volumes and abstraction rates
 - Effects of the intake structure, including fish entrainment and impingement on the intake screens, the effect of the intake structure on fish migration, and the effect of screen sparging on the environment and river ecology
 - Water quality and volumes of operational discharges to the Waikato River, including process, maintenance and treated off-spec water discharges
 - Leakages from the water pipeline.
- An overview of water conservation activities
- Measures to prevent invasive plant and animal pests in the water being transferred into the Auckland Region
- Details of any equipment failures, chemical spills, or other events related to activities authorised by the consents in Table 1-1 that may cause, or may have caused, an adverse environmental effect
- Confirmation of restoration funding
- Cultural indicators monitoring
- A register of data sources is provided in Appendix G.

2 WATER TAKE FROM THE WAIKATO RIVER

2.1 Overview

The raw water intake for the Waikato WTP is located approximately 25 m from the true right bank of the Waikato River, comprising of four Johnson T-54 passive intake screens. These are submerged in the river, marked on the surface with two buoys. The Waikato 50 WTP intake is approximately 20 m from the true right bank, with two AWMA retrievable intake screens and an associated floating pump station. Both intakes are screened with a mesh aperture size of 1.5 mm in diameter.

2.2 Quality of raw water

Although there are no consent conditions related to raw water quality, monitoring of water taken from the Waikato River is required under the current resource consent monitoring plan. A summary of the results for the ongoing raw water sampling programme is provided in Appendix A. These samples and tests are carried out by the Watercare Laboratory Services (WLS). The data shows that river quality was relatively consistent over the year, with maximum and average results similar to those reported for the previous annual reporting period (2023-2024). One exception to this is arsenic, which was slightly elevated in November 2024 compared to typical results but returned to normal soon after.

Turbidity of the raw water is also measured on a continuous basis using an online turbidimeter. Results from the online turbidimeter are summarised in Figure 2-1. The data shows that raw water turbidity was generally low, with a median value of 12.45 NTU and a 90th percentile of 27.31 NTU. There were 296 instances where turbidity exceeded 100 NTU, measured in 1-minute intervals over the year. This marks a notable increase compared to the 94 instances recorded in 2023-2024.

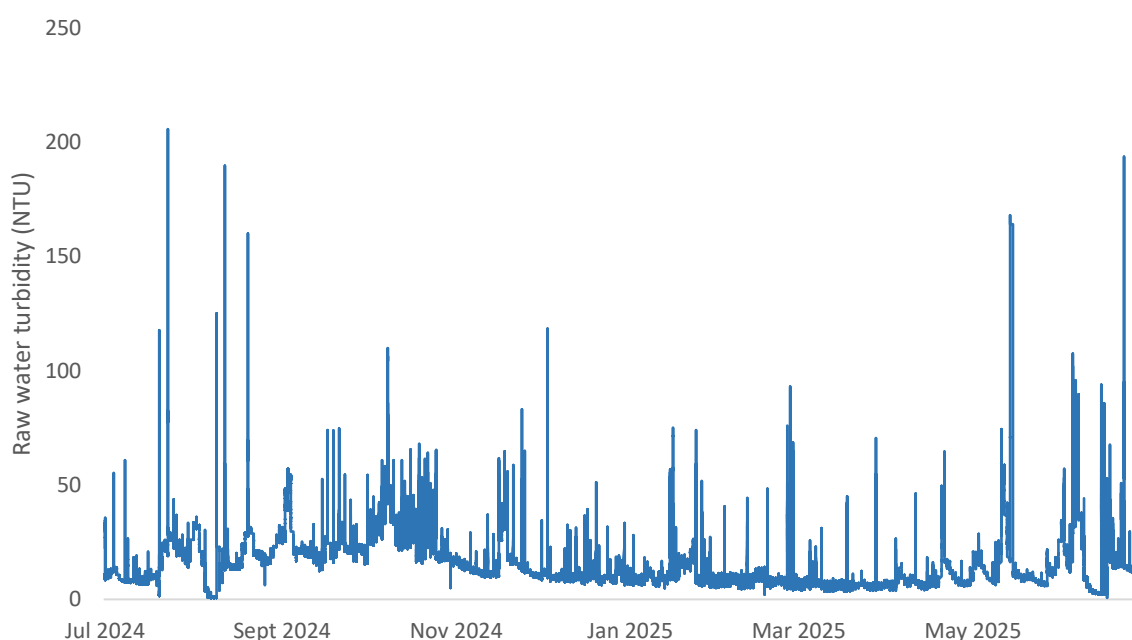


Figure 2-1: Turbidity of raw water taken from the Waikato River for the reporting period 2024-2025.

2.3 Waikato River flow rate and take volumes

Resource consents AUTH960089.01.05 and AUTH131259.01.02 authorise a combined maximum daily net take of 300,000 m³ of water from the Waikato River for municipal supply purposes. The new resource consent facilitates the construction and operation of a new plant that can utilise the additional abstraction volumes, which is currently in the planning phase. Watercare does not currently have the production capacity to exceed the maximum daily net take. The abstraction rate did not exceed the consented limits in the 2024-2025 period and is displayed in Figure 2-2. Net take volumes ranged between 22,802 m³/day to 198,412 m³/day. The water abstracted was treated primarily at the Waikato WTP, with Waikato 50 WTP out of service for several months of the reporting period. If the seven-day rolling average flow of the Waikato River at Rangiriri falls below 163.53 m³/s for 10 or more consecutive days, the average daily net take over any consecutive two-day period must not exceed 127,500 m³ for water taken under the secondary consent, or 277,500 m³ when considering both consents combined. The minimum flow at Rangiriri was 185.7 m³ in this reporting period, displayed in Figure 2-3.

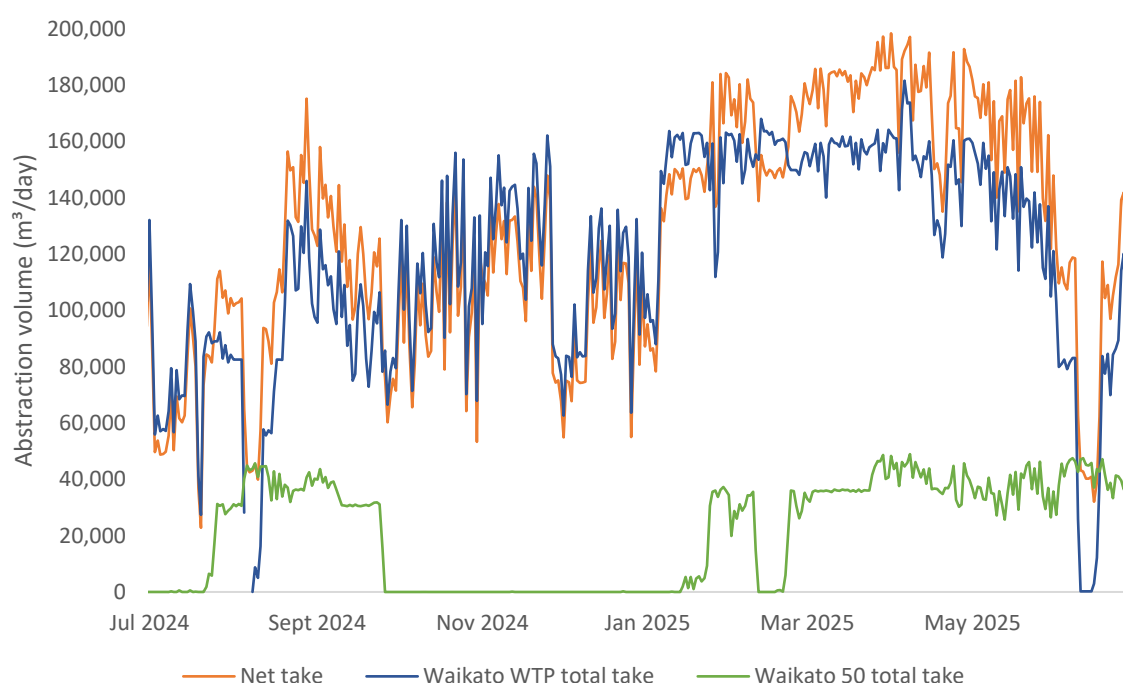


Figure 2-2: Total and net intake¹ volumes of the Waikato and Waikato 50 WTPs.

¹ “Net take” is the combined daily abstraction allocated across AUTH960089 and AUTH131259, after deducting discharges

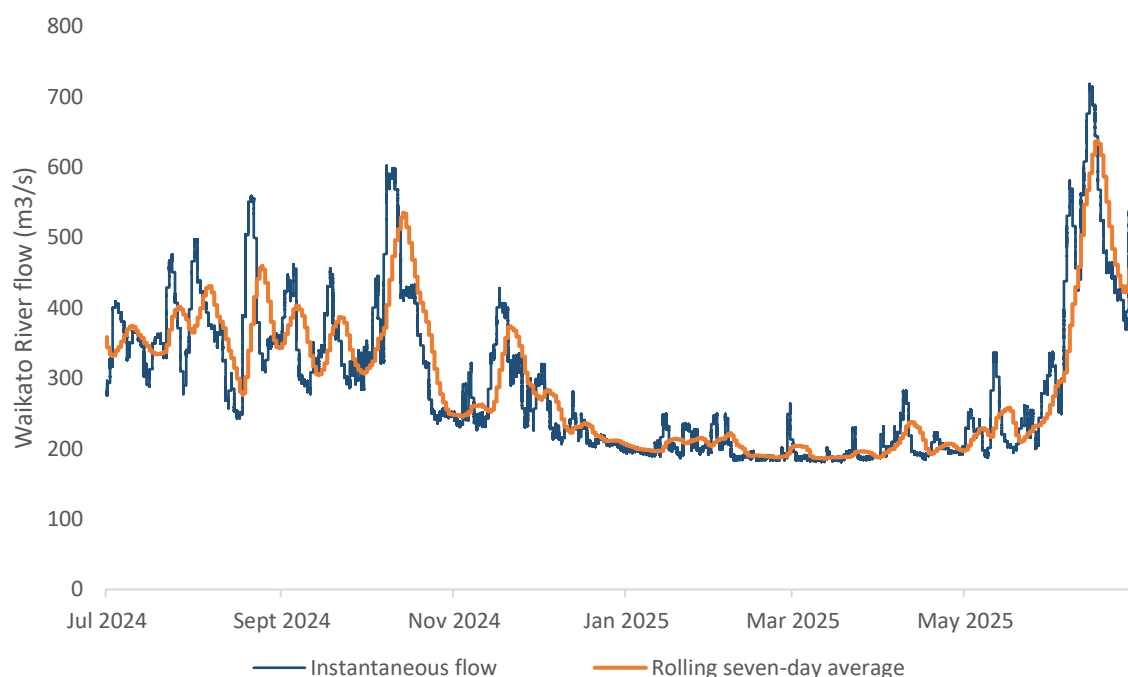


Figure 2-3: Waikato River flow at Rangiriri for the reporting period 2024-2025.

2.4 Waikato River instantaneous take rate and water velocity

Resource consents AUTH960089.01.05 and AUTH131259.01.02 authorise a maximum instantaneous rate of 2,450 L/s and 3.2 m³/s (3,200 L/s) respectively, for a combined maximum of 5,650 L/s. Water velocity must not exceed 0.15 m/s. The four Waikato WTP intake screens each have an approximate designed intake rate capacity of 745 L/s, allowing a maximum intake rate of 2,980 L/s. The two Waikato 50 intake screens each have a designed maximum flow rate of 347 L/s, or 694 L/s for the whole intake structure. Across both WTP intake structures, the maximum instantaneous take capacity for the reporting period was 3,674 L/s. The Waikato and Waikato 50 WTP intake screens each have a designed maximum intake velocity of 0.15 m/s.

The instantaneous take rate was not exceeded in the reporting period, with a maximum instantaneous take rate of 2,759 L/s on 1 November 2024. The average daily maximum instantaneous take across the period was 1,592 L/s. The data is displayed in Figure 2-4.

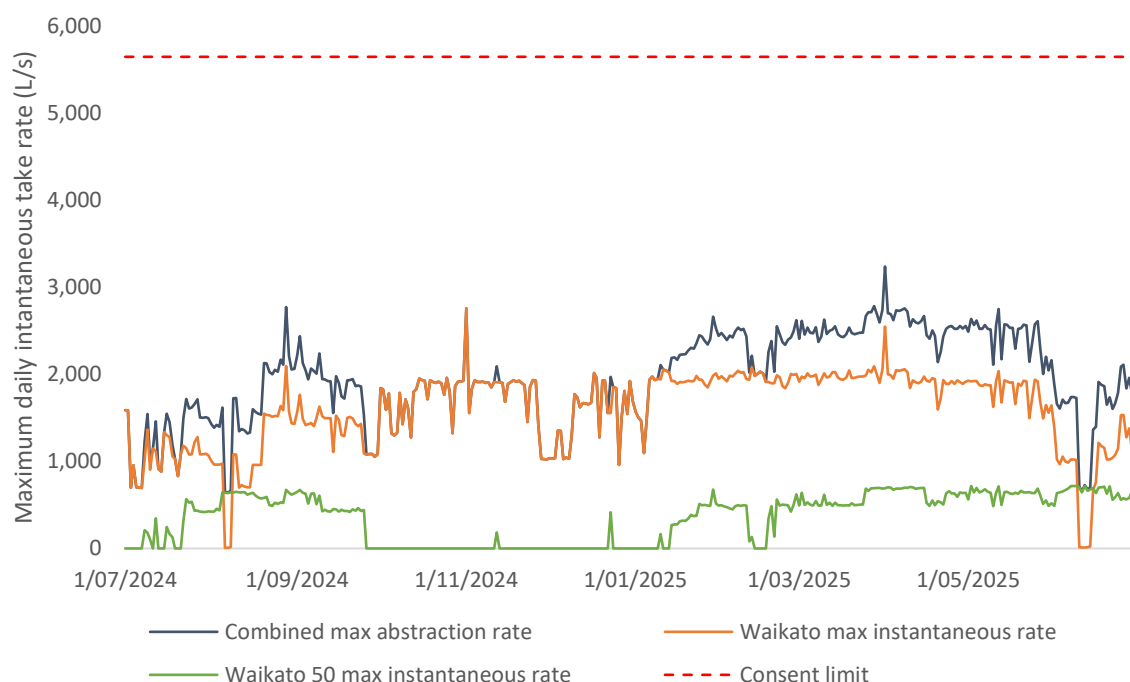


Figure 2-4: Maximum daily instantaneous take rates of the Waikato and Waikato 50 WTPs.

2.5 Effects of the intake structure

2.5.1 Fish entrainment and impingement on intake screens

The Waikato WTP intake structure has been designed to prevent fish entrainment and impingement, and this is confirmed in the approved “Fisheries Management Plan (MFPv3 2007)” (FMP), section “3.2.2 Impingement” and “3.2.3 Entrainment”. Results of the required monitoring defined in the FMP are described below.

Underwater (SCUBA) video of the exterior of the intake screens and an ichthyoplankton (fish eggs and larvae) entrainment survey in the intake wet well were carried out on 6 May 2025 and 17 June 2025 by Tonkin + Taylor and Deep Dive Division, followed by cleaning of the screens post-inspection. A copy of the survey report is provided in Appendix B. The key findings were:

- The screens clearance from the riverbed was 2.0 m below Screen 1 and 1.7 m below Screen 2, 1.4 m below Screen 3 and <0.5 m below Screen 4
- Water velocity was moderate, however was not qualitatively assessed. Visual observation expects the FMP velocity guidelines to be met
- No fish impingement was recorded on any of the intake screens during the survey
- No visible damage to the screens or openings greater than 2.5 mm were recorded, therefore no repairs or replacement are necessary
- Build-up of algae was moderate or moderate-high for all screens
- The density of smelt larvae in the penstock was 0 smelt/m³, which is well below the maximum density threshold (1.9 smelt/m³) that would require further investigation. In accordance with the FMP, no further sampling is required in winter 2025
- One gold clam (*Corbicula fluminea*) was identified in the penstock (these are known to be present in the area).

Dredging below the screens did not occur in 2024-2025 but will be undertaken in 2025-2026 to maintain minimum clearance under the intake screens.

2.5.2 Effect of the intake structure on fish migration

The intake structure and location has been designed to minimise effects and is discussed in Section 3.1.1. (Upstream Migrations) of the FMP. No further monitoring is deemed necessary.

2.5.3 Effect of screen sparging

The air compressor used for sparging has been fitted with oil/filter traps to ensure oil does not discharge through the intake screens. Oil/filter traps are maintained on a regular basis.

Screen sparging is generally carried out daily to maintain the intake screens as required, based on abstraction rates and raw water conditions. There have been no changes to the installed screens nor their operation over the reporting period. No further monitoring is deemed necessary.

2.5.4 Cultural indicators monitoring and ecological enhancement

Resource consent AUTH131259.01.02 requires the invitation of Te Whakakitenga o Waikato Incorporated and Te Taniwha o Waikato to participate in a Waikato River water take “Tangata Whenua Liaison Group” (“TWLG”). A Cultural Indicators Management Plan must be developed to incorporate appropriate matters of importance to the TWLG to assist Watercare and the Waikato Regional Council in understanding the cultural effects of the activities authorised by the operation of the WTP.

The first meeting with the TWLG occurred in December 2022 and a second meeting in August 2023. No meeting occurred in 2024, with the next meeting scheduled for 7 October 2025. An overview of WTP performance and consent matters was provided in the first meetings. The TWLG have discussed preliminary ideas for the preferred cultural indicators, however, they have not appointed Kaitiaki Advisors to implement a Cultural Indicators Monitoring Plan. In 2025, several ideas for cultural monitoring were proposed to key members of the TWLG.

The Ecological Enhancement Plan for Haywards Landing was also discussed by the TWLG. The funding of \$2 million per annum to the Waikato River Clean-up Trust began in 2023 which will in part be allocated to the transformation of Haywards Landing. In the reporting period, payment was completed in January 2025. The ecological enhancement plan for Haywards Landing was required within two years of the commencement of the consent, being January 2025. An extension, requested jointly by Watercare and Te Whakakitenga o Waikato Incorporated, was approved by Waikato Regional Council, with the Ecological Enhancement Plan required by 31 October 2025. At the end of the reporting period, Watercare has provided a concept design for Haywards Landing to Te Whakakitenga o Waikato Incorporated and is on track to have the Ecological Enhancement Plan completed by 31 October.

For further details on use of the funds provided to the Waikato River Authority, please see their annual and five yearly reports here: <https://waikatoriver.org.nz/wra-key-documents/>

3 DISCHARGES TO THE WAIKATO RIVER

3.1 Types of discharges

3.1.1 Operational discharges

Resource consent AUTH137497.01.01 and AUTH14278.01.01 authorises the discharge of “*process water and/or other water*” and “*off-spec and process water*” from the Waikato and W50 WTPs respectively into the Waikato River. These include discharges from the treatment process itself, typically called “process discharges”, as well as discharges from maintenance activities. To differentiate between the two, the overall discharges authorised under these resource consents are collectively referred to as “operational discharges” in this report, which include the following:

- **Planned process discharges:** These discharges occur through the off-spec pipeline as a result of routine treatment plant processes. These include supernatant discharges from solids dewatering, membrane cleaning or backwash, and backwash or filter-to-waste discharges from the activated carbon filters.
- **Unplanned process discharges:** these may occur when there is a failure of control instruments and/or infrastructure resulting in overflows or rapid draining to prevent further damage. These are primarily discharged to the Waikato River via the off-spec pipeline but can also overflow into Wairiri Stream (referred to as the “unnamed tributary” in the resource consents) through two overflow points.
- **Maintenance discharges:** these are also discharged via the off-spec pipeline and include tank cleaning, replacement or commissioning of plant equipment or infrastructure, and periodical discharge of rainwater from chemical containment bunds.
- **Off-spec discharges:** these are discharged via the off-spec pipeline and comprises partially treated or fully treated water that does not comply with the standards established by the Water Services Act 2021.

3.1.2 Stormwater discharges

Authorised by resource consent AUTH137497.03.01, these discharges include stormwater from the WTP which is directed into a detention pond. When full, the detention pond discharges to the Wairiri Stream that runs adjacent to the WTP and flows into the Waikato River.

3.2 Quality of operational discharges

3.2.1 Introduction

Resource consents AUTH137497.01.01 and AUTH142778.01.01 requires the quality of operational discharges to be within the following limits from 25 May 2023 (stage two discharge):

- pH between 6.5-9
- Total residual chlorine ≤ 0.25 mg/L
- Fluoride ≤ 2 mg/L
- Total suspended solids ≤ 50 mg/L
- Soluble aluminium ≤ 4.0 mg/L.

The quality of operational discharges is summarised in the following sub-sections.

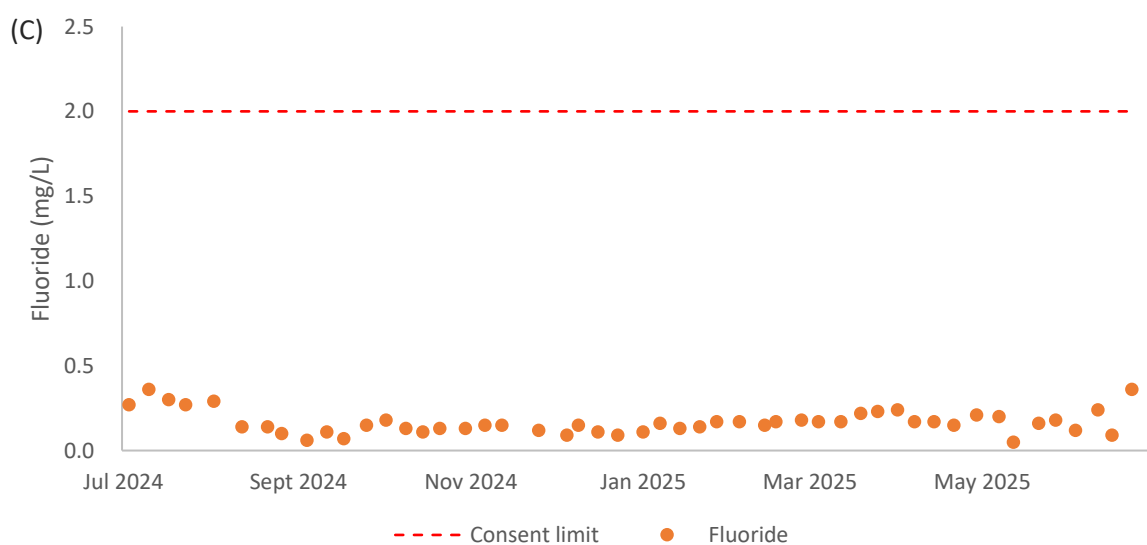
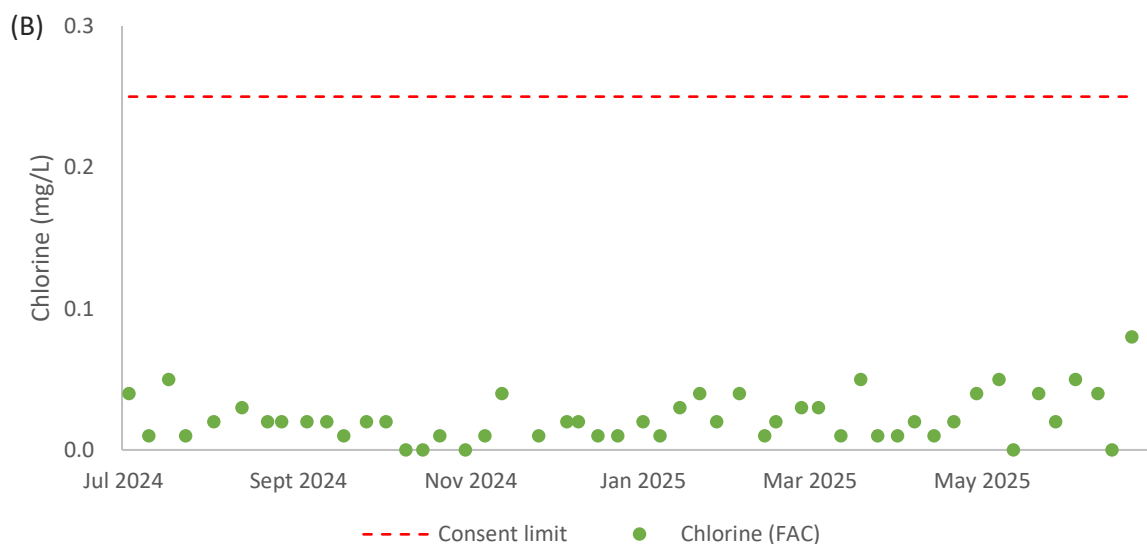
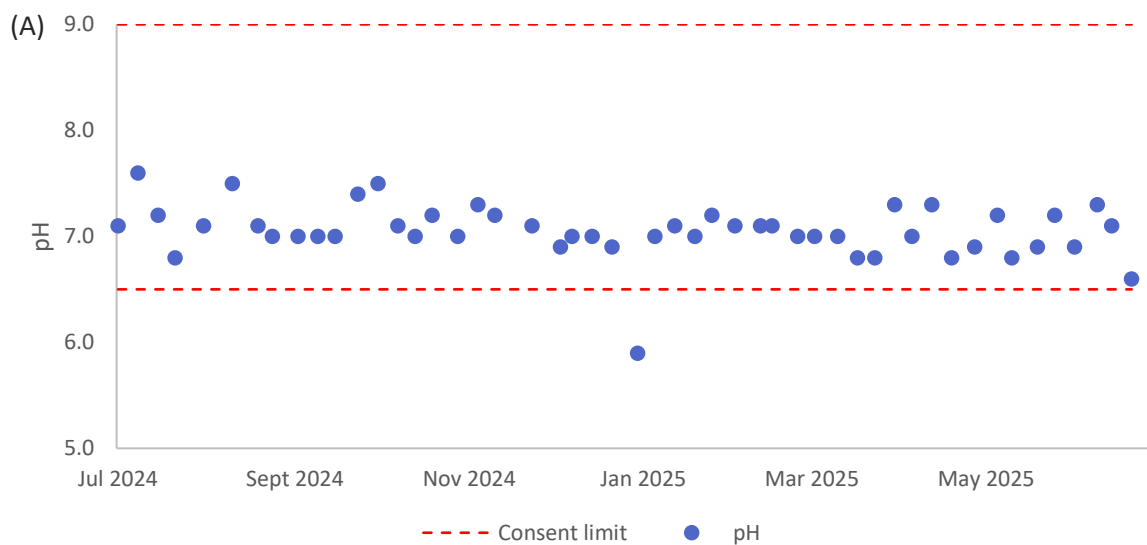
3.2.2 Planned process discharges

Samples of operational discharges are taken weekly from the off-spec pipeline and tested by WLS. Given these samples are taken once a week, they are representative of the planned process discharges which occur on a continuous basis. The off-spec pipeline discharges directly to the Waikato River and has two overflow points to the Wairiri Stream. The plant staff did not report any overflows to the stream in this reporting period. No glycerine discharges occurred in this monitoring period.

The sample results for the reporting period are presented in Appendix C and illustrated in Figure 3-1(A-E). As shown in Figure 3-1(A), there was one pH result below the minimum limit on 1 January 2025. Due to the elevated arsenic in the Waikato River at the time, the plant implemented enhanced coagulation by lowering the chemically conditioned water pH to approximately 6.0 and increasing aluminium sulphate dosing to precipitate arsenic for removal through settling and membrane filtration. The breach resulted from fine-tuning of chemical dosing during the early implementation phase of enhanced coagulation. The lower pH process water (5.8 - 6.0 pH) combined with backwash water from the biological activated carbon contactors created a discharge mixture that temporarily exceeded consent limits. Dosing refinements were undertaken, resulting in an increase in pH and a return to compliance, as shown in subsequent samples.

As shown in Figure 3-1(D), there were 6 occasions when total suspended solids exceeded the consent limit of 50 mg/L during routine monitoring:

- 21 August 2024. A fault with the thickener 3 valve caused an exceedance of 330 mg/L.
- 4 February 2025. Extensive investigation could not find an operational cause of the 77 mg/L exceedance. Concurrent onsite sampling returned a result of 26 mg/L, highlighting inconclusive evidence for compliance.
- 26 February and 3 March 2025. Exceedances of 110 mg/L and 470 mg/L were the result of two concurrent issues. At the time of sampling, the wastewater recycle tank was overflowing, likely causing the exceedances. Ongoing issues also persisted with discrepancies between the testing sampling and the lab testing.
- 29 April 2025. Investigation found the cause of the 73 mg/L exceedance was most likely to be related to a wastewater recycle tank overflow. Concurrent onsite sampling returned a result of 5 mg/L, highlighting ongoing issues with sampling confidence.
- 21 May 2025. The exceedance of 56 mg/L was caused by a fault with the wastewater recycle tank.



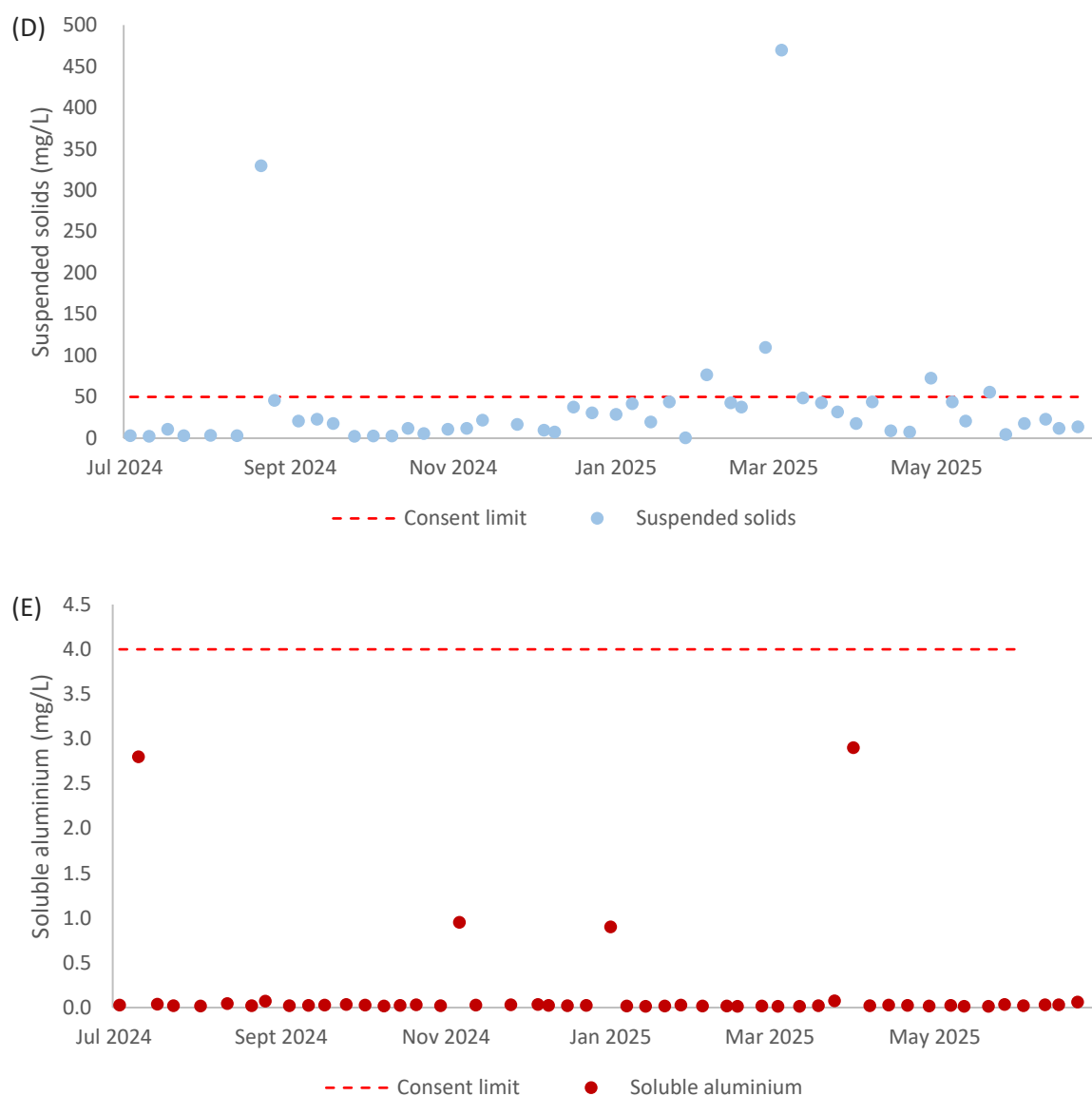


Figure 3-1(A-E): Discharge water quality results for the reporting period 2024-2025

3.2.3 Unplanned process discharges

As the unplanned process discharges are intermittent and unpredictable in nature, they are not always captured by routine weekly sampling. Notwithstanding this, the following is noted about unplanned discharges:

- Unplanned process discharges result from the Membrane Inlet Channel (MIC) and activated carbon filter overflows, which occur on average between two to three times per week and results on an average discharge volume of approximately 137 m³ each time
- No unplanned discharges contained chlorinated or fluoridated water
- The discharges made were all returned to the Waikato River via the off-spec pipeline
- Water that is discharged from the MIC has been coagulated and passed through the clarifiers
- Water that is discharged from the activated carbon filters inlet channel has passed through the membranes but not the activated carbon

- The pH of the water at the activated carbon filters inlet channel is between 6 and 7.

3.2.4 Maintenance discharges

In addition to the weekly monitoring by WLS, some sampling and testing is also carried out by the WTP operators during maintenance activities. The laboratory at the WTP is not IANZ accredited, however, they provide a useful indication of the water quality for these irregular, low volume/short duration discharges which can often happen outside of the routine sampling days.

The maintenance activities and results from in-house testing of discharges are summarised as follows:

- **Draining of chemical bunds:** Stormwater collected in the chemical bunds can only be drained by manual operation of a valve, the position of which is monitored by the plant control system and will generate an alarm if the valve is left open for more than 30 minutes. The water collected in the chemical containment bunds is tested for contaminants to confirm it meets discharge criteria before the bunds are drained to the off-spec pipeline. If the discharge criteria are not met, then a vacuum truck is used to remove the water in the containment bunds and dispose off-site. The water quality results for all tests are presented in Appendix D, including bund contents removed via truck. Water was removed via truck on several days throughout the reporting period, and all discharges to the environment met the consent criteria.
- **Draining of clarifiers:** In-house, non-accredited sampling and testing is undertaken during the planned draining of clarifiers. Details regarding these events and in-house test results are provided in Appendix E. As these samples were taken specifically during the discharge of clean out water from the clarifier, the total suspended solids (TSS) results can be high. It is noted that each clarifier draining event and result in an additional discharge of between 400 to 600 m³ into the off-spec pipeline, in combination with the near continuous planned process discharges. Several of the discharges were to geobags rather than the off-spec pipeline, with either significantly lower or no volumes discharged to the environment. These clarifier cleans are now conducted as full annual cleans to inspect for the gold clam, *Corbicula fluminea*.

In the 2024-2025 period, maintenance discharges resulted in three total suspended solids exceedances; 286 mg/L on 14 March 2025, 98 mg/L and 63 mg/L on 17 March 2025. These results occurred as part of the biological activated carbon (BAC) 3 media replacement project. During this, fine sediments from the new media were released during backwashing and discharged to the river along with other process water. Following the initial exceedance on 14 March, the mud valve from the chlorine contact tank was left open during subsequent backwashes to help reduce total suspended solids in the discharge.

3.3 Volume of operational discharges

3.3.1 Waikato WTP

Resource consent AUTH137497.01.01 for the Waikato WTP establishes a daily discharge volume limit of 20,000 m³ for the operational discharges or an instantaneous discharge rate not exceeding 2,450 L/s. As described in section 3.1, these include the planned and unplanned process discharges, as well as maintenance discharges.

The volume of total process discharges is calculated by adding all planned and unplanned discharges from the various parts of the treatment process and then subtracting the wastewater that is recycled back to the treatment. The maintenance discharges (e.g., from chemical bunds and clarifier drains) are then added to the process total to estimate the total daily volume of operational discharges. The volume for each clarifier draining event is typically between 400 to 600 m³, and so an average of 500 m³ has been used as an estimate for each event.

The daily volumes for the operational discharges are detailed in Appendix F and summarised in

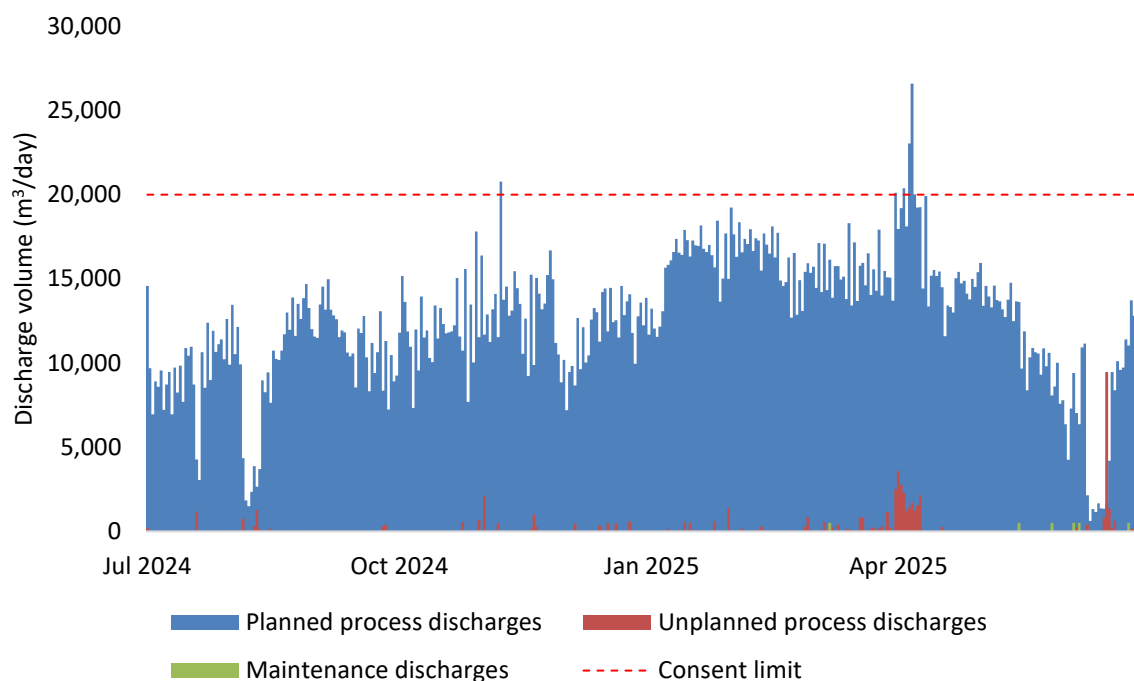


Figure 3-2. During the reporting period, the average total daily discharge volume was 12,935 m³, and a cumulative total of 4,708,497 m³. There were 10 days where the Waikato WTP exceeded its individual discharge limits:

- 7 November 2024: discharge volume of 20,782 m³
- 31 March to 3 April 2025: discharge volumes between 21,557 m³ to 22,656 m³
- 5 April to 9 April 2025: discharge volumes between 20,769 m³ to 28,315 m³.

On 7 November 2024, the filter to waste was operating for longer than recommended, allowing additional discharge to continue beyond the consented limit. In the March to April 2025 period, commissioning of BAC 3 resulted in an abnormally large volume of filter to waste and backwash waste discharging to the off-spec pipeline.

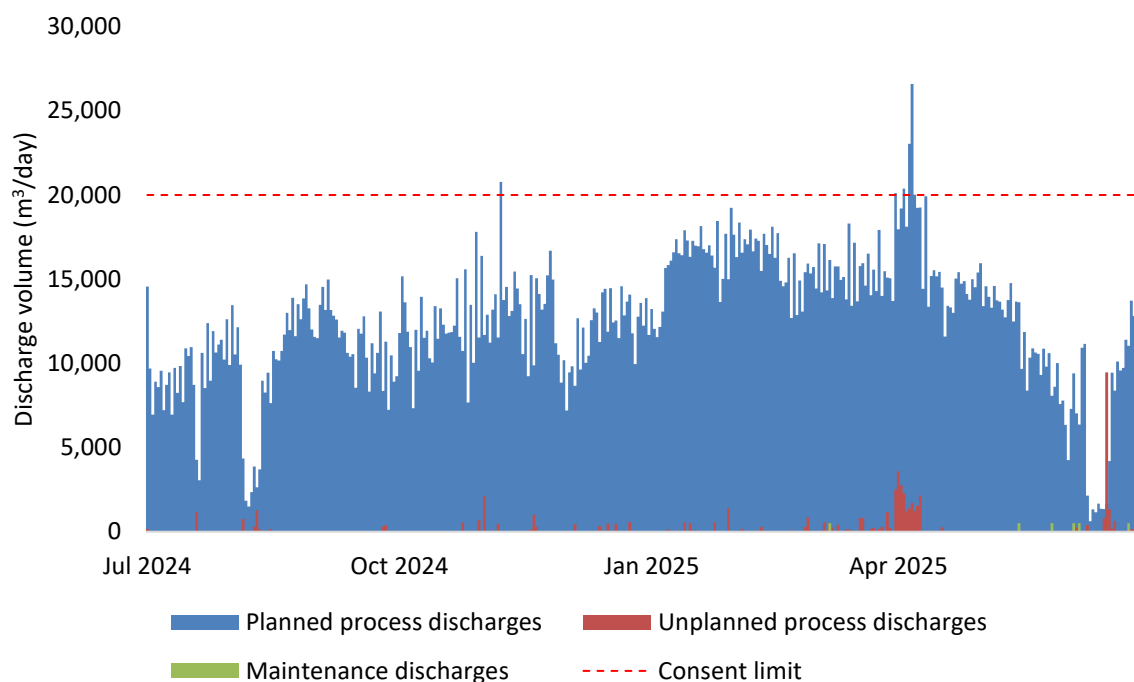


Figure 3-2: Daily process discharge volumes for the Waikato WTP for the reporting period 2024-2025

3.3.2 Waikato 50 WTP

Annual reporting of the Waikato 50 discharge volumes is not required by AUTH142778.01.01. However, condition 13 requires a summary of any non-compliances identified in each reporting period. In 2024-2025, there were three days where the Waikato 50 WTP exceeded its individual discharge limits:

- 17 January 2025: discharge volume of 5,096 m³
- 27 April 2025: discharge volume of 5,560 m³
- 7 May 2025: discharge volume of 5,017 m³.

In January, the plant was being run to waste as part of the preparations of bringing it back into service. The run to waste was scheduled to stop before the discharge limits were exceeded, however the drain valve on the contact tank was slow to close, leading to the exceedance. In April and May, Membrane Train 2 was turned off due to issues with the inlet valve not closing properly and allowing water to pass. However, this caused the train to overflow to the wash water system, where it overflowed to the off-spec line and caused the exceedance. All instances were investigated to prevent reoccurrence.

3.4 Treated off-spec water discharges

There were no discharges of the off-spec treated water (authorised under resource consent AUTH142778.01.01) during the reporting period.

3.5 Stormwater discharges

Stormwater runoff from the WTP is discharged to the Wairiri Stream via a treatment pond, designed to ensure discharges do not exceed a total suspended solids concentration of 50 g/m³. No process

discharges are connected to the installed stormwater pipework system. Stormwater from the grounds surrounding the WTP is diverted through collection drains that discharge to a culvert downstream of the detention pond to minimise the flow through the WTP stormwater system. Stormwater collected in the exterior chemical bunded areas are isolated, monitored and drained directly to the off-spec pipeline as described in Section 3.2.4.

No erosion or scouring was evident at the point of discharge. The discharge point has large gravel rocks (see Figure 3-3 and Figure 3-4), which slow high volume discharges and mitigate erosion.

The Wairiri Stream banks are gently sloping. Vegetation is limited in some sections of the stream, with small grasses and scrub. In other sections of the stream, vegetation is more developed with Mānuka, and various grasses close to the main path of the stream. There was no evidence of vegetation slumping because of discharges to the unnamed stream. Overall, no adverse effects from the stormwater discharges were identified during the 2024-2025 reporting period.



Figure 3-3: Discharge outlet location into the Wairiri Stream. View looking upstream.



Figure 3-4: Discharge outlet location into the Wairiri Stream. View looking downstream.

4 WATER CONSERVATION

4.1 Leakages from the raw water pipeline

There were no leakages from the Waikato 1 Treated Watermain between 1 July 2024 and 30 June 2025.

4.2 Water efficiency programme

Watercare has published the Auckland Water Efficiency Plan 2021 to 2025², which includes a section detailing its water efficiency programmes and achievements. In summary, Watercare's water efficiency strategy has four main pillars:

- **Municipal water efficiency programme:** related to reducing water use by Watercare itself, mainly through reuse at its treatment plants, and by Auckland Council, through initiatives targeted at saving 30% of water use.
- **Residential water efficiency programme:** includes working with schools and sports clubs to raise awareness and water-saving campaigns, and a partnership with EcoMatters to give households the opportunity to have their water use audited and receive a report on the water and dollar savings they can achieve through simple changes.
- **Commercial water efficiency programme:** involves working with key costumers to reduce demand from our largest users, through initiatives such as the digital meter roll-out project across high-use industrial users, schools and sports clubs.
- **Non-revenue water reduction programme:** related to initiatives focused on reducing three aspects of non-revenue water: leakage, under-reading of meters, and unauthorised use.

Watercare continues with its proactive leakage detection programme, which is effectively targeting areas for leakage surveying using its district meter areas and its Leakage Management System. We continue to optimise our water networks performance through our pressure management programme, which is reducing the number of leaks and their recurrence of them.

The average consumption of Aucklanders is 257 l/p/d which is within our target for water consumption.

More details on water efficiency initiatives, performance, challenges, targets, and strategies for the future are available directly in the Auckland Water Efficiency Plan 2021 to 2025.

² <https://waterefficiencyplan.watercare.co.nz/>

5 MEASURES TO PREVENT PESTS IN WATER

Condition 10 of consent AUTH960089.01.05 requires the plant to adopt all practicable means to ensure invasive plant and animal pests are not transferred to the Auckland Region. The WTP has been designed to prevent animal pests and invasive plants from entering the treated water. For example, all treated water must pass through the membranes that have a pore size of 0.035 microns, which is substantially smaller than any animal or plant. All treated water storage tanks in the treatment plant and along the pipeline have sealed access hatches that prevent entry of foreign matter.

In addition, the treated water pipeline has been designed to always operate under positive pressure, therefore preventing the possibility of ingress of groundwater, invasive plants or pests. Procedural controls are in place during maintenance works that require a drain-down to secure the empty sections and prevent ingress.

The invasive gold clam, *Corbicula fluminea* was first detected within the sand separators on 20 February 2024. As stated above, the treatment processes within the plant do not allow transfer of any animal species into the Auckland Region. Watercare has established protocols onsite to ensure the gold clams are not spread to Auckland through other means and continues to work with the Ministry for Primary Industries, Waikato Regional Council and Auckland Council to ensure best practice.

6 ENVIRONMENTAL INCIDENTS

There were no equipment failures, chemical spills or maintenance activities undertaken in the reporting period that resulted in any observed adverse environmental effects.

7 CONCLUSIONS

This report presents annual monitoring data for consents AUTH960089.01.05, AUTH131259.01.02, 960090, AUTH137497.02.01, AUTH960092.01.04, AUTH137497.03.01, AUTH137497.01.01 and AUTH142778.01.01.

The Waikato WTP exceeded the total suspended solids discharge limit specified in AUTH137497.01.01 during routine sampling on six occasions, with investigations finding causes were the thickener 3 valve, the wastewater recycle tank or unknown causes (Table 7-1). Three additional instances occurred over two days during a BAC 3 media replacement project, where the total suspended solids exceeded the discharge limit before entering the off-spec pipeline. These instances were detected through non-routine onsite sampling. These exceedances were unlikely to have caused any adverse effects due to their relatively short duration and the relatively large background variation in total suspended solids in the receiving environment.

Discharge volume exceedances at the Waikato WTP occurred on 10 days throughout the reporting period, with a maximum discharge of 28,315 m³ on 6 April 2025, primarily related to the BAC 3 media replacement. Additional discharge exceedances occurred at the Waikato 50 WTP, caused by the run-to-waste process and a fault with an inlet valve.

The Waikato, Waikato 50 and Waikato A WTPs were fully compliant across all other consents for the conditions considered in this report as shown in Table 7-1.

Table 7-1: Resource consent compliance summary for 2024-2025

Consent	Consent subcategory	Compliance status
AUTH960089.01.05	Water Take from Waikato River	Compliant
AUTH131259.01.02	Water Take from Waikato River	Compliant
960090	Diversion of water from culverts of an unnamed tributary	Compliant
AUTH137497.02.01	Discharge from back washing of intake screens into the Waikato River	Compliant
AUTH960092.01.04	Land Use intake structure and discharges	Compliant
AUTH137497.03.01	Discharge of stormwater into the Waikato River	Compliant
AUTH137497.01.01	Discharge of process and other water into the Waikato River	Non-compliant
AUTH142778.01.01	Discharge of off-spec and process water into the Waikato River	Non-compliant

Appendix A. Raw water quality data

Intake source	Component	Units	Min	Max	Average
Waikato	Confirmed Cryptosporidium (count)		0	0	0
Waikato	Confirmed Giardia (count)		0	0	0
Waikato	Presumptive Cryptosporidium (count)		0	0	0
Waikato	Presumptive Giardia (count)		1	1	1
Waikato	Colorseed Cryptosporidium Recovery	%	35	35	35
Waikato	Colorseed Giardia Recovery	%	35	35	35
Waikato	Confirmed Cryptosporidium	/10 L	0	0	0
Waikato	Confirmed Giardia	/10 L	0	0	0
Waikato	Presumptive Cryptosporidium	/10 L	0	0	0
Waikato	Presumptive Giardia	/10 L	0.67	0.67	0.67
Waikato	Acetochlor	µg/L	0	0	0
Waikato	Alachlor	µg/L	0	0	0
Waikato	Aldicarb	µg/L	0	0	0
Waikato	AMPA	µg/L	0	0	0
Waikato	Anatoxin-a	µg/L	0	0.33	0.017
Waikato	Anatoxins - excl. congener dihydrohomoanatoxin-a (expressed as anatoxin-a toxicity equivalents)	µg/L	0	0.33	0.012
Waikato	Anatoxins-Total - excl. congener dihydrohomoanatoxin-a	µg/L	0	0.33	0.014
Waikato	Atrazine	µg/L	0	0	0
Waikato	Atrazine desethyl	µg/L	0	0	0
Waikato	Atrazine desisopropyl	µg/L	0	0	0
Waikato	Azaconazole	µg/L	0	0	0
Waikato	Azinphos methyl	µg/L	0	0	0
Waikato	Benalaxyl	µg/L	0	0	0
Waikato	Bitertanol	µg/L	0	0	0
Waikato	Bromacil	µg/L	0	0	0
Waikato	Butachlor	µg/L	0	0	0
Waikato	Carbaryl	µg/L	0	0	0
Waikato	Carbofuran	µg/L	0	0	0
Waikato	Chlorfluazuron	µg/L	0	0	0
Waikato	Chlorpyrifos	µg/L	0	0	0
Waikato	Chlorpyrifos methyl	µg/L	0	0	0
Waikato	Chlortoluron	µg/L	0	0	0
Waikato	Cyanazine	µg/L	0	0	0
Waikato	Cylindrospermopsin	µg/L	0	0	0
Waikato	Cylindrospermopsin (expressed as cylindrospermopsin toxicity equivalents)	µg/L	0	0	0
Waikato	Diazinon	µg/L	0	0	0
Waikato	Dichlorvos	µg/L	0	0	0
Waikato	Difenoconazole	µg/L	0	0	0
Waikato	Dihydroanatoxin-a	µg/L	0	0	0

Intake source	Component	Units	Min	Max	Average
Waikato	Dimethoate	µg/L	0	0	0
Waikato	Diquat	µg/L	0	0	0
Waikato	Diuron	µg/L	0	0	0
Waikato	Fenpropimorph	µg/L	0	0	0
Waikato	Fluazifop butyl	µg/L	0	0	0
Waikato	Fluometuron	µg/L	0	0	0
Waikato	Flusilazole	µg/L	0	0	0
Waikato	Fluvalinate tau	µg/L	0	0	0
Waikato	Furalaxyl	µg/L	0	0	0
Waikato	Glufosinate	µg/L	0	0	0
Waikato	Glyphosate	µg/L	0	0	0
Waikato	Haloxypop methyl	µg/L	0	0	0
Waikato	Hexaconazole	µg/L	0	0	0
Waikato	Hexazinone	µg/L	0	0	0
Waikato	Homoanatoxin-a	µg/L	0	0	0
Waikato	Hydroxyatrazine	µg/L	0	0	0
Waikato	Imazapyr	µg/L	0	0	0
Waikato	IPBC	µg/L	0	0	0
Waikato	Isoproturon	µg/L	0	0	0
Waikato	Kresoxim methyl	µg/L	0	0	0
Waikato	Linuron	µg/L	0	0	0
Waikato	Malathion	µg/L	0	0	0
Waikato	Metalaxyl	µg/L	0	0	0
Waikato	Metolachlor	µg/L	0	0	0
Waikato	Metribuzin	µg/L	0	0	0
Waikato	Metsulfuron	µg/L	0	0	0
Waikato	Microcystin-LR	µg/L	0	0	0
Waikato	Microcystin-RR	µg/L	0	0	0
Waikato	Microcystins (expressed as microcystin-LR toxicity equivalents)	µg/L	0	0	0
Waikato	Microcystins/nodularins (expressed as microcystin-LR toxicity equivalents)	µg/L	0	0	0
Waikato	Microcystins-Total	µg/L	0	0	0
Waikato	Microcystin-YR	µg/L	0	0	0
Waikato	Molinate	µg/L	0	0	0
Waikato	Myclobutanil	µg/L	0	0	0
Waikato	Nodularin	µg/L	0	0	0
Waikato	Norflurazon	µg/L	0	0	0
Waikato	Oryzalin	µg/L	0	0	0
Waikato	Oxadiazon	µg/L	0	0	0
Waikato	Paclobutrazol	µg/L	0	0	0
Waikato	Paraquat	µg/L	0	0	0
Waikato	Parathion ethyl	µg/L	0	0	0

Intake source	Component	Units	Min	Max	Average
Waikato	Pendimethalin	µg/L	0	0	0
Waikato	Pirimicarb	µg/L	0	0	0
Waikato	Pirimiphos methyl	µg/L	0	0	0
Waikato	Primisulfuron methyl	µg/L	0	0	0
Waikato	Prochloraz	µg/L	0	0	0
Waikato	Prometryn	µg/L	0	0	0
Waikato	Propachlor	µg/L	0	0	0
Waikato	Propanil	µg/L	0	0	0
Waikato	Propazine	µg/L	0	0	0
Waikato	Propiconazole	µg/L	0	0	0
Waikato	Pyriproxyfen	µg/L	0	0	0
Waikato	Quizalofop ethyl	µg/L	0	0	0
Waikato	Simazine	µg/L	0	0	0
Waikato	Simetryn	µg/L	0	0	0
Waikato	Sulfentrazone	µg/L	0	0	0
Waikato	Sum of atrazine and its metabolites	µg/L	0	0	0
Waikato	TCMTB	µg/L	0	0	0
Waikato	Tebuconazole	µg/L	0	0	0
Waikato	Terbacil	µg/L	0	0	0
Waikato	Terbufos	µg/L	0	0	0
Waikato	Terbumeton	µg/L	0	0	0
Waikato	Terbuthylazine	µg/L	0	0	0
Waikato	Terbuthylazine desethyl	µg/L	0	0	0
Waikato	Terbutryn	µg/L	0	0	0
Waikato	Thiabendazole	µg/L	0	0	0
Waikato	Thiobencarb	µg/L	0	0	0
Waikato	Triazophos	µg/L	0	0	0
Waikato	Algae & Cyanobacteria biovolume	µm ³ /mL	81000	4.7E+07	4980761
Waikato	Cyanobacteria biovolume	µm ³ /mL	0	150000	18199.2
Waikato	UV Absorption at 254 nm	abs units	0.054	0.24	0.12333
Waikato	Algae & Cyanobacteria cells	cells/mL	650	21000	4225.22
Waikato	Cyanobacteria cells	cells/mL	0	5300	730.567
Waikato	HPC (22°C)	cfu/mL	0	13000	3583.33
Waikato	Algae & Cyanobacteria colonies	colonies/mL	380	17000	2307.31
Waikato	Cyanobacteria colonies	colonies/mL	0	480	63.5373
Waikato	True Colour (Dissolved)	Hazen Units	5	30	15.8333
Waikato	1,1,1,2-Tetrachloroethane	mg/L	0	0	0
Waikato	1,1,1-Trichloroethane	mg/L	0	0	0
Waikato	1,1,2,2-Tetrachloroethane	mg/L	0	0	0
Waikato	1,1,2-Trichloroethane	mg/L	0	0	0
Waikato	1,1-Dichloroethane	mg/L	0	0	0
Waikato	1,1-Dichloroethene	mg/L	0	0	0
Waikato	1,1-Dichloropropene	mg/L	0	0	0

Intake source	Component	Units	Min	Max	Average
Waikato	1,2,3-Trichlorobenzene	mg/L	0	0	0
Waikato	1,2,3-Trichloropropane	mg/L	0	0	0
Waikato	1,2,4-Trichlorobenzene	mg/L	0	0	0
Waikato	1,2,4-Trimethylbenzene	mg/L	0	0	0
Waikato	1,2-Dibromo-3-chloropropane	mg/L	0	0	0
Waikato	1,2-Dibromoethane	mg/L	0	0	0
Waikato	1,2-Dichlorobenzene	mg/L	0	0	0
Waikato	1,2-Dichloroethane	mg/L	0	0	0
Waikato	1,2-Dichloroethene (cis + trans)	mg/L	0	0	0
Waikato	1,2-Dichloropropane	mg/L	0	0	0
Waikato	1,3,5-Trimethylbenzene	mg/L	0	0	0
Waikato	1,3-Dichlorobenzene	mg/L	0	0	0
Waikato	1,3-Dichloropropane	mg/L	0	0	0
Waikato	1,3-Dichloropropene (cis + trans)	mg/L	0	0	0
Waikato	1,4-Dichlorobenzene	mg/L	0	0	0
Waikato	1080 (Sodium fluoroacetate)	mg/L	0	0	0
Waikato	1-1-1-Trichloro-2-propanone	mg/L	0	0	0
Waikato	1-1-Dichloro-2-propanone	mg/L	0	0	0
Waikato	2,2-Dichloropropane	mg/L	0	0	0
Waikato	2,3,4,6-tetrachlorophenol	mg/L	0	0	0
Waikato	2,4,5-trichlorophenol	mg/L	0	0	0
Waikato	2,4,5-Trichlorophenoxyacetic acid	mg/L	0	0	0
Waikato	2,4,6-trichlorophenol	mg/L	0	0	0
Waikato	2,4-dichlorophenol	mg/L	0	0	0
Waikato	2,4-Dichlorophenoxyacetic acid (2,4-D)	mg/L	0	0	0
Waikato	2,4-dimethylphenol	mg/L	0	0	0
Waikato	2,4-dinitrotoluene	mg/L	0	0	0
Waikato	2,6-dichlorophenol	mg/L	0	0	0
Waikato	2,6-Dinitrotoluene	mg/L	0	0	0
Waikato	2-chloronaphthalene	mg/L	0	0	0
Waikato	2-chlorophenol	mg/L	0	0	0
Waikato	2-Chlorotoluene	mg/L	0	0	0
Waikato	2-methyl 4,6-dinitrophenol	mg/L	0	0	0
Waikato	2-methylnaphthalene	mg/L	0	0	0
Waikato	2-methylphenol	mg/L	0	0	0
Waikato	2-nitrophenol	mg/L	0	0	0
Waikato	4-(2,4-Dichlorophenoxy) butanoic acid	mg/L	0	0	0
Waikato	4,4'-DDD	mg/L	0	0	0
Waikato	4,4'-DDE	mg/L	0	0	0
Waikato	4,4'-DDT	mg/L	0	0	0
Waikato	4-bromophenylphenyl ether	mg/L	0	0	0

Intake source	Component	Units	Min	Max	Average
Waikato	4-Chloro-3-methylphenol	mg/L	0	0	0
Waikato	4-chlorophenylphenyl ether	mg/L	0	0	0
Waikato	4-Chlorotoluene	mg/L	0	0	0
Waikato	4-methylphenol	mg/L	0	0	0
Waikato	Acenaphthene	mg/L	0	0	0
Waikato	Acenaphthylene	mg/L	0	0	0
Waikato	Aldrin	mg/L	0	0	0
Waikato	Alpha-Chlordane	mg/L	0	0	0
Waikato	Aluminium (Dissolved)	mg/L	0.0066	0.14	0.03527
Waikato	Aluminium (Total)	mg/L	0.11	1.8	0.51816
Waikato	Ammoniacal Nitrogen (as N)	mg/L	0.0077	0.03	0.01812
Waikato	Anthracene	mg/L	0	0	0
Waikato	Antimony (Total)	mg/L	0	0	0
Waikato	Arsenic (Dissolved)	mg/L	0.007	0.019	0.01484
Waikato	Arsenic (Total)	mg/L	0.0073	0.021	0.01583
Waikato	BAP Equivalent	mg/L	0	0	0
Waikato	Barium (Total)	mg/L	0.019	0.032	0.02483
Waikato	Bentazone	mg/L	0	0	0
Waikato	Benzene	mg/L	0	0	0
Waikato	Benzo(a)anthracene	mg/L	0	0	0
Waikato	Benzo(a)pyrene	mg/L	0	0	0
Waikato	Benzo(b)fluoranthene	mg/L	0	0	0
Waikato	Benzo(ghi)perylene	mg/L	0	0	0
Waikato	Benzo(k)fluoranthene	mg/L	0	0	0
Waikato	Beryllium (Total)	mg/L	0	0	0
Waikato	BHC alpha	mg/L	0	0	0
Waikato	BHC beta	mg/L	0	0	0
Waikato	BHC delta	mg/L	0	0	0
Waikato	bis(2-chloroethoxy)methane	mg/L	0	0	0
Waikato	bis(2-chloroethyl) ether	mg/L	0	0	0
Waikato	bis(2-chloroisopropyl) ether	mg/L	0	0	0
Waikato	Bis(2-ethylhexyl)adipate	mg/L	0	0	0
Waikato	bis(2-ethylhexyl)phthalate	mg/L	0	0	0
Waikato	Boron (Total)	mg/L	0.12	0.21	0.16833
Waikato	Bromate	mg/L	0	0	0
Waikato	Bromide	mg/L	0.04	0.056	0.04732
Waikato	Bromoacetic Acid	mg/L	0	0	0
Waikato	Bromobenzene	mg/L	0	0	0
Waikato	Bromochloroacetic Acid	mg/L	0	0	0
Waikato	Bromochloroacetonitrile	mg/L	0	0	0
Waikato	Bromodichloromethane	mg/L	0	0	0
Waikato	Bromoform	mg/L	0	0	0
Waikato	Bromomethane	mg/L	0	0	0

Intake source	Component	Units	Min	Max	Average
Waikato	Butylbenzyl phthalate	mg/L	0	0	0
Waikato	Cadmium (Total)	mg/L	0	0	0
Waikato	Calcium (Total)	mg/L	5.2	8.6	6.93571
Waikato	Calcium Hardness (as CaCO ₃) (Total)	mg/L	13	22	17.4444
Waikato	Carbazole	mg/L	0	0	0
Waikato	Carbon tetrachloride	mg/L	0	0	0
Waikato	Chloral hydrate	mg/L	0	0	0
Waikato	Chlorate	mg/L	0	0	0
Waikato	Chloride	mg/L	0.066	17.6	14.8841
Waikato	Chlorite	mg/L	0	0	0
Waikato	Chloroacetic Acid	mg/L	0	0	0
Waikato	Chlorobenzene	mg/L	0	0	0
Waikato	Chloroform	mg/L	0	0	0
Waikato	Chloromethane	mg/L	0	0	0
Waikato	Chlorophyll A	mg/L	0	0.02	0.00714
Waikato	Chloropicrin	mg/L	0	0	0
Waikato	Chromium (Total)	mg/L	0.00051	0.001	0.00067
Waikato	Chrysene	mg/L	0	0	0
Waikato	cis-1,3-Dichloropropene	mg/L	0	0	0
Waikato	cis-1-2-dichloroethylene	mg/L	0	0	0
Waikato	cis-Permethrin	mg/L	0	0	0
Waikato	COD (as O ₂)	mg/L	24	24	24
Waikato	Copper (Total)	mg/L	0.00044	0.0014	0.00074
Waikato	Cyanogen Chloride	mg/L	0	0	0
Waikato	Dibenzo(ah)anthracene	mg/L	0	0	0
Waikato	Dibenzofuran	mg/L	0	0	0
Waikato	Dibromoacetic Acid	mg/L	0	0	0
Waikato	Dibromoacetonitrile	mg/L	0	0	0
Waikato	Dibromochloromethane	mg/L	0	0	0
Waikato	Dibromomethane	mg/L	0	0	0
Waikato	Dicamba	mg/L	0	0	0
Waikato	Dichloroacetic Acid	mg/L	0	0	0
Waikato	Dichloroacetonitrile	mg/L	0	0	0
Waikato	Dichlorodifluoromethane	mg/L	0	0	0
Waikato	Dichloroprop	mg/L	0	0	0
Waikato	Dieldrin	mg/L	0	0	0
Waikato	Diethyl phthalate	mg/L	0	0	0
Waikato	Dimethyl phthalate	mg/L	0	0	0
Waikato	Di-n-butyl phthalate	mg/L	0	0	0
Waikato	Di-n-octyl phthalate	mg/L	0	0	0
Waikato	Dinoseb	mg/L	0	0	0
Waikato	Diphenylhydrazine	mg/L	0	0	0
Waikato	Dissolved Organic Carbon	mg/L	1	5.2	2.1383

Intake source	Component	Units	Min	Max	Average
Waikato	Dissolved Reactive Phosphorus (as P)	mg/L	0.008	0.028	0.02142
Waikato	Endosulfan I	mg/L	0	0	0
Waikato	Endosulfan II	mg/L	0	0	0
Waikato	Endosulfan sulfate	mg/L	0	0	0
Waikato	Endrin	mg/L	0	0	0
Waikato	Endrin aldehyde	mg/L	0	0	0
Waikato	Epichlorohydrin	mg/L	0	0	0
Waikato	Ethylbenzene	mg/L	0	0	0
Waikato	Ethylchloride	mg/L	0	0	0
Waikato	Fenoprop (Silvex)	mg/L	0	0	0
Waikato	Fluoranthene	mg/L	0	0	0
Waikato	Fluorene	mg/L	0	0	0
Waikato	Fluoride	mg/L	0.09	0.19	0.13786
Waikato	Fluorotrichloromethane	mg/L	0	0	0
Waikato	Formaldehyde	mg/L	0	0.4	0.1
Waikato	Gamma-chlordane	mg/L	0	0	0
Waikato	Heptachlor	mg/L	0	0	0
Waikato	Heptachlor epoxide	mg/L	0	0	0
Waikato	Hexachlorobenzene	mg/L	0	0	0
Waikato	Hexachlorobutadiene	mg/L	0	0	0
Waikato	Hexachlorocyclopentadiene	mg/L	0	0	0
Waikato	Hexachloroethane	mg/L	0	0	0
Waikato	Indeno(1,2,3,c,d)pyrene	mg/L	0	0	0
Waikato	Iodide	mg/L	0	0.0042	0.00142
Waikato	Iron (Dissolved)	mg/L	0.054	0.26	0.14883
Waikato	Iron (Total)	mg/L	0.22	1.5	0.765
Waikato	Isophorone	mg/L	0	0	0
Waikato	iso-Propylbenzene	mg/L	0	0	0
Waikato	Lead (Total)	mg/L	0.0002	0.00054	0.00033
Waikato	Lindane (BHC gamma)	mg/L	0	0	0
Waikato	Lithium (Total)	mg/L	0.039	0.068	0.0545
Waikato	Lontrel	mg/L	0	0	0
Waikato	m- & p-Xylene	mg/L	0	0	0
Waikato	Magnesium (Total)	mg/L	2.3	2.9	2.63571
Waikato	Magnesium Hardness (as CaCO ₃) (Total)	mg/L	9.9	12	11.1
Waikato	Manganese (Dissolved)	mg/L	0.00079	0.021	0.00963
Waikato	Manganese (Total)	mg/L	0.024	0.074	0.05129
Waikato	MCPA	mg/L	0	0	0
Waikato	MCPB	mg/L	0	0	0
Waikato	Mecoprop (MCP)	mg/L	0	0	0
Waikato	Mercury (Total)	mg/L	0	0.00012	8.6E-06
Waikato	Methoxychlor	mg/L	0	0	0

Intake source	Component	Units	Min	Max	Average
Waikato	Methylene chloride	mg/L	0	0	0
Waikato	Molybdenum (Total)	mg/L	0	0.00042	0.00028
Waikato	Naphthalene	mg/L	0	0	0
Waikato	n-Butylbenzene	mg/L	0	0	0
Waikato	Nickel (Total)	mg/L	0.00023	0.00086	0.00043
Waikato	Nitrate (as N)	mg/L	0.116	0.744	0.45064
Waikato	Nitrite (as N)	mg/L	0	0.0036	0.00097
Waikato	Nitrite (as N) + Nitrate (as N)	mg/L	0.12	0.74	0.455
Waikato	Nitrobenzene	mg/L	0	0	0
Waikato	n-nitrosodi-n-propylamine	mg/L	0	0	0
Waikato	n-Nitrosodiphenylamine	mg/L	0	0	0
Waikato	n-Propylbenzene	mg/L	0	0	0
Waikato	o-Xylene	mg/L	0	0	0
Waikato	Pentachlorophenol	mg/L	0	0	0
Waikato	Perchlorate	mg/L	0	0	0
Waikato	Phenanthrene	mg/L	0	0	0
Waikato	Phenol	mg/L	0	0	0
Waikato	Picloram	mg/L	0	0	0
Waikato	p-Isopropyltoluene	mg/L	0	0	0
Waikato	Potassium (Total)	mg/L	3	3.4	3.23333
Waikato	Pyrene	mg/L	0	0	0
Waikato	sec-Butylbenzene	mg/L	0	0	0
Waikato	Selenium (Total)	mg/L	0	0	0
Waikato	Silicon (as Silica) (Total)	mg/L	30	37	32
Waikato	Silver (Total)	mg/L	0	0	0
Waikato	Sodium (Total)	mg/L	13	19	15.3333
Waikato	Styrene	mg/L	0	0	0
Waikato	Sulphate	mg/L	9	13.8	10.19
Waikato	tert-Butylbenzene	mg/L	0	0	0
Waikato	Tetrachloroethylene	mg/L	0	0	0
Waikato	Tin (Total)	mg/L	0	0	0
Waikato	Toluene	mg/L	0	0	0
Waikato	Total Alkalinity (as CaCO ₃)	mg/L	26	43	37.0408
Waikato	Total Cyanide	mg/L	0	0	0
Waikato	Total Dissolved Solids	mg/L	110	150	124.167
Waikato	Total Hardness (as CaCO ₃)	mg/L	24	33	28.0909
Waikato	Total Kjeldahl Nitrogen (as N)	mg/L	0.159	0.41	0.2895
Waikato	Total Nitrogen (as N)	mg/L	0.35	1.2	0.69917
Waikato	Total Organic Carbon	mg/L	1.5	4.1	2.575
Waikato	Total Phosphorus (as P)	mg/L	0.041	0.127	0.05858
Waikato	Total Solids	mg/L	120	160	139.167
Waikato	Total Suspended Solids	mg/L	5	25	14.2714
Waikato	trans-1,2-Dichloroethene	mg/L	0	0	0

Intake source	Component	Units	Min	Max	Average
Waikato	trans-1,3-Dichloropropene	mg/L	0	0	0
Waikato	trans-Permethrin	mg/L	0	0	0
Waikato	Trichloroacetic Acid	mg/L	0	0	0
Waikato	Trichloroacetoneitrile	mg/L	0	0	0
Waikato	Trichloroethylene	mg/L	0	0	0
Waikato	Triclopyr	mg/L	0	0	0
Waikato	Trihalomethanes - Total	mg/L	0	0	0
Waikato	Uranium (Total)	mg/L	2.2E-05	6E-05	3.8E-05
Waikato	Vinyl chloride	mg/L	0	0	0
Waikato	Xylenes (Total)	mg/L	0	0	0
Waikato	Zinc (Total)	mg/L	0.0021	0.0055	0.00317
Waikato	Escherichia coli	MPN/100mL	41	5200	465.979
Waikato	Total Coliforms	MPN/100mL	460	20000	4030.21
Waikato	Conductivity (at 25 °C)	mS/m	13	16.8	15.2071
Waikato	2,4,6-trichloroanisole	ng/L	0	0	0
Waikato	2-isobutyl-3-methoxypyrazine	ng/L	0	0	0
Waikato	2-isopropyl-3-methoxypyrazine	ng/L	0	0	0
Waikato	2-methylisoborneol	ng/L	0	3.8	0.41481
Waikato	Geosmin	ng/L	1.4	210	15.6
Waikato	Turbidity	NTU	2.2	27	8.69574
Waikato	pH	pH unit	6.9	8	7.50851
Waikato	Salinity	ppt	0	0	0
Waikato 50	Acetochlor	µg/L	0	0	0
Waikato 50	Alachlor	µg/L	0	0	0
Waikato 50	Aldicarb	µg/L	0	0	0
Waikato 50	AMPA	µg/L	0	0	0
Waikato 50	Anatoxin-a	µg/L	0	0	0
Waikato 50	Anatoxins - excl. congener dihydrohomoanatoxin-a (expressed as anatoxin-a toxicity equivalents)	µg/L	0	0	0
Waikato 50	Anatoxins-Total - excl. congener dihydrohomoanatoxin-a	µg/L	0	0	0
Waikato 50	Atrazine	µg/L	0	0	0
Waikato 50	Atrazine desethyl	µg/L	0	0	0
Waikato 50	Atrazine desisopropyl	µg/L	0	0	0
Waikato 50	Azaconazole	µg/L	0	0	0
Waikato 50	Azinphos methyl	µg/L	0	0	0
Waikato 50	Benalaxyl	µg/L	0	0	0
Waikato 50	Bitertanol	µg/L	0	0	0
Waikato 50	Bromacil	µg/L	0	0	0
Waikato 50	Butachlor	µg/L	0	0	0
Waikato 50	Carbaryl	µg/L	0	0	0
Waikato 50	Carbofuran	µg/L	0	0	0
Waikato 50	Chlorfluazuron	µg/L	0	0	0

Intake source	Component	Units	Min	Max	Average
Waikato 50	Chlorpyrifos	µg/L	0	0	0
Waikato 50	Chlorpyrifos methyl	µg/L	0	0	0
Waikato 50	Chlortoluron	µg/L	0	0	0
Waikato 50	Cyanazine	µg/L	0	0	0
Waikato 50	Cylindrospermopsin	µg/L	0	0	0
Waikato 50	Cylindrospermopsin (expressed as cylindrospermopsin toxicity equivalents)	µg/L	0	0	0
Waikato 50	Diazinon	µg/L	0	0	0
Waikato 50	Dichlorvos	µg/L	0	0	0
Waikato 50	Difenoconazole	µg/L	0	0	0
Waikato 50	Dihydroanatoxin-a	µg/L	0	0	0
Waikato 50	Dimethoate	µg/L	0	0	0
Waikato 50	Diquat	µg/L	0	0	0
Waikato 50	Diuron	µg/L	0	0	0
Waikato 50	Fenpropimorph	µg/L	0	0	0
Waikato 50	Fluazifop butyl	µg/L	0	0	0
Waikato 50	Fluometuron	µg/L	0	0	0
Waikato 50	Flusilazole	µg/L	0	0	0
Waikato 50	Fluvalinate tau	µg/L	0	0	0
Waikato 50	Furalaxyl	µg/L	0	0	0
Waikato 50	Glufosinate	µg/L	0	0	0
Waikato 50	Glyphosate	µg/L	0	0.11	0.00647
Waikato 50	Haloxifop methyl	µg/L	0	0	0
Waikato 50	Hexaconazole	µg/L	0	0	0
Waikato 50	Hexazinone	µg/L	0	0	0
Waikato 50	Homoanatoxin-a	µg/L	0	0	0
Waikato 50	Hydroxyatrazine	µg/L	0	0	0
Waikato 50	Imazapyr	µg/L	0	0	0
Waikato 50	IPBC	µg/L	0	0	0
Waikato 50	Isoproturon	µg/L	0	0	0
Waikato 50	Kresoxim methyl	µg/L	0	0	0
Waikato 50	Linuron	µg/L	0	0	0
Waikato 50	Malathion	µg/L	0	0	0
Waikato 50	Metalaxyl	µg/L	0	0	0
Waikato 50	Metolachlor	µg/L	0	0	0
Waikato 50	Metribuzin	µg/L	0	0	0
Waikato 50	Metsulfuron	µg/L	0	0	0
Waikato 50	Microcystin-LR	µg/L	0	0	0
Waikato 50	Microcystin-RR	µg/L	0	0	0
Waikato 50	Microcystins (expressed as microcystin-LR toxicity equivalents)	µg/L	0	0	0

Intake source	Component	Units	Min	Max	Average
Waikato 50	Microcystins/nodularins (expressed as microcystin-LR toxicity equivalents)	µg/L	0	0	0
Waikato 50	Microcystins-Total	µg/L	0	0	0
Waikato 50	Microcystin-YR	µg/L	0	0	0
Waikato 50	Molinate	µg/L	0	0	0
Waikato 50	Myclobutanil	µg/L	0	0	0
Waikato 50	Nodularin	µg/L	0	0	0
Waikato 50	Norflurazon	µg/L	0	0	0
Waikato 50	Oryzalin	µg/L	0	0	0
Waikato 50	Oxadiazon	µg/L	0	0	0
Waikato 50	Paclobutrazol	µg/L	0	0	0
Waikato 50	Paraquat	µg/L	0	0	0
Waikato 50	Parathion ethyl	µg/L	0	0	0
Waikato 50	Pendimethalin	µg/L	0	0	0
Waikato 50	Pirimicarb	µg/L	0	0	0
Waikato 50	Pirimiphos methyl	µg/L	0	0	0
Waikato 50	Primisulfuron methyl	µg/L	0	0	0
Waikato 50	Prochloraz	µg/L	0	0	0
Waikato 50	Prometryn	µg/L	0	0	0
Waikato 50	Propachlor	µg/L	0	0	0
Waikato 50	Propanil	µg/L	0	0	0
Waikato 50	Propazine	µg/L	0	0	0
Waikato 50	Propiconazole	µg/L	0	0	0
Waikato 50	Pyriproxyfen	µg/L	0	0	0
Waikato 50	Quizalofop ethyl	µg/L	0	0	0
Waikato 50	Simazine	µg/L	0	0	0
Waikato 50	Simetryn	µg/L	0	0	0
Waikato 50	Sulfentrazone	µg/L	0	0	0
Waikato 50	Sum of atrazine and its metabolites	µg/L	0	0	0
Waikato 50	TCMTB	µg/L	0	0	0
Waikato 50	Tebuconazole	µg/L	0	0	0
Waikato 50	Terbacil	µg/L	0	0	0
Waikato 50	Terbufos	µg/L	0	0	0
Waikato 50	Terbumeton	µg/L	0	0	0
Waikato 50	Terbuthylazine	µg/L	0	0	0
Waikato 50	Terbuthylazine desethyl	µg/L	0	0	0
Waikato 50	Terbutryn	µg/L	0	0	0
Waikato 50	Thiabendazole	µg/L	0	0	0
Waikato 50	Thiobencarb	µg/L	0	0	0
Waikato 50	Triazophos	µg/L	0	0	0
Waikato 50	Algae & Cyanobacteria biovolume	µm ³ /mL	130000	1.6E+07	2633333
Waikato 50	Cyanobacteria biovolume	µm ³ /mL	0	85000	11618.7

Intake source	Component	Units	Min	Max	Average
Waikato 50	UV Absorption at 254 nm	abs units	0.051	0.39	0.15022
Waikato 50	Algae & Cyanobacteria cells	cells/mL	160	6900	2761.67
Waikato 50	Cyanobacteria cells	cells/mL	0	6000	562
Waikato 50	HPC (22°C)	cfu/mL	3300	5200	4200
Waikato 50	Algae & Cyanobacteria colonies	colonies/mL	100	3400	1242.67
Waikato 50	Cyanobacteria colonies	colonies/mL	0	360	42.3433
Waikato 50	True Colour (Dissolved)	Hazen Units	7.5	25	16.1111
Waikato 50	1,1,1,2-Tetrachloroethane	mg/L	0	0	0
Waikato 50	1,1,1-Trichloroethane	mg/L	0	0	0
Waikato 50	1,1,2,2-Tetrachloroethane	mg/L	0	0	0
Waikato 50	1,1,2-Trichloroethane	mg/L	0	0	0
Waikato 50	1,1-Dichloroethane	mg/L	0	0	0
Waikato 50	1,1-Dichloroethene	mg/L	0	0	0
Waikato 50	1,1-Dichloropropene	mg/L	0	0	0
Waikato 50	1,2,3-Trichlorobenzene	mg/L	0	0	0
Waikato 50	1,2,3-Trichloropropane	mg/L	0	0	0
Waikato 50	1,2,4-Trichlorobenzene	mg/L	0	0	0
Waikato 50	1,2,4-Trimethylbenzene	mg/L	0	0	0
Waikato 50	1,2-Dibromo-3-chloropropane	mg/L	0	0	0
Waikato 50	1,2-Dibromoethane	mg/L	0	0	0
Waikato 50	1,2-Dichlorobenzene	mg/L	0	0	0
Waikato 50	1,2-Dichloroethane	mg/L	0	0	0
Waikato 50	1,2-Dichloroethene (cis + trans)	mg/L	0	0	0
Waikato 50	1,2-Dichloropropane	mg/L	0	0	0
Waikato 50	1,3,5-Trimethylbenzene	mg/L	0	0	0
Waikato 50	1,3-Dichlorobenzene	mg/L	0	0	0
Waikato 50	1,3-Dichloropropane	mg/L	0	0	0
Waikato 50	1,3-Dichloropropene (cis + trans)	mg/L	0	0	0
Waikato 50	1,4-Dichlorobenzene	mg/L	0	0	0
Waikato 50	1080 (Sodium fluoroacetate)	mg/L	0	0	0
Waikato 50	1-1-1-Trichloro-2-propanone	mg/L	0	0	0
Waikato 50	1-1-Dichloro-2-propanone	mg/L	0	0	0
Waikato 50	2,2-Dichloropropane	mg/L	0	0	0
Waikato 50	2,3,4,6-tetrachlorophenol	mg/L	0	0	0
Waikato 50	2,4,5-trichlorophenol	mg/L	0	0	0
Waikato 50	2,4,5-Trichlorophenoxyacetic acid	mg/L	0	0	0
Waikato 50	2,4,6-trichlorophenol	mg/L	0	0	0
Waikato 50	2,4-dichlorophenol	mg/L	0	0	0
Waikato 50	2,4-Dichlorophenoxyacetic acid (2,4-D)	mg/L	0	0.00011	6.5E-06
Waikato 50	2,4-dimethylphenol	mg/L	0	0	0
Waikato 50	2,4-dinitrotoluene	mg/L	0	0	0
Waikato 50	2,6-dichlorophenol	mg/L	0	0	0

Intake source	Component	Units	Min	Max	Average
Waikato 50	2,6-Dinitrotoluene	mg/L	0	0	0
Waikato 50	2-chloronaphthalene	mg/L	0	0	0
Waikato 50	2-chlorophenol	mg/L	0	0	0
Waikato 50	2-Chlorotoluene	mg/L	0	0	0
Waikato 50	2-methyl 4,6-dinitrophenol	mg/L	0	0	0
Waikato 50	2-methylnaphthalene	mg/L	0	0	0
Waikato 50	2-methylphenol	mg/L	0	0	0
Waikato 50	2-nitrophenol	mg/L	0	0	0
Waikato 50	4-(2,4-Dichlorophenoxy) butanoic acid	mg/L	0	0	0
Waikato 50	4,4'-DDD	mg/L	0	0	0
Waikato 50	4,4'-DDE	mg/L	0	0	0
Waikato 50	4,4'-DDT	mg/L	0	0	0
Waikato 50	4-bromophenylphenyl ether	mg/L	0	0	0
Waikato 50	4-Chloro-3-methylphenol	mg/L	0	0	0
Waikato 50	4-chlorophenylphenyl ether	mg/L	0	0	0
Waikato 50	4-Chlorotoluene	mg/L	0	0	0
Waikato 50	4-methylphenol	mg/L	0	0	0
Waikato 50	Acenaphthene	mg/L	0	0	0
Waikato 50	Acenaphthylene	mg/L	0	0	0
Waikato 50	Aldrin	mg/L	0	0	0
Waikato 50	Alpha-Chlordane	mg/L	0	0	0
Waikato 50	Aluminium (Dissolved)	mg/L	0.007	0.14	0.03156
Waikato 50	Aluminium (Total)	mg/L	0.056	3.6	0.58039
Waikato 50	Ammoniacal Nitrogen (as N)	mg/L	0.0064	0.074	0.02855
Waikato 50	Anthracene	mg/L	0	0	0
Waikato 50	Antimony (Total)	mg/L	0	0	0
Waikato 50	Arsenic (Dissolved)	mg/L	0.0048	0.021	0.01544
Waikato 50	Arsenic (Total)	mg/L	0.0071	0.024	0.01708
Waikato 50	BAP Equivalent	mg/L	0	0	0
Waikato 50	Barium (Total)	mg/L	0.018	0.04	0.025
Waikato 50	Bentazone	mg/L	0	0	0
Waikato 50	Benzene	mg/L	0	0	0
Waikato 50	Benzo(a)anthracene	mg/L	0	0	0
Waikato 50	Benzo(a)pyrene	mg/L	0	0	0
Waikato 50	Benzo(b)fluoranthene	mg/L	0	0	0
Waikato 50	Benzo(ghi)perylene	mg/L	0	0	0
Waikato 50	Benzo(k)fluoranthene	mg/L	0	0	0
Waikato 50	Beryllium (Total)	mg/L	0	9.5E-05	2.4E-05
Waikato 50	BHC alpha	mg/L	0	0	0
Waikato 50	BHC beta	mg/L	0	0	0
Waikato 50	BHC delta	mg/L	0	0	0
Waikato 50	bis(2-chloroethoxy)methane	mg/L	0	0	0

Intake source	Component	Units	Min	Max	Average
Waikato 50	bis(2-chloroethyl) ether	mg/L	0	0	0
Waikato 50	bis(2-chloroisopropyl) ether	mg/L	0	0	0
Waikato 50	Bis(2-ethylhexyl)adipate	mg/L	0	0	0
Waikato 50	bis(2-ethylhexyl)phthalate	mg/L	0	0	0
Waikato 50	Boron (Total)	mg/L	0.11	0.2	0.1675
Waikato 50	Bromate	mg/L	0	0	0
Waikato 50	Bromide	mg/L	0.023	0.055	0.04515
Waikato 50	Bromobenzene	mg/L	0	0	0
Waikato 50	Bromochloroacetonitrile	mg/L	0	0	0
Waikato 50	Bromodichloromethane	mg/L	0	0	0
Waikato 50	Bromoform	mg/L	0	0	0
Waikato 50	Bromomethane	mg/L	0	0	0
Waikato 50	Butylbenzyl phthalate	mg/L	0	0	0
Waikato 50	Cadmium (Total)	mg/L	0	0	0
Waikato 50	Calcium (Total)	mg/L	5.8	8.4	7.26667
Waikato 50	Calcium Hardness (as CaCO ₃) (Total)	mg/L	15	21	18.5714
Waikato 50	Carbazole	mg/L	0	0	0
Waikato 50	Carbon tetrachloride	mg/L	0	0	0
Waikato 50	Chloral hydrate	mg/L	0	0	0
Waikato 50	Chlorate	mg/L	0	0.034	0.0011
Waikato 50	Chloride	mg/L	13.2	17.3	15.4222
Waikato 50	Chlorite	mg/L	0	0	0
Waikato 50	Chlorobenzene	mg/L	0	0	0
Waikato 50	Chloroform	mg/L	0	0	0
Waikato 50	Chloromethane	mg/L	0	0	0
Waikato 50	Chlorophyll A	mg/L	0	0.02	0.00352
Waikato 50	Chloropicrin	mg/L	0	0	0
Waikato 50	Chromium (Total)	mg/L	0	0.0017	0.00059
Waikato 50	Chrysene	mg/L	0	0	0
Waikato 50	cis-1,3-Dichloropropene	mg/L	0	0	0
Waikato 50	cis-1-2-dichloroethylene	mg/L	0	0	0
Waikato 50	cis-Permethrin	mg/L	0	0	0
Waikato 50	Copper (Total)	mg/L	0.00059	0.0026	0.00119
Waikato 50	Cyanogen Chloride	mg/L	0	0	0
Waikato 50	Dibenzo(ah)anthracene	mg/L	0	0	0
Waikato 50	Dibenzofuran	mg/L	0	0	0
Waikato 50	Dibromoacetonitrile	mg/L	0	0	0
Waikato 50	Dibromochloromethane	mg/L	0	0	0
Waikato 50	Dibromomethane	mg/L	0	0	0
Waikato 50	Dicamba	mg/L	0	0	0
Waikato 50	Dichloroacetonitrile	mg/L	0	0	0
Waikato 50	Dichlorodifluoromethane	mg/L	0	0	0
Waikato 50	Dichlorprop	mg/L	0	0	0

Intake source	Component	Units	Min	Max	Average
Waikato 50	Dieldrin	mg/L	0	0	0
Waikato 50	Diethyl phthalate	mg/L	0	0	0
Waikato 50	Dimethyl phthalate	mg/L	0	0	0
Waikato 50	Di-n-butyl phthalate	mg/L	0	0	0
Waikato 50	Di-n-octyl phthalate	mg/L	0	0	0
Waikato 50	Dinoseb	mg/L	0	0	0
Waikato 50	Diphenylhydrazine	mg/L	0	0	0
Waikato 50	Dissolved Organic Carbon	mg/L	1.1	6.2	2.41613
Waikato 50	Dissolved Reactive Phosphorus (as P)	mg/L	0.015	0.034	0.02211
Waikato 50	Endosulfan I	mg/L	0	0	0
Waikato 50	Endosulfan II	mg/L	0	0	0
Waikato 50	Endosulfan sulfate	mg/L	0	0	0
Waikato 50	Endrin	mg/L	0	0	0
Waikato 50	Endrin aldehyde	mg/L	0	0	0
Waikato 50	Epichlorohydrin	mg/L	0	0	0
Waikato 50	Ethylbenzene	mg/L	0	0	0
Waikato 50	Ethylchloride	mg/L	0	0	0
Waikato 50	Fenoprop (Silvex)	mg/L	0	0	0
Waikato 50	Fluoranthene	mg/L	0	0	0
Waikato 50	Fluorene	mg/L	0	0	0
Waikato 50	Fluoride	mg/L	0.11	0.19	0.14889
Waikato 50	Fluorotrichloromethane	mg/L	0	0	0
Waikato 50	Formaldehyde	mg/L	0	0.037	0.00925
Waikato 50	Gamma-chlordane	mg/L	0	0	0
Waikato 50	Heptachlor	mg/L	0	0	0
Waikato 50	Heptachlor epoxide	mg/L	0	0	0
Waikato 50	Hexachlorobenzene	mg/L	0	0	0
Waikato 50	Hexachlorobutadiene	mg/L	0	0	0
Waikato 50	Hexachlorocyclopentadiene	mg/L	0	0	0
Waikato 50	Hexachloroethane	mg/L	0	0	0
Waikato 50	Indeno(1,2,3,c,d)pyrene	mg/L	0	0	0
Waikato 50	Iodide	mg/L	0	0.003	0.00193
Waikato 50	Iron (Dissolved)	mg/L	0.064	0.25	0.14289
Waikato 50	Iron (Total)	mg/L	0.24	2.8	0.93222
Waikato 50	Isophorone	mg/L	0	0	0
Waikato 50	iso-Propylbenzene	mg/L	0	0	0
Waikato 50	Lead (Total)	mg/L	0.0002	0.0012	0.00048
Waikato 50	Lindane (BHC gamma)	mg/L	0	0	0
Waikato 50	Lithium (Total)	mg/L	0.04	0.078	0.05825
Waikato 50	Lontrel	mg/L	0	0	0
Waikato 50	m- & p-Xylene	mg/L	0	0	0
Waikato 50	Magnesium (Total)	mg/L	2.5	3	2.81111

Intake source	Component	Units	Min	Max	Average
Waikato 50	Magnesium Hardness (as CaCO ₃) (Total)	mg/L	10	13	11.5714
Waikato 50	Manganese (Dissolved)	mg/L	0.00058	0.035	0.00691
Waikato 50	Manganese (Total)	mg/L	0.022	0.11	0.04732
Waikato 50	MCPA	mg/L	0	0	0
Waikato 50	MCPB	mg/L	0	0	0
Waikato 50	Mecoprop (MCP)	mg/L	0	0	0
Waikato 50	Mercury (Total)	mg/L	0	0	0
Waikato 50	Methoxychlor	mg/L	0	0	0
Waikato 50	Methylene chloride	mg/L	0	0	0
Waikato 50	Molybdenum (Total)	mg/L	0	0.00044	0.00022
Waikato 50	Naphthalene	mg/L	0	0	0
Waikato 50	n-Butylbenzene	mg/L	0	0	0
Waikato 50	Nickel (Total)	mg/L	0.00018	0.0012	0.0005
Waikato 50	Nitrate (as N)	mg/L	0.159	1.06	0.52656
Waikato 50	Nitrite (as N)	mg/L	0	0.009	0.00133
Waikato 50	Nitrite (as N) + Nitrate (as N)	mg/L	0.16	1.1	0.53222
Waikato 50	Nitrobenzene	mg/L	0	0	0
Waikato 50	n-nitrosodi-n-propylamine	mg/L	0	0	0
Waikato 50	n-Nitrosodiphenylamine	mg/L	0	0	0
Waikato 50	n-Propylbenzene	mg/L	0	0	0
Waikato 50	o-Xylene	mg/L	0	0	0
Waikato 50	Pentachlorophenol	mg/L	0	0	0
Waikato 50	Perchlorate	mg/L	0	0	0
Waikato 50	Phenanthrene	mg/L	0	0	0
Waikato 50	Phenol	mg/L	0	0	0
Waikato 50	Picloram	mg/L	0	0	0
Waikato 50	p-Isopropyltoluene	mg/L	0	0	0
Waikato 50	Potassium (Total)	mg/L	2.9	3.9	3.35
Waikato 50	Pyrene	mg/L	0	0	0
Waikato 50	sec-Butylbenzene	mg/L	0	0	0
Waikato 50	Selenium (Total)	mg/L	0	0	0
Waikato 50	Silicon (as Silica) (Total)	mg/L	32	37	34.5
Waikato 50	Silver (Total)	mg/L	0	0	0
Waikato 50	Sodium (Total)	mg/L	13	21	17
Waikato 50	Styrene	mg/L	0	0	0
Waikato 50	Sulphate	mg/L	8.49	14.3	10.9833
Waikato 50	tert-Butylbenzene	mg/L	0	0	0
Waikato 50	Tetrachloroethylene	mg/L	0	0	0
Waikato 50	Tin (Total)	mg/L	0	0.00013	3.3E-05
Waikato 50	Toluene	mg/L	0	0	0
Waikato 50	Total Alkalinity (as CaCO ₃)	mg/L	23	42	36.2581
Waikato 50	Total Cyanide	mg/L	0	0	0

Intake source	Component	Units	Min	Max	Average
Waikato 50	Total Dissolved Solids	mg/L	110	160	131.111
Waikato 50	Total Hardness (as CaCO ₃)	mg/L	26	33	29.8571
Waikato 50	Total Kjeldahl Nitrogen (as N)	mg/L	0.138	0.62	0.33175
Waikato 50	Total Nitrogen (as N)	mg/L	0.32	1.9	0.80222
Waikato 50	Total Organic Carbon	mg/L	1.5	7.2	3.03333
Waikato 50	Total Phosphorus (as P)	mg/L	0.029	0.122	0.05711
Waikato 50	Total Suspended Solids	mg/L	2.5	48	19.5222
Waikato 50	trans-1,2-Dichloroethene	mg/L	0	0	0
Waikato 50	trans-1,3-Dichloropropene	mg/L	0	0	0
Waikato 50	trans-Permethrin	mg/L	0	0	0
Waikato 50	Trichloroacetonitrile	mg/L	0	0	0
Waikato 50	Trichloroethylene	mg/L	0	0	0
Waikato 50	Triclopyr	mg/L	0	0	0
Waikato 50	Trihalomethanes - Total	mg/L	0	0	0
Waikato 50	Uranium (Total)	mg/L	2E-05	1E-04	4.4E-05
Waikato 50	Vinyl chloride	mg/L	0	0	0
Waikato 50	Xylenes (Total)	mg/L	0	0	0
Waikato 50	Zinc (Total)	mg/L	0.002	0.011	0.00485
Waikato 50	Escherichia coli	MPN/100mL	1	6900	573.452
Waikato 50	Total Coliforms	MPN/100mL	6.3	24000	4512.14
Waikato 50	Conductivity (at 25 °C)	mS/m	14	16.2	15.2889
Waikato 50	2,4,6-trichloroanisole	ng/L	0	0	0
Waikato 50	2-isobutyl-3-methoxypyrazine	ng/L	0	0	0
Waikato 50	2-isopropyl-3-methoxypyrazine	ng/L	0	0	0
Waikato 50	2-methylisoborneol	ng/L	0	2.5	0.15484
Waikato 50	Geosmin	ng/L	0	13	6.46129
Waikato 50	Turbidity	NTU	1.8	140	15.3065
Waikato 50	pH	pH unit	7	7.9	7.45806
Waikato 50	Salinity	ppt	0	0.1	0.01111

Appendix B. Screen entrainment survey report

11 July 2025
Job No: 20973.7000

Watercare Services Ltd
Private Bag 92521
Wellesley St
Auckland 1141

Attention: Emma Barker

Dear Emma

Waikato Water Treatment Plant Intake Fish Impingement Survey - Autumn 2025

1 Introduction

In accordance with your instructions, and our proposal of 9 January 2006¹, we have coordinated a dive survey at the Waikato Raw Water Intake. The survey was carried out in accordance with the Fisheries Management Plan (FMP) for the Waikato Water Treatment Plant (v.3). This report outlines the work carried out and the findings.

The FMP states that: 'Entrainment of fish eggs and larvae will be measured by vertical haul sampling in the penstocks area of the water treatment plant during April/May of each year (May/June in 2007 only), and comparison of the results with data collected from the river in 2003-2006.'. This was unable to be undertaken in April/May 2025 due to operational matters. The water treatment plant was operating at maximum capacity throughout April/May. As such, it was not possible to isolate the penstocks for sample collection. Instead, this work was undertaken at the earliest opportunity in June 2025 (17 June 2025).

2 Methods

A SCUBA survey of the exterior of the intake screens was conducted on 6 May 2025. The SCUBA work was carried out by Deep Dive Division, under the direction of a Tonkin & Taylor Ltd (T+T) freshwater ecologist who was at the surface with a real-time audio link. Weather during the survey was overcast, with a moderate fog cover that eased throughout the morning. No rainfall occurred in the 24 hours preceding the survey. The river water was turbid with approximately 0.15 m visibility based on visual observations from the dive team.

An ichthyoplankton (fish eggs and larvae) entrainment survey was carried out on 17 June 2025 in the intake penstocks, between the intake screens and the water treatment plant. A 0.3 m diameter 500 µm mesh net was used, with a concentrating bucket attached. Vertical hauls were repeated (24 times) until at least 10 m³ of water had been filtered. A composited filtrate sample was sent to NIWA for larval fish and egg identification and counting.

¹ Variation email dated 08 April 2025.

3 Results

The findings of the dive survey are summarised in the Table 3.1 below.

Table 3.1: Results

Parameter	Findings
Riverbed profiles and position relative to intake screens	<p>The clearance between the riverbed and the underside of the screens was estimated to be 2.0 m for Screen 1, 1.7 m for Screen 2, and 1.4 m for Screen 3. At Screen 4, there was little to no clearance between the underside of the screen and the riverbed, with sediment covering the concrete plinth upon which the screen is mounted. On average, clearance distances are reduced compared to those recorded in the Spring 2024 survey, with sediment having accumulated during the summer.</p> <p>Resource Consent conditions require a minimum clearance of 0.5 m be maintained between underside of the screens and the riverbed. There is currently little to no clearance between the underside of Screen 4 and the riverbed. As such, it is recommended that water basting is undertaken by divers at Screen 4 to reinstate a minimum clearance of 0.5 m.</p>
Water velocities	<p>Observations made by the diver at the riverbed and parallel to the screens suggested that water velocities were faster at Screens 3 and 4 than at Screens 1 and 2. This is consistent with findings during the Spring 2024 survey.</p> <p>No flow meter was carried by the dive team during the survey. Whilst we are unable to quantitatively confirm whether the “sweep” velocities are at least twice the design “approach” velocity as required by the FMP guideline, estimations made by the diver using sediment drift times suggest that this condition continues to be met, in line with previous survey results. We will confirm this during the next survey, scheduled for Spring 2025.</p>
Distribution of debris	No large debris was recorded in the vicinity of the screens or around the concrete plinths.
Fish impingement on screens	None recorded visually by the diver.
Species composition, abundance, size range of impinged organisms	None recorded visually by the diver.
Physical damage to screens	No physical damage recorded on any of the screens.
Fouling of screens	<p>Overall, levels of fouling were moderate-high and consistent with recent surveys. Details on the fouling status of each screen are as follows:</p> <p><u>Screen 1 upstream section:</u></p> <p>Moderate-high (50-90% coverage) build-up of algae. The algae was not easy to remove by hand.</p> <p>High (80%) fouling within the screen slots, predominantly small stones and/or pumice.</p> <p><u>Screen 1 downstream section:</u></p> <p>Moderate-high (50-80%) build-up of algae. The algae was not easy to uplift by hand.</p> <p>High (80%) fouling within the screen slots, predominantly small stones and/or pumice.</p>

Parameter	Findings
	<p><u>Screen 2 upstream section:</u> Moderate (40-70%) build-up of algae. The algae was not easy to uplift by hand.</p> <p>High (70-80%) fouling within the screen slots, predominantly small stones and/or pumice.</p> <p><u>Screen 2 downstream section:</u></p> <p>Moderate-high (40-80%) build-up of algae. The algae was not easy to uplift by hand.</p> <p>High (70-80%) fouling within the screen slots, predominantly small stones and/or pumice.</p> <p><u>Screen 3 upstream section:</u></p> <p>Moderate (40-70%) build-up of algae. Some of the algae could be wiped away by hand but most was stubborn and required more intensive scrubbing.</p> <p>Moderate-high (60-80%) fouling within the screen slots, predominantly small stones and/or pumice.</p> <p><u>Screen 3 downstream section:</u></p> <p>Low-moderate (20-70%) build-up of algae. The algae was not easy to uplift by hand.</p> <p>Moderate-high (60-90%) fouling within the screen slots, predominantly small stones and/or pumice.</p> <p><u>Screen 4 upstream section:</u></p> <p>Moderate-high (40-80%) build-up of algae. The algae was not easy to uplift by hand.</p> <p>Moderate-high (60-80%) fouling within the screen slots, predominantly small stones and/or pumice.</p> <p><u>Screen 4 downstream section:</u></p> <p>Moderate (50-70%) build-up of algae, the algae was not easy to uplift by hand.</p> <p>High (70-90%) fouling within the screen slots, predominantly small stones and/or pumice as well as fine sediment.</p>
Surface marker buoys	Both buoys intact.

No native fish eggs or larvae were identified in the vertical haul sample collected in the penstock. Ichthyoplankton densities greater than 1 smelt /m³ or 15.15 inanga /m³ would have triggered further investigation. In accordance with Section 4.3.2 of the Waikato Water Supply Intake FMP, no further sampling is required in Winter 2025.

One larval freshwater gold clam *Corbicula fluminea* was identified in the vertical haul sample from within the penstocks. This invasive species can clog water-based infrastructure as well as outcompete native species. Gold clam presence within the penstocks indicates that this species is getting through the intake screens. Control measures may need to be put in place to prevent any clogging of the water intake system infrastructure.

4 Summary and Recommendations

The key conclusions and recommendations of the Autumn 2025 fish impingement survey are summarised as follows:

- The clearance of the underside of the screens above the riverbed ranged from 0 m at Screen 4 to 2.0 m at Screen 1. The Resource Consent conditions require a minimum clearance of 0.5 m. As such, it is recommended that water blasting is undertaken to reinstate a minimum clearance of 0.5 m.
- We recommend that dive surveys be continued on a minimum frequency of once every six months to ensure screen clearances are maintained at greater than 0.5 m from the riverbed.
- Water velocities were unable to be recorded during the survey therefore we cannot absolutely confirm whether velocity parallel to the screen was at least two times the design “approach velocity”, but visual observations suggest that this requirement was being met. We will confirm that the requirement continues to be met during the next survey (Spring 2025).
- In general, the build-up of algae was moderate to high. Most of the algae present was stubborn and difficult to uplift by hand.
- No fish impingement was recorded on any of the intake screens during the survey.
- No visible damage to the screens or openings greater than 2.5 mm were observed, therefore no repair or replacement is necessary.
- No large debris was recorded in the vicinity of the screens.
- No native fish eggs or larvae were identified in the vertical haul sample. No further sampling is required in Winter 2025.
- A larval freshwater gold clam was identified in the vertical haul sample. Control measures may need to be put in place to prevent any clogging of the intake infrastructure in the future.

5 Applicability

This report has been prepared for the exclusive use of our client Watercare Services Ltd, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

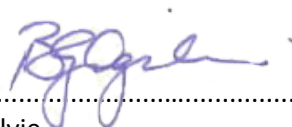
Tonkin & Taylor Ltd

Report prepared by:



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Ecologist

Authorised for Tonkin & Taylor Ltd by:



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Brett Ogilvie
Project Director

Technical review by Liza Kabrle, Principal Aquatic Ecologist.

11-Jul-25

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Appendix C. Process discharge quality

	pH (pH units)	Chlorine (FAC) (mg/L)	Fluoride (mg/L)	Suspended Solids (mg/L)	Soluble Aluminium (mg/L)
3/07/2024	7.10	0.04	0.27	3.30	0.03
10/07/2024	7.60	0.01	0.36	2.40	2.80
17/07/2024	7.20	0.05	0.30	11.00	0.04
23/07/2024	6.80	0.01	0.27	3.40	0.02
2/08/2024	7.10	0.02	0.29	3.80	0.02
12/08/2024	7.50	0.03	0.14	3.20	0.05
21/08/2024	7.10	0.02	0.14	330.00	0.02
26/08/2024	7.00	0.02	0.10	46.00	0.07
4/09/2024	7.00	0.02	0.06	21.00	0.02
11/09/2024	7.00	0.02	0.11	23.00	0.02
17/09/2024	7.00	0.01	0.07	18.00	0.03
25/09/2024	7.40	0.02	0.15	2.40	0.04
2/10/2024	7.50	0.02	0.18	2.90	0.03
9/10/2024	7.10	0.00	0.13	2.80	0.02
15/10/2024	7.00	0.00	0.11	12.00	0.02
21/10/2024	7.20	0.01	0.13	6.00	0.03
30/10/2024	7.00	0.00	0.13	11.00	0.02
6/11/2024	7.30	0.01	0.15	12.00	0.95
12/11/2024	7.20	0.04	0.15	22.00	0.03
25/11/2024	7.10	0.01	0.12	17.00	0.03
5/12/2024	6.90	0.02	0.09	10.00	0.03
9/12/2024	7.00	0.02	0.15	7.60	0.02
16/12/2024	7.00	0.01	0.11	38.00	0.02
23/12/2024	6.90	0.01	0.09	31.00	0.02
1/01/2025	5.90	0.02	0.11	29.00	0.90
7/01/2025	7.00	0.01	0.16	42.00	0.01
14/01/2025	7.10	0.03	0.13	20.00	0.01
21/01/2025	7.00	0.04	0.14	44.00	0.01
27/01/2025	7.20	0.02	0.17	0.80	0.03
4/02/2025	7.10	0.04	0.17	77.00	0.02
13/02/2025	7.10	0.01	0.15	43.00	0.02
17/02/2025	7.10	0.02	0.17	38.00	0.01

26/02/2025	7.00	0.03	0.18	110.00	0.01
4/03/2025	7.00	0.03	0.17	470.00	0.01
12/03/2025	7.00	0.01	0.17	49.00	0.01
19/03/2025	6.80	0.05	0.22	43.00	0.02
25/03/2025	6.80	0.01	0.23	32.00	0.08
1/04/2025	7.30	0.01	0.24	18.00	2.90
7/04/2025	7.00	0.02	0.17	44.00	0.02
14/04/2025	7.30	0.01	0.17	9.20	0.03
21/04/2025	6.80	0.02	0.15	7.80	0.02
29/04/2025	6.90	0.04	0.21	73.00	0.02
7/05/2025	7.20	0.05	0.20	44.00	0.02
12/05/2025	6.80	0.00	0.05	21.00	0.01
21/05/2025	6.90	0.04	0.16	56.00	0.01
27/05/2025	7.20	0.02	0.18	4.80	0.03
3/06/2025	6.90	0.05	0.12	18.00	0.02
11/06/2025	7.30	0.04	0.24	23.00	0.03
16/06/2025	7.10	0.00	0.09	12.00	0.03
23/06/2025	6.60	0.08	0.36	14.00	0.06

Appendix D. Chemical bunds discharges

Date	Waikato WTP source (bund)	Volume (m ³)	pH* (pH units)	Fluoride* (mg/L)	Soluble Aluminium* (mg/L)	Suspended solids* (mg/L)	Chlorine (FAC)* (mg/L)
01/07/2024	Lime	0.5	8.20	0.00	0.00	28.00	0.00
03/07/2024	Sodium Hypochlorite	3	7.11	0.00	0.00	4.00	0.00
03/07/2024	Aluminium Sulphate	2	7.11	0.00	0.02	6.00	0.01
03/07/2024	Lime	2	7.11	0.00	0.00	17.00	0.01
15/07/2024	Hypo Washdown	1.75	7.05	0.00	0.00	5.00	0.05
18/07/2024	Sodium Hypochlorite	2	7.56	0.00	0.00	2.00	0.00
18/07/2024	Aluminium Sulphate	4	8.95	0.00	0.13	3.00	0.01
18/07/2024	Lime	3	7.65	0.00	0.00	15.00	0.01
24/07/2024	Sodium Hypochlorite	3	6.62	0.00	0.40	18.00	0.03
20/08/2024	Sodium Hypochlorite	5	7.40	0.00	0.00	11.00	0.02
20/08/2024	Aluminium Sulphate	5	6.80	0.00	0.30	10.00	0.00
02/09/2024	Sodium Hypochlorite	2	8.21	0.00	0.00	6.00	0.02
02/09/2024	Lime	4	6.95	0.00	0.00	3.00	0.01
14/09/2024	Hypo Washdown	1.5	7.04	0.00	0.00	4.00	0.05
03/10/2024	Hypo Washdown	1	6.95	0.00	0.00	6.00	0.11
10/10/2024	Hypo Washdown	2	7.66	0.00	0.00	5.00	0.02
10/10/2024	HFA	1	3.82	2.16	0.00	1.00	0.01
10/10/2024	Aluminium Sulphate	3	7.66	0.00	0.34	3.00	0.03
10/10/2024	Lime	2	7.66	0.00	0.00	8.00	0.00

Date	Waikato WTP source (bund)	Volume (m ³)	pH* (pH units)	Fluoride* (mg/L)	Soluble Aluminium* (mg/L)	Suspended solids* (mg/L)	Chlorine (FAC)* (mg/L)
26/10/2024	Hypo Washdown	1.5	6.79	0.00	0.00	10.00	0.09
28/10/2024	Lime	1.5	8.81	0.00	0.00	24.00	0.01
28/10/2024	Sodium Hypochlorite	1.5	7.80	0.00	0.00	6.00	0.02
31/10/2024	Sodium Hypochlorite	1.5	7.61	0.00	0.00	9.00	0.01
05/11/2024	Hypo Washdown	1	7.09	0.00	0.00	4.00	0.03
08/11/2024	Hypo Washdown	1.5	7.20	0.00	0.00	4.00	0.01
13/11/2024	Sodium Hypochlorite	1	7.22	0.00	0.00	9.00	0.02
13/11/2024	Aluminium Sulphate	1	7.54	0.00	2.60	2.00	0.05
13/11/2024	Lime	1	7.54	0.00	0.00	28.00	0.04
18/11/2024	Hypo Washdown	1	8.80	0.00	0.00	5.00	0.03
26/11/2024	Hypo Washdown	2	6.60	0.00	0.00	4.00	0.06
06/12/2024	HFA	2	10.60	2.53	0.00	5.00	0.00
06/12/2024	Aluminium Sulphate	4	7.39	0.00	999.99	26.00	0.02
06/12/2024	Lime	3	7.08	0.00	0.00	1.00	0.00
06/12/2024	Hypo Washdown	3	7.08	0.00	0.00	39.00	0.01
09/12/2024	Hypo Washdown	2	6.71	0.00	0.00	43.00	0.00
17/12/2024	Hypo Washdown	1	6.60	0.00	0.00	7.00	0.04
17/12/2024	Sodium Hypochlorite	3	6.71	0.00	0.00	0.00	0.06
06/01/2025	Lime	3	6.74	0.00	0.00	0.00	0.01

Date	Waikato WTP source (bund)	Volume (m ³)	pH* (pH units)	Fluoride* (mg/L)	Soluble Aluminium* (mg/L)	Suspended solids* (mg/L)	Chlorine (FAC)* (mg/L)
06/01/2025	Aluminium Sulphate	3	6.74	0.00	2.10	8.00	0.01
08/02/2025	Hypo Washdown	2	6.52	0.00	0.00	22.00	0.03
14/02/2025	Hypo Washdown	3	6.60	0.00	0.00	8.00	0.09
10/03/2025	Hypo Washdown	3	6.70	0.00	0.00	20.00	0.04
20/03/2025	Sodium Hypochlorite	2	8.30	0.00	0.00	5.00	0.00
20/03/2025	HFA	2	8.05	15.60	0.00	8.00	0.00
20/03/2025	Aluminium Sulphate	3	4.00	0.00	22.00	10.00	0.00
20/03/2025	Lime	3	10.95	0.00	0.00	12.00	0.00
06/04/2025	Lime	4	7.00	0.00	0.00	11.00	0.00
06/04/2025	Sodium Hypochlorite	4	7.00	0.00	0.00	6.00	0.00
28/04/2025	Aluminium Sulphate	0	4.25	0.00	35+	0.00	0.00
28/04/2025	Lime	3	8.00	0.00	0.00	11.00	0.00
28/04/2025	Sodium Hypochlorite	3	8.77	0.00	0.00	3.00	0.00
30/04/2025	Hypo Washdown	2	7.40	0.00	0.00	3.00	0.07
06/04/2025	Hypo Washdown	2	6.81	0.00	0.00	3.00	0.04
08/05/2025	Sodium Hypochlorite	3	6.84	0.00	0.00	2.00	0.02
14/05/2025	Lime	4	7.05	0.00	0.00	31.00	0.00
14/05/2025	Sodium Hypochlorite	3	7.05	0.00	0.00	6.00	0.00
21/05/2025	Hypo Washdown	1.8	7.35	0.00	0.00	17.00	0.02

Date	Waikato WTP source (bund)	Volume (m ³)	pH* (pH units)	Fluoride* (mg/L)	Soluble Aluminium* (mg/L)	Suspended solids* (mg/L)	Chlorine (FAC)* (mg/L)
25/06/2025	Sodium Hypochlorite	4	7.21	0.00	0.00	1.00	0.03
25/06/2025	Aluminium Sulphate	4	7.21	0.00	1.70	1.70	0.01
25/06/2025	Lime	4	7.21	0.00	0.00	6.00	0.02
25/06/2025	Hypo Washdown	3	7.21	0.00	0.00	1.00	0.01

Source: Operators' bund discharge log.

*Note: in-house test results measured at the Waikato Water Treatment Plant, which is not IANZ accredited.

Date	Waikato 50 WTP source (bund)	Volume (m ³)	pH* (pH units)	Fluoride* (mg/L)	Soluble Aluminium* (mg/L)	Suspended solids* (mg/L)	Chlorine (FAC)* (mg/L)
15/10/2024	Sodium Hypochlorite	12	7.42	0	0	10	0.01
15/10/2024	Caustic	12	7.42	0	0	10	0.01
17/10/2024	PACL	6	7.60	0.00	0.63	3.00	0.00
12/11/2024	Sodium Hypochlorite	1	8.30	0.00	0.00	0.00	0.03
24/05/2025	Sodium Hypochlorite	10	7.81	0	0	2	0.03
24/05/2025	Caustic	10	7.81	0	0	2	0.03
10/06/2025	PACL	12	7.01	0	0.281	1	0
10/06/2025	Washdown Chamber	25	7.24	0	0.498	1	0.02

Source: Operators' bund discharge log.

*Note: in-house test results measured at the Waikato Water Treatment Plant, which is not IANZ accredited.

Appendix E. Clarifier draining record sheets



SUBJECT : Discharge to Environment from Waikato Water Treatment Plant

Discharge Date:	05-07-2024	Discharge Start Time:	0820
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Discharge Type: Process

Reason for Discharge:	Draining Down of Clarifier for routine maintenance		
Volume of Discharge:	~400 – 600 <i>m³</i>		
Discharge Source:	Clarifier 4		
Discharge Point:	Off-Spec Pipeline		
Receiving Environment:	Waikato River		

Contaminants in Discharge: Sampling Results

Time from Valve open	pH	FAC	TSS	Sol Alum
0:05	7.05	0.02	3mg	0.15
1:00	6.92	0.01	26mg	0.32
2:00	6.98	0.01	32mg	0.26

Environmental Impact(s):

Any visible scums, foams or oil/grease films in the river?	<u>No</u>
Any erosion or scour at the point of discharge?	<u>No</u>
Any additional impacts?	<u>No</u>



SUBJECT : Discharge to Environment from Waikato Water Treatment Plant

Discharge Date:	30/10/24	Discharge Start Time:	12.50am
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Discharge Type: Process

Reason for Discharge:	Draining Down of Clarifier for routine maintenance		
Volume of Discharge:	~400 – 600	m ³	
Discharge Source:	Clarifier 4		
Discharge Point:	Off-Spec Pipeline		
Receiving Environment:	Waikato River		

Contaminants in Discharge: **Sampling Results**

Time from Valve open	pH	FAC	TSS	Sol Alum
0:05	7.12	0.02	34 mg/L	0.87 mg/L
1:00	6.98	0.01	16 mg/L	0.4 mg/L
2:00	6.94	0.01	16 mg/L	0.3 mg/L
3:00	6.96	0.01	11 mg/L	0.5 mg/L

Environmental Impact(s):

Any visible scums, foams or oil/grease films in the river?	No
Any erosion or scour at the point of discharge?	No
Any additional impacts?	No

Appendix F. Volume of Waikato WTP operational discharges

Date	Planned Process Discharges (m ³)						Unplanned Process Discharges (m ³)		Maintenance Discharges (m ³)		Total operational discharges ^(c) (m ³)
	Membrane Reject	Membrane Cleans	GAC Backwash	GAC Filter to Waste	Supernatant Discharge	WW recycle ^(A)	MIC Overflow	GAC Overflow	Chemical bunds	Clarifier draining discharges ^(B)	
01/07/2024	6695	520	2374	2423	2560	3	176	0	0.5	0	14749
02/07/2024	4940	520	789	1448	2006	3	0	0	0	0	9705
03/07/2024	2925	260	1181	1046	1540	3	0	0	7	0	6961
04/07/2024	3055	260	1981	2044	1574	3	0	0	0	0	8915
05/07/2024	3120	0	394	3529	1557	3	0	0	0	0	8601
06/07/2024	2860	195	1975	3068	1460	3	0	0	0	0	9558
07/07/2024	2860	260	1186	1461	1455	3	0	0	0	0	7224
08/07/2024	3055	130	1489	2419	1626	3	0	0	0	0	8721
09/07/2024	4225	195	1274	1950	1824	3	0	0	0	0	9470
10/07/2024	2990	130	1184	1202	1457	3	0	0	0	0	6964
11/07/2024	4290	195	1583	1824	1834	3	0	0	0	0	9726
12/07/2024	3770	325	1186	915	2047	3	0	0	0	0	8244
13/07/2024	3900	0	1979	2273	1701	3	0	0	0	0	9853
14/07/2024	3705	195	1184	890	1718	3	0	0	0	0	7694
15/07/2024	4940	65	1979	1839	2073	3	0	0	1.75	0	10898
16/07/2024	5850	130	787	1290	2374	3	0	0	0	0	10433
17/07/2024	5070	455	1982	1349	2118	3	0	0	0	0	10975
18/07/2024	4615	195	788	1094	2030	3	0	0	9	0	8732
19/07/2024	2275	65	389	609	1310	372	1172	0	0	0	5934
20/07/2024	1755	0	388	206	708	3	0	14	0	0	3072
21/07/2024	4485	0	1978	2295	1878	3	0	0	0	0	10637
22/07/2024	4355	390	786	570	2429	3	0	0	0	0	8531

Date	Planned Process Discharges (m ³)						Unplanned Process Discharges (m ³)		Maintenance Discharges (m ³)		Total operational discharges ^(c) (m ³)
	Membrane Reject	Membrane Cleans	GAC Backwash	GAC Filter to Waste	Supernatant Discharge	WW recycle ^(A)	MIC Overflow	GAC Overflow	Chemical bunds	Clarifier draining discharges ^(B)	
23/07/2024	4875	260	2376	2591	2299	3	0	0	0	0	12402
24/07/2024	5070	0	785	546	2580	3	0	0	3	0	8986
25/07/2024	4745	325	1976	1786	3087	3	0	0	0	0	11919
26/07/2024	4680	260	1185	1087	3442	3	0	0	0	0	10656
27/07/2024	4810	325	1182	1344	3459	3	0	0	0	0	11120
28/07/2024	4290	325	1582	1864	3350	3	0	0	0	0	11411
29/07/2024	4615	195	1183	835	3399	3	0	0	0	0	10227
30/07/2024	4225	520	1580	2985	3315	3	44	0	0	0	12669
31/07/2024	4550	325	787	768	3473	3	44	0	0	0	9947
01/08/2024	4485	390	2374	2718	3501	3	0	0	0	0	13468
02/08/2024	4485	520	786	1213	3530	3	0	0	0	0	10534
03/08/2024	4550	195	1977	2007	3413	3	0	0	0	0	12141
04/08/2024	4420	390	786	1088	3238	3	0	0	0	0	9922
05/08/2024	1690	0	392	164	2110	4	756	0	0	0	5111
06/08/2024	0	0	0	0	1841	3	0	0	0	0	1841
07/08/2024	0	0	0	0	1491	3	0	0	0	0	1491
08/08/2024	0	0	0	0	2352	3	0	0	0	0	2352
09/08/2024	195	0	787	385	2512	3	298	0	0	0	4177
10/08/2024	390	0	0	325	1935	3	1239	23	0	0	3912
11/08/2024	585	130	788	810	1392	3	126	1	0	0	3832
12/08/2024	2925	520	1182	1960	2382	3	0	0	0	0	8969
13/08/2024	2990	195	1581	951	2553	3	0	0	0	0	8270

Date	Planned Process Discharges (m ³)						Unplanned Process Discharges (m ³)		Maintenance Discharges (m ³)		Total operational discharges ^(c) (m ³)
	Membrane Reject	Membrane Cleans	GAC Backwash	GAC Filter to Waste	Supernatant Discharge	WW recycle ^(A)	MIC Overflow	GAC Overflow	Chemical bunds	Clarifier draining discharges ^(B)	
14/08/2024	2860	325	1581	2230	2446	3	0	0	0	0	9441
15/08/2024	2925	195	1183	926	2414	3	163	0	0	0	7806
16/08/2024	3770	520	1582	2165	2699	3	0	0	0	0	10736
17/08/2024	4355	325	1579	1279	2712	3	0	0	0	0	10251
18/08/2024	4550	195	1181	1374	2880	3	0	0	0	0	10180
19/08/2024	4485	260	1582	1620	2801	3	0	0	0	0	10748
20/08/2024	5265	585	1202	1361	3296	3	3	0	10	0	11722
21/08/2024	6955	65	1584	1699	2702	3	0	0	0	0	13005
22/08/2024	6630	260	1185	1193	2706	3	0	0	0	0	11974
23/08/2024	6500	520	1581	2156	3139	3	0	0	0	0	13897
24/08/2024	5525	585	1568	961	2971	3	0	0	0	0	11610
25/08/2024	5460	650	1595	2486	3325	3	0	0	0	0	13517
26/08/2024	6565	325	1184	992	3556	3	42	0	0	0	12663
27/08/2024	6500	130	1581	2093	3557	3	1	0	0	0	13869
28/08/2024	7540	130	1582	1484	3969	3	0	0	0	0	14704
29/08/2024	6370	455	1185	1425	3832	3	0	0	0	0	13267
30/08/2024	5785	0	1581	1695	2956	3	0	0	0	0	12017
31/08/2024	5850	390	1183	1142	3012	3	0	0	0	0	11577
01/09/2024	5070	195	1582	1697	2964	3	0	0	0	0	11508
02/09/2024	6955	455	1184	1136	3755	3	0	0	6	0	13491
03/09/2024	5915	325	1579	2091	4632	3	0	0	0	0	14541
04/09/2024	5915	520	1184	933	4623	3	0	0	0	0	13174

Date	Planned Process Discharges (m ³)						Unplanned Process Discharges (m ³)		Maintenance Discharges (m ³)		Total operational discharges ^(c) (m ³)
	Membrane Reject	Membrane Cleans	GAC Backwash	GAC Filter to Waste	Supernatant Discharge	WW recycle ^(A)	MIC Overflow	GAC Overflow	Chemical bunds	Clarifier draining discharges ^(B)	
05/09/2024	5525	520	1980	2476	4480	3	0	0	0	0	14980
06/09/2024	5915	520	1184	932	4619	3	0	0	0	0	13169
07/09/2024	5005	455	1584	1296	4489	3	0	0	0	0	12829
08/09/2024	4875	325	1580	1969	3846	3	0	0	0	0	12596
09/09/2024	6110	325	1184	1182	2731	3	0	0	0	0	11532
10/09/2024	5720	130	1583	1821	2680	3	0	0	0	0	11934
11/09/2024	6955	260	1183	895	2543	7	0	0	0	0	11836
12/09/2024	4810	195	1404	1848	2376	3	0	0	0	0	10633
13/09/2024	5135	130	1364	1196	2568	3	0	0	0	0	10394
14/09/2024	4420	260	1579	2079	2222	3	0	0	1.5	0	10561
15/09/2024	3900	455	1182	797	2223	3	0	0	0	0	8558
16/09/2024	5330	390	1581	2070	2679	3	0	0	0	0	12050
17/09/2024	5460	585	1582	1332	2819	3	0	0	0	0	11778
18/09/2024	5265	260	1184	3043	3035	3	0	0	0	0	12787
19/09/2024	4290	195	1805	1681	2373	3	0	0	0	0	10344
20/09/2024	3900	455	962	864	2136	3	0	0	0	0	8318
21/09/2024	4225	325	1982	2304	2366	3	0	0	0	0	11202
22/09/2024	5005	260	786	776	2581	3	0	0	0	0	9408
23/09/2024	5070	520	1184	1362	2500	3	0	0	0	0	10637
24/09/2024	5395	390	1977	2235	3077	3	0	0	0	0	13074
25/09/2024	3965	520	788	1129	1970	3	288	4	0	0	8664
26/09/2024	4810	520	1979	2082	1911	3	386	0	0	0	11689

Date	Planned Process Discharges (m ³)						Unplanned Process Discharges (m ³)		Maintenance Discharges (m ³)		Total operational discharges ^(c) (m ³)
	Membrane Reject	Membrane Cleans	GAC Backwash	GAC Filter to Waste	Supernatant Discharge	WW recycle ^(A)	MIC Overflow	GAC Overflow	Chemical bunds	Clarifier draining discharges ^(B)	
27/09/2024	3445	520	792	895	1596	3	0	0	0	0	7248
28/09/2024	4225	455	1980	2004	1815	3	0	0	0	0	10479
29/09/2024	4680	195	787	1263	1985	3	0	0	0	0	8910
30/09/2024	4160	65	1583	1532	1909	3	0	0	0	0	9248
01/10/2024	5460	260	1581	1923	2586	3	0	0	0	0	11809
02/10/2024	6500	260	1185	4565	2659	3	6	0	0	0	15175
03/10/2024	5135	585	1980	3714	2226	3	0	0	1	0	13641
04/10/2024	6890	390	788	1104	2701	3	0	0	0	0	11873
05/10/2024	5330	455	1580	1362	2235	3	0	0	0	0	10962
06/10/2024	3900	195	787	711	1750	3	0	0	0	0	7343
07/10/2024	5135	195	1980	2556	2122	3	0	0	0	0	11988
08/10/2024	6045	260	390	387	2472	3	0	0	0	0	9554
09/10/2024	5980	390	2377	2669	2545	3	12	0	0	0	13973
10/10/2024	6825	260	786	944	2711	3	2	0	8	0	11536
11/10/2024	5590	390	1582	2092	2281	3	0	0	0	0	11935
12/10/2024	4810	455	1579	1316	2137	3	0	0	0	0	10297
13/10/2024	4940	260	1184	1539	2136	3	0	0	0	0	10059
14/10/2024	7085	325	1601	1877	2525	3	1	0	0	0	13413
15/10/2024	5785	975	1142	804	2754	3	0	0	0	0	11460
16/10/2024	5655	455	2008	2747	2397	3	0	0	0	0	13262
17/10/2024	7085	715	789	831	2889	3	4	0	0	0	12313
18/10/2024	4680	455	2378	2160	2091	3	0	0	0	0	11764

Date	Planned Process Discharges (m ³)						Unplanned Process Discharges (m ³)		Maintenance Discharges (m ³)		Total operational discharges ^(c) (m ³)
	Membrane Reject	Membrane Cleans	GAC Backwash	GAC Filter to Waste	Supernatant Discharge	WW recycle ^(A)	MIC Overflow	GAC Overflow	Chemical bunds	Clarifier draining discharges ^(B)	
19/10/2024	7345	390	391	822	2877	3	0	0	0	0	11825
20/10/2024	5200	195	1980	2327	2170	3	0	0	0	0	11872
21/10/2024	6890	260	1186	1229	2672	3	10	0	0	0	12246
22/10/2024	8060	260	1582	2337	2813	3	0	0	0	0	15053
23/10/2024	5590	715	1583	1408	2281	3	0	0	0	0	11577
24/10/2024	6045	325	789	1122	2466	3	548	1	0	0	11296
25/10/2024	8385	130	1979	2094	3001	3	0	0	0	0	15590
26/10/2024	3965	520	787	755	1661	3	0	0	1.5	0	7690
27/10/2024	5330	845	2378	2710	2215	3	0	0	0	0	13478
28/10/2024	5525	585	788	821	2328	3	0	0	3	0	10049
29/10/2024	7020	195	1191	6601	2798	3	0	0	0	0	17806
30/10/2024	3185	0	389	6827	1141	3	675	1	0	0	12218
31/10/2024	7020	260	2057	4132	2921	3	0	0	1.5	0	16392
01/11/2024	6175	390	1187	1418	2526	3	2119	6	0	0	13821
02/11/2024	6110	585	1580	2060	2557	3	0	0	0	0	12892
03/11/2024	5980	260	1188	1341	2475	3	0	0	0	0	11244
04/11/2024	7410	390	1186	1317	2890	3	95	0	0	0	13287
05/11/2024	6500	585	1987	2214	2812	3	14	0	1	0	14113
06/11/2024	7280	325	389	779	2772	3	425	42	0	0	12013
07/11/2024	7670	585	2378	7018	3127	3	4	0	0	0	20782
08/11/2024	7150	260	786	2813	2758	3	0	0	1.5	0	13769
09/11/2024	7670	260	1982	1801	2840	3	3	0	0	0	14556

Date	Planned Process Discharges (m ³)						Unplanned Process Discharges (m ³)		Maintenance Discharges (m ³)		Total operational discharges ^(c) (m ³)
	Membrane Reject	Membrane Cleans	GAC Backwash	GAC Filter to Waste	Supernatant Discharge	WW recycle ^(A)	MIC Overflow	GAC Overflow	Chemical bunds	Clarifier draining discharges ^(B)	
10/11/2024	6565	585	1184	1919	2567	3	0	0	0	0	12821
11/11/2024	7345	390	1185	1391	2801	3	2	0	0	0	13114
12/11/2024	8190	520	1585	1969	3199	3	0	0	0	0	15463
13/11/2024	7670	195	1583	1905	3102	3	0	0	3	0	14458
14/11/2024	6955	325	1583	1818	2838	3	0	0	0	0	13519
15/11/2024	6305	65	786	882	2512	3	0	0	0	0	10550
16/11/2024	5265	390	2171	2342	2478	3	0	0	0	0	12646
17/11/2024	5200	585	599	638	2216	3	14	0	0	0	9252
18/11/2024	7215	195	2378	2648	2818	3	122	0	1	0	15377
19/11/2024	5590	455	786	1072	1990	3	981	26	0	0	10899
20/11/2024	7800	455	1585	2290	2932	3	298	0	0	0	15360
21/11/2024	8320	455	1191	1117	3040	3	2	0	0	0	14126
22/11/2024	6955	585	1184	1666	2806	3	0	0	0	0	13195
23/11/2024	6305	390	2468	1803	2577	3	0	0	0	0	13544
24/11/2024	7605	195	2193	2421	2807	3	0	0	0	0	15220
25/11/2024	8515	455	2230	2533	2954	3	0	0	0	0	16687
26/11/2024	7865	195	1993	2348	2586	3	0	0	2	0	14989
27/11/2024	4355	845	2082	1795	2129	3	0	0	0	0	11205
28/11/2024	3575	390	2217	2324	2008	3	27	0	0	0	10541
29/11/2024	3315	390	1662	1267	2217	3	0	0	0	0	8852
30/11/2024	3185	195	2499	2469	1835	3	0	0	0	0	10184
01/12/2024	2405	260	1246	1686	1600	3	0	0	0	0	7198

Date	Planned Process Discharges (m ³)						Unplanned Process Discharges (m ³)		Maintenance Discharges (m ³)		Total operational discharges ^(c) (m ³)
	Membrane Reject	Membrane Cleans	GAC Backwash	GAC Filter to Waste	Supernatant Discharge	WW recycle ^(A)	MIC Overflow	GAC Overflow	Chemical bunds	Clarifier draining discharges ^(B)	
02/12/2024	3315	195	2090	1915	1945	3	1	0	0	0	9461
03/12/2024	3250	195	2087	2380	1909	3	3	0	0	0	9824
04/12/2024	3315	390	1664	1568	1724	3	448	2	0	0	9111
05/12/2024	5785	260	2082	2272	2273	3	0	0	0	0	12672
06/12/2024	4420	325	1664	1308	1916	3	0	0	12	0	9645
07/12/2024	4745	195	2499	2757	1932	3	0	0	0	0	12129
08/12/2024	4420	715	1244	1713	1936	3	0	0	0	0	10029
09/12/2024	4615	130	2083	1711	1923	3	0	0	2	0	10464
10/12/2024	5590	65	2080	2499	2342	3	0	0	0	0	12576
11/12/2024	6955	260	1663	1585	2811	3	0	0	0	0	13273
12/12/2024	5395	390	2499	2374	2373	3	0	0	0	0	13031
13/12/2024	5720	260	1246	1639	2417	3	292	39	0	0	11613
14/12/2024	6500	195	2501	2380	2642	3	0	0	0	0	14218
15/12/2024	7410	390	1663	2125	2840	3	9	0	0	0	14437
16/12/2024	5785	260	2083	1370	2383	3	492	5	0	0	12378
17/12/2024	5785	780	2083	3014	2814	3	0	0	4	0	14480
18/12/2024	7020	390	1245	1119	2661	3	0	0	0	0	12435
19/12/2024	4810	585	2513	2463	2175	3	448	12	0	0	13007
20/12/2024	5265	650	1663	1841	2093	3	0	0	0	0	11511
21/12/2024	6890	585	2083	2297	2730	3	18	0	0	0	14603
22/12/2024	6175	455	1663	2144	2409	3	0	0	0	0	12846
23/12/2024	6825	195	2081	1869	2693	3	1	0	0	0	13664

Date	Planned Process Discharges (m ³)						Unplanned Process Discharges (m ³)		Maintenance Discharges (m ³)		Total operational discharges ^(c) (m ³)
	Membrane Reject	Membrane Cleans	GAC Backwash	GAC Filter to Waste	Supernatant Discharge	WW recycle ^(A)	MIC Overflow	GAC Overflow	Chemical bunds	Clarifier draining discharges ^(B)	
24/12/2024	6500	585	2082	2333	2584	3	574	1	0	0	14659
25/12/2024	6045	715	1245	1216	2567	3	1	0	0	0	11788
26/12/2024	2990	585	2502	2241	1650	3	0	0	0	0	9968
27/12/2024	5200	650	2082	2565	2282	3	0	0	0	0	12779
28/12/2024	6045	780	2082	1909	2783	3	0	0	0	0	13599
29/12/2024	4550	520	2502	2455	2224	3	0	0	0	0	12251
30/12/2024	6110	585	2082	2486	2606	3	2	0	0	0	13871
31/12/2024	5395	260	2083	1803	2159	3	2	0	0	0	11702
01/01/2025	5785	195	2500	2533	2219	3	0	0	0	0	13233
02/01/2025	5005	325	2085	2530	2111	3	0	0	0	0	12056
03/01/2025	5135	390	2083	1806	2152	3	0	0	0	0	11566
04/01/2025	4940	195	2501	2509	2024	3	0	0	0	0	12168
05/01/2025	5980	260	2079	2305	2461	3	0	0	0	0	13086
06/01/2025	7865	520	2079	2141	3066	3	8	0	6	0	15685
07/01/2025	7280	650	2569	2566	2769	3	143	0	0	0	15978
08/01/2025	7735	585	2014	2460	3300	3	0	0	0	0	16095
09/01/2025	8775	520	2082	2055	3171	3	3	0	0	0	16606
10/01/2025	8060	780	2921	2568	3044	3	0	0	0	0	17372
11/01/2025	9230	0	1664	2527	3129	3	69	0	0	0	16619
12/01/2025	9100	260	2082	2015	2964	3	0	0	0	0	16421
13/01/2025	8645	325	2921	2758	3260	3	572	0	0	0	18481
14/01/2025	8775	715	1665	2730	3424	3	1	0	0	0	17310

Date	Planned Process Discharges (m ³)						Unplanned Process Discharges (m ³)		Maintenance Discharges (m ³)		Total operational discharges ^(c) (m ³)
	Membrane Reject	Membrane Cleans	GAC Backwash	GAC Filter to Waste	Supernatant Discharge	WW recycle ^(A)	MIC Overflow	GAC Overflow	Chemical bunds	Clarifier draining discharges ^(B)	
15/01/2025	8060	845	2083	2030	3317	3	503	0	0	0	16838
16/01/2025	8255	780	2502	2746	2990	3	85	0	0	0	17358
17/01/2025	8775	650	2085	2324	3167	3	0	0	0	0	17000
18/01/2025	8645	845	2082	2353	3036	4	59	0	0	0	17020
19/01/2025	8710	975	2502	2798	3182	3	0	0	0	0	18166
20/01/2025	8385	845	2084	2373	3105	3	0	0	0	0	16792
21/01/2025	8320	780	2081	2355	3052	3	0	0	0	0	16588
22/01/2025	7930	715	2499	2721	3143	3	0	0	0	0	17007
23/01/2025	8320	585	2080	2196	3224	3	0	0	0	0	16405
24/01/2025	7605	650	1757	2254	3426	3	593	1	0	0	16286
25/01/2025	8385	650	2504	3138	3789	3	0	0	0	0	18466
26/01/2025	6110	585	1662	2066	3225	3	0	0	0	0	13649
27/01/2025	6500	455	2500	2277	3285	3	0	0	0	0	15017
28/01/2025	8515	715	2500	2214	3750	3	0	0	0	0	17694
29/01/2025	7085	650	1246	2206	3815	3	812	586	0	0	16401
30/01/2025	9230	130	2923	3012	3951	3	10	0	0	0	19256
31/01/2025	8775	715	2084	2518	3551	3	9	0	0	0	17652
01/02/2025	8255	715	1664	2366	3306	3	22	0	0	0	16328
02/02/2025	8385	845	2918	2549	3677	3	0	0	0	0	18374
03/02/2025	7800	650	2088	2416	3632	3	151	9	0	0	16746
04/02/2025	8905	455	1667	2321	4022	3	0	0	0	0	17369
05/02/2025	7930	325	3039	2115	3669	4	0	0	0	0	17078

Date	Planned Process Discharges (m ³)						Unplanned Process Discharges (m ³)		Maintenance Discharges (m ³)		Total operational discharges ^(c) (m ³)
	Membrane Reject	Membrane Cleans	GAC Backwash	GAC Filter to Waste	Supernatant Discharge	WW recycle ^(A)	MIC Overflow	GAC Overflow	Chemical bunds	Clarifier draining discharges ^(B)	
06/02/2025	8580	585	2381	2618	3788	4	10	0	0	0	17962
07/02/2025	8255	975	1665	2225	3535	3	19	0	0	0	16673
08/02/2025	7995	780	2917	2066	3658	3	39	0	2	0	17456
09/02/2025	7995	975	2082	2517	3717	3	80	0	0	0	17366
10/02/2025	8125	845	1667	1495	3362	3	189	97	0	0	15780
11/02/2025	7930	0	3047	3444	3285	3	69	0	0	0	17776
12/02/2025	9035	585	2083	2120	3213	3	11	0	0	0	17046
13/02/2025	8580	390	2079	2664	2781	3	0	0	0	0	16494
14/02/2025	8645	715	2503	2993	3254	4	51	0	3	0	18164
15/02/2025	8450	325	2086	2127	3278	3	19	0	0	0	16286
16/02/2025	8645	520	2537	2860	3173	3	0	0	0	0	17735
17/02/2025	7930	975	1728	1392	2874	3	0	0	0	0	14899
18/02/2025	8580	130	1248	1304	3327	3	16	0	0	0	14605
19/02/2025	7995	845	1244	1044	3690	3	0	0	0	0	14818
20/02/2025	8645	520	1666	2641	2805	3	0	0	0	0	16277
21/02/2025	8320	845	408	379	2756	3	75	0	0	0	12783
22/02/2025	8255	325	2499	2213	3250	3	39	0	0	0	16580
23/02/2025	7995	585	408	391	3489	3	0	0	0	0	12868
24/02/2025	7085	390	2079	1993	3377	3	11	0	0	0	14935
25/02/2025	7410	455	826	613	3786	3	0	0	0	0	13089
26/02/2025	8450	325	1663	1526	3462	3	185	89	0	0	15700
27/02/2025	8515	1235	1247	1253	3690	3	833	11	0	0	16784

Date	Planned Process Discharges (m ³)						Unplanned Process Discharges (m ³)		Maintenance Discharges (m ³)		Total operational discharges ^(c) (m ³)
	Membrane Reject	Membrane Cleans	GAC Backwash	GAC Filter to Waste	Supernatant Discharge	WW recycle ^(A)	MIC Overflow	GAC Overflow	Chemical bunds	Clarifier draining discharges ^(B)	
28/02/2025	8840	845	1245	1162	3260	3	71	0	0	0	15423
01/03/2025	8840	910	1250	1278	3447	3	3	0	0	0	15728
02/03/2025	8515	715	842	794	3593	3	7	0	0	0	14465
03/03/2025	8840	585	2068	2005	3625	3	2	0	0	0	17124
04/03/2025	8840	715	416	392	3866	4	74	0	0	0	14302
05/03/2025	8580	715	2500	1954	3350	3	566	0	0	0	17666
06/03/2025	9490	390	409	595	3453	3	92	0	0	0	14429
07/03/2025	8905	715	1664	1596	3254	3	488	0	0	500	17122
08/03/2025	7475	845	1244	1242	3076	3	244	0	0	0	14125
09/03/2025	9035	520	1662	1154	3387	3	1	0	0	0	15759
10/03/2025	9360	585	1243	1441	3123	2	387	2	3	0	16144
11/03/2025	9360	650	1068	886	2993	-2	0	0	0	0	14958
12/03/2025	8320	845	1425	1633	2902	-3	3	0	0	0	15129
13/03/2025	9165	650	832	456	2701	-3	148	0	0	0	13952
14/03/2025	9100	715	2475	3293	2728	-2	122	0	0	0	18433
15/03/2025	9165	780	408	369	2693	-2	69	0	0	0	13484
16/03/2025	9165	195	2500	2590	2710	-2	1	0	0	0	17162
17/03/2025	9100	325	1205	321	2732	-2	4	0	0	0	13686
18/03/2025	8775	260	2463	1649	2628	-2	824	3	0	0	16602
19/03/2025	9685	390	1871	1315	2683	-2	821	0	0	0	16765
20/03/2025	8515	455	2025	1031	2592	-3	8	0	10	0	14635
21/03/2025	9230	520	2601	1485	2691	-3	4	0	0	0	16530

Date	Planned Process Discharges (m ³)						Unplanned Process Discharges (m ³)		Maintenance Discharges (m ³)		Total operational discharges ^(c) (m ³)
	Membrane Reject	Membrane Cleans	GAC Backwash	GAC Filter to Waste	Supernatant Discharge	WW recycle ^(A)	MIC Overflow	GAC Overflow	Chemical bunds	Clarifier draining discharges ^(B)	
22/03/2025	8840	650	835	1045	2681	-2	142	0	0	0	14192
23/03/2025	8775	910	1665	1542	2676	-2	228	0	0	0	15796
24/03/2025	8645	585	1456	981	2622	-2	4	0	0	0	14293
25/03/2025	8450	390	3016	3161	2903	-3	169	0	0	0	18089
26/03/2025	7670	845	1772	1036	2677	-1	279	0	0	0	14278
27/03/2025	8645	585	2184	1352	2703	0	31	0	0	0	15501
28/03/2025	8905	195	2082	1169	2740	1	1151	0	0	0	16242
29/03/2025	9165	455	1251	1507	2683	0	221	0	0	0	15283
30/03/2025	8190	585	1245	1072	2618	2	19	0	0	0	13729
31/03/2025	9165	910	1136	6040	2855	2	2503	0	0	0	22609
01/04/2025	9555	455	2093	3072	2795	1	3588	0	0	0	21557
02/04/2025	8840	780	842	6015	2723	-1	2747	0	0	0	21946
03/04/2025	8840	520	1667	6644	2710	-1	2275	0	0	0	22656
04/04/2025	7540	845	1249	5914	2561	0	1203	0	0	0	19312
05/04/2025	9100	650	742	9716	2837	-1	1403	0	0	0	24448
06/04/2025	9230	650	1613	12271	2840	-3	1704	0	8	0	28315
07/04/2025	9165	520	1137	6350	2837	-2	1216	0	0	0	21225
08/04/2025	9100	520	832	5937	2853	-1	1528	0	0	0	20769
09/04/2025	7735	780	1672	6233	2829	-1	2143	0	0	0	21392
10/04/2025	8385	650	1248	1086	3063	-2	12	0	0	0	14443
11/04/2025	8970	130	1972	5942	2901	-1	4	0	0	0	19919
12/04/2025	8320	975	826	646	2593	-2	0	0	0	0	13361

Date	Planned Process Discharges (m ³)						Unplanned Process Discharges (m ³)		Maintenance Discharges (m ³)		Total operational discharges ^(c) (m ³)
	Membrane Reject	Membrane Cleans	GAC Backwash	GAC Filter to Waste	Supernatant Discharge	WW recycle ^(A)	MIC Overflow	GAC Overflow	Chemical bunds	Clarifier draining discharges ^(B)	
13/04/2025	9035	585	1679	1218	2665	-3	1	0	0	0	15183
14/04/2025	8840	390	1670	1985	2651	-3	1	0	0	0	15537
15/04/2025	9035	715	1265	1094	3058	-2	2	0	0	0	15169
16/04/2025	8515	520	1689	2091	2626	-2	1	0	0	0	15441
17/04/2025	7345	715	2100	1848	2495	-1	254	4	0	0	14761
18/04/2025	7215	325	851	734	2464	-2	0	0	0	0	11589
19/04/2025	7150	455	1685	1636	2488	-2	0	0	0	0	13414
20/04/2025	6435	390	2085	1934	2484	-1	0	0	0	0	13328
21/04/2025	7085	780	1260	1367	2508	-1	49	0	0	0	13049
22/04/2025	8320	845	1664	1423	2789	0	13	0	0	0	15054
23/04/2025	8580	520	1676	1870	2766	-1	17	0	0	0	15429
24/04/2025	8775	780	1248	1097	2824	-2	2	0	0	0	14726
25/04/2025	7475	845	2097	1773	2688	-2	0	0	0	0	14878
26/04/2025	7930	715	1445	1307	2731	-1	0	0	0	0	14128
27/04/2025	7345	520	1496	1832	2588	-1	0	0	0	0	13781
28/04/2025	8580	975	1670	1228	2546	0	9	0	6	0	15015
29/04/2025	8450	325	1279	1691	2787	3	0	0	0	0	14532
30/04/2025	8385	650	1678	1941	2745	1	1	0	2	0	15402
01/05/2025	9100	325	2095	1941	2488	-1	0	0	0	0	15949
02/05/2025	8125	585	1256	1063	2367	-1	1	0	0	0	13398
03/05/2025	8515	650	1673	1426	2309	-2	3	0	0	0	14576
04/05/2025	7670	845	1671	1658	2110	-3	0	0	0	0	13955

Date	Planned Process Discharges (m ³)						Unplanned Process Discharges (m ³)		Maintenance Discharges (m ³)		Total operational discharges ^(c) (m ³)
	Membrane Reject	Membrane Cleans	GAC Backwash	GAC Filter to Waste	Supernatant Discharge	WW recycle ^(A)	MIC Overflow	GAC Overflow	Chemical bunds	Clarifier draining discharges ^(B)	
05/05/2025	8385	195	1256	1126	2335	-3	0	0	0	0	13298
06/05/2025	8060	195	2089	1606	2656	-3	0	0	2	0	14608
07/05/2025	7800	715	1252	1297	2681	1	11	0	0	0	13755
08/05/2025	7150	520	1672	1689	2634	3	0	0	3	0	13668
09/05/2025	7800	195	1255	1082	2855	3	0	0	0	0	13186
10/05/2025	6695	390	1663	1439	2545	3	0	0	0	0	12732
11/05/2025	7670	260	1678	1412	2740	3	0	0	0	0	13760
12/05/2025	7800	715	2086	1496	2672	3	0	0	0	0	14769
13/05/2025	7150	715	1252	1262	2636	534	0	0	0	0	13015
14/05/2025	8450	455	1679	1361	2750	1035	0	0	3	0	14697
15/05/2025	7930	910	1670	2002	2770	1657	0	0	0	500	15783
16/05/2025	7280	585	1258	1036	2639	3134	0	0	0	0	12798
17/05/2025	7930	585	2085	1591	2803	3126	0	0	0	0	14994
18/05/2025	6045	585	1246	1256	2454	3212	0	0	0	0	11585
19/05/2025	8060	390	1244	1109	2865	3325	0	0	0	0	13669
20/05/2025	7410	585	1673	1423	3013	3211	2	0	0	0	14106
21/05/2025	7215	845	1677	1374	2740	3207	0	0	1.8	0	13853
22/05/2025	7410	520	1685	1443	2720	3213	0	0	0	0	13777
23/05/2025	6500	520	1674	1347	2566	3302	0	0	0	0	12607
24/05/2025	7020	715	1676	1657	2758	2948	0	0	0	0	13826
25/05/2025	6630	650	1672	1332	2585	3066	0	0	0	0	12869
26/05/2025	7280	585	1664	1565	2775	3264	0	0	0	0	13869

Date	Planned Process Discharges (m ³)						Unplanned Process Discharges (m ³)		Maintenance Discharges (m ³)		Total operational discharges ^(c) (m ³)
	Membrane Reject	Membrane Cleans	GAC Backwash	GAC Filter to Waste	Supernatant Discharge	WW recycle ^(A)	MIC Overflow	GAC Overflow	Chemical bunds	Clarifier draining discharges ^(B)	
27/05/2025	6305	130	1248	1045	2727	3375	0	0	0	500	11954
28/05/2025	6110	455	1667	1305	2432	3360	0	0	0	0	11969
29/05/2025	7475	585	1492	1804	2709	4044	0	0	0	0	14066
30/05/2025	5720	715	1435	1488	2473	4250	0	0	0	0	11831
31/05/2025	6760	130	1673	1355	2528	4659	0	0	0	0	12445
01/06/2025	5720	325	1679	1250	2309	4929	0	0	0	0	11283
02/06/2025	4095	650	1672	1106	1920	5186	0	0	0	0	9444
03/06/2025	4420	520	1252	4446	2084	5421	0	0	0	0	12723
04/06/2025	4420	325	1256	6098	2121	4811	0	0	0	500	14720
05/06/2025	4420	195	1671	4934	2050	6234	247	0	0	0	13517
06/06/2025	4745	0	1244	994	2093	2711	0	0	0	500	9576
07/06/2025	4485	520	2085	1687	2161	6	0	0	0	0	10938
08/06/2025	4810	520	1664	1948	2224	9	0	0	0	0	11166
09/06/2025	1560	0	0	0	1583	1000	397	0	0	0	3540
10/06/2025	0	0	0	0	632	10	3	0	0	0	634
11/06/2025	0	0	0	0	1334	10	0	0	0	0	1334
12/06/2025	0	0	0	0	1161	10	0	0	0	0	1161
13/06/2025	0	0	0	0	1699	24	0	0	0	0	1699
14/06/2025	0	0	0	0	1368	10	0	0	0	0	1368
15/06/2025	0	0	0	0	1361	11	803	0	0	0	2164
16/06/2025	65	0	0	0	1618	14	9464	0	0	0	11148
17/06/2025	2535	0	408	0	1264	14	1311	26	0	0	5545

Date	Planned Process Discharges (m ³)						Unplanned Process Discharges (m ³)		Maintenance Discharges (m ³)		Total operational discharges ^(C) (m ³)
	Membrane Reject	Membrane Cleans	GAC Backwash	GAC Filter to Waste	Supernatant Discharge	WW recycle ^(A)	MIC Overflow	GAC Overflow	Chemical bunds	Clarifier draining discharges ^(B)	
18/06/2025	5005	0	1244	871	2347	13	164	0	0	0	9631
19/06/2025	4875	0	836	468	2213	13	622	0	0	0	9014
20/06/2025	5070	325	1241	1145	2340	12	0	0	0	0	10120
21/06/2025	4745	195	1659	820	2180	12	0	0	0	0	9599
22/06/2025	5070	325	1241	761	2349	12	2	0	0	0	9748
23/06/2025	5070	845	1237	1618	2647	12	12	0	0	0	11430
24/06/2025	5330	585	1242	1594	2306	12	0	0	0	500	11557
25/06/2025	6695	650	2078	1825	2483	12	149	0	15	0	13894
26/06/2025	7020	780	1193	1274	2547	11	153	0	0	0	12967
27/06/2025	5200	650	1248	931	2546	11	0	0	0	0	10575
28/06/2025	6565	390	1670	1229	2487	11	1	0	0	0	12341
29/06/2025	4225	195	830	718	2033	11	0	0	0	0	8001
30/06/2025	6110	130	2092	1423	2233	12	309	0	0	0	

Notes: (A) Wastewater recycle is presented as negative volumes because it is recirculated back to the treatment process and therefore subtracted from the total process discharges. (B) Volumes for each clarifier draining event is between 400 to 600 m³, and so an average of 500 m³ has been added for each event. (C) These volumes are for the total operational discharges allowed under Resource Consent AUTH137497.01.01. They do not include stormwater discharges or treated off-spec water discharges allowed under resource consents AUTH137497.03.01 and AUTH142778.01.01, respectively.

Appendix G. Data sources

Category	Parameter	Source platform	Tag/ID
Water quality	All raw water lab samples	Power BI	N/A
Water quality	Continuous turbidity	Pi	STWKO20_AI12/AI1/OUT.CV
Abstraction volume	Waikato WTP	Pi	STWKO51_FI01/AI1/PV.CV
Abstraction volume	Waikato 50 WTP	Pi	STW50_20_FIT_X01/AI1/PV.CV
Treated water volume	Waikato WTP	Pi	STWKO90_FI01/AI1/PV.CV
Discharge volume	Waikato 50 WTP	Pi	STW50_85_FIT_X05/AI1/OUT.CV
Rangiriri Flow	Instantaneous flow	Pi	Rangiriri_Flow(EW)
Rangiriri Flow	Rolling seven-day average	Pi	Rangiriri_7dayAvg(EW)
Abstraction rate	Waikato WTP	Pi	STWKO51_FI01/AI1/PV.CV
Abstraction rate	Waikato 50 WTP	Pi	STW50_20_FIT_X01/AI1/PV.CV
Discharge quality	Routine	Business Objects/ Power BI	N/A
Discharge quality	Non-routine	Documents	Discharge to environment form
Discharge volume	Waikato WTP – process and unplanned	Pi	Please see source spreadsheet (“STWKO discharges summary”)
Discharge volume	Waikato WTP – clarifier drain	Discharge to environment record sheet (paper)	N/A
Discharge volume	Waikato 50	Pi	STW50_85_FIT_X05/AI1/OUT.CV
Chemical bund discharges	Waikato WTP and Waikato 50	Chemical bund discharge logs	N/A