Water Supply

Te Kauwhata Supply Zones

DRINKING WATER SAFETY PLAN

2025

Community Code	**TEK001**
Source Code	**S00067**
Treatment Plant Code	**TP00127**
Zone Code	**TEK001TR Te Kauwhata/Rangiriri** **TEK001WH Whangamarino Rural/Meremere**

Watercare

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1.0	Drinking Water Safety Plan 2022 update	Grant King **Water Quality Scientist**	Bliss Pappachan **Water Quality Scientist** Tatiana Derevianko **Water Quality & Science Manager**	October 2022	Mathew Telfer **Operations Manager Waikato District**
2.0	Drinking Water Safety Plan 2023 update	Bliss Pappachan, **Water Quality Scientist**	Marieka van der Lee **Water Quality Scientist** Tatiana Derevianko **Water Quality & Science Manager**	November 2023	Mathew Telfer **Operations Manager Waikato District**
3.0	Drinking Water Safety Plan 2024 update	Mitchell Adams **Water Quality Scientist**	Tatiana Derevianko **Water Quality Compliance & Science Manager**	November 2024	Anin Nama **Head of Service Delivery – Waikato**
4.0	Drinking Water Safety Plan 2025 update	Cara Dreyer **Water Quality Scientist**	Tatiana Derevianko **Water Quality Compliance & Science Manager**	October 2025	Anin Nama **Head of Service Delivery – Waikato**

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Executive Summary

This Drinking Water Safety Plan (DWSP) has been developed using the *New Zealand Drinking Water Safety Plan Framework* and provides a comprehensive review of the Te Kauwhata water supply system. It outlines how public health risks associated with these supplies are managed and summarises monthly compliance requirements required to ensure the delivery of safe and reliable drinking water.

The Te Kauwhata supply is owned by Waikato District Council (WDC) and operated by Watercare Services Limited (Watercare) under contract with the Te Kauwhata Water Association (TKWA). This DWSP satisfies the legislative requirements of the *Water Services Act 2021* and must be viewed alongside the *Watercare Waikato General DWSP (Version 1.0; Appendix 1).*

WDC and Watercare adhere to the six principles of drinking-water safety, which are embedded into all systems, processes, and behaviours:

1) Embrace a high standard of care
2) Protect source water
3) Maintain multiple barriers against contamination
4) Change precedes contamination
5) Suppliers must own the safety of drinking-water
6) Apply a preventive risk management approach.

This DWSP will be reviewed and updated regularly to reflect changes in infrastructure, operations, or risk profiles, ensuring ongoing compliance and continuous improvement in drinking water safety.

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Amendments

Requests for amendments or revisions of the manual are submitted to the document controller, who is responsibility of reviewing requests and implementing changes to the document. Amendments and updates are documented in the *Table 1: Document Control Record.* Amendments or revisions of the document will result in a new version number and updated date in the footer.

1. Assessment of the Te Kauwhata Drinking-Water Supply

Table 3: Water Supply Details.

Supply Details	
Supply Name	Te Kauwhata
Hinekōrako Community Code	TEK001
Supply Owner	Waikato District Council
Population Served by Supply	4,000 (2022 estimate based on connection data and Stats NZ Statistical area population count)
Source Details	
Easting: 1750346.46	**Southing**: 372346.92
Source	Waikato River
Hinekōrako Code	S00067
Consent	109337 - To take water from the Waikato River for community water supply, tree crop irrigation and stock watering purposes and use an existing intake structure.
Consent Expiry	30-June-24 – *Reconsenting in progress.*
Maximum Consented Water Take	22,900 m^3/day
Treatment	
Hinekōrako Code	TP00127
Treatment Processes	Coagulation, Clarification, Filtration, Ultraviolet (UV) Disinfection, Chlorination, Fluoridation
Average Daily Volume	4,215 m^3/day (2024 - 25)
Peak Daily Volume	5,814 m^3/day (2024 - 25)
Distribution – Te Kauwhata/Rangiriri	
Hinekōrako Code	TEK001TR
Distribution Zone Population	3,000 (2022 estimate based on connection data and Stats NZ Statistical area population count)
Distribution – Whangamarino Rural/Meremere	
Hinekōrako Code	TEK001WH
Distribution Zone Population	1,000 (2022 estimate based on connection data and Stats NZ Statistical area population count)

Source Water Quality and Log Credit Requirements

The Te Kauwhata WTP abstracts raw water from the Waikato River, which presents microbiological risks including protozoa, bacteria, viruses, and cyanobacteria. The river typically has low turbidity but elevated colour, with relatively stable quality due to upstream influences from Lake Taupō and hydro-electric impoundments.

Based on catchment risk evaluation and protozoa monitoring data provided by Massey University in 2018, the source water for Te Kauwhata WTP is classified as a 3-log protozoa risk *(Appendix 2).* However, extensive monitoring conducted in 2023 indicated that a 4-log protozoa removal credit is needed to meet *Drinking Water Standards for New Zealand (DWSNZ*) protozoal treatment requirements. The WTP is designed to achieve 7-log removal under normal operating conditions:

- 4-log credits are achieved through coagulation, sedimentation, and filtration.
- 3-log credits are achieved through ultraviolet (UV) disinfection.

Te Kauwhata Water Supply System Description

Te Kauwhata WTP, located on Hall Road, supplies treated water for domestic, commercial, and industrial use across the communities of Te Kauwhata, Meremere, and Hampton Downs. A conventional treatment facility, Te Kauwhata WTP uses coagulation, flocculation, clarification, filtration, UV disinfection, chlorination and fluoridation. The supply is divided into two distribution zones: Te Kauwhata/Rangiriri and Whangamarino Rural/Meremere. The Te Kauwhata/Rangiriri zone serves the township of Te Kauwhata, while the Whangamarino Rural/Meremere zone supplies the communities of Hampton Downs and Meremere. Treated water is delivered via a mix of on-demand and restricted supplies.

Te Kauwhata WTP receives screened raw water from the Te Kauwhata Irrigation Association (TKIA) intake, under Resource Consent 109337 held by TKIA. From the intake, raw water is piped to the Irrigation Reservoir owned by TKIA. A pipeline transfers raw water to the WTP while a second pipeline supplies water to the irrigation scheme.

Intake:

Raw water is abstracted from the Waikato River via three submersible intake pumps (duty/assist), controlled by the Irrigation Reservoir level transmitter. Water is drawn through 2.5 mm mesh screens to prevent the ingress of debris and aquatic life. An automated backwash system, powered by an air compressor, helps prevent blockages. Key water quality parameters, including turbidity, conductivity, UV transmittance (UVT), and pH, are continuously monitored to assess raw water conditions. A flow meter continuously monitors the rate of abstraction and backup power is available through a portable generator connection.

Screened water passes through 100-micron nominal Arkal filters before being pumped to the Irrigation Reservoir. The pipeline from the intake to the reservoir is primarily constructed of asbestos cement and transverses farmland, making it susceptible to damage from agricultural activities.

Coagulation, Flocculation and Clarification:

Aluminium sulphate (alum, $Al_2(SO_4)_3$) and pre-caustic soda (sodium hydroxide, NaOH) are dosed into a common main via duty/standby pumps - alum to support coagulation and pre-caustic soda to counteract the resulting pH drop. Dosing is controlled using flow-pacing and streaming current feedback, with jar testing used for optimisation. Powdered activated carbon (PAC) dosing is available for taste, odour, and cyanotoxin control, but has been discontinued following the replacement of sand media with granular activated carbon (GAC) in the filters.

Flow is distributed across two up-flow clarifiers where turbidity is continuously monitored. To minimise flow shocks that can disrupt the sludge blanket within the clarifiers, raw water flow is ramp restricted. Polyelectrolyte, a charged polymer used to promote floc formation, is dosed into the flash mixer tank of each clarifier via duty/standby pumps. Flocculant dosing is flow-paced, with set points adjusted based on jar testing.

Sludge is discharged to onsite settling ponds where supernatant is syphoned to a tributary of the Ngāriohe Stream, and settled sludge is removed and disposed of at landfill.

Filtration and UV Disinfection:

Hydrofluorosilicic acid (HFA, H_2SiF_6) is dosed prior to filtration via a single flow-paced dosing pump, providing fluoridation. Clarified water passes through four gravity filters containing sand and granular activated carbon (GAC), which provide partial removal of organic material. Filters are backwashed routinely or when triggered by high turbidity, head loss, or manual override. Air scour is provided by two blowers (duty/standby). Backwash water is drawn from the backwash water tank and discharged to the settling ponds, where supernatant is siphoned to a tributary of the Ngāriohe Stream and settled sludge is disposed of at landfill. Each filter is equipped with a level meter, pressure meter, outflow meter, turbidimeter and a filter-to-waste system.

Following filtration, post-caustic soda is dosed for pH correction via a flow-paced duty/standby dosing pump. A UVT meter measures the transmissivity of the filtered water prior to UV disinfection. Disinfection is provided by two Trojan Swift SC D12 UV reactors (duty/manual standby) provide disinfection, validated to DVGW standards (*Appendix 3)*. Any deviation from the required dose triggers an alarm. Outflow meters monitor flow exiting the UV units.

Chemical Dosing and Post Treatment Monitoring:

Chlorine gas is dosed using a single chlorinator, with dosing feedback-controlled to a set point and automatically adjusted in response to system demand. The dosing system operates using pressurised feed water and a venturi vacuum delivery mechanism. One 920kg drum and one 70kg cylinder are kept on site in a duty/standby arrangement.

Water enters three treated water reservoirs, providing 30 minutes of contact time. Under normal operating conditions, treated water flows by gravity from Reservoir 1 to Reservoir 2, and subsequently to the 40% level of Reservoir 3. A final water pump is available to transfer water from Reservoir 2 to Reservoir 3 when required.

Final water is continuously monitored for turbidity, chlorine, pH, and fluoride. Data is telemetered to WDC, with monitoring equipment calibrated weekly and validated quarterly.

Reticulation and Reservoirs:

Treated water is delivered from the reservoirs to the Western B (360 m³), Springhill (250 m³), and two Te Kauwhata (1,500 m³ each) storage reservoirs via duty/standby pump sets. All reservoirs are equipped with high and low-level alarms, with alerts sent to the duty operator and controller. The distribution network has been progressively upgraded and currently consists of PE, HDPE, and PVC pipes. Reservoir details are included in the *Reservoir Register* (*Appendix 4*).

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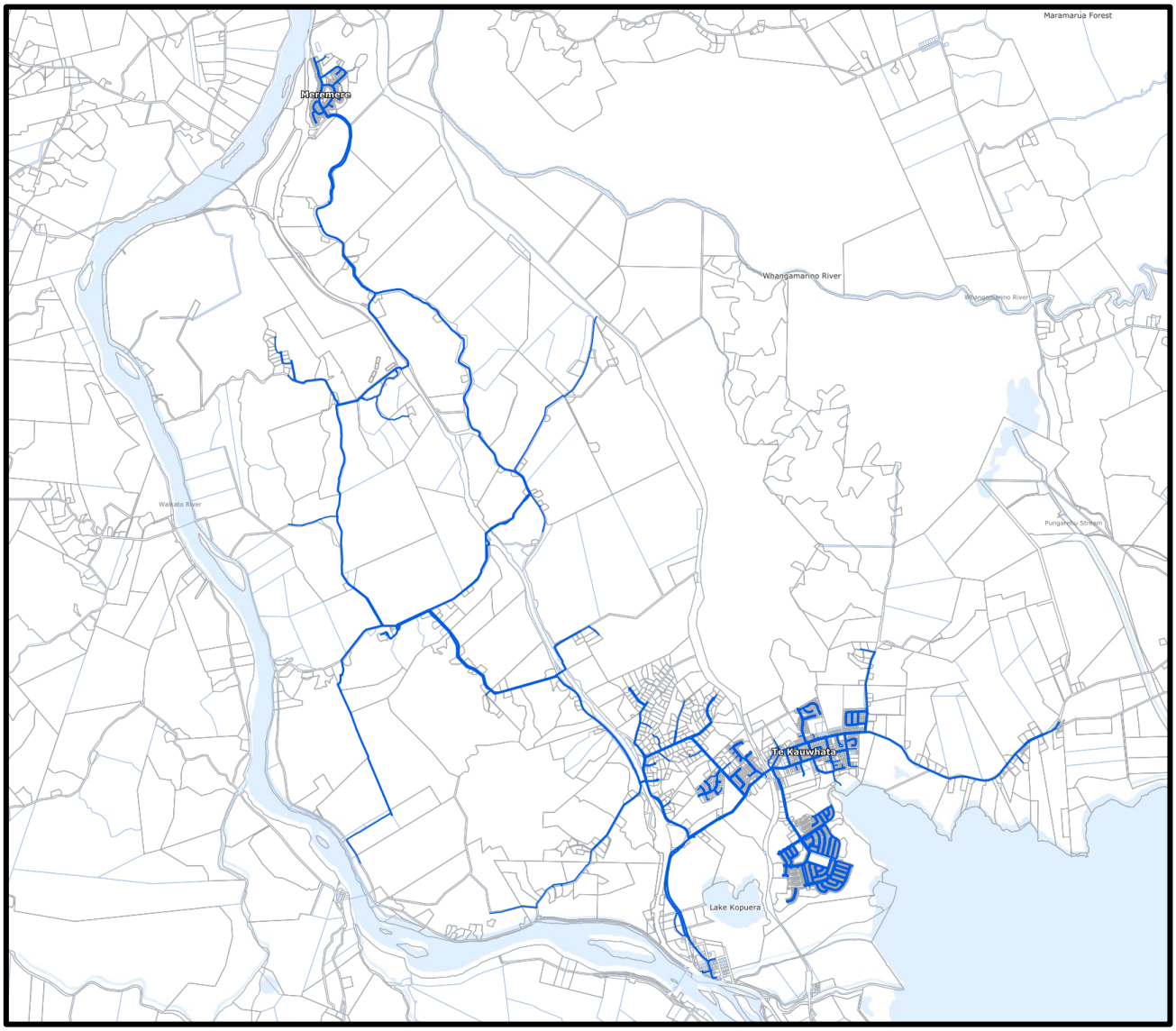

Figure 1: Te Kauwhata Water Supply Location.

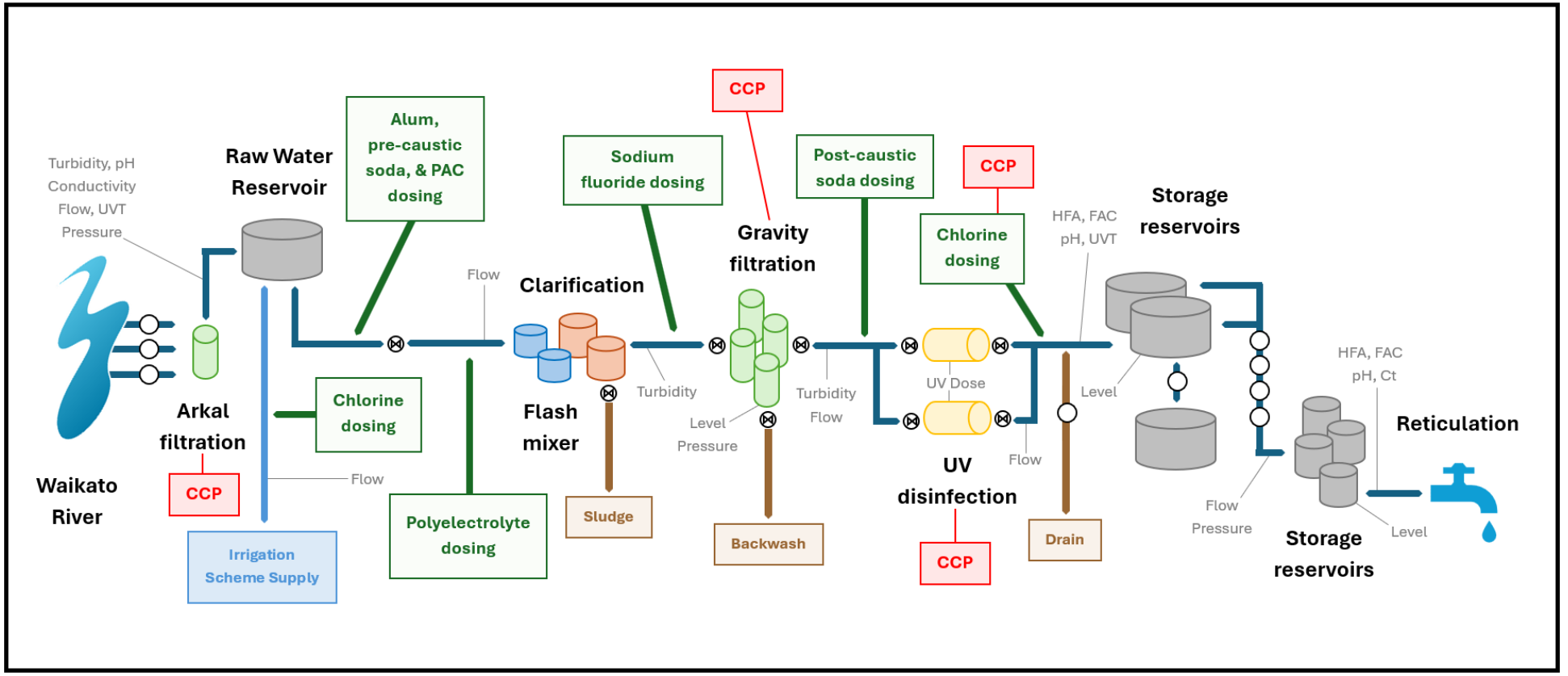

Figure 2: Te Kauwhata Water Supply Flow Diagram.

2. Risk Identification and Preventive Measures

A qualitative risk assessment of the Te Kauwhata water supply systems is detailed in the *Water Supply Risk Table* (*Appendix 5*). The table identify potential public health risks across the entire supply system, with each hazardous event assessed based on its likelihood and consequence, and includes the following components:

- Catchment
- Intake
- Coagulation, Flocculation Sedimentation/PAC Dosing
- Filtration
- UV Disinfection
- Chlorination
- Lift Pumps
- pH Correction
- Fluoridation
- Storage Reservoirs
- Reticulation
- Other

A multiple barrier approach is used to manage these risks. This approach ensures that if one barrier fails, others remain in place to maintain the safety and reliability of the supply. Key barriers include physical treatment processes, chemical dosing, operational monitoring, and system redundancies.

As part of this approach, Critical Control Points (CCPs) are established at key stages of the treatment process. These are process barriers and monitoring points designed to detect and respond to deviations that could compromise water safety. Each CCP has defined operational limits and is monitored at a frequency that ensures timely detection of any failures.

The location of CCPs are shown in the supply flow diagram and further details are included in *Critical Control Points (Appendix 6).*

Table 4: Barriers and Preventative Measures in place at the Te Kauwhata WTP.

Four Types of Barriers	Existing Preventive Measures Include:
Preventing hazards entering the raw water	• Wedge wire intake screens - CCP • Arkal disk filters - CCP
Removing particles and hazardous chemicals from the water by physical treatment	• Coagulation, Flocculation, Sedimentation • Rapid sand and GAC filtration – CCP
Killing or inactivating pathogens in the water by disinfection	• UV disinfection – CCP • Chlorination with contact time – CCP
Maintaining the quality of the water in the distribution system	• Residual disinfection maintained. • Hygiene and construction codes of practice • Adequate network pressures maintained • Backflow prevention programme • Reservoirs protected from ingress - CCP • Online continuous SCADA monitoring and alarms

3. Compliance Monitoring and Reporting Requirements

The Te Kauwhata WTP is required to demonstrate compliance with the Drinking Water Quality Assurance Rules (2022), revised 29 November 2024 (DWQAR) Level 3. The reporting period is monthly, with compliance data submitted to Taumata Arowai within 10 working days following the end of each month. Determinands listed in Table 5 are reported via API transfers from Water Outlook to Taumata Arowai's compliance database, Hinekorako. The sampling plan is detailed in Appendix 7.

Table 5: Monitoring Requirements for Te Kauwhata WTP.

Population	Determinands	Compliance Limit	Hazard	DWQAR	Sampling Frequency	Compliance Period
4,000	C.t	15 min.mg/L (min. 95%)	Bacteria	4.10.1.1 - T3.2	Continuous	1 Day
4,000	FACe	0.2 mg/L	Bacteria	4.10.1.1 - T3.3	Continuous	1 Day
4,000	T_{10}	5 minutes	Bacteria	4.10.1.1 - T3.4	Continuous	1 Day
4,000	Turbidity	< 1.0 NTU (min. 95%)	Bacteria	4.10.1.1 - T3.5	Continuous	1 Day
4,000	Turbidity	< 2.0 NTU (15-min max)	Bacteria	4.10.1.1 - T3.6	Continuous	1 Day
4,000	UV Flow	74-580 m^3/hr (90% UVT)	Bacteria	4.10.1.4 – T3.15	Continuous	1 Day
4,000	RED	>= 40 mJ/cm^2 (min. 95%)	Bacteria	4.10.1.4 - T3.16	Continuous	1 Day
4,000	RED	< 40 mJ/cm^2 (15-min max)	Bacteria	4.10.1.4 - T3.17	Continuous	1 Day
4,000	Turbidity	< 5.0 NTU (15-min max)	Bacteria	4.10.1.4 - T3.18	Continuous	1 Day
4,000	Turbidity	< 0.3 NTU (min 95%)	Protozoa	4.10.2.5 – T3.39	Continuous	1 Day
4,000	Turbidity	< 0.5 NTU (15-min max)	Protozoa	4.10.2.5 – T3.40	Continuous	1 Day
4,000	Turbidity	< 0.1 NTU (min. 95%)	Protozoa	4.10.2.7 – T3.47	Continuous	1 Day
4,000	Turbidity	< 0.3 NTU (15-min max)	Protozoa	4.10.2.7 – T3.48	Continuous	1 Day
4,000	UV Flow	74-580 m^3/hr	Protozoa	4.10.2.13 - T3.85	Continuous	1 Year
4,000	UV Dose	47 W/m^2	Protozoa	4.10.2.13 - T3.86	Continuous	1 Day
4,000	UV Dose	47 W/m^2	Protozoa	4.10.2.13 - T3.87	Continuous	1 Day
4,000	Turbidity	< 5.0 NTU (15-min max)	Protozoa	4.10.2.13 - T3.88	Continuous	1 Day
4,000	UVT	> 66.5% (min 95%) | > 99.3 % (min 95%)	Protozoa	4.10.2.13 - T3.89	Continuous	1 Day
4,000	UVT	> 56% (15-min)	Protozoa	4.10.2.13 - T3.90	Continuous	1 Day
4,000	Chemical Constituents	DWQAR	Chemical	4.10.3 Tables 33 & 34	Various	Various

APPENDIX 1: GENERAL WATER SAFETY PLAN (VERSION 1.0)

Addresses the ten fundamental components for the provision of safe and secure drinking water across all WDC-owned water supplies in alignment with the *New Zealand Drinking Water Safety Plan Framework.*
Available at: O:\Ops\Watercare Waikato\Water Safety Plans\1. DWSP General

APPENDIX 2: CATCHMENT RISK ASSESSMENT OF DRINKING WATER INTAKES ALONG THE WAIKATO RIVER

Identifies potential sources of contamination within the water supply catchment and assess risks to drinking water quality. Supports proactive risk management and informs mitigation strategies.
Available at: O:\Ops\Watercare Waikato\Water Safety Plans\Catchment Risk Assessment

APPENDIX 3: UV VALIDATION CERTIFICATE

Confirms that the Trojan Swift SC D12 UV reactors at Te Kauwhata WTP are validated to DVGW standards.
Available at: O:\Ops\Watercare Waikato\Water Safety Plans\1. DWSP Te Kauwhata

APPENDIX 4: RESERVOIR STORAGE MANAGEMENT PLAN

Details operational parameters and maintenance requirements for drinking water storage facilities, aligned with the *DWQAR D3.12*.
Available at: O:\Ops\Watercare Waikato\Water Safety Plans\1. DWSP Te Kauwhata

APPENDIX 5: WATER SUPPLY RISK TABLES

Summarises potential risks to drinking water quality for the Te Kauwhata supply, supporting control prioritisation and improvement planning. Available at: O:\Ops\Watercare Waikato\Water Safety Plans\1. DWSP Te Kauwhata

APPENDIX 6: CRITICAL CONTROL POINTS

Outlines key process barriers and monitoring points to manage drinking water quality risks with defined limits and response protocols to mitigate public health risks.
Available at: O:\Ops\Watercare Waikato\Water Safety Plans\1. DWSP Te Kauwhata

APPENDIX 7: DISTRIBUTION NETWORK SAMPLING PLAN

Outlines WDC's distribution network compliance monitoring schedule, reviewed annually per DWQAR D3.18 and D3.28. Available at: O:\Ops\Watercare Waikato\Water Safety Plans\1. DWSP Te Kauwhata

APPENDIX 8: OPERATOR MONITORING AND MAINTENANCE SCHEDULE

Outlines a defined set of performance criteria used to assess and verify the functionality of key components within the water supply system. The Operator Monitoring and Maintenance Schedule is included in the General Drinking Water Safety Plan.
Available at: O:\Ops\Watercare Waikato\Water Safety Plans\1. DWSP Te Kauwhata

APPENDIX 9: STANDARD OPERATING PROCEDURES (SOPS)

Step-by-step instructions for routine tasks, maintenance activities, and incident response, ensuring compliance with regulatory requirements and best practice standards.
Available at: O:\Ops\Watercare Waikato\1. CONTROL of WORKS\CONTROL OF WORKS\SOPs\Production\Water