Water Supply
Tuakau and Pokeno supplies
DRINKING WATER SAFETY PLAN

Community Code	**TUA002 Tuakau; POK001 Pokeno**
Source Code	**N/a**
Treatment Plant Code	**N/a**
Zone Code	**TUA002TS Tuakau; POK001PO Pokeno**

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Table 1: Document Control Record

Version No.	Description	Author	Reviewer	Reviewer	Date	Authorised
1	Drinking Water Safety Plan 2022 update	Grant King- Water Quality Scientist	Bliss Pappachan - Water Quality Scientist	Tatiana Derevianko - Water Quality Compliance and Science Manager	October 2022	Mat Telfer – Operations Manager Waikato District
2	Drinking Water Safety Plan 2023 update	Bliss Pappachan - Water Quality Scientist	Marieka van der Lee – Water Quality Scientist	Tatiana Derevianko - Water Quality Compliance and Science Manager	November 2023	

Table 2: Document Distribution List

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EXECUTIVE SUMMARY

Drinking Water Safety Plans (DWSPs) have been developed to describe the management of public health risk associated with the Tuakau and Pokeno water supply, to ensure the safe and reliable supply of drinking water to our customers. Tuakau and Pokeno Distribution is owned by Waikato District Council (WDC) and operated by Watercare Services Limited (Watercare). These plans also satisfy the legislative requirements of the Water Services Act 2021

WDC and Watercare operating models demonstrates a high level of commitment to drinking-water quality management. The provision of safe and secure drinking-water and a commitment to Drinking water safety planning is visible through the organisational strategy, plans and budget.

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

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 assesses risks from source to supply point and ranks risks according to their likelihood and consequence. Necessary improvements are identified and prioritised as part of a larger process which has considered the risks across all the WDC water supplies and prioritised the greatest risks for prioritised improvement. The supply specific improvements have been included in this plan.

Each element of the water supply system has been reviewed using the New Zealand Drinking Water Safety Plan Framework (referred to as “the framework”).
The following components of the framework are included in the DWSP:

- Commitment to drinking water quality
- Assessment of the drinking-water supply for hazards, hazardous events, and risks
- Existing preventive measure
- Operational procedures
- Verification monitoring and inspection programme
- Improvement plan
- Management of incidents and emergencies
- Documentation and reporting
- Investigation
- Oversight, review and continual improvement

DWSPs have been developed to include Critical Control Points (CCPs). The CCPs are the process controls for the water supply system, have defined limits and are monitored continuously to ensure that any failures are detected in time for action to be taken.

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DOCUMENT CONTROL

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AMENDMENTS

Requests for amendments or revisions of the manual are made to the Document Controller, who has the responsibility of reviewing requests and implementing amendments or revisions to the document.

Amendments and updates are documented in the Table 1: Document Control Record on page 2.

Amendments or revisions of the manual will result in a new version number and date in the footer.

GLOSSARY

Acronym	Expanded
AMP	Asset Management Plan
APHA	American Public Health Association
AWWA	American Water Works Association
CCP	Critical Control Point
CEO	Chief Executive Officer
DMP	Drought Management Plan
DWSNZ	Drinking Water Standards for New Zealand 2022
DWAV	Drinking Water Aesthetic Values
DWQAR	Drinking Water Quality Assurance Rules 2022
E. coli	Escherichia coli
EIR	Event Investigation Report
FAC	Free Available Chlorine
FACe	Free Available Chlorine equivalent (found by calculation)
FD	Functional Description
GIS	Geographic Information System – satellite-based mapping
GV	Guideline Value
IANZ	International Accreditation New Zealand
IEC	International Electrotechnical Commission
ISO	International Organisation for Standardization
NTU	A measure of turbidity
PLC	Programmable Logic Controller
pH	A measure of acidity / alkalinity (pH 7 = neutral)
SCADA	Supervisory Control and Data Acquisition
SOP	Standard Operating Procedure
UVT	Ultraviolet Transmittance
WDC	Waikato District Council
DWSP	Drinking Water Safety Plan
WTP	Water Treatment Plant

1. Commitment to drinking-water quality management

WDC and Watercare are committed to the provision of safe and secure drinking-water for its consumers and to the future improvements that have been identified in this DWSP. The organisational commitment to drinking-water quality management is signed by WDC and Watercare and listed in Appendix 1: Key Documents Register.

The Waikato District is located in the Northern Waikato region and has a resident population of 79,900 (2018 census) which is relatively evenly mixed between urban and rural. The main urban populations are centred in the towns of Huntly, Ngaruawahia, Raglan, Te Kauwhata, Pokeno and Tuakau.

WDC and Watercare are responsible for the management and operation of the public water supply systems across the Waikato District Council. Council also has an agreement with Hamilton City Council to take up to 12,000 cubic metres per day, Watercare to take up to 5000 cubic meters per day and Te Kauwhata Water Association to take up to 4000 cubic metres per day for parts of the district. The supplies are managed by Watercare Services staff as per the operations and maintenance contract WDC has had in place from 1 October 2019. All residential properties have been metered since 2017. In addition, all commercial and industrial properties are metered. WDC operates a 24-hour call centre for customer complaints about faults and Watercare operates a 24-hour operation on-call service to address issues as necessary.

The long-term Operations and Maintenance Contract with Watercare started on the 1st of October 2019 WDC. The contract encompasses all aspects of water and wastewater operations, maintenance, planning and customer activities. All WDC Staff involved with Water and Wastewater servicing were transferred to Watercare.

Relationship of DWSP to organisational policy and strategy

The provision of safe and secure drinking-water is visible in both WDC and Watercare's organisational policies and strategies. WDC has established a comprehensive strategic and organisational framework in all other organisational policies and strategic planning documents that refer to drinking-water management.

Title	To access listed document
Waikato District Council Three Waters AMP 2021-31	www.waikatodistrict.govt.nz
Long Term Plan (LTP 21-31)	https://www.waikatodistrict.govt.nz/your-council/plans-policies-and-bylaws/plans/long-term-plan
30 Year Infrastructure Strategy (2021 – 2051)	www.waikatodistrict.govt.nz/docs/default-source/your-council/plans-policies-and-bylaws/
Watercare Statement of Intent (SOI)	https://www.watercare.co.nz/About-us/Reports-and-publications

Engaging Stakeholders

The WDC stakeholder/ Communications team maintains relationships with councillors and local board members and responds to queries they receive from their constituents about water quality, providing up to date results and confirmation that compliance is maintained. These elected officials, along with the public, are given the opportunity to visit treatment plants at various times throughout the year. The long-term stakeholder engagement strategy is listed in Appendix 1: Key Documents Register.

The delivery of Drinking Water to the reticulated Waikato communities is a joint commitment between WDC and Watercare and the Drinking Water Safety plan has been developed collaboratively. WDC has retained responsibility Stakeholder liaison and provide customer facing activities. See figure 1: Watercare Waikato organisational chart that sets Watercare's operational structure.

Staff employed in each water supply area receive training specific to their operational area to ensure that they understand the scope of their role, can undertake required tasks safely and are competent in the delivery of their 'business as usual' responsibilities. Staff work under the supervision of experienced staff until such time as they undertake a competency assessment from their respective supervisor.

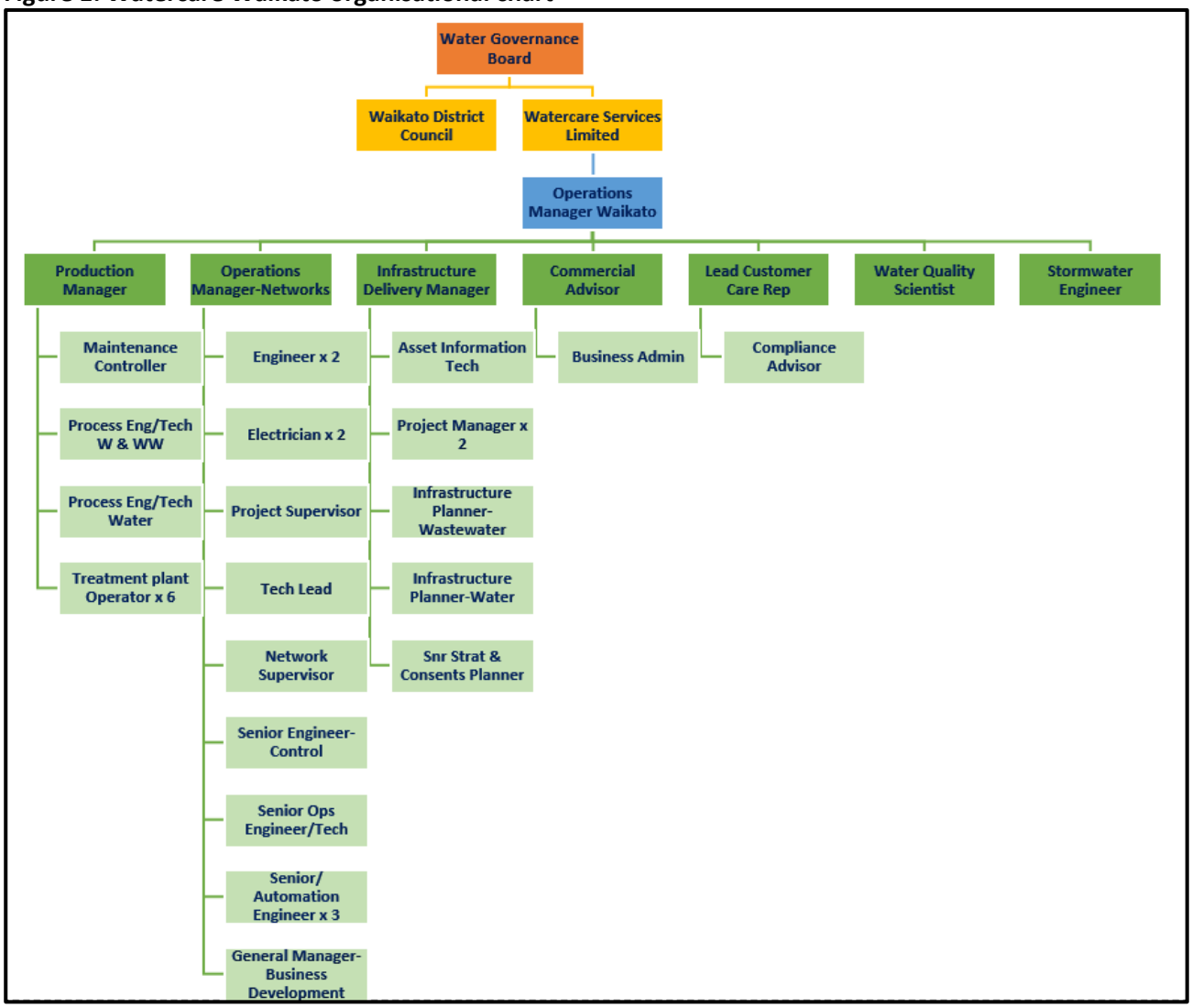
In addition to the task specific training, Watercare also focuses on the professional development of staff, for example:

- Following initial water treatment plant-based training, operators, process technicians and process engineers are enrolled to complete either their National Certificate in Drinking-water Treatment or the National Diploma in Drinking-water Treatment. The training undertaken is dependent on prior qualifications obtained and resource availability.
- Health and Safety training, specific to role requirements.

Watercare has developed significant in-house water supply system technical and engineering capabilities. This capability development has been in recognition of the need for greater technical capability dedicated to the management of water supply risks.

Long-term employee engagement plan on awareness and involvement in safe and secure drinking-water is included in the training matrix programme with associated records of completion and is listed in Appendix 1: Key Documents Register.

Figure 1: Watercare Waikato organisational chart



The core team that lead the DWSP development includes senior management, technical specialists, operational team leaders, process engineers, and water quality scientists. The senior staff within this core team hold the authority to make decisions and enact changes. They also have extensive knowledge of the legislative requirements around DWSP development. These team members have a wide range of expertise and years of experience in drinking-water production, distribution, and risk management.

Engaging Community

The WDC consumer engagement strategy is led by the Communications and Customer Teams. WDC consumer engagement programmes are listed on the WDC public website and explain how the customers and community are involved in drinking-water initiatives including water conservation measure. When there is a change to a community's water supply, WDC uses these channels to inform people in advance and during the change.

2. Assessment of the drinking-water supply system

Supplies details

Supply Details	
Supply Name	Tuakau
Hinekōrako Community Code	TUA002
Supply Owner	Waikato District Council
Population Served by Supply	5750 (2022 estimate based on connection data and Stats NZ Statistical area population count)
Source Details	
Source Name	Waikato River, Auckland
Source Hinekōrako Code	S00865
Type of Source	River
Consent Expires	2032
Maximum Consented water take:	1 July 2015 to 30 June 2021 – 150,000m3/day **1 July 2021 to 30 June 2042 – 200,000m3/day**
Grid Reference of Source (NZMG)	
Easting : 1745947	**Northing** : 3716538
Treatment	
Location	Waikato
Plant Hinekōrako Code	TP02337
Treatment Processes	Clarification; membrane ultrafiltration; biological activated carbon (BAC) filtration; chlorination;
Distribution – Zone 1	
Distribution Zone Name	Tuakau
Distribution Zone Hinekōrako Code	TUA002TS
Distribution Zone Population	5750 (2022 estimate based on connection data and Stats NZ Statistical area population count)

Supply Details	
Supply Name	Pokeno
Hinekōrako Community Code	POK001
Supply Owner	Waikato District Council
Population Served by Supply	5000 (2022 estimate based on connection data and Stats NZ Statistical area population count)

Source Details	
Source Name	Waikato River, Auckland
Source Hinekōrako Code	S00865
Type of Source	River
Consent Expires	2032
Maximum Consented water take:	1 July 2015 to 30 June 2021 – 150,000m3/day **1 July 2021 to 30 June 2042 – 200,000m3/day**
Grid Reference of Source (NZMG)	
Easting : 1745947	**Northing** : 3716538
Treatment	
Location	Waikato
Plant Hinekōrako Code	TP02337
Treatment Processes	Clarification; membrane ultrafiltration; biological activated carbon (BAC) filtration; chlorination;
Distribution – Zone 1	
Distribution Zone Name	Pokeno
Distribution Zone Hinekōrako Code	POK001PO
Distribution Zone Population	5000 (2022 estimate based on connection data and Stats NZ Statistical area population count)

Water supply system description

Water is supplied to the Tuakau and Pokeno supplies from the Watercare water treatment plant off Trig Road at Tuakau. A written agreement between Watercare and WDC is in place for the supply and acceptance of potable water. This agreement does not place limits on volume or duration of the agreement. Water is supplied from the Watercare trunk main via two separate metered bulk mains, one at 296a Whangarata Road for the Tuakau supply, and one at 118F Barnaby Road for the Pokeno supply (See figure 2 and 3).

The water treatment plant at Trig Road sources water from the Waikato River before treating it prior to distribution. The primary raw water quality concerns are microbiological - protozoa, bacteria, viruses and cyanobacteria. Treatment s is a four-stage process: coagulation and clarification, membrane filtration, biological activated carbon filtration, and chlorine treatment (see figure 4).

<u>Tuakau</u>

The distribution network for the Tuakau supply zone contains 54km of pipe, consisting predominantly of PE, AC and PVC pipework. Water from the Watercare supply point is fed direct to the Harrisville Road reservoirs from where it gravitates South. The treated water storage includes two reservoirs, a 2,145m3 above ground circular steel reservoir and a 260m3 above ground circular timber reservoir (total capacity of 2,405m3). Continuation of supply in the event of Watercare treatment plant failure is reliant upon Watercare's Redoubt

Road reservoirs, and the Harrisville Road reservoirs. The Railway Road booster pump station, supplied from the Harrisville Road reservoirs, boosts pressure to the Northern area.

The Railway booster pump station, located at the intersection of Ryders and Harrisville Roads, includes two booster pumps. The pumps are controlled by pressure transducers to maintain pressure at a set point. The pumps operate in response to demand identified by the pressure transducer set point. The booster pumps ensure that the minimum performance requirements for pressure within the higher parts of the zone are met.

The system includes several alarms including reservoir high and low, and loss of communications. The Railway Booster Pump Station has a low-pressure alarm and a pump failure alarm. A description of reservoirs is included the Reservoir Register listed Appendix 1: Key Documents Register.

Pokeno

The Watercare supply point consists of a primary Pressure Regulating Valve (PRV), a secondary PRV for primary PRV bypass, and a manually operated bypass for both PRVs. Management of the supply point is the responsibility of Watercare. The supply has one distribution zone and one 2,400m3 steel reservoir at Hitchens Road. The distribution network for Pokeno contains 41km of pipe, consisting predominantly of MDPE and PVC pipework. A description of reservoirs is included the Reservoir Register listed Appendix 1: Key Documents Register.

Management

The Tuakau and Pokeno reticulation systems are managed by Watercare on behalf of WDC with maintenance contracted to CityCare.

Figure 2: Tuakau zone supply location

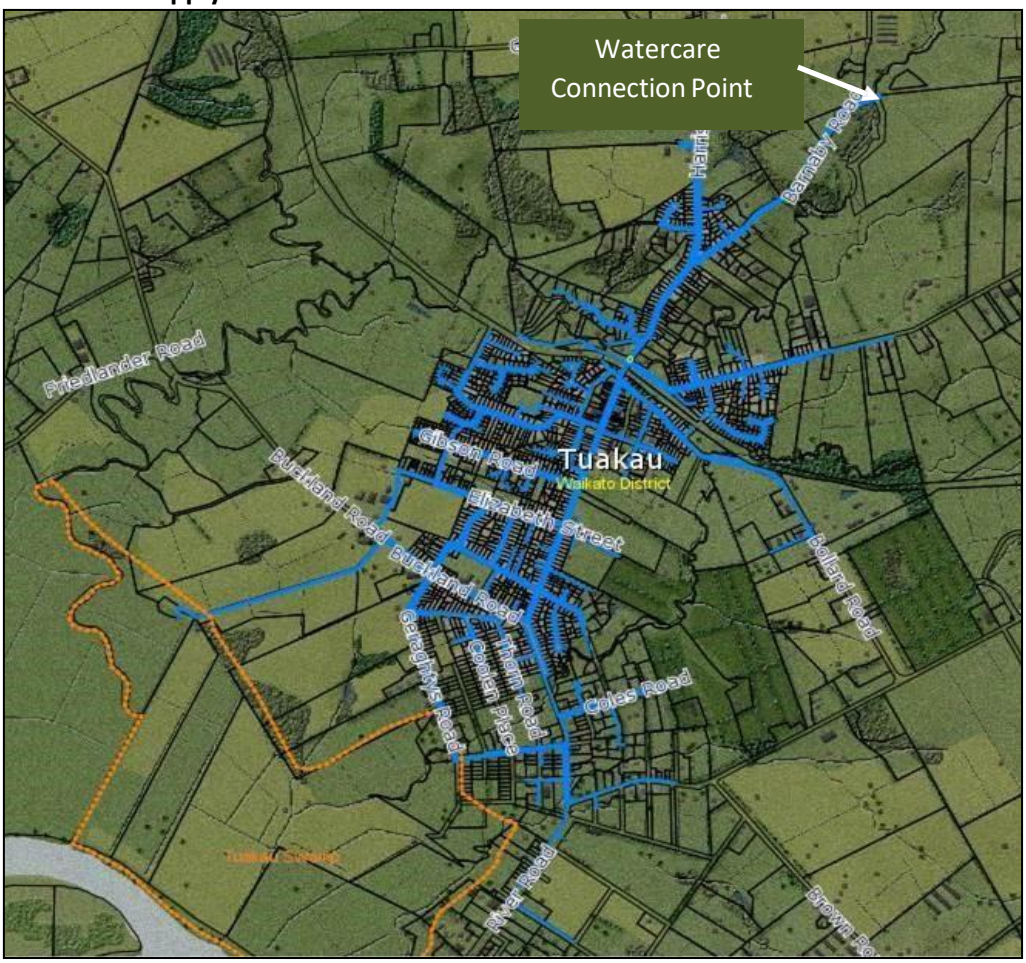


Figure 3: Pokeno zone supply location

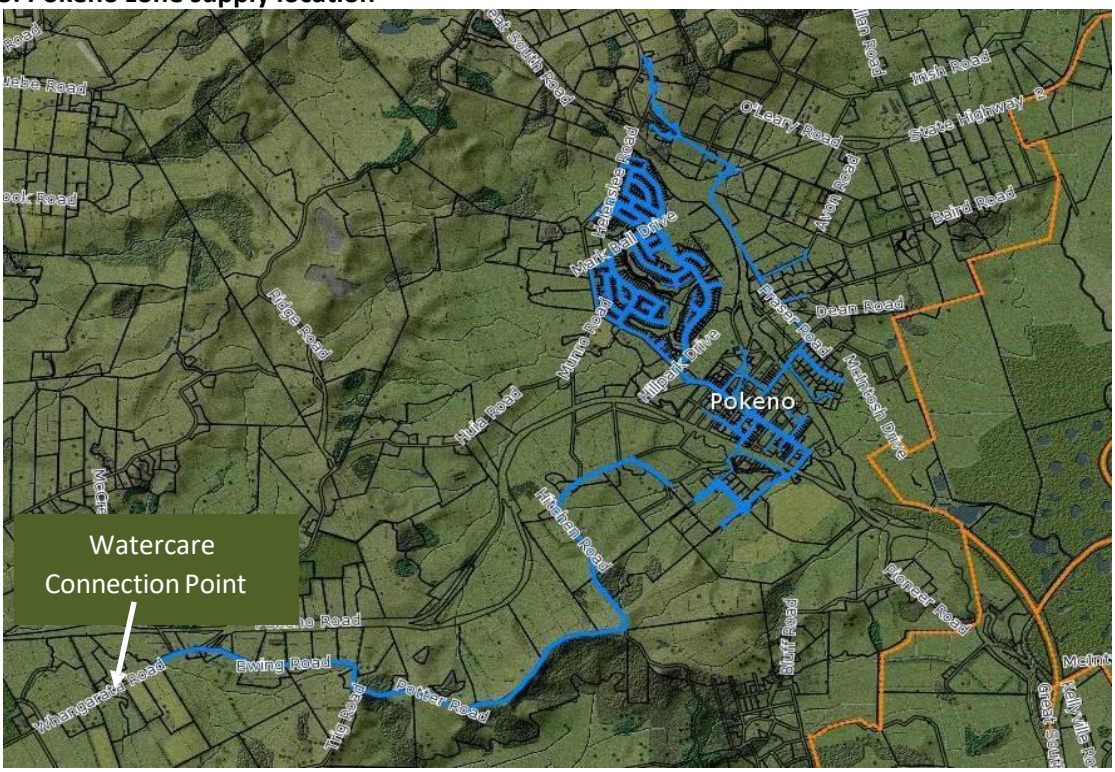
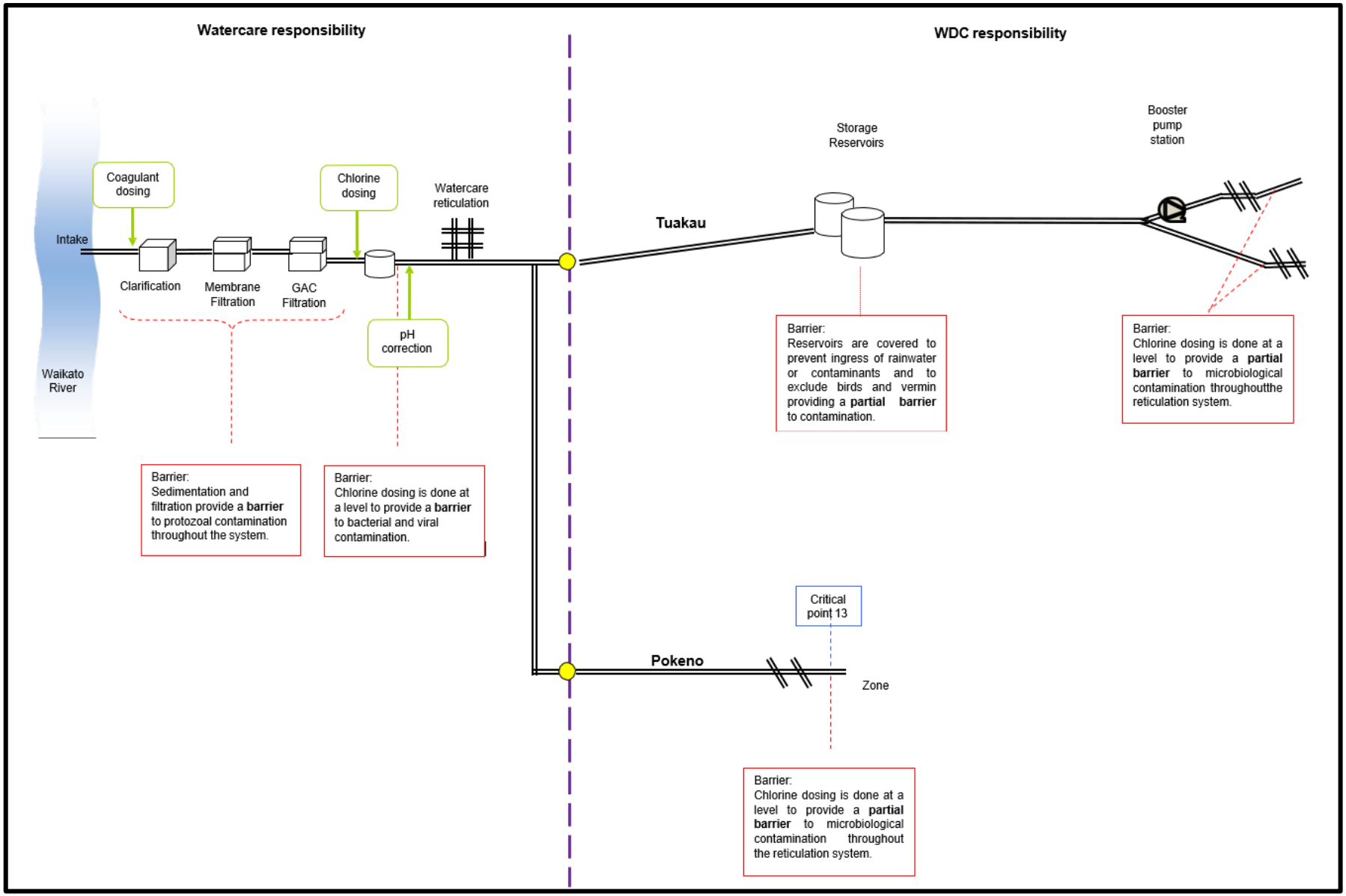


Figure 4: Water Supply Flow Diagram



Assessment of water quality data and catchment characteristics

Assessment of source water quality data and catchment characteristics falls under the responsibilities of Watercare Auckland and are expected to be set out in the relevant DWSP and Source Water Risk Management Plan. Section 5 Monitoring Programmes, Laboratory Sampling and Testing below contains details covering zone water quality. Previous water quality incidents are investigated, and corrective actions implemented to reduce the likelihood of a recurrence.

Hazard and hazardous event identification and risk assessment

A qualitative risk assessment approach has been taken for the Water Supply Risk Table set out in Appendix 3. Risk tables cover the following areas:

- Supply of Water
- Tuakau north area Booster Pumps
- Tuakau Reservoirs
- Reticulation (both supplies)
- Other (both supplies)

The Water Supply Risk Tables identify the possible public health risks in each part of the supply. Each risk or possible 'event' which might occur has been evaluated based on the likelihood of the event occurring and the consequence (or outcome) if it occurs.

For the purposes of this DWSP, categories for likelihood and consequence have been adapted from those in the 2019 DWSP Framework, in order to make them more appropriate to this supply. These adapted ratings are given below in below in **Table 3** and **Table 4**. The overall risk estimate derived from the product of likelihood and consequence is provided in **Table 5.**

Table 3: Likelihood Scale

Likelihood	Description
Almost certain	Is expected to occur in most circumstances.
Likely	Will probably occur (once in 1 or 2 years)
Possible	Might occur at some time (once in 10 years)
Unlikely	Could occur at some time (once in 50 years).
Rare	Only in exceptional circumstances (once in 100 years).

Table 4: Consequence Scale

Consequences	Description
Insignificant	Insignificant public health impact.
Minor	Minor public health impact or inconvenience to supply users.

Medium	Moderate public health impact and/or short term loss of supply.
Major	Major public health impact and/or loss of supply for a long period. Small number of water-borne illnesses.
Catastrophic	Major public health impact. Significant water-borne illness.

Table 5: Risk Level Allocation Table

	Consequence				
Likelihood	Insignificant	Minor	Medium	Major	Catastrophic
Almost certain	Moderate	Moderate	Very High	Extreme	Extreme
Likely	Low	Moderate	High	Very High	Extreme
Possible	Low	Moderate	Moderate	Very High	Very High
Unlikely	Low	Low	Moderate	High	Very High
Rare	Low	Low	Low	Moderate	High

3. Existing preventive measures for drinking water quality management

A multiple barrier approach is followed to identify and implement preventive measures. If one barrier fails, the remaining barriers can compensate for it.

Assessment of existing preventive measures and multiple barriers from Risk Register Tables are summarised as:

Four types of barriers	Existing preventive measures include:
Preventing hazards entering the raw water	• Wedgewire intake screen
Removing particles and hazardous chemicals from the water by physical treatment	• Membrane and GAC filtration – Critical Control Point
Killing or inactivating pathogens in the water by disinfection	• Chlorination with contact time– Critical Control Point
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

4. Operational procedures

Operational procedures include a defined set of performance criteria to assess and confirm the performance of the components of the water supply.

Copies of these documents are stored electronically and are accessible by operations staff. Changes to the procedures must be approved by the person responsible for document control. Staff training records are included in the training matrix. Location of existing operational procedures are listed in Appendix 1: Key Documents Register.

Operational and maintenance procedures have been prepared for all components of the water supply. Operational and maintenance procedures at Watercare are grouped as following:

- Standard Operating Procedures (SOPs)
- Functional Descriptions (FDs)
- Process related drawings (P&IDs and PFDs)
- Operational Manuals
- Calibration Manuals
- Maintenance Schedules

Performance criteria are defined across Watercare's water supply system based on the principal to allow enough time for actions to be taken to bring the system back under control before the compliance limits are breached.

Example SOPs, FDs and Operations Manuals:

Title	To access listed document
Water Production	
Isolations Procedure	O:\Ops\Watercare Waikato\Training
Chlorine Gas Drum Changeover	O:\Ops\Watercare Waikato\Training
Physical Entry into Treated water reservoirs/chamber	O:\Ops\Watercare Waikato\Training
UV module Cleaning	O:\Ops\Watercare Waikato\Training
Manage a Level 1 Minor Local (Contained) Chlorine Gas Leak	O:\Ops\Watercare Waikato\Training
Manage a Level 2 Moderate Local (Contained) Chlorine Gas Leak	O:\Ops\Watercare Waikato\Training
Manage a Level 3 Major Local (Uncontained) Chlorine Gas Leak	O:\Ops\Watercare Waikato\Training
UV Sensor Check - Raglan	O:\Ops\Watercare Waikato\Training
Transport and Install Raglan Generator	O:\Ops\Watercare Waikato\Training
Spill Free Chlorine Buffer (solution)	O:\Ops\Watercare Waikato\Training
Manage spill of Phosphoric acid (solution)	O:\Ops\Watercare Waikato\Training
Enter Data into the weekly verification tab	O:\Ops\Watercare Waikato\Training
Enter data into water outlook primary calibration	O:\Ops\Watercare Waikato\Training
Manage SCADA On-Call and Alarm system – Treatment Plants	O:\Ops\Watercare Waikato\Training

Respond to SCADA Alarms for Treatment Plants	O:\Ops\Watercare Waikato\Training
Create a Trends Page on Archestra	O:\Ops\Watercare Waikato\Training
Perform a Calibration for the real UV254 (realtech)	O:\Ops\Watercare Waikato\Training
Perform a Primary Calibration for the Chlorine Analyser (Deplox 3)	O:\Ops\Watercare Waikato\Training
Perform a Primary Calibration on the Hach Turbidimeter	O:\Ops\Watercare Waikato\Training
Perform a Primary Calibration on the pH Analyser (Crius)	O:\Ops\Watercare Waikato\Training
Perform a Primary calibration on the pH analyser (Depolox 3)	O:\Ops\Watercare Waikato\Training
Perform a Primary Calibration on Treated Water Chlorine Analyser	O:\Ops\Watercare Waikato\Training
Perform a Verification for the Chlorine Analyser (Crius)	O:\Ops\Watercare Waikato\Training
Perform a Verification for the Chlorine Analyser (Depolox 3)	O:\Ops\Watercare Waikato\Training
Perform a Verification for the Hach Turbidimeter	O:\Ops\Watercare Waikato\Training
Perform a Verification for the pH Analyser (Crius)	O:\Ops\Watercare Waikato\Training
Perform a Verification for the pH Analyser (Depolox 3)	O:\Ops\Watercare Waikato\Training
Undertake a Water Shutdown (Planned or unplanned)	O:\Ops\Watercare Waikato\Training
Operations	
Carry Out Reservoir Inspections	O:\Ops\Watercare Waikato\Training
Customer Water Quality Complaint	O:\Ops\Watercare Waikato\Training
Flush a water main (routine and Reactive)	O:\Ops\Watercare Waikato\Training
Install _ Replace a Faulty Water Meter	O:\Ops\Watercare Waikato\Training
Inspect and Test Hydrants	O:\Ops\Watercare Waikato\Training
Installing a New Hydrant or Valve	O:\Ops\Watercare Waikato\Training
Investigate a Water Pressure or Flow Complaint	O:\Ops\Watercare Waikato\Training
Manage SCADA On-Call System - Reticulation	O:\Ops\Watercare Waikato\Training
Perform a chorine test to check for potable water	O:\Ops\Watercare Waikato\Training
Remove _ Reinstall Flow Restrictors in Rural Metered Water Connections	O:\Ops\Watercare Waikato\Training
Repair a Major Water Break	O:\Ops\Watercare Waikato\Training
Repair a Minor Water Break	O:\Ops\Watercare Waikato\Training
Undertake a Water Shutdown (Planned or unplanned)	O:\Ops\Watercare Waikato\Training

Operational monitoring and inspection

Operational monitoring and inspection cover regular measurements and observations to assess and confirm the performance of the preventive measures, including the Critical Control Points.

Ref	What to Measure or Observe	How Often	What to do with the results	Responsibility
Catchment (Huntly, Nga, TK, Raglan, Port Waikato, Onewhero).				
Manual checks (visual)	Visual inspection of intake (Raglan, Port Waikato).	Weekly	Investigate, escalate adverse findings	Duty Operators
	Intake dive surveys	Annually	Repair/replacement as required.	External Contractors
SCADA records	Online pH, NTU, stream weir ultrasonics, flow meters	Continuous with alarm set points	Verify and or calibrate as required.	Duty Operators Process Engineer
Maintenance/ mechanical checks	Analysers, electrical sensors, Electrical systems,	Annually	Repair/replacement as required.	External Contractors
Performance Monitoring	Drinking water compliance and operational monitoring schedule	Various	Short and long-term evaluation of results. Follow Water Quality Incident Response Plan as required.	Water Quality Scientist Watercare lab
Treatment Plant (Huntly, Nga, TK, Raglan, Port Waikato, Onewhero).				
Manual checks (visual)	Raw water jar tests Equipment checks Chemical dosing checks Chemical storage levels UV lamps, run hours	Weekly	Adjust dose rates. Reorder chemicals.	Duty Operators Process Engineer
	PAC dosing system	Weekly when in use	Adjust dose rates. Reorder chemicals.	Duty Operators Process Engineer
SCADA records	Online pre-dosing pH, clarifier turbidity, filter turbidity, UV intensity, UV transmissivity, UV turbidity, filtered water chlorine, pH, treated water chlorine, pH and HFA. Flow, level meters, valve positions. Chemical dosing tanks.	Continuous with alarm set points	Linked to critical control points. Verify and or calibrate as required.	Duty Operators Process Engineer
Maintenance/ mechanical checks	Cleaning clarifiers and filter walls	As required		Duty Operators

Ref	What to Measure or Observe	How Often	What to do with the results	Responsibility
	Flow meter calibrations	Annually	Repair/replacement as required.	External Contractors
	Analysers, electrical sensors, Electrical systems, PLCs, PSUs, dose pumps and other chemical delivery systems, UV units and lamps, plant security systems	Annually	Repair/replacement as required.	External Contractors
	Chlorine gas delivery systems	3-monthly	Repair/replacement as required.	External Contractors
	Backup PSU replacements	Every 2 years		External Contractors
Performance Monitoring	Drinking water compliance and operational monitoring schedule	Various	Short and long-term evaluation of results. Follow Water Quality Incident Response Plan as required.	Water Quality Scientist Watercare lab
Network (All supplies).				
Manual checks (visual)	Critical pipes (pipe bridges Air valve chambers (Hall Road area only)	Annually		Network Operations Team
	Reservoir contamination and security inspection	6 monthly	Cleaning, maintenance as required	Network Operations Team
SCADA records	Flow rates from main reservoirs Flow rates from pump stations Network pressure at pump stations Network pressure at main reservoirs	Continuous with alarm set points		Network Operations Team
Maintenance/ mechanical checks	Full electrical inspection of pump stations and reservoir control and telemetry. Critical valve exercising Generator servicing and load testing	Annually	Repair/replacement as required.	External contractor/ Network Operations Team
	Generator checks	2-monthly	Repair/replacement as required.	External contractor/ Network Operations Team
	Routine flushing at key points– Huntly	Monthly		Network Operations Team

Ref	What to Measure or Observe	How Often	What to do with the results	Responsibility
	Reactive flushing	As required		Network Operations Team
	Reservoir detailed cleaning and inspection	As per reservoir register list	Cleaning, maintenance as required	
	Pipe and other network asset renewals programme.	As planned		Infrastructure Development Team
	Medium and high-risk backflow protection device testing	Annually	Repair/replacement as required.	External contractor/ Network Operations Team
Performance Monitoring	Drinking water compliance and operational monitoring schedule	Various	Short and long-term evaluation of results. Follow Water Quality Incident Response Plan as required.	Water Quality Scientist Watercare lab
	Network modelling Modelling in place for large urban areas.	Calibrated/updated every 5-10 and as required due to growth/ change of use.	Infrastructure planning	Infrastructure Development Team
	Water balance/loss calculation	Annually	Infrastructure planning	Customer care Team/ Water Quality Science

Critical Control Points

CCPs apply to the treatment plants for the supply. For Tuakau and Pokeno supply zones CCPs are associated with the Watercare Tuakau water treatment plant.

5. Verification monitoring programme

Drinking water quality compliance monitoring plan

Drinking water quality laboratory sampling and analysis programmes covering raw water, treated water and reticulated water have been developed from risk assessments, requirements of compliance rules and process monitoring requirements. The monitoring programme is reviewed on an annual basis or as required during the year due to changing operational requirements**.**

Watercare Waikato District compliance monitoring plan consist of the following components:

- Compliance Overview
- Laboratory monitoring schedule of monitoring for source, treatment plan and distribution
- Frequency and calendar schedules
- Sample point database and maps
- Reservoir Register and storage management plan
- Accredited laboratory and accredited sampling
- Water Quality Incident Response Plan

Components are listed in Appendix 1: Key Documents Register.

The Tuakau and Pokeno distribution zone are required to demonstrate compliance against the DWQAR level 3 Rules and have a reporting period of 1 month and must report the required set of compliance data to Taumata Arowai each month. Compliance reporting for the determinands listed in the DWQAR are sent via API reports from Water Outlook to Taumata Arowai database Hinekōrako.

Consumer Satisfaction

Monitoring consumer comments and complaints is a vital part of water supply operations. Complaints and information received from consumers is received by WDC and recorded in their Customer Relationship Management system (Tech One). Complaints and information is categorised and prioritised and transferred to Watercare through the works orders system Enterprise Asset Management (EAM). Watercare and their reticulation and maintenance contractors record actions taken in EAM.

Short-Term Evaluation of Results

The following tools are utilised by Watercare for the ongoing review and evaluation of results:

- Daily monitoring of continuous monitoring via SCADA
- Working alongside the Customer team to monitor complaints
- Daily, weekly, monthly, and annual water quality reports by Water Quality Scientist.
- Feedback from the management team
- Review of the previous water quality incidents via the Incident Investigation Report process

A review of previous water quality incidents for causes and the effectiveness of responses is part of the internal event investigation process. Link to the Event Investigation Report template is listed in Appendix 1: Key Documents Register.

Laboratory Service Provider

Sampling and water quality testing undertaken by Watercare Laboratory Services located at 52 Aintree Avenue, Mangere. Watercare Laboratory Services is IANZ accredited to NZS/ISO/IEC 17025 for the chemical and biological examination of waters, wastewater, environmental monitoring and sampling. All accredited test methods are confirmed by an IANZ audit. Laboratory staff undergo regular training to comply with the NZS/ISO/IEC 17025 standard. Sampling protocols are in accordance with Standard Methods for the Examination of Water and Wastewater, 20th Edition, published jointly by the APHA, AWWA, and WEF.

Instrumentation

The WTPs incorporate a number of analysers for the provision of real time information on the system operation to staff. They are used for a number of purposes including:

- Identification of parameter trend changes
- Operational control
- Compliance with standards

The analyser indications are displayed on the HMI SCADA displays at the WTP. The analysers have been provided with alarm points which if reached will generate an alarm through SCADA to indicate a potential operational problem to staff.

The procedures for routine validation, calibration and verification of the performance of the equipment are set out in SOPs. The supply specific calibration and instrument maintenance schedules have been developed and are kept on site and in Water Outlook. Instrument calibrations are carried out by the treatment Plant operators and Chemfeed (a specialist contractor).

6. Improvement plan

Watercare's risk management strategy is based on the understanding of source water quality and quantity which is determined through routine monitoring of the groundwater.

Preventive measures across the WTP drinking-water supply system are based on a multi-barrier approach and continuous improvement. Engineering controls are also in place at the WTP. Risks are continuously evaluated in line with the Water Supply Risk Tables. Improvements are generated based on reviews of supply performance, new or emerging risk, internal or external quality and compliance requirements (see section 10. Oversight, review and continual improvement) Improvements are listed in Appendix 5: Improvement Plan.

7. Management of incidents and emergencies

Watercare has a hierarchy of response plans for the management of incidents and emergencies:

1. Operational corrective actions set out in Critical Control Points process control summaries. (section 4 above).

2. Watercare Water Quality Incident Response Plan covering drinking water standards/ compliance responses.
3. Watercare Incident Management Plan in conjunction with the Watercare and Waikato District Council Communication Plan(s).

Other incident response documents include the Drought Management Plan and Cyanobacterial Operational and Contingency Plan. For a full list of documents related to management of incidents and emergencies see Appendix 1: Key Documents Register.

The Watercare Incident Management Plan provides a generic process for the management of threats to the water supply, irrespective of origin. This includes but is not limited to security breach events, water supply contamination events, cyber security and pandemic events. This plan has been developed using the principles of risk analysis, reduction, readiness, response and recovery. These five principles form a cyclic process which enables Watercare to learn from incidents that occur and put measures in place to prevent or lessen the effects of future incidents.

An Incident Controller and Incident Management Team appropriate to the response required and the situational complexity are formed once a fault has been escalated to an incident. The Incident Controller is appointed based on the operational functional area to which the incident is related. The Incident Controller is accountable for managing the incident through to resolution including directing all resources, organising all facilities and delegating tasks to Incident Management Team members as necessary to investigate the cause and manage the effects of the incident. The Incident Management Team reflects Watercare's organisational structure during business hours; after hours resources are mobilised using on-call rostered personnel.

Incident levels are assigned based on the nature, management complexity and scale of an event. Level 1 incidents are minor in nature with localised consumer or minor plant/process effects and are capable of being managed as a matter of routine operations and resolved within a reasonable timeframe. Level 2 incidents require an escalating level of senior Watercare management coordination due to their complexity, consequential effects and the involvement of communications and other specialist support. Level 3 incidents are coordinated by the Executive Management Team due to their consequential effects, incident management complexity, and multi-agency involvement and may be triggered by a regional or national civil defence emergency or a regional water services event of an extreme nature.

The standard processes for any event are:

Isolate	Dependent on the nature of the event, it may be possible to isolate the cause
Minimise	Reduce supply or affected area
Investigate	An investigation of the cause of the problem would be undertaken by Operations staff, with technical assistance as required
Remedy	Following diagnosis, the issue will be resolved and the process returned to normal
Notify	Taumata Arowai would be notified and a communication plan for the customers implemented

Watercare follows the Water Quality Incident Response Plan (WQIRP) for response to transgressions. The WQIRP is intended to provide guidelines for managing water quality incidents that occur as a result of Watercare's compliance and operational monitoring. It has been prepared in line with the requirements of compliance rules and shall be utilised in conjunction with the DWSPs and Watercare's Incident Management Plan.

This Plan has been prepared for water quality transgressions that are notified by exception reporting from the laboratory to the Water Quality Compliance and Science team. The DWSNZ Maximum Acceptable Values (MAV), Guideline Values (GV) and/or Watercare's operational performance criteria are outlined at the beginning of each section. And from 1st January 2023, the DWQAR and DWAV.

Triggers for response escalation to the Incident Management Plant are documented in the WQIRP.

Maintaining supply security during a drought is managed by the Drought Management Plan (DMP). The DMP has been developed for the Incident Management Team (IMT) which is responsible for the declaration and overall management of a drought. The DMP provides a framework for Watercare and WDC to make the necessary decisions for the management of water resources and demands during drought conditions. It is intended to be robust for dealing with a variety of scenarios whilst being sufficiently flexible so that different impending drought situations can be dealt with according to conditions at the time.

8. Documenting and reporting

Management of documentation and records

The following document and records management systems are in place for the WDC supplies:

System	Purpose
Microsoft SharePoint	General records management
Enterprise Asset Manager	Asset management system used on all Council owned and operated three water's assets.
WaterOutlook	Compliance reporting, Routine operations and inspections records.
Tech One	WDC Customer Relationship Management software
ICare	Health and Safety Audit application
SCADA	Plant and network control system

Systems listed above have document control aspects built in through individual user accounts, traceability, document/record backup and recovery capability.

Reporting

Reporting is undertaken to ensure compliance requirements are met and for continual improvement. The following internal reports are created to support the management and operations of the WDC water supplies:

Internal reporting type	Purpose
WaterOutlook compliance reports	Daily and monthly compliance reports
Business reporting	Monthly Operational reporting
Enterprise Management Reports	Complaints and work order summaries as required
Production, Networks and infrastructure Teams reports	Weekly and monthly reports
Compliance reports	Quarterly and /or annual reports on drinking water compliance and Drinking water safety planning
Event Investigation Reports	Debrief records as required
Drinking Water safety plan assessment	Annual summary report for oversight, review and continual improvement

The following external reports are created to support the management and operations of the WDC water supplies:

External reporting type	Purpose
WaterOutlook compliance reports	Submitted to the Regulator for compliance demonstration
Business reporting	Monthly operational reports from Watercare to WDC. Water Governance Board Reporting
Waikato District Council Local Government Reporting	Annual KPI reports
Regional Council	Resource Consent annual compliance reports

9. Investigations

Watercare takes any events related to the quality or quantity of water supplied to its customers and the associated investigations very seriously. During reactive investigations staff follow procedures and protocols to:

- Understand why potentially unsatisfactory performance has occurred and implement corrective measures as appropriate; and
- Ensure that issues are resolved effectively.

Investigation procedures and protocols identify situations that may result in the need for an investigation. The WQIRP provides a detailed step-by-step process to follow in response to each type of water quality situation. This includes the criteria to determine when an investigation is needed; who has responsibility for the investigation; steps to take while it proceeds; and actions to be taken at its completion. A report containing investigation findings is completed for every water quality parameter breach incident.

Reactive investigations also inform planning and continuous improvement processes, identifying the need for future proactive investigations. Such investigations are initiated via the company's business need identification and project planning framework and enable Watercare to stay ahead of emerging issues and provide valuable ideas for the future suitable designs and best practice.

Where the performance of equipment, processes or practices is susceptible to variation (e.g. seasonal source water quality change or filter media replacement), process performance is reviewed to ensure that:

- Barriers are operating to achieve their design objectives
- Supporting process operation is optimised to minimise the risk to drinking-water quality

'Acceptance to Service' reports refer to the process for initial validation and, where required, routine re-validation of equipment, processes, and practices. Validation documents are referenced in Appendix 1: Key Documents Register for UV units and cartridge filtration units.

10. Oversight, review and continual improvement

Long-term evaluation of results

Watercare and WDC are committed to the long-term evaluation of results and a systematic review of operational monitoring, verification monitoring and inspection results. This enables the company to assess its overall performance against regulatory requirements and guidelines; identify emerging issues and trends and determine priorities for improving drinking-water quality.

The following tools are utilised by Watercare / WDC for the systematic review and evaluation of results:

- SCADA and compliance platform data trending and operational set points and alarms
- Internal audits
- Annual reports of drinking water compliance

In addition, water supply operations undergo annual assessment, evaluation and audit by a number of regulatory bodies in the areas of health and safety, contracts management, finance and many others.

Internal audits

The DWSP internal audit process is consistent with WDC organisation-wide internal audit format. The following documents define the internal audit process:

- DWSP Internal Audit Guideline
- DWSP Internal Audit Schedule
- DWSP Internal Auditor Log

Any non-conformances identified as a result of the internal audit are logged in the audit schedule and assigned to the person responsible to complete the task. The auditor maintains the schedule and will follow up on the completion of tasks.

WDC undertakes internal audits to ensure that the drinking-water quality management system is properly implemented and remains effective in ensuring drinking-water quality. Auditing is one of the key functions of the Water Contract Relationship team.

Audits are undertaken to ensure that the following system components are functioning as intended:

- Operational procedures
- Monitoring and inspection programmes, records and use of corrective actions
- Incident and emergency responses
- Staff training and competencies
- Delivery of the improvement plan

External audits

External audits are undertaken at the direction of the Waikato Operations Manager, based on the outcome of the review by senior leadership. External audits of water supply operations have previously been undertaken by drinking water assessors. Currently Audit NZ audits compliance with non-financial performance measures rules. During the transition period to Taumata Arowai, Watercare is investigating how external audits may be undertaken.

Review by senior leadership

A weekly meeting is held at Watercare's Hamilton office in which the overall system performance is reviewed and reported to the Waikato Operations Manager if required. Events, incidents and issues arising are all discussed, and actions are agreed upon.

Water quality performance is also reported via the Water Relationship Manager to the Water Governance Board at WDC. This reporting is focused on the measures documented in Watercare's operations and maintenance contract and includes District wide-level reporting of specific water quality and quantity related risks.

The Water Governance Board are also involved in the development and approval of funding cases to manage and maintain Watercare's commitment to the supply of safe drinking-water to Auckland's and Waikato District communities. Here, decisions regarding operational and capital expenditure are made based on the risk to Watercare's Waikato water supply systems.

A brief report on the performance of drinking water safety and compliance will be prepared annually by the Water Quality Scientist Waikato District including the performance against any drinking water quality compliance rules, major changes to water supplies, a summary of significant events or near misses, and a summary of planned improvement progress and submitted to the Operations Manager Waikato District and any necessary changes made to the Drinking water safety plans. Plans will be re-lodged with Taumata Arowai as soon as practicable if there have been any significant changes to supplies, operations and treatment processes, or risks.

Watercare will be responsible for ensuring that any matters requiring attention will be appropriately included into the Business Plan, Annual Plan or the Asset Management Plan for Water Supplies. If significant capital funding is required, then Watercare will include the matter into the Council approval process via the Water Governance Board and the Council Long Term Plan.

Appendix 1: Key Documents Register

Appendix 2: Source Water Risk Management Plan

Appendix 3: Water Supply Risk Tables

Appendix 4: Critical Control Point Process Control Summaries

Appendix 5: Improvement Plan