Redland City Council

Drinking Water Service Annual Report

SPID No. 541

Drinking Water Service Annual Report 2023/2024

Redland City Council
PO Box 21
Cleveland QLD 4163
07 3829 8999
rcc@redland.qld.gov.au

This report has been prepared in accordance with the *Guideline for the preparation, review and audit of drinking water quality management plans (Oct 2022)*.

Contents

List of Figures

List of Tables

Notation and Abbreviations

<	Less than
>	Greater than
ADWG	Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia
ASMP	Asset and Service Management Plan
DRDMW	Department of Regional Development, Manufacturing and Water
DLGWV	Department of Local Government, Water and Volunteers
DWQMP	Drinking Water Quality Management Plan
E. coli	*Escherichia coli*, a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk
ICPMS	Inductively Coupled Plasma Mass Spectrometry
mg/L	Milligrams per litre
MPN	Most Probable Number
NSI	North Stradbroke Island
NTU	Nephelometric Turbidity Units
PFAS	Per- and polyfluoroalkyl substances
SAS	Scientific Analytical Services
RCC	Redland City Council
RMIP	Risk Management Improvement Program
SPID	Service Provider Identification
SMBI	Southern Moreton Bay Islands
SWIM	Statewide Water Information Management
The Plan	RCC Drinking Water Quality Management Plan
µg/L	Micrograms per litre
WTP	Water Treatment Plant

1 Introduction

This report documents the performance of Redland City Council's (RCC or Council) (Service Provider Identification 541) drinking water service with respect to water quality and performance in implementing the actions detailed in the Drinking Water Quality Management Plan (DWQMP or the Plan) as required under the *Water Supply (Safety and Reliability) Act 2008* (the Act) for the 2023-24 financial year.

The report assists the Department of Local Government, Water and Volunteers (DLGWV) (the Regulator) to determine whether the approved DWQMP and any approval conditions have been complied with.

This report has been prepared in accordance with the *"Guideline for the preparation, review and audit of DWQMPs (2022)"* published by the Department of Regional Development, Manufacturing and Water (now DLGWV) accessible at www.rdmw.qld.gov.au.

This DWQMP report includes:

- Activities undertaken over the financial year in operating the drinking water service.
- Performance of RCC's drinking water supply.
- Actions taken to implement the Drinking Water Quality Management Plan.
- Details of incidents and complaints relating to drinking water quality.

This report is available to our customers through the Council website, or upon request at the Council's Customer Service Centres.

2 Summary of schemes operated

Council receives treated bulk water from Seqwater and is responsible for delivering it to residents through its distribution network. The provision of a safe water supply is managed through an approved DWQMP to ensure adherence to the Australian Drinking Water Guidelines (ADWG). Key responsibilities of RCC and Seqwater are summarised in Table 2.1.

Table 2.1 - Seqwater and Redland City Council Responsibilities

Seqwater's Responsibilities	Redland City Council's Responsibilities
• Catchment management. • Raw water treatment (including fluoridation). • Operation of bores, dams and reservoirs. • Bulk water transport to defined transfer points. • Monitoring of raw and treated water supply.	• Receipt of bulk treated water from Seqwater at defined transfer points. • Delivery to customers through Council's water distribution network. • Operation and maintenance of the distribution network, service reservoirs and pumping stations. • Monitoring of drinking water quality performance throughout the distribution network.

RCC covers an area of approximately 537km^2 and has a population of approximately 169,945 people as at 30/06/2024 (ABS estimated resident population for 2023 with 1.88% forecast increase for 2024). Council provides drinking water to Redland City residents through four water supply schemes. Information about each scheme is summarised below in Table 2.2. There are five bulk water zones within these schemes and the adopted boundaries are shown in Figure 2.1.

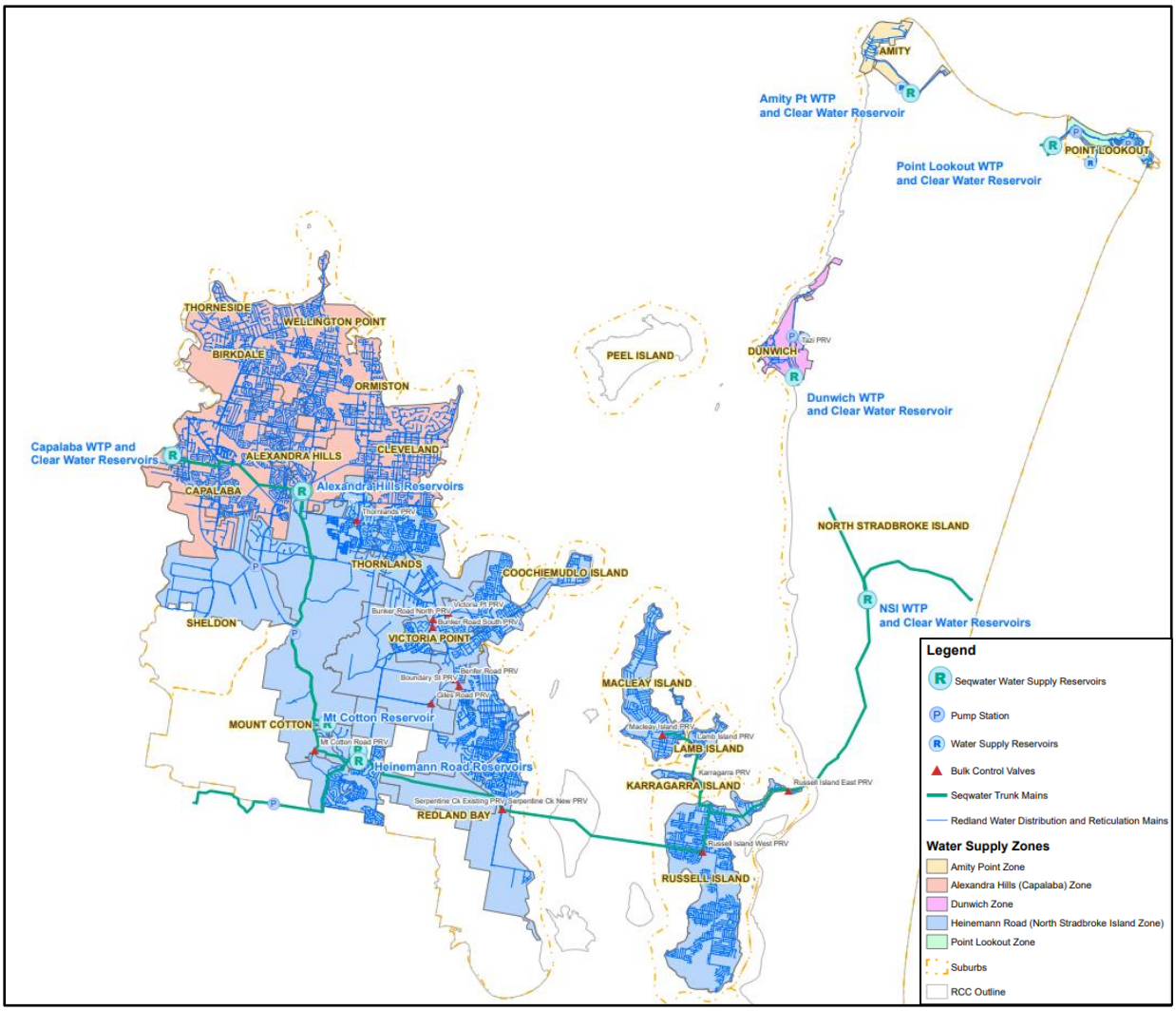

Figure 2.1 - Redland City Council Water Supply Zones

Table 2.2 - Profile of RCC water supply schemes

Scheme	Bulk Water Supply Zone	Suburbs serviced	Scheme/Zone Population*	Customer Connections**	Water Source	Treatment	Water Treatment Plant	Distribution disinfection
Redland City Mainland	Alexandra Hills Reservoir Zone Heinemann Road Reservoir Zone	• Redland Bay • Victoria Point • Mount Cotton • Sheldon • Thornlands • Capalaba • Alexandra Hills • Cleveland • Birkdale • Thorneside • Wellington Point • Ormiston • SMBIs (Russell, Macleay, Lamb and Karragarra Islands) • Coochiemudlo Island	157,217	**Residential** 57,180 **Non-Residential** 1,898	Leslie Harrison Dam **NSI:** Groundwater aquifer (Logan Water Basin) Herring Lagoon **SEQ Water grid** Brisbane River Seawater (rarely)	Conventional Conventional Desalination	Capalaba NSI Mt Crosby Gold Coast Desalination	UV + Chlorination Chlorination Chloramination Chloramination Chlorination
Dunwich	Dunwich Zone	Dunwich Township	795	**Residential** 406 **Non-Residential** 88	Groundwater aquifer (Logan Water Basin)	pH correction, filtration, disinfection	Dunwich	Chlorination
Amity Point	Amity Point Zone	Amity Point Township	425	**Residential** 389 **Non-Residential** 11	Groundwater aquifer (Logan Water Basin)	pH correction, disinfection	Amity Point	Chlorination
Point Lookout	Point Lookout Zone	Point Lookout Township	785	**Residential** 765 **Non-Residential** 41	Groundwater aquifer (Logan Water Basin)	pH correction, disinfection	Point Lookout	Chlorination

** Derived from 2021 Australian Bureau of Statistics Census data*

*** Customer connection information as of 01/07/2024 taken from RCC Property and Rating system*

3 DWQMP Implementation

Council's City Water Group is responsible for providing customers with a safe, reliable and compliant water supply. The Compliance and Reporting Unit oversee the implementation of the DWQMP and manage the drinking water verification monitoring program, investigate customer drinking water complaints and report any drinking water non-compliances to the Regulator.

City Water's Network Operations Unit and City Assets Group – Water and Wastewater Infrastructure Asset Management Unit play an integral role to ensure that construction, operation and maintenance activities do not impact on water quality throughout the water supply system.

Council's Water Quality Officer is responsible for ensuring the DWQMP is implemented and actively promotes the importance of operating under the Plan to management and operators through discussions at monthly water (and sewer) toolbox meetings, development and implementation of procedures, and Council's ongoing training and induction processes.

3.1 Progress in implementing the Risk Management Improvement Program

Council's Risk Management Improvement Program (RMIP) is aimed at reducing contamination risks associated with the supply of drinking water. Actions captured in the RMIP may originate from the following sources:

- Risk Assessments
- DWQMP reviews and audits
- Drinking water incidents
- Regulator feedback
- General improvements

Council conducts regular reviews of its progress against the RMIP to ensure actions from the RMIP are implemented effectively and in a timely manner. The RMIP is an evolving component of the DWQMP as actions are added and removed as identified or completed.

All RMIP actions are assigned to the responsible officer as identified in the Risk Register. Target dates are allocated to each actionable item and are monitored regularly to ensure they are being progressed and completed.

The Water Quality Officer collates information from the individual risk owners on progress and completion of actions which is then reported in RCC's Drinking Water Service Annual Report.

The RMIP implementation status is included in Appendix A with some key achievements summarised below:

- Internal reservoir inspections undertaken.
- Review and update of all drinking water related procedures completed.
- Cyber Security improvements implemented.

Many of the RMIP actions have been completed and the outstanding actions will continue to be progressed during 2024/25. New actions proposed as a result of the DWQMP review being undertaken in October 2024 will also be included in the 2024/2025 RMIP.

3.2 Revisions made to the verification monitoring program

The following changes were made to the verification monitoring program during 2023/2024:

- Triannual monitoring of PFAS, Radionuclides, Cyanobacteria, Xylene, Pesticides, Plasticisers and Polyaromatic Hydrocarbons has been included in the 2023/2024 verification monitoring program, as recommended by the Regulator in the DWQMP Approval - Information Notice for the Decision dated 25 January 2023, and commenced in July 2023. Two years of data is being collected in the network for baseline determination purposes. Monitoring frequency may be reduced following review of results and risk assessment.

3.3 Revisions made to the operational monitoring program

Seqwater is responsible for operational monitoring of the system as it owns, operates, and monitors all chlorine dosing systems at the treatment plants and reservoirs. Verification monitoring is the only available option to monitor drinking water quality in the Council controlled part of the water supply network.

4 Verification monitoring - water quality information and summary

To ensure the provision of safe and reliable drinking water to RCC customers, sample sites are selected within each zone to monitor the reticulated distribution system water quality. Some reticulation sample locations were chosen to give a 'worse-case' picture of water quality, including end-of-line areas, areas affected by high water age, and others to identify any emerging issues in the system. The parameters monitored are selected based on risks identified in the risk assessment and as required by the Regulator via the DWQMP. The monitoring program also assesses and confirms the performance of control measures identified in the risk assessment. The verification monitoring locations are included in Appendix C.

The sample collection, field analysis and laboratory testing for the 2023/2024 verification monitoring program was contracted to Scientific Analytical Services (SAS) Laboratory, who are NATA accredited. All samples were collected, stored and transported to the laboratory for analysis by appropriately qualified staff in accordance with approved procedures.

The results from the verification monitoring program for *E. coli* have been compared against the water quality criteria specified in the DRDMW *"Guideline for the preparation, review and audit of DWQMPs (2022)"*. The results from the verification monitoring program for all other parameters have been compared against the National Water Quality Management Strategy, *Australian Drinking Water Guidelines 6 2011*, Version 3.8 (updated September 2022).

The reported statistics do not include results from repeat samples, or from emergency or investigative samples collected in response to an elevated result or an incident such as a main break.

The verification monitoring summaries are included in Appendix B.

5 Incidents reported to the Regulator

During the 2023/2024 financial year, there was one non-compliance against the ADWG from verification monitoring that was reported to the Water Supply Regulator under section 102[1] of the Act. A disinfection by product (Dichloroacetic acid (DCA) exceedance was recorded in the reticulation network in the Alexandra Hills Reservoir Water Supply Zone following a THM exceedance reported by Seqwater at Capalaba WTP in March 2024. Table 5.1 outlines more details of this incident.

There were no prescribed incidents reportable under section 102A of the Act.

Table 5.1 - Incidents Reported to Regulator

Incident Date	Location	Parameter	Corrective and Preventive Actions
08/03/2024	**M10** VMP Sample Tap Bailey Road Birkdale **M5** VMP Sample Tap Neumann Rd Capalaba	*Dichloroacetic Acid (DCA)*	**Immediate:** • Mains network flushed in vicinity of M10 sample tap. • Follow-up samples taken with no further exceedances of DCA at M10, however the result at M5 (upstream) was above the ADWG health limit. • Communicated results with Seqwater so they could continue making process improvements at Capalaba WTP. (increased Powdered Activated Carbon (PAC) Dosing) **Preventive:** • RCC officers and operators met with Seqwater to gain a better understanding of catchment issues and treatment processes affecting water quality at Capalaba WTP. • THM and HAA monitoring frequencies were increased until results were consistently well below the ADWG limit. • DCA results did not correlate well with Seqwater's results so a comparison between two different laboratories was undertaken for the reticulation samples. DCA levels had decreased by this time and reported results were similar from both Laboratories. • Improve source water blending, with increased supply from the Heinemann Reservoir Zone, which had lower THM/HAA levels.

The incident investigation concluded that source water quality from Leslie Harrison Dam/Capalaba WTP was the most likely cause of elevated disinfection by products in the reticulation network as there were elevated organic levels following rain events since January 2024. There was also an increase in taste-related complaints (earthy in nature) reported from the receiving community in the Alexandra Hills Reservoir Water Supply Zone during this time.

[1] s102 is a non-compliance with a water quality criterion, s102A is notice of a prescribed incident (e.g., an event)

6 Customer complaints related to water quality

RCC is committed to ensuring our water service meets the needs and expectations of the community. Feedback is encouraged to help identify any potential issues, trends and possible opportunities for improvement in the operation, maintenance and management of the water supply network. Customers can lodge complaints through the following mechanisms:

- Over the telephone,
- Via the online enquiry form,
- In writing, and
- In person at Council Customer Contact Centres.

Council keeps a record of all customer enquiries and complaints in an electronic database (Property and Rating). Water quality related complaints are dispatched immediately for investigation to the City Water Group and are followed up initially within 4 business hours.

Water quality complaints are categorised as:

- Discoloured water
- Taste/odour
- Suspected illness

The following complaints in relation to water quality were received in 2023/2024:

Table 6.1 - Water Quality Complaints

Water Supply Scheme	Connections*	Health Concern	Discoloured Water	Taste and Odour	Total/1000 connections
Redland City Mainland & SMBI	70,050	3	62	38	1.48
Dunwich	489	0	0	0	0
Point Lookout	1,222	0	0	0	0
Amity Point	403	0	0	0	0
Total	72,164	3	62	38	1.43

** Total connected properties including vacant land.*

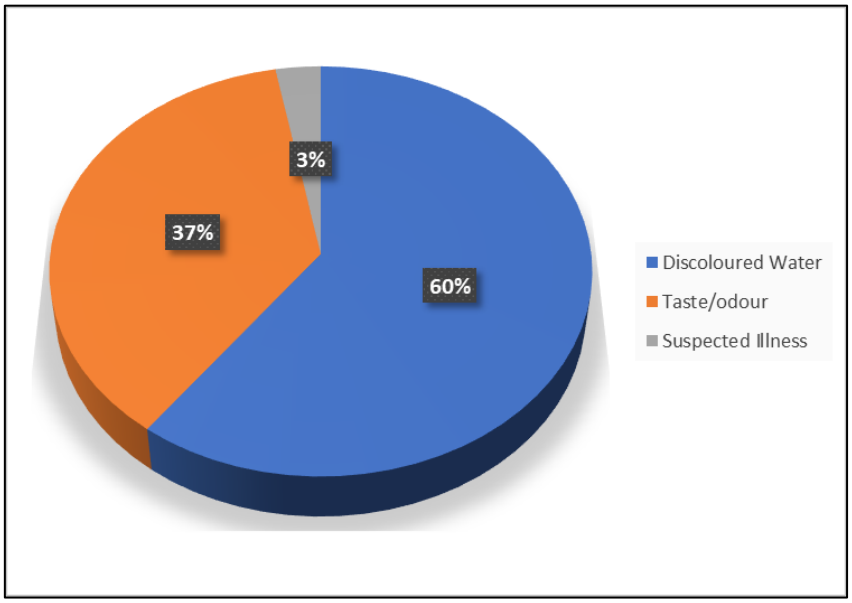

Figure 6.1 - 2023/2024 Water Quality Complaints by Category

6.1 Suspected illness

Complaints are, on occasion, received from customers who suspect their water may be associated with an illness they are experiencing. Council investigates each complaint relating to alleged illness from the water supply, typically by taking samples at the customer's tap, the water meter (council's side) or nearest council hydrant, and the closest verification sampling point. Parameters tested may vary depending on the nature of the health complaint. There were no confirmed cases of illness arising from our water supply system during 2023/24.

6.2 Discoloured water

Discoloured water quality complaints usually occur after maintenance activities on the water distribution network. Customers are advised of the reason for the discoloured water and encouraged to allow water to settle for a brief period and then flush internal pipes for a few minutes. If the issue is not resolved after these actions, the mains will be flushed in the vicinity of the complaint. A regular mains flushing maintenance program is scheduled for known problem areas (dead ends and low consumption areas).

6.3 Taste and odour

The taste and odour complaints for 2023/2024 were mainly related to an 'earthy/dirty' taste in the water supply. In particular, complaints increased in the Alexandra Hills Reservoir Water Supply Zone following elevated organics and THMs from the raw water supply at Capalaba WTP. Flushing was undertaken in some areas, and the elevated organics issue was explained to customers and they were advised the taste should improve following further treatment processes being undertaken by Seqwater. Some complaints were also reported as metallic/chemical or chlorine tastes and odours. Taste and odour panel samples can be taken to determine if an issue is likely to be originating from the water supply or internally within the customers property and can also assist in determining the veracity of the complaint. More detailed lab analysis can be undertaken if the taste and odour panel test identify discrepancies between Council and customer samples.

7 DWQMP review outcomes

No review was required or conducted during 2023/2024.

As per the *Information Notice for the Decision to approve the amendment of Redland City Council's approved Drinking Water Quality Management Plan* dated 25 January 2023, a scheduled review was completed prior to 12 October 2024 and outcomes will be reported in the 2024/2025 annual report.

8 DWQMP audit findings

No external DWQMP audit was carried out in 2023/24. As per the *Information Notice for the Decision to approve the amendment of Redland City Council's approved Drinking Water Quality Management Plan* dated 25 January 2023, the next external DWQMP audit is due by 12 October 2025.

The last External Audit was undertaken in September 2021 by Viridis Consultants and concluded that:

- accurate data has been reported in the DWQMP Annual Reports.

- the implementation of the DWQMP and relevant procedures/systems should be improved to ensure that the overall intended outcome of the DWQMP is consistently achieved.
- the relevance of the plan is adequate, however there are some process improvements identified which can enhance risk management aspects.

Appendix A - Implementation of the DWQMP Risk Management Improvement Program

Table A.1 - Risk Management Improvement Program Implementation Status 2023-24

Risk ID	Scheme Name/ Component	Issues/Risks	Proposed Action	Priority	Responsible Position	Due Date	Review Comments	New close out Date	Status
R1	Bulk Supply	Out-of-specification water quality is received from Seqwater due to system issues/failures at Seqwater end resulting in harm to the community. Requires internal and external discussions.	RCC to undertake internal discussions on issue of high pH in Amity Point Zone, which should include discussions with Seqwater.	**M**	Water Quality Officer	30/06/2024	• Data analysis undertaken to guide discussions. • pH found to be increasing through the network - reservoir and WTP levels are within acceptable ranges. • Likely due to aging infrastructure, low/intermittent water consumption and AC pipes. • Will continue monitor and investigate options to reduce pH at extremities. • Continue to work with Seqwater to improve water quality outcomes. • New action created to undertake targeted investigative field testing	30/06/2025	Complete
			Undertake field pH testing at hydrants between reservoir and extremities in Amity Pint to investigate possible points of change.	**M**	Water Quality Officer	30/9/2024	• Monitoring plan developed.		In Progress
R3	Network	Sloughing or biofilm stripping due to a change in the flow, velocity	Consider testing for heterotrophic plate counts	**M**	Water Quality Officer	30/06/2024	• 12 months data collected – very little	30/06/2025	In Progress

Risk ID	Scheme Name/ Component	Issues/Risks	Proposed Action	Priority	Responsible Position	Due Date	Review Comments	New close out Date	Status
		and direction of water in the Redland water mains impacts water quality harm to the community. Requires consideration of HPC testing, investigation of pressure monitoring and staff training/awareness.	(HPC) in the network as part of the verification monitoring program. Use results to establish a trigger to guide need for further investigation and action based on HPC results (E.g., flushing, discussions with Seqwater on increasing chlorine, need for asset replacement etc)				HPC being detected in the network (most sites <1 MPN, 1 x 40 MPN at Wellington Point) • Trigger action response plan to be developed once more data collected.		
			Investigate opportunities for managing and monitoring pressure, velocity and flow changes in the network, including the required staff training and awareness.	**M**	Service Manager Network Delivery and Operations	30/09/2024	• Pressure logger trial commenced in June 2023 within the network at Redland Bay and Victoria Point. This is helping to diagnose issues. • Pressure is monitored at existing pump station installations.		In progress
R4	Network	Trunk main(s) is damaged due to human intervention or mechanical failure resulting in no supply of water for a timeframe exceeding Council's agreed service standard. Requires clearer messaging to customers through review and update of council forms/facts sheets.	Investigate options to make it clearer for customers on the need to contact Council before digging (E.g., use of larger fonts for this in forms/materials), including reviewing all relevant forms which still reference 'Before you Dig Australia' website.	**M**	Water Quality Officer Service Manager Water and Wastewater Infrastructure Asset Management (WWIAM)	31/1/2024	• There aren't actually many forms – but current ones mostly reference 'Before you Dig Australia' also reference RCC as the contact for water and sewer infrastructure. • City Water Group manager is progressing option to subscribe to Before you Dig Australia (new action)		Complete

Risk ID	Scheme Name/ Component	Issues/Risks	Proposed Action	Priority	Responsible Position	Due Date	Review Comments	New close out Date	Status
			Investigate options to subscribe to 'Before you Dig Australia'	M	Water Quality Officer Group Manager City Water	31/6/2025			In Progress
			Emergency Response Plan to incorporate Critical Trunk Main Break Response	M	Service Manager Network Delivery and Operations	30/06/2024	• Criticality assigned to all water supply assets. • ERP to be updated following next exercise	30/06/2025	In Progress
R6	Network	Contaminated water will enter the RCC water supply system due to no/or poorly maintained backflow prevention devices resulting in water supply which causes harm to the community (including filling stations, cross connections). Requires formalisation of backflow prevention program.	Formalise and document the backflow prevention program, including roles, responsibilities, record keeping and resourcing needs for a) testable BFD for customers, including identifying customers who require testable devices, testable BFD register and monitoring annual testing compliance and b) RCC owned BFDs, including testing and monitoring requirements, water filling stations.	L	Team Leader Plumbing Services Service Manager Network Delivery and Operations	30/06/2024	• Maintenance is based on requirements outlined in the *Plumbing and Drainage Act 2018*. • All RPZ valves tested with a form 9 submitted annually. • Procedures in place to track compliance of annual inspections of customer BFDs and record keeping. • Annual inspections of Council owned BFDs scheduled in Assetic • Overall formalised plan still to be developed – need to determine internal RCC responsibilities (RACI Matrix)	30/06/2025	In Progress
			Determine Responsibilities within RCC (Responsible, Accountable, Consult, Inform (RACI) matrix)		Service Manager Network Delivery and Operations	30/06/2025			In Progress

Risk ID	Scheme Name/ Component	Issues/Risks	Proposed Action	Priority	Responsible Position	Due Date	Review Comments	New close out Date	Status
R10	Reservoirs	Contamination incident may occur due to an act of terrorism or a criminal act resulting in a contaminated water supply causing community and reputational harm (Reservoir security breach). Requires review/update of ERP.	Emergency Response Plan to incorporate Loss of Supply due to Contamination	**M**	Water Quality Officer Service Manager Network Delivery and Operations	30/03/2024	• ERP currently caters for some catastrophic events. • Water Quality Incident response and non-compliance procedures referenced in ERP. • Specific contingency plan to be developed following emergency exercise in early 2025.	31/3/2025	In Progress
R11	Network	Stagnated water due to long detention times and dead-end flows impacts water quality resulting in low levels of chlorine in the system causing harm to the community. Requires improvements to WQ data software, update of ERP, internal discussions and investigation of auto flushers.	Set up alerts from the water quality data software in relation to low chlorine levels detected in the network.	**M**	Water Quality Officer	30/06/2024	• New WQ database now being used (SWIM Local). • Alerts for low chlorine results (and other analytes) now set up in SWIM • New Lab contract for 2024/25 onwards will have capacity for emailed alerts for any specified exceedances. • Samplers will also notify WQ Officer immediately if field tests exceed triggers.		Complete
			Emergency Response Plan to incorporate Loss of Supply due to Contamination	**M**	Water Quality Officer Service Manager Network Delivery and Operations	30/03/2024	• ERP currently caters for some catastrophic events. • Water Quality Incident response and non-compliance procedures referenced in ERP. • Specific contingency plan to be developed	30/03/2025	In Progress

Risk ID	Scheme Name/ Component	Issues/Risks	Proposed Action	Priority	Responsible Position	Due Date	Review Comments	New close out Date	Status
							following emergency exercise in early 2025.		
			Undertake internal discussions on options to improve chlorine at the ends of Wellington Point.	**M**	Water Quality Officer Service Manager Network Delivery and Operations	30/06/2024	• Internal meetings held to discuss options. • Relevant staff have been liaising with other utilities about pros and cons of operating network disinfection systems, including a field visit to some operational examples on the Gold Coast. • Will conduct disinfection options analysis in reticulation network to manage low chlorine in extremities of the network during summer period. • Continue operational maintenance and trigger response (E.g. flushing) - planned and responsive.	31/12/2025	In Progress
R12	Reservoirs	Redland City Council reservoirs are contaminated by environmental events resulting in a contaminated water supply and harm to the community. (reservoir integrity breach). Requires update of ERP and improvements to reservoir inspection program.	Emergency Response Plan to incorporate Loss of Supply due to Contamination	**M**	Service Manager Network Delivery and Operations	31/03/2024	• ERP currently caters for some catastrophic events. • Water Quality Incident response and non-compliance procedures referenced in ERP. • More specific contingency plan to be developed	31/03/2025	In Progress

Risk ID	Scheme Name/ Component	Issues/Risks	Proposed Action	Priority	Responsible Position	Due Date	Review Comments	New close out Date	Status
							following emergency exercise in early 2025		
			Complete the detailed reservoir assessments/ inspections which have been planned (including integrity of the reservoirs against vermin and roof runoff). Rectify any issues identified and based on findings review the reservoir inspection and maintenance (including cleaning) program.	**M**	Service Manager Network Delivery and Operations	31/06/2024	• Internal reservoir inspections completed in February 2024 using submersible remote operated vehicle and camera • Internal cleaning scheduled for July 2024. • SMEC consultants undertook external visual assessments of the 5 NSI reservoirs in Nov 2022. • Additional UAV inspection/photos of 2 reservoir roofs undertaken by Council surveyors in 2023. • Follow up works to rectify identified issues are being planned and prioritised based on risk. • Preventive maintenance activities to be discussed and scheduled. • Regular external inspections are planned and scheduled in Assetic.	30/06/2025	In Progress

Risk ID	Scheme Name/ Component	Issues/Risks	Proposed Action	Priority	Responsible Position	Due Date	Review Comments	New close out Date	Status
R13	Reservoirs	Redland City Council reservoir has a structural integrity failure leading to loss of supply to the community. (Asset condition) Requires update of ERP and formalisation of asset condition assessment program.	Emergency Response Plan to incorporate Structural Failure of Reservoir	**M**	Asset Engineer (WWIAM)	30/06/2025	• ERP currently caters for some catastrophic events. A more specific contingency plan to be developed, rather than a separate ERP. • ERP currently being reviewed and will reference other plans once they are finalised.		In Progress
			Formulate the condition assessment program for drinking water supply reservoir assets and commence rectification program for issues identified.	**M**	Asset Engineer (WWIAM)	30/06/2024	• Annual budget now allocated for condition assessment for all water supply assets. • Asset condition now better understood following internal and external inspections. • Internal inspection completed in February 2024. • SMEC undertook reservoir assessments in Nov 2022. • Additional UAV inspection of 2 reservoir roofs by Council surveyors • Follow up works to rectify identified issues will be prioritised and planned based on risk. • Preventive maintenance activities to be	31/12/2025	In Progress

Risk ID	Scheme Name/ Component	Issues/Risks	Proposed Action	Priority	Responsible Position	Due Date	Review Comments	New close out Date	Status
							discussed and scheduled. • Internal reservoir cleaning scheduled for July 2024.		
R14	Whole of System	Distribution assets are not maintained and fail due to financial restrictions and/or lack of resources resulting in lack of supply and or faulty mains and equipment allowing a contaminated water supply. (Asset condition). Requires resourcing of maintenance schedule and formalisation of asset condition assessment program.	Implement a maintenance schedule with sufficient resources to ensure distribution assets are maintained to the required standard.	**M**	Group Manager City Water	30/06/2024	• ASMP review completed as required by corporate integrated planning calendar. • Annual budget allocated to undertake condition assessment of assets. • Budget allocated for asset maintenance programs.		Complete/ Ongoing
			Formulate the condition assessment program for drinking water assets (other than reservoirs) and commence rectification program for issues identified.	**M**	Service Manager Water and Wastewater Infrastructure Asset Mgt / Asset Engineer (WWIAM)	30/06/2024	• Annual budget now allocated for condition assessment for all water supply assets. • Works to rectify identified issues will be prioritised and planned based on risk. • Preventive maintenance activities to be discussed and scheduled. • Formalised program still be developed.		In Progress
R15	Whole of System	Severe water restrictions will be imposed due to drought combined with limited flushing resulting in high water age and poor water quality resulting in contaminated	Investigate water capture during flushing and re-use.	**L**	Service Manager Network Delivery and Operations	30/06/2024	• Currently no in-house capabilities to do this but will be investigated further		Complete

Risk ID	Scheme Name/ Component	Issues/Risks	Proposed Action	Priority	Responsible Position	Due Date	Review Comments	New close out Date	Status
		water supply and harm to the community. Requires investigation of water capture/reuse during flushing.					as part of any drought contingency planning. • During restrictions prioritisation of flushing will be for high risk areas only.		
R16	Whole of System	Loss of supply due to cyber security stopping pump operation impacts supply resulting in loss of water supply and harm to the community. Requires update of procedure and ERP and enhancements to SCADA/OT network.	Develop formal incident response procedure for water supply pump station failure and incorporate into ERP	**L**	Service Manager Compliance and Reporting	30/06/2024	• Council wide cyber incident response plan developed. • Cyber security dedicated RCC position. • Tabletop testing of cyber scenario impacting water operations completed. • Preventative inspections and mechanical maintenance of the water pump/booster sites conducted every 12 weeks and electrical maintenance every 6 months. • Pump and motor condition baseline for vibration and temp established and monitored. • Sufficient mechanical and electrical spares are stocked. • Specific pump station incident response procedure still to be developed and will be	30/06/2025	In progress

Risk ID	Scheme Name/ Component	Issues/Risks	Proposed Action	Priority	Responsible Position	Due Date	Review Comments	New close out Date	Status
							referenced in updated ERP.		
			Perform enhancement to Councils SCADA / OT network.	L	Principal Cyber Security Adviser	30/06/2024	• Dedicated projects undertaken in collaboration with government agencies to uplift water ops and infrastructure to federal standards. • SCADA improvements undertaken.		Complete
R17	Whole of System	Ineffective implementation of the procedures/DWQMP due to lack of staff training to perform their duties resulting in potential for poor water quality and harm to the community (e.g. with operations, formal tickets, DWQMP requirements). Requires investigation into E learning opportunities and establishment of internal audit program.	Establish an internal audit program to periodically (E.g., annually) assess compliance with the DWQMP and associated procedures.	M	Service Manager Compliance and Reporting	31/3/2024	• Internal audit completed on sample taps in October 2023 – actions and improvements being progressed. • Audit and review of DWQMP related procedures undertaken and all are now current and up to date. • 3 x Compliance and Reporting staff have undertaken Lead Auditor training in order to prepare for and conduct internal audits. • Formal internal audit program to be developed and scheduled using Jira Workflow.	30/6/2025	In Progress

Risk ID	Scheme Name/ Component	Issues/Risks	Proposed Action	Priority	Responsible Position	Due Date	Review Comments	New close out Date	Status
R19	Whole of System	Failure to react to a water quality event or incident in a timely and coordinated manner due to lack of training or periodic mock exercises resulting in compromised water quality supplied to customers causing harm or complaints. Requires more staff awareness and training.	Include water quality as part of the larger periodic council-wide disaster exercise.	**M**	Service Manager Compliance and Reporting	30/06/2024	• Tabletop testing of cyber scenario impacting water operations completed. • Relevant City Water staff attend annual SEQ Hydra emergency exercises. • City Water to liaise with Disaster Mgt Team to incorporate water quality component into future exercises.	31/12/2025	In Progress
R21	Whole of System	The health of customers is impacted due to lack of any education and awareness programs for customers on their responsibilities (E.g., with internal plumbing etc) resulting in loss of confidence with Council supplied water. Requires regular review/update of community education and awareness materials.	Develop a process for periodic review of water quality and supply related information and fact sheets on RCC's website to ensure currency and relevance (by who and when).	**L**	Service Manager Compliance and Reporting	30/06/2024	• Annual review of website content is triggered by RCC Communication, Engagement and Tourism team and notified to City Water Project Officer, for regular oversight by relevant team stakeholders • Factsheets also developed and updated on an as needs basis. • Staying abreast of regional and national water quality issues that may impact customers via industry working groups.		Complete

Appendix B - Summary of compliance with water quality criteria

Table B.1 - Verification Monitoring Alexandra Hills Reservoir Water Supply Zone - 2023-2024

Category	Parameter	Limit of Reporting	Frequency of Sampling	Total No. of Samples Taken	No. Samples required as per DWQMP	ADWG Health Guideline Limit	No. Samples Exceeding Health Guideline Value	ADWG Aesthetic Limit	No. Samples Exceeding Aesthetic Guideline Value	Min of Value	Max of Value	Avg of Value
Anions	Chloride by FIA (mg/L)	1	Quarterly	8	8			250		42	72	49
	Fluoride by ISE (mg/L)	0.05	Weekly	90	82	1.5				0.35	0.9	0.74
	Sulphate ICPMS (mg/L)	1	Quarterly	8	8			250		22	73	38
Cations	Calcium ICPMS (mg/L)	0.1	Quarterly	8	8					24	41	30
	Magnesium ICPMS (mg/L)	0.001	Quarterly	8	8					4.4	9.2	7.04
	Potassium ICPMS (mg/L)	0.01	Quarterly	8	8					1.8	2.4	2.03
	Sodium ICPMS (mg/L)	1	Quarterly	8	8			180		21	38	28
Chemical	Total Cyanide (mg/L)	0.004	Quarterly	8	8	0.08				<0.004	<0.004	0.000
Disinfection	Free chlorine (mg/L)	0.1	Weekly	1356	1352	5		0.6	850	<0.1	2	0.7
	Total chlorine (mg/L)	0.1	Weekly	1356	1352	5		0.6	1044	<0.1	2.3	0.96
Disinfection Byproducts	Bromodichloromethane (µg/L)	2	Monthly	141	100	250				20	61	38
	Bromoform (µg/L)	2	Monthly	141	100	250				<2	33	4
	Chlorate (mg/L)	0.01	Monthly	13	12					<0.01	0.13	0.06
	Chlorodibromomethane (µg/L)	2	Monthly	141	100	250				3.7	48	20
	Chloroform (µg/L)	3	Monthly	141	100	250				15	180	61
	THMs Total (µg/L)	10	Monthly	141	100	250				61	240	122
Haloacetic Acids	Bromochloroacetic Acid (µg/L)	10	Monthly	118	100					<10	24	14
	Dibromoacetic Acid (µg/L)	10	Monthly	118	100					<10	20	10
	Dichloroacetic Acid (µg/L)	10	Monthly	118	100	100	1			<10	196	47
	Monobromoacetic Acid (µg/L)	10	Monthly	118	100					<10	10	10
	Monochloroacetic Acid (µg/L)	10	Monthly	118	100					<10	10	10
	Trichloroacetic Acid (µg/L)	10	Monthly	118	100	100				<10	99	23
	Total Haloacetic Acids (µg/L)	60	Monthly	118	100					<60	319	88

Category	Parameter	Limit of Reporting	Frequency of Sampling	Total No. of Samples Taken	No. Samples required as per DWQMP	ADWG Health Guideline Limit	No. Samples Exceeding Health Guideline Value	ADWG Aesthetic Limit	No. Samples Exceeding Aesthetic Guideline Value	Min of Value	Max of Value	Avg of Value
Metals	Aluminium ICPMS (mg/L)	0.001	Quarterly	8	8			0.2		0.023	0.056	0.035
	Arsenic ICPMS (mg/L)	0.001	Quarterly	8	8	0.01				<0.001	<0.001	0.000
	Boron ICPMS (mg/L)	0.001	Quarterly	8	8	4				0.014	0.027	0.021
	Cadmium ICPMS (mg/L)	0.001	Quarterly	8	8	0.002				<0.001	<0.001	0.000
	Chromium ICPMS (mg/L)	0.001	Quarterly	8	8	0.05				<0.001	<0.001	0.000
	Copper ICPMS (mg/L)	0.001	Quarterly	8	8	2		1		0.0038	0.011	0.007
	Iron ICPMS (mg/L)	0.001	Quarterly	8	8			0.3		0.0069	0.039	0.015
	Lead ICPMS (mg/L)	0.001	Quarterly	8	8	0.01				<0.001	<0.001	0.000
	Manganese ICPMS (mg/L)	0.001	Quarterly	8	8	0.5		0.1		0.002	0.014	0.006
	Mercury (µg/L)	0.01	Quarterly	8	8	1				<0.01	<0.01	0.00
	Molybdenum ICPMS (mg/L)	0.001	Quarterly	8	8	0.05				<0.001	<0.001	0.000
	Nickel ICPMS (mg/L)	0.001	Quarterly	8	8	0.02				<0.001	<0.001	0.000
	Selenium ICPMS (mg/L)	0.001	Quarterly	8	8	0.01				<0.001	<0.001	0.000
	Silica ICPMS (mg/L)	0.1	Quarterly	8	8			80		4.6	9	7.6
	Zinc ICPMS (mg/L)	0.001	Quarterly	8	8			3		<0.001	0.01	0.004
Microbiology	Coliforms Colilert (MPN/100mL)	1	Weekly	405	296					<1	4	1
	E. coli Colilert (MPN/100mL)	1	Weekly	405	296	1				<1	<1	0
	HPC (cfu/mL)	1	Quarterly	104	104					<1	17	2
Nutrients	Nitrate N by FIA (Calc) (mg/L)	0.001	Quarterly	8	8	50				0.091	0.53	0.324
	Nitrite N by FIA (mg/L)	0.002	Quarterly	8	8	3				0.002	0.012	0.003
	Nitrite+Nitrate as N (mg/L)	0.004	Quarterly	8	8					0.091	0.53	0.326
Physical	Alkalinity (mg/L)	1	Quarterly	8	8					40	73	61
	Colour - True (PCU)	1	Quarterly	8	8			15		1	1.3	1
	Conductivity (µS/cm)	1	Quarterly	8	8					300	380	339
	Langelier Index (calc)	-	Quarterly	8	8					-0.96	-0.53	-0.74
	Permanent Hardness (mg/L)	2	Quarterly	8	8			200		92	120	105

Category	Parameter	Limit of Reporting	Frequency of Sampling	Total No. of Samples Taken	No. Samples required as per DWQMP	ADWG Health Guideline Limit	No. Samples Exceeding Health Guideline Value	ADWG Aesthetic Limit	No. Samples Exceeding Aesthetic Guideline Value	Min of Value	Max of Value	Avg of Value
	pH - Field (pH Unit)	0.1	Weekly	1356	1352			8.5		6.84	8.31	7.3
	Temperature - Field (deg C)	-	Weekly	1356	1352					16.5	30.3	23.6
	Total Dissolved Solids (mg/L)	5	Quarterly	8	8			600		200	280	224
	Total Hardness ICPMS (mg/L)	2	Quarterly	8	8			200		92	120	104
	Turbidity (NTU)	0.1	Weekly	1356	1352			5	3	0.1	9.8	0.4

Note: Where the result is less than the limit of reporting, a value of 0 has been adopted for the average calculations

Table B.2 - Verification Monitoring Heinemann Road Reservoir Water Supply Zone - 2023-2024

Category	Parameter	Limit of Reporting	Frequency of Sampling	Total No. of Samples Taken	No. Samples required as per DWQMP	ADWG Health Guideline Limit	No. Samples Exceeding Health Guideline Value	ADWG Aesthetic Limit	No. Samples Exceeding Aesthetic Guideline Value	Min of Value	Max of Value	Avg of Value
Anions	Chloride by FIA (mg/L)	1	Quarterly	20	20			250		22	65	39
	Fluoride by ISE (mg/L)	0.05	Weekly	83	76	1.5				0.48	0.9	0.73
	Sulphate ICPMS (mg/L)	1	Quarterly	20	20			250		2.1	40	16
Cations	Calcium ICPMS (mg/L)	0.1	Quarterly	20	20					17	32	23.5
	Magnesium ICPMS (mg/L)	0.001	Quarterly	20	20					1.1	9.4	4.94
	Potassium ICPMS (mg/L)	0.01	Quarterly	20	20					0.46	2.3	1.28
	Sodium ICPMS (mg/L)	1	Quarterly	20	20			180		9.1	36	22
Chemical	Total Cyanide (mg/L)	0.004	Quarterly	20	20	0.08				<0.004	<0.004	0.000
Disinfection	Free chlorine (mg/L)	0.1	Weekly	1558	1532	5		0.6	1331	<0.1	2.6	0.98
	Total chlorine (mg/L)	0.1	Weekly	1558	1532	5		0.6	1453	0.2	2.7	1.20
Disinfection Byproducts	Bromodichloromethane (µg/L)	2	Monthly	72	60	250				<2	41	15
	Bromoform (µg/L)	2	Monthly	72	60	250				<2	6.8	3
	Chlorate (mg/L)	0.01	Monthly	12	60					0.05	0.25	0.10
	Chlorodibromomethane (µg/L)	2	Monthly	72	60	250				<2	32	13
	Chloroform (µg/L)	3	Monthly	72	60	250				<3	67	14
	THMs Total (µg/L)	10	Monthly	72	60	250				<10	140	45
Haloacetic Acids	Bromochloroacetic Acid (µg/L)	10	Monthly	72	60					<10	17	11
	Dibromoacetic Acid (µg/L)	10	Monthly	72	60					<10	12	10
	Dichloroacetic Acid (µg/L)	10	Monthly	72	60					<10	39	16
	Monobromoacetic Acid (µg/L)	10	Monthly	72	60					<10	10	10
	Monochloroacetic Acid (µg/L)	10	Monthly	72	60					<10	10	10
	Trichloroacetic Acid (µg/L)	10	Monthly	72	60	100				<10	20	11
	Total Haloacetic Acids (µg/L)	60	Monthly	72	60					<60	72	60
Metals	Aluminium ICPMS (mg/L)	0.001	Quarterly	20	20			0.2		0.018	0.043	0.031
	Arsenic ICPMS (mg/L)	0.001	Quarterly	20	20	0.01				<0.001	<0.001	0.000

Category	Parameter	Limit of Reporting	Frequency of Sampling	Total No. of Samples Taken	No. Samples required as per DWQMP	ADWG Health Guideline Limit	No. Samples Exceeding Health Guideline Value	ADWG Aesthetic Limit	No. Samples Exceeding Aesthetic Guideline Value	Min of Value	Max of Value	Avg of Value
	Boron ICPMS (mg/L)	0.001	Quarterly	20	20	4				0.005	0.024	0.014
	Cadmium ICPMS (mg/L)	0.001	Quarterly	20	20	0.002				<0.001	<0.001	0.000
	Chromium ICPMS (mg/L)	0.001	Quarterly	20	20	0.05				<0.001	0.0015	0.001
	Copper ICPMS (mg/L)	0.001	Quarterly	20	20	2		1		0.0013	0.011	0.006
	Iron ICPMS (mg/L)	0.001	Quarterly	20	20			0.3		0.0047	0.028	0.011
	Lead ICPMS (mg/L)	0.001	Quarterly	20	20	0.01				<0.001	0.0022	0.001
	Manganese ICPMS (mg/L)	0.001	Quarterly	20	20	0.5		0.1		0.003	0.011	0.005
	Mercury (µg/L)	0.01	Quarterly	20	20	1				<0.01	<0.01	0.00
	Molybdenum ICPMS (mg/L)	0.001	Quarterly	20	20	0.05				<0.001	<0.001	0.000
	Nickel ICPMS (mg/L)	0.001	Quarterly	20	20	0.02				<0.001	<0.001	0.000
	Selenium ICPMS (mg/L)	0.001	Quarterly	20	20	0.01				<0.001	<0.001	0.000
	Silica ICPMS (mg/L)	0.1	Quarterly	20	20			80		7.7	10	8.9
	Zinc ICPMS (mg/L)	0.001	Quarterly	20	20			3		0.001	0.01	0.004
Microbiology	Coliforms Colilert (MPN/100mL)	1	Weekly	480	466	1				<1	12	1
	E. coli Colilert (MPN/100mL)	1	Weekly	480	466	1				<1	<1	0
	HPC (cfu/mL)	1	Quarterly	162	164					<1	7	1
Nutrients	Nitrate N by FIA (Calc) (mg/L)	0.001	Quarterly	20	20	50				0.28	0.93	0.401
	Nitrite N by FIA (mg/L)	0.002	Quarterly	20	20	3				0.002	0.01	0.003
	Nitrite+Nitrate as N (mg/L)	0.004	Quarterly	20	20					0.28	0.93	0.402
Physical	Alkalinity (mg/L)	1	Quarterly	20	20					44	80	62
	Colour - True (PCU)	1	Quarterly	20	20			15		1	1.2	1
	Conductivity (µS/cm)	1	Quarterly	20	20					150	410	264
	Langelier Index (calc)	-	Quarterly	20	20					-1.24	-0.4	-0.885
	Permanent Hardness (mg/L)	2	Quarterly	20	20			200		44	120	80
	pH - Field (pH Unit)	0.1	Weekly	1558	1532			6.5-8.5		6.62	8.3	7.2
	Temperature - Field (deg C)	-	Weekly	1558	1532					15.3	29.5	23.1

Category	Parameter	Limit of Reporting	Frequency of Sampling	Total No. of Samples Taken	No. Samples required as per DWQMP	ADWG Health Guideline Limit	No. Samples Exceeding Health Guideline Value	ADWG Aesthetic Limit	No. Samples Exceeding Aesthetic Guideline Value	Min of Value	Max of Value	Avg of Value
	Total Dissolved Solids (mg/L)	5	Quarterly	20	20			600		76	260	166
	Total Hardness ICPMS (mg/L)	2	Quarterly	20	20			200		47	120	80
	Turbidity (NTU)	0.1	Weekly	1558	1532			5	5	<0.1	12	0.4

Note: Where the result is less than the limit of reporting, a value of 0 has been adopted for the average calculations

Table B.3 - Verification Monitoring Dunwich Supply Zone - 2023-2024

Category	Parameter	Limit of Reporting	Frequency of Sampling	Total No. of Samples Taken	No. Samples required as per DWQMP	ADWG Health Guideline Limit	No. Samples Exceeding Health Guideline Value	ADWG Aesthetic Limit	No. Samples Exceeding Aesthetic Guideline Value	Min of Value	Max of Value	Avg of Value
Anions	Chloride by FIA (mg/L)	1	Quarterly	4	4			250		22	23	23
	Fluoride by ISE (mg/L)	0.05	Weekly	52	52	1.5				0.74	0.93	0.86
	Sulphate ICPMS (mg/L)	1	Quarterly	4	4			250		2	2.2	2.1
Cations	Calcium ICPMS (mg/L)	0.1	Quarterly	4	4					7.2	9.8	8.4
	Magnesium ICPMS (mg/L)	0.001	Quarterly	4	4					0.61	0.95	0.818
	Potassium ICPMS (mg/L)	0.01	Quarterly	4	4					0.33	0.37	0.35
	Sodium ICPMS (mg/L)	1	Quarterly	4	4			180		11	14	12
Chemical	Total Cyanide (mg/L)	0.004	Quarterly	4	4	0.08				<0.004	<0.004	0.000
Disinfection	Free chlorine (mg/L)	0.1	Weekly	260	260	5		0.6	255	<0.1	1.8	1.3
	Total chlorine (mg/L)	0.1	Weekly	260	260	5		0.6	259	0.1	2	1.46
Disinfection Byproducts	Bromodichloromethane (µg/L)	2	Monthly	12	12	250				2.4	6.6	4
	Bromoform (µg/L)	2	Monthly	12	12	250				<2	4	2
	Chlorodibromomethane (µg/L)	2	Monthly	12	12	250				3.6	8	6
	Chloroform (µg/L)	3	Monthly	12	12	250				<3	3	3
	THMs Total (µg/L)	10	Monthly	12	12	250				<10	18	12
Haloacetic Acids	Bromochloroacetic Acid (µg/L)	10	Monthly	12	12					<10	<10	0
	Dibromoacetic Acid (µg/L)	10	Monthly	12	12					<10	<10	0
	Dichloroacetic Acid (µg/L)	10	Monthly	12	12					<10	<10	0
	Monobromoacetic Acid (µg/L)	10	Monthly	12	12					<10	<10	0
	Monochloroacetic Acid (µg/L)	10	Monthly	12	12					<10	<10	0
	Trichloroacetic Acid (µg/L)	10	Monthly	12	12	100				<10	<10	0
	Total Haloacetic Acids (µg/L)	60	Monthly	12	12					<60	<60	0
Metals	Aluminium ICPMS (mg/L)	0.001	Quarterly	4	4			0.2		0.006	0.007	0.006
	Arsenic ICPMS (mg/L)	0.001	Quarterly	4	4	0.01				<0.001	<0.001	0.000

Category	Parameter	Limit of Reporting	Frequency of Sampling	Total No. of Samples Taken	No. Samples required as per DWQMP	ADWG Health Guideline Limit	No. Samples Exceeding Health Guideline Value	ADWG Aesthetic Limit	No. Samples Exceeding Aesthetic Guideline Value	Min of Value	Max of Value	Avg of Value
	Boron ICPMS (mg/L)	0.001	Quarterly	4	4	4				0.005	0.011	0.009
	Cadmium ICPMS (mg/L)	0.001	Quarterly	4	4	0.002				<0.001	<0.001	0.000
	Chromium ICPMS (mg/L)	0.001	Quarterly	4	4	0.05				<0.001	<0.001	0.000
	Copper ICPMS (mg/L)	0.001	Quarterly	4	4	2		1		0.004	0.014	0.009
	Iron ICPMS (mg/L)	0.001	Quarterly	4	4			0.3		0.009	0.033	0.020
	Lead ICPMS (mg/L)	0.001	Quarterly	4	4	0.01				<0.001	<0.001	0.000
	Manganese ICPMS (mg/L)	0.001	Quarterly	4	4	0.5		0.1		<0.001	<0.001	0.000
	Mercury (µg/L)	0.01	Quarterly	4	4	1				<0.01	<0.01	0.00
	Molybdenum ICPMS (mg/L)	0.001	Quarterly	4	4	0.05				<0.001	<0.001	0.000
	Nickel ICPMS (mg/L)	0.001	Quarterly	4	4	0.02				<0.001	<0.001	0.000
	Selenium ICPMS (mg/L)	0.001	Quarterly	4	4	0.01				<0.001	<0.001	0.000
	Silica ICPMS (mg/L)	0.1	Quarterly	4	4			80		7.6	9.7	8.5
	Zinc ICPMS (mg/L)	0.001	Quarterly	4	4			3		<0.001	0.0018	0.001
Microbiology	Coliforms Colilert (MPN/100mL)	1	Weekly	105	60					<1	93	2
	E. coli Colilert (MPN/100mL)	1	Weekly	105	60	1				<1	1	1
	HPC (cfu/mL)	1	Quarterly	20	20					<1	6	1
Nutrients	Nitrate N by FIA (Calc) (mg/L)	0.001	Quarterly	4	4	50				0.074	0.13	0.090
	Nitrite N by FIA (mg/L)	0.002	Quarterly	4	4	3				<0.002	<0.002	0.000
	Nitrite+Nitrate as N (mg/L)	0.004	Quarterly	4	4					0.074	0.13	0.090
Physical	Alkalinity (mg/L)	1	Quarterly	4	4					20	21	20
	Colour - True (PCU)	1	Quarterly	4	4			15		<1	<1	0
	Conductivity (µS/cm)	1	Quarterly	4	4					110	120	113
	Langelier Index (calc)	-	Quarterly	4	4					-1.92	-1.62	-1.7075
	Permanent Hardness (mg/L)	2	Quarterly	4	4			200		22	36	27
	pH - Field (pH Unit)	0.1	Weekly	260	260			8.5		6.68	8.08	7.2
	Temperature - Field (deg C)	-	Weekly	260	260					16.9	30.3	22.7

Category	Parameter	Limit of Reporting	Frequency of Sampling	Total No. of Samples Taken	No. Samples required as per DWQMP	ADWG Health Guideline Limit	No. Samples Exceeding Health Guideline Value	ADWG Aesthetic Limit	No. Samples Exceeding Aesthetic Guideline Value	Min of Value	Max of Value	Avg of Value
	Total Dissolved Solids (mg/L)	5	Quarterly	4	4			600		56	84	69
	Total Hardness ICPMS (mg/L)	2	Quarterly	4	4			200		22	28	24
	Turbidity (NTU)	0.1	Weekly	260	260			5		<0.1	0.99	0.3

Note: Where the result is less than the limit of reporting, a value of 0 has been adopted for the average calculations

Table B.4 - Verification Monitoring Point Lookout Water Supply Zone - 2023-2024

Category	Parameter	Limit of Reporting	Frequency of Sampling	Total No. of Samples Taken	No. Samples required as per DWQMP	ADWG Health Guideline Limit	No. Samples Exceeding Health Guideline Value	ADWG Aesthetic Limit	No. Samples Exceeding Aesthetic Guideline Value	Min of Value	Max of Value	Avg of Value
Anions	Chloride by FIA (mg/L)	1	Quarterly	4	4			250		46	57	51
	Fluoride by ISE (mg/L)	0.05	Weekly	52	52	1.5				0.27	0.97	0.84
	Sulphate ICPMS (mg/L)	1	Quarterly	4	4			250		4.5	6	5
Cations	Calcium ICPMS (mg/L)	0.1	Quarterly	4	4					5	6.8	5.6
	Magnesium ICPMS (mg/L)	0.001	Quarterly	4	4					2.5	3.1	2.767
	Potassium ICPMS (mg/L)	0.01	Quarterly	4	4					0.83	0.96	0.87
	Sodium ICPMS (mg/L)	1	Quarterly	4	4			180		25	30	27
Chemical	Total Cyanide (mg/L)	0.004	Quarterly	4	4	0.08				<0.004	0.004	0.004
Disinfection	Free chlorine (mg/L)	0.1	Weekly	208	208	5		0.6	201	<0.1	1.4	1.1
	Total chlorine (mg/L)	0.1	Weekly	208	208	5		0.6	205	<0.1	1.5	1.2
Disinfection Byproducts	Bromodichloromethane (µg/L)	2	Monthly	24	12	250				<2	3.1	2
	Bromoform (µg/L)	2	Monthly	24	12	250				<2	4.8	3
	Chlorodibromomethane (µg/L)	2	Monthly	24	12	250				<2	6	3
	Chloroform (µg/L)	3	Monthly	24	12	250				<3	3	3
	THMs Total (µg/L)	10	Monthly	24	12	250				<10	14	10
Haloacetic Acids	Bromochloroacetic Acid (µg/L)	10	Monthly	24	12					<10	<10	0
	Dibromoacetic Acid (µg/L)	10	Monthly	24	12					<10	<10	0
	Dichloroacetic Acid (µg/L)	10	Monthly	24	12					<10	<10	0
	Monobromoacetic Acid (µg/L)	10	Monthly	24	12					<10	<10	0
	Monochloroacetic Acid (µg/L)	10	Monthly	24	12					<10	<10	0
	Trichloroacetic Acid (µg/L)	10	Monthly	24	12	100				<10	<10	0
	Total Haloacetic Acids (µg/L)	60	Monthly	24	12					<60	<60	0
Metals	Aluminium ICPMS (mg/L)	0.001	Quarterly	4	4			0.2		0.016	0.02	0.018
	Arsenic ICPMS (mg/L)	0.001	Quarterly	4	4	0.01				<0.001	0.001	0.001
	Boron ICPMS (mg/L)	0.001	Quarterly	4	4	4				0.016	0.019	0.018

Category	Parameter	Limit of Reporting	Frequency of Sampling	Total No. of Samples Taken	No. Samples required as per DWQMP	ADWG Health Guideline Limit	No. Samples Exceeding Health Guideline Value	ADWG Aesthetic Limit	No. Samples Exceeding Aesthetic Guideline Value	Min of Value	Max of Value	Avg of Value
	Cadmium ICPMS (mg/L)	0.001	Quarterly	4	4	0.002				<0.001	<0.001	0.000
	Chromium ICPMS (mg/L)	0.001	Quarterly	4	4	0.05				<0.001	<0.001	0.000
	Copper ICPMS (mg/L)	0.001	Quarterly	4	4	2		1		0.016	0.02	0.018
	Iron ICPMS (mg/L)	0.001	Quarterly	4	4			0.3		0.0046	0.0076	0.006
	Lead ICPMS (mg/L)	0.001	Quarterly	4	4	0.01				<0.001	<0.001	0.000
	Manganese ICPMS (mg/L)	0.001	Quarterly	4	4	0.5		0.1		<0.001	0.001	0.001
	Mercury (µg/L)	0.01	Quarterly	4	4	1				<0.01	0.01	0.01
	Molybdenum ICPMS (mg/L)	0.001	Quarterly	4	4	0.05				<0.001	<0.001	0.000
	Nickel ICPMS (mg/L)	0.001	Quarterly	4	4	0.02				<0.001	<0.001	0.000
	Selenium ICPMS (mg/L)	0.001	Quarterly	4	4	0.01				<0.001	<0.001	0.000
	Silica ICPMS (mg/L)	0.1	Quarterly	4	4			80		7.2	9.6	8.2
	Zinc ICPMS (mg/L)	0.001	Quarterly	4	4			3		0.0033	0.0064	0.005
Microbiology	Coliforms Colilert (MPN/100mL)	1	Weekly	131	48					<1	1	1
	E. coli Colilert (MPN/100mL)	1	Weekly	131	48	1				<1	<1	0
	HPC (cfu/mL)	1	Quarterly	16	16					<1	1	1
Nutrients	Nitrate N by FIA (Calc) (mg/L)	0.001	Quarterly	4	4	50				0.054	0.1	0.070
	Nitrite N by FIA (mg/L)	0.002	Quarterly	4	4	3				0.002	0.002	0.002
	Nitrite+Nitrate as N (mg/L)	0.004	Quarterly	4	4					0.054	0.1	0.070
Physical	Alkalinity (mg/L)	1	Quarterly	4	4					14	15	15
	Colour - True (PCU)	1	Quarterly	4	4			15		<1	<1	0
	Conductivity (µS/cm)	1	Quarterly	4	4					180	210	188
	Langelier Index (calc)	-	Quarterly	4	4					-2.31	-1.99	-2.11
	Permanent Hardness (mg/L)	2	Quarterly	4	4			200		22	27	24
	pH - Field (pH Unit)	0.1	Weekly	208	208			8.5	3	7.04	8.66	7.5
	Temperature - Field (deg C)	-	Weekly	208	208					18.7	30.4	23.6
	Total Dissolved Solids (mg/L)	5	Quarterly	4	4			600		100	120	115

Category	Parameter	Limit of Reporting	Frequency of Sampling	Total No. of Samples Taken	No. Samples required as per DWQMP	ADWG Health Guideline Limit	No. Samples Exceeding Health Guideline Value	ADWG Aesthetic Limit	No. Samples Exceeding Aesthetic Guideline Value	Min of Value	Max of Value	Avg of Value
	Total Hardness ICPMS (mg/L)	2	Quarterly	4	4			200		23	30	26
	Turbidity (NTU)	0.1	Weekly	208	208			5		<0.1	1.8	0.3

Note: Where the result is less than the limit of reporting, a value of 0 has been adopted for the average calculations

Table B.5 - Verification Monitoring Amity Point Water Supply Zone - 2023-2024

Category	Parameter	Limit of Reporting	Frequency of Sampling	Total No. of Samples Taken	No. Samples required as per DWQMP	ADWG Health Guideline Limit	No. Samples Exceeding Health Guideline Value	ADWG Aesthetic Limit	No. Samples Exceeding Aesthetic Guideline Value	Min of Value	Max of Value	Avg of Value
Anions	Chloride by FIA (mg/L)	1	Weekly	52	52	1.5				0.45	0.93	0.81
	Fluoride by ISE (mg/L)	0.05	Quarterly	4	4			250		3.3	4.4	3.7
	Sulphate ICPMS (mg/L)	1	Quarterly	4	4					9.9	13	10.7
Cations	Calcium ICPMS (mg/L)	0.1	Quarterly	4	4					1.7	2	1.85
	Magnesium ICPMS (mg/L)	0.001	Quarterly	4	4					0.56	0.59	0.58
	Potassium ICPMS (mg/L)	0.01	Quarterly	4	4			180		19	21	20
	Sodium ICPMS (mg/L)	1	Quarterly	4	4	0.08				<0.004	<0.004	0.000
Chemical	Total Cyanide (mg/L)	0.004	Quarterly	4	4			250		33	35	34
Disinfection	Free chlorine (mg/L)	0.1	Weekly	208	208	5		0.6	201	0.4	1.4	1.0
	Total chlorine (mg/L)	0.1	Weekly	208	208	5		0.6	206	0.6	1.5	1.1
Disinfection Byproducts	Bromodichloromethane (µg/L)	2	Monthly	12	12	250				<2	4.1	3
	Bromoform (µg/L)	2	Monthly	12	12	250				3.6	23	13
	Chlorodibromomethane (µg/L)	2	Monthly	12	12	250				3.9	14	9
	Chloroform (µg/L)	3	Monthly	12	12	250				<3	<3	0
	THMs Total (µg/L)	10	Monthly	12	12	250				<10	40	24
Haloacetic Acids	Bromochloroacetic Acid (µg/L)	10	Monthly	12	12					<10	<10	0
	Dibromoacetic Acid (µg/L)	10	Monthly	12	12					<10	<10	0
	Dichloroacetic Acid (µg/L)	10	Monthly	12	12					<10	<10	0
	Monobromoacetic Acid (µg/L)	10	Monthly	12	12					<10	<10	0
	Monochloroacetic Acid (µg/L)	10	Monthly	12	12					<10	<10	0
	Trichloroacetic Acid (µg/L)	10	Monthly	12	12	100				<10	<10	0
	Total Haloacetic Acids (µg/L)	60	Monthly	12	12					<60	<60	0
Metals	Aluminium ICPMS (mg/L)	0.001	Quarterly	4	4			0.2		0.033	0.036	0.035
	Arsenic ICPMS (mg/L)	0.001	Quarterly	4	4	0.01				<0.001	<0.001	0.000
	Boron ICPMS (mg/L)	0.001	Quarterly	4	4	4				0.007	0.015	0.012

Category	Parameter	Limit of Reporting	Frequency of Sampling	Total No. of Samples Taken	No. Samples required as per DWQMP	ADWG Health Guideline Limit	No. Samples Exceeding Health Guideline Value	ADWG Aesthetic Limit	No. Samples Exceeding Aesthetic Guideline Value	Min of Value	Max of Value	Avg of Value
	Cadmium ICPMS (mg/L)	0.001	Quarterly	4	4	0.002				<0.001	<0.001	0.000
	Chromium ICPMS (mg/L)	0.001	Quarterly	4	4	0.05				<0.001	<0.001	0.000
	Copper ICPMS (mg/L)	0.001	Quarterly	4	4	2		1		0.0028	0.0059	0.004
	Iron ICPMS (mg/L)	0.001	Quarterly	4	4			0.3		0.011	0.021	0.015
	Lead ICPMS (mg/L)	0.001	Quarterly	4	4	0.01				<0.001	<0.001	0.000
	Manganese ICPMS (mg/L)	0.001	Quarterly	4	4	0.5		0.1		<0.001	<0.001	0.000
	Mercury (µg/L)	0.01	Quarterly	4	4	1				<0.01	<0.01	0.00
	Molybdenum ICPMS (mg/L)	0.001	Quarterly	4	4	0.05				<0.001	<0.001	0.000
	Nickel ICPMS (mg/L)	0.001	Quarterly	4	4	0.02				<0.001	<0.001	0.000
	Selenium ICPMS (mg/L)	0.001	Quarterly	4	4	0.01				<0.001	<0.001	0.000
	Silica ICPMS (mg/L)	0.1	Quarterly	4	4			80		6	7.7	6.7
	Zinc ICPMS (mg/L)	0.001	Quarterly	4	4			3		<0.001	0.0011	0.001
Microbiology	Coliforms Colilert (MPN/100mL)	1	Weekly	170	48					<1	<1	0
	E. coli Colilert (MPN/100mL)	1	Weekly	170	48	1				<1	<1	0
	HPC (cfu/mL)	1	Quarterly	16	16					<1	<1	0
Nutrients	Nitrate N by FIA (Calc) (mg/L)	0.001	Quarterly	4	4	50				0.23	0.28	0.255
	Nitrite N by FIA (mg/L)	0.002	Quarterly	4	4	3				<0.002	<0.002	0.000
	Nitrite+Nitrate as N (mg/L)	0.004	Quarterly	4	4					0.23	0.28	0.255
Physical	Alkalinity (mg/L)	1	Quarterly	4	4					27	28	28
	Colour - True (PCU)	1	Quarterly	4	4			15		<1	<1	0
	Conductivity (µS/cm)	1	Quarterly	4	4					160	190	168
	Langelier Index (calc)	-	Quarterly	4	4					-1.16	-0.74	-0.99
	Permanent Hardness (mg/L)	2	Quarterly	4	4			200		31	42	35
	pH - Field (pH Unit)	0.1	Weekly	208	208			8.5	98	7.15	9.18	8.3
	Temperature - Field (deg C)	-	Weekly	208	208					17.3	27.2	22.5
	Total Dissolved Solids (mg/L)	5	Quarterly	4	4			600		95	100	99

Category	Parameter	Limit of Reporting	Frequency of Sampling	Total No. of Samples Taken	No. Samples required as per DWQMP	ADWG Health Guideline Limit	No. Samples Exceeding Health Guideline Value	ADWG Aesthetic Limit	No. Samples Exceeding Aesthetic Guideline Value	Min of Value	Max of Value	Avg of Value
	Total Hardness ICPMS (mg/L)	2	Quarterly	4	4			200		32	42	35
	Turbidity (NTU)	0.1	Weekly	208	208			5		<0.1	1.4	0.3

Note: Where the result is less than the limit of reporting, a value of 0 has been adopted for the average calculations

Table B.6 - Triannual Monitoring Program Water Quality Data Summary - 2023-2024

Categories of Parameters	M15 Wellington Point				M36 Redland Bay				M60 Thornlands				F7A Dunwich				F10A Amity Point				F17A Point Lookout			
	Jul 23	Nov 23	Mar 24	Jul 24	Jul 23	Nov 23	Mar 24	Jul 24	Jul 23	Nov 23	Mar 24	Jul 24	Jul 23	Nov 23	Mar 24	Jul 24	Jul 23	Nov 23	Mar 24	Jul 24	Jul 23	Nov 23	Mar 24	Jul 24
PFAS *(inc. PFOS, PFHxS, PFOA)*	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
Radionuclides	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
Cyanobacteria	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
Pesticides	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
BTEX *(inc. Xylene, Benzene, Toluene)*	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
Polyaromatic Hydrocarbons	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR
Plasticisers	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR

Note: LORs vary between individual analytes in each category

Table B.7 - E. coli Compliance with Annual Value Redland City and SMBI Supply Scheme

Year	***2023-2024***											
Month	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***June***
No. of samples collected	68	65	80	80	70	67	67	85	76	72	87	68
No. of samples collected in which *E. coli* is detected (i.e., a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	882	877	890	891	901	886	872	893	896	900	896	885
No. of failures for previous 12-month period	1	1	1	1	1	1	1	1	1	1	1	0
% of samples that comply	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	100%
Compliance with 98% Annual Value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table B.8 - E. coli Compliance with Annual Value Amity Point Supply Scheme

Year	***2023-2024***											
Month	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***June***
No. of samples collected	13	17	13	13	16	13	13	16	13	13	17	13
No. of samples collected in which *E. coli* is detected (i.e., a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	170	174	170	170	173	170	170	173	170	170	174	170
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Compliance with 98% Annual Value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table B.9 - E. coli Compliance with Annual Value Dunwich Supply Scheme

Year	***2023-2024***											
Month	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***June***
No. of samples collected	8	10	8	8	10	8	8	10	8	9	10	8
No. of samples collected in which *E. coli* is detected (i.e., a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	104	106	104	104	106	104	104	106	104	105	107	105
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Compliance with 98% Annual Value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table B.10 - E. coli Compliance with Annual Value Point Lookout Supply Scheme

Year	***2023-2024***											
Month	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***June***
No. of samples collected	10	13	10	10	12	10	10	13	10	10	13	10
No. of samples collected in which *E. coli* is detected (i.e., a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	131	134	131	131	133	131	131	134	131	131	134	131
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Compliance with 98% Annual Value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Appendix C – Verification monitoring sites

Figure C.1 - Mainland Verification Monitoring Sites

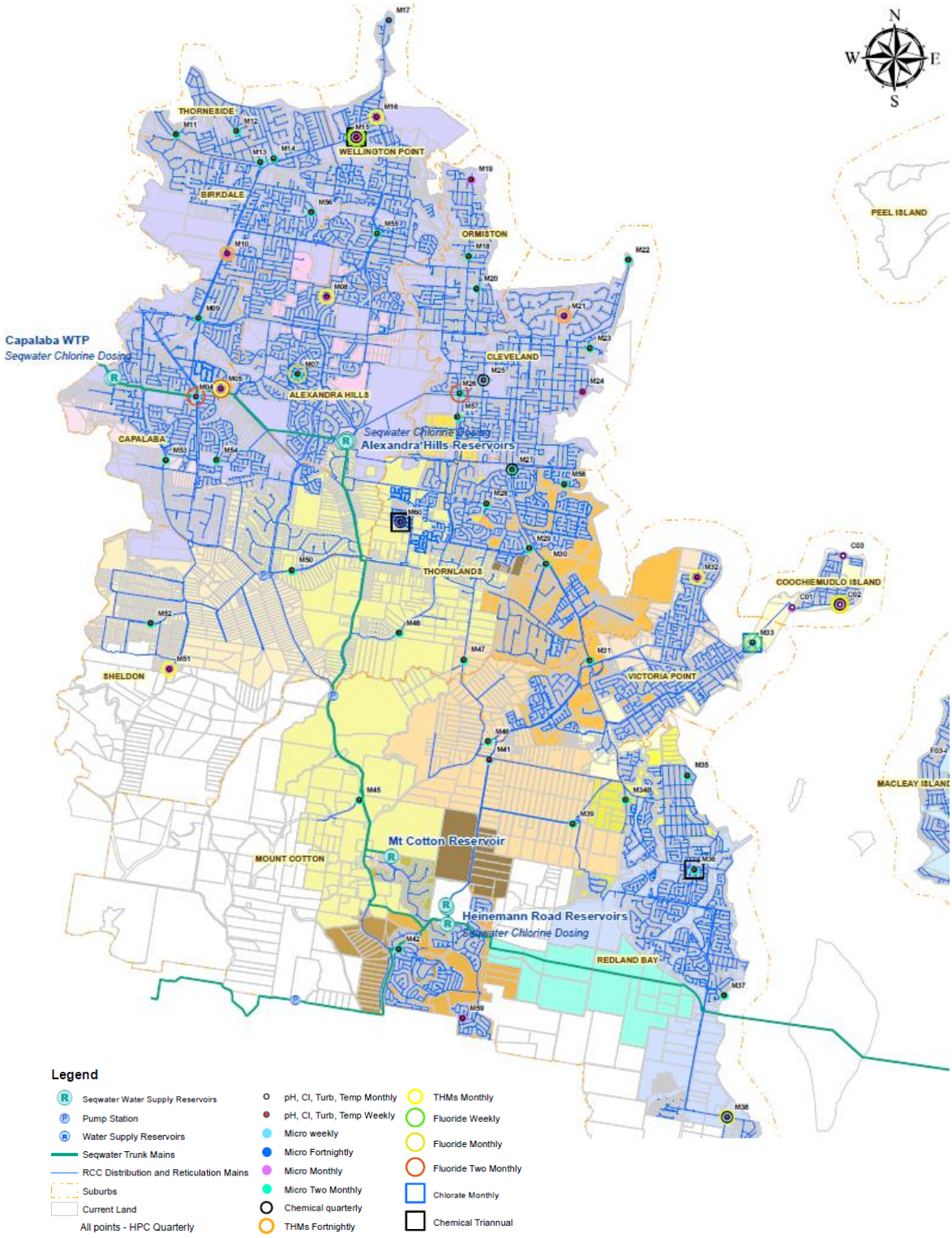

Figure C.2 - SMBI and NSI Verification Monitoring Sites