



Drinking Water Service

Annual Report 2023-24

December 2024



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EXECUTIVE SUMMARY

Water suppliers in Queensland (QLD) are required under the *Water Supply (Safety and Reliability) Act 2008* (the Act) to operate under an approved Drinking Water Quality Management Plan (DWQMP) to protect public health. In addition, the preparation of a DWQMP report per financial year is required by the Act.

This DWQMP report documents the performance of Cherbourg Aboriginal Shire Council (Council) in implementing the DWQMP for the 2023-24 financial year.

Council is a registered service provider that manages the Cherbourg drinking water supply scheme and distributes treated water to the Cherbourg community. The water supply scheme is comprised of a single raw water source, a water treatment plant, pump stations, service reservoirs and distribution network.

Council has undertaken risk management and water quality testing to ensure the supply of safe drinking water. The water quality verification results and assessment showed that Council in general supplied safe quality water to the customers. The compliance for *E. coli*, which is the key indicator of microbiological safety of drinking water was 98.4%. The Public Health Regulation requires a compliance level of at least 98%, which Council exceeded.

The compliance with metals, chemicals and blue green algae was 100%. There has been a notable out-of-spec issue with regards to trihalomethanes (THMs) as well as maintaining a consistent free chlorine residual within in the network, which led to a Boil Water Alert (BWA) in December 2023 and remained in place for the rest of the reporting period. Council actively monitored these ongoing issues and the risk to public health was managed in consultation and advice from the Regulator and the Public Health Unit (PHU).

Incidents were reported to the Regulator as required and managed effectively to rectify any issues. There were no formally recorded water quality related customer complaints which indicated a good overall customer satisfaction.

Various improvement actions have been undertaken and/or planned as continual improvement. The improvement actions have been identified through detailed risk assessment to ensure safe quality of drinking water.

A regular review of the DWQMP was conducted on the 30 October 2023. The review required an update to the DWQMP and approval of the amended DWQMP by the Regulator. The DWQMP amendments were approved by the Regulator.

No regulatory audit was required to be conducted during the reporting period. The next regular audit of the DWQMP must be conducted by 30 June 2025.

1. INTRODUCTION

This is the Drinking Water Service Annual Report for Cherbourg Aboriginal Shire Council (Council) for the financial year 2023-24.

The Drinking Water Quality Management Plan (DWQMP) has been established and is being adhered to protect public health through identification and minimisation of public health related risks associated with drinking water. Council is operating under an approved DWQMP, with the approval granted by the Department of Local Government, Water and Volunteers (DLGWV).

This Annual Report summarises Council's drinking water quality performance for the reporting period and progress on the implementation of the improvement plan. The report is made available to customers on Council's website and for inspection upon request at the Council office.

1.1. Scope

The report has been prepared to fulfil the legislative DWQMP reporting requirements set out in the *Water Supply (Safety and Reliability) Act 2008* (the Act).

1.2. Purpose

This annual report aims to:

- be a reference document for the Regulator, as well as customers, on Council's performance in relation to the DWQMP reporting obligations under the Act, for the reporting period
- provide a summary of Council's performance in implementing the DWQMP.

2. SCHEME OPERATED

Council is a registered drinking water service provider, with the service provider identification (SPID) number as 146.

Council manages the Cherbourg drinking water supply scheme and distributes treated water to the Cherbourg community. The water supply scheme is comprised of a single raw water source, a water treatment plant, pump stations, service reservoirs and distribution network.

3. DWQMP IMPLEMENTATION

The implementation of the DWQMP is discussed in this section, and also captured in the other sections that follow.

3.1. Risk Management

The process of keeping drinking water safe is one of the risk management. Through efficient operations and implementation of the DWQMP, Council has ensured effective risk management to assure safe quality of drinking water to our customers.

During the reporting period, Council encountered some challenges, however, all incidents were managed in a manner to ensure protection of public health, refer to Section 5.

3.2. Monitoring

Council maintains monitoring programs to ensure that the quality of water supplied to customers is safe. The monitoring programs assist to identify any issue before it becomes a significant water quality incident. The results from the verification monitoring for the reporting period are discussed in Section 4.

Council also undertakes operational monitoring, which includes the planned sequence of measurements and observations to assess and confirm the performance of their preventive or control measures. Measurements are of operational parameters that indicate whether processes are functioning effectively.

Quality assurance is important to guarantee consistently reliable and legally defensible results and ensure customers are provided with the best quality water.

Council has the following quality management systems in place:

- samples were appropriately collected and sent to Queensland Health Forensic Scientific Services (QHFSS), which is a National Association of Testing Authorities (NATA) accredited laboratory, during the reporting period.
- operations staff have been appropriately trained to undertake sampling and continue to receive refreshers, as required.

3.3. Implementation of Risk Management Improvement Plan

Council maintains a culture of continuous improvement and are implementing the Risk Management Improvement Plan (RMIP) of the DWQMP and making progress towards strengthening the management of the water supply.

Detailed status of the Improvement Plan (IP) implementation is presented in Appendix A.

4. VERIFICATION MONITORING COMPLIANCE

Verification of drinking water quality provides an assessment of the overall performance of the system and the ultimate quality of the drinking water being supplied to customers.

Council supplied safe water that generally complied with the Australian Drinking Water Guidelines (ADWG), see Figure 1. The compliance for *E. coli*, which is the key indicator of microbiological safety of drinking water was 98.4%. The Public Health Regulation requires a compliance level of at least 98%, which Council exceeded. However, Council had problems managing consistent free chlorine residual at the Water Treatment Plant (WTP) and within the network, which led to a Boil Water Alert (BWA) in December 2023. The risk to public health was being managed in consultation and advice from the Regulator and Public Health Unit (PHU) and the BWA was lifted in early August 2024.

The compliance with metals, chemicals and blue green algae was 100%. There was a notable out-of-specification issue with regards to trihalomethanes (THMs); this is an ongoing, open incident.

Further details on the verification monitoring data and level of compliance are presented in Appendix B.

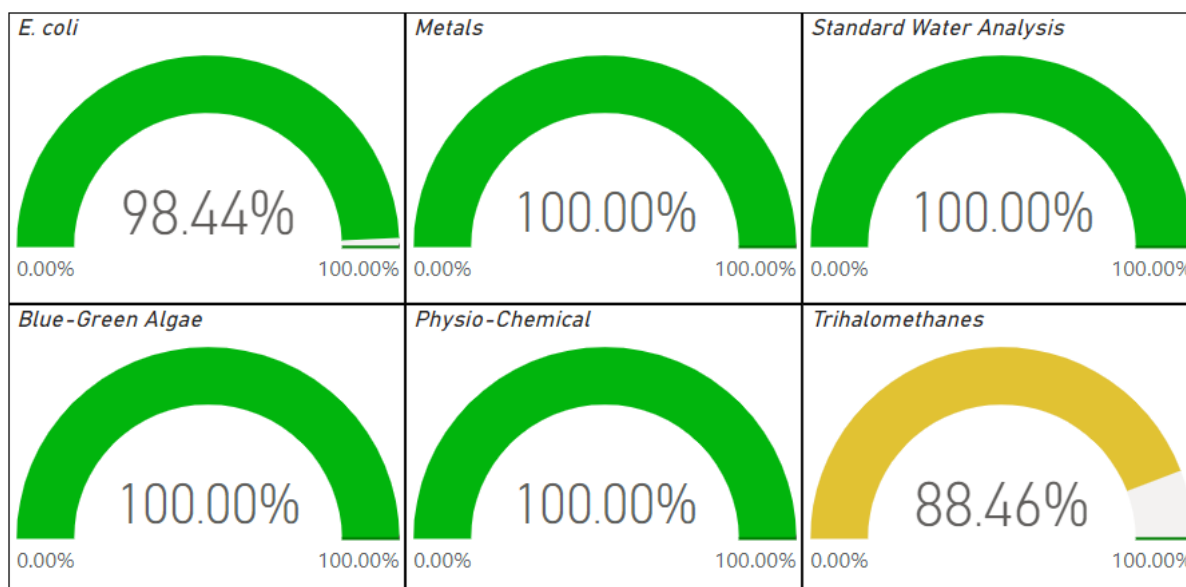


Figure 1 Compliance with ADWG health guideline values

There were a couple of excursions of aesthetic parameters, see Figure 2. These were observed and continually monitored to improve water quality but being aesthetic these do not pose a risk to public health.

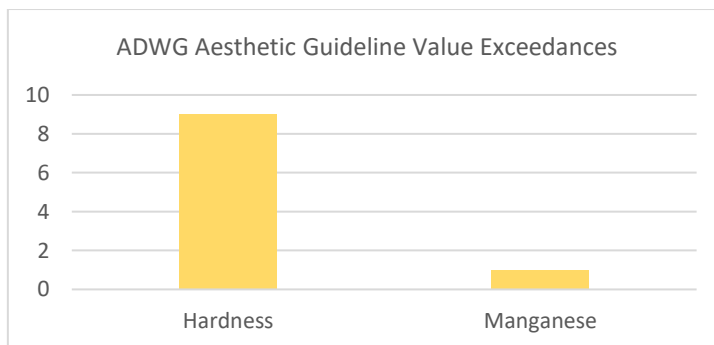


Figure 2 ADWG aesthetic guideline value exceedances

5. REPORTING TO THE REGULATOR

The following reporting was undertaken to the Regulator for the 2023-24 period. Appropriate actions were undertaken to ensure water quality risks were proactively managed.

Table 1 Incidents or Events reported to the Regulator

Date	What Happened	Actions Taken	Comments
05/05/2022	THM exceedance	Under ongoing investigation.	Open
14/11/2023	Low chlorine / turbidity	BWA was issued to ensure no negative impact on public health. Maintenance performed on chlorine system filters and clarifier. Ongoing daily manual dosing of chlorine in reservoirs as well as increased monitoring.	Closed
27/03/2024	<i>E. coli</i> detection at Burt Button Reservoir.	The Regulator was notified, and actions taken to resolve the detection. Undertook resealing of all joints on reservoir and hatch to prevent frog ingress.	Cherbourg supply was still on a BWA and impact to public health was managed. This is now closed.
04/04/2024	Unauthorised break in	Increased security at sites including better doors and windows locked.	Closed

6. CUSTOMER COMPLAINTS

There were no formal water quality related customer complaints recorded for the reporting period.

7. DWQMP REVIEW OUTCOMES

The DWQMP was required to be reviewed by 31 October 2023 as part of the DWQMP approval conditions. An external contractor was engaged to facilitate the review process. A review workshop was undertaken on 3 – 4 October 2023 and the review was completed on 30 October 2023 (within the required period).

The findings of the review are shown in Table 2.

Table 2 DWQMP review details and findings

Area Reviewed	Details	Findings
Service Details	Future projection not needed as per the new Guideline so can be removed.	Section 1 of the DWQMP needed to be updated.
Infrastructure and Process Flow Diagram	<p>An onsite visit was undertaken to verify the process flow and operations for the supply and verify changes. This was undertaken on 3/10/2023. There are bypasses for the clarifier, sand filter, Granular Activated Carbon (GAC) filter and each reservoir. Reservoir 3 (old Clear Water Tank (CWT)) is planned to be brought online as an extra service tank, so add infrastructure details and include in the schematic. The Burt Button Reservoirs capacity is 130 kL and needs to be corrected. Process flow diagram in the DWQMP needs to be updated.</p> <p>Body text to be updated to reflect the changes.</p> <p>Remove the C.t calculations from Section 2 and include in the Data Analysis Report 2023.</p> <p>Key stakeholders – to be reviewed to reflect current engagement – add Supervisory Control and Data Acquisition (SCADA) contractor and contractor used for Operation and Management (O&M) advice.</p>	Section 2 and process flow diagrams of the DWQMP needs to be updated to reflect infrastructure changes.
Catchment Details and Classification	New Guideline requirement. Needs to be further explained and catchment / source water protection information included.	Included in the Data Analysis Report 2023 – DWQMP supporting document.
Water Quality Data	Detailed analysis of available water quality data (statistics and scatter plot) was undertaken to guide the risk assessment review and verify the risk profiles.	Data Analysis Report 2023 prepared – DWQMP supporting document.
Risk Assessment	<p>The risk assessment for the supply was reviewed in detail via onsite discussions on 3-4/10/2023. The risk team details are included in the Risk Register – relevant tab.</p> <p>The Darling Downs Public Health Unit (DDPHU) participated at the risk workshop.</p>	The changes made to the risk assessment (RA) are included in the RA Register spreadsheet – DWQMP supporting document.
Improvement Plan	<p>Improvement actions were reviewed as part of the risk review discussions.</p> <p>It was decided to archive the 2022 IP to make the list more manageable. Any pending actions from the 2022 IP was carried over to the new 2023 IP.</p>	The changes made to the Improvement Plan are included in the Improvement Plan spreadsheet – DWQMP supporting document.
DWQMP Audit Findings	n/a	n/a

Area Reviewed	Details	Findings
Procedures and Information Management	<p>Section 5.1 Table 9 to reflect Council’s procedure document register including new columns for Standard Operating Procedure (SOP) no., issue date, approval date and last reviewed.</p> <p>Update Section 5.2 to include Reservoir 3 (old CWT) sampling location in Critical Control Point (CCP) procedure, update disinfection target range, and include information on the SCADA management process.</p> <p>Update Section 5.5 for currency and inclusion of the QR Code System.</p>	Sections 5.1, 5.2 and 5.5 of the DWQMP need to be updated for currency.
Incident and Emergency Response	<p>This was reviewed. Include information on reporting for cybersecurity breach.</p> <p>Mention about how radiological exceedance of screening levels will be responded to.</p> <p>Update Disaster flowchart for currency.</p>	Section 5.3 of the DWQMP needs to be updated.
Monitoring Programs	<p>This was reviewed. Can reduce pesticide testing in raw water monitoring to 6-monthly (based on data analysis findings) and remove from treated water verification monitoring (this can be tested if there is a need identified from incident response).</p> <p>Update verification monitoring locations in Table 15 for currency.</p> <p>Reservoir 3 (old CWT) to be tested in line with the other reservoirs – it needs to have a Disinfection CCP monitoring location added – Reservoir 3 tap.</p> <p>Include information on managing public health risk (via operational monitoring checks) due to inability to carryout verification monitoring at the external laboratory during end of year holiday closure.</p>	Section 6 of the DWQMP needs to be updated to include changes to the monitoring programs.
General – DWQMP Body	<p>Criteria from old DWQMP Guideline to be removed.</p> <p>General edits and updates for currency and in line with the above areas reviewed.</p>	Minor changes need to be made to the DWQMP.

The review indicated a need to amend the DWQMP. The amended plan was submitted to the regulator on 16 November 2023, with the DWQMP approval granted on 20 February 2024. The next regular review of the DWQMP is due by 31 October 2025.

8. DWQMP AUDIT FINDINGS

No regulatory audit was required to be conducted during the reporting period. The next regular audit of the DWQMP must be conducted by 30 June 2025.

9. GLOSSARY

Term	Definition
ADWG	Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia
BGA	Blue-green algae
BWA	Boil water alert
CASC/Council	Cherbourg Aboriginal Shire Council
CCP	Critical Control Point
CWT	Clear Water Tank
DDPHU	Darling Downs Public Health Unit
DLGWV	Department of Local Government, Water and Volunteers
DWQMP	Drinking Water Quality Management Plan
<i>E. coli</i>	<i>Escherichia coli</i> , a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk.
Event	Means anything that has happened to the service that has escalated beyond the ability to control and there is concern that public health may be adversely impacted as a result.
GAC	Granular Activated Carbon
Incident	Means a non-compliance with water quality criteria (e.g. exceeding an ADWG health guideline value).
IP	Improvement Plan
mg/L	Milligrams per litre
MPN/100mL	Most probable number per 100 millilitres
NATA	National Association of Testing Authorities
ND	Not detected
O&M	Operation and Management
PHU	Public Health Unit
QHFSS	Queensland Health Forensic Scientific Services
QLD	Queensland
RA	Risk Assessment
RMIP	Risk Management Improvement Plan
SCADA	Supervisory Control and Data Acquisition

Term	Definition
SOP	Standard Operating Procedure
SPID	Service Provider Identification
The Act	<i>Water Supply (Safety and Reliability) Act 2008</i>
THMs	Trihalomethanes, a group of disinfection by-products that become a potential health risk in elevated concentrations.
WTP	Water Treatment Plant

DOCUMENT HISTORY AND TRACKING

Document History

Version	Section/s Modified	Brief Description of Amendment	Author/s	Approver	Issue Date
0.1	NA	Draft for internal review	Emma Sun	Emma Sun	29/11/2024
0.2	Several	Draft for client review	Emma Sun	Emma Sun	2/12/2024
1.0	NA	Final version	Emma Sun	Matthew Bock	3/12/2024

Document Tracking

Document Name	Drinking Water Service Annual Report 23-24
Prepared By	Emma Sun
Reviewed by	Matthew Bock
Approved by	Emma Sun
Date Approved	3/12/2024
Status	Final
Document Number	REC-24-174
Version Number	1.0
Review Date	3/12/2024

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A. IMPROVEMENT PLAN PROGRESS

The improvement actions relevant for this reporting period are included in the table below with relevant commentary on implementation status.

Cherbourg Aboriginal Shire Council - DWQMP Improvement Plan 2023

Action No.	Source	Link to Risk Register tab - Hazardous source / event	Residual Risk Level - from the risk register tab	Improvement Action or Follow up Action	Priority	Responsibility	Original timeframe (initial due date)	Revised timeframe (from reviews etc)	Status	Comments
1	DWQMP Feb 2018	NA - carried forward from improvement Plan 2022 Archived tab action #3	NA	Replacement of valves and old pipes in reticulation	Medium	Operations Manager	1-Dec-22	1-Dec-25	In Progress	Funding application being lodged late 2023. To identify critical areas. Capital works project will take time. Timeframe revised on 11/10/23.
2	DWQMP Audit 2018	NA - carried forward from improvement Plan 2022 Archived tab action #4	NA	OFI-03 Consider developing a drinking water policy and including induction to the policy for all relevant staff.	Low	Operations Manager	1-Dec-22	1-Dec-24	To Start	Low priority in the scheme of other priorities but will be still good to have to provide organisational commitment. Timeframe revised on 11/10/23.
3	Risk Assessment Review October 2023	- Catchment: Overturn of Dam - Coagulation/flocculation: Failure of coagulation/flocculation; Underdose of Ultrion - pH correction: Overdose of soda ash (pH >8.5 can impact on chlorine efficiency) - Filtration: Breakthrough (suboptimal performance) (sand and carbon filters)	High (10)	Investigate and ensure that: - the SCADA alarm for raw water turbidity in SCADA is set at 30 NTU, for >15mins - clarified water online turbidity has an alarm at an appropriate level in SCADA (i.e. 5 NTU) to alert operators on need for intervention e.g. jar testing - the online pH has an alarm at an appropriate level in SCADA (e.g. pH 8) to alert operators on need for intervention - the online filtered water turbidity has alarms and shutdown at appropriate levels in SCADA (i.e. target <0.5 NTU, 0.5-1.0 NTU alarm sent to investigate and action, >1.0 NTU plant to shutdown).	High	Water and Sewerage Manager	NA	31-Dec-23	Completed	This may have been checked but there is no evidence or correspondence to confirm it. The SCADA contractor has been contacted to (re)confirm this. Contractor has shown staff how to access this information and it has been checked is within specs.
4	Risk Assessment Review April 2021 & October 2023	Catchment: Industrial activities (lime quarry)	Low (3)	Contact the quarry to find out their processes (chemicals used etc).	Low	Operations Manager	31-Dec-21	31-Dec-24	To Start	With the raw water monitoring program, this is not a priority item but will be looked into in the future, as other high priority items are addressed. Timeframe revised on 11/10/23.
5	Risk Assessment Review April 2021	Catchment: Persistent organic pollutants	Low (3)	Undertake a one-off testing for PFAS in discussions with DDPHU and QFSS-QH.	Low	Water and Sewerage Manager	31-Dec-21	31-Dec-24	To Start	This is not a priority item but will be looked into in the future, as other high priority items are addressed. Timeframe revised on 11/10/23.
6	Risk Assessment Review April 2021, August 2022 & October 2023	- Coagulation/flocculation: Failure of coagulation/flocculation; Underdose of Ultrion - Whole of System: Loss of supply due to equipment failure	Medium (6)	Develop a critical spares list.	Medium	Operations Manager / Water and Sewerage Manager	31-Dec-22	31-Dec-23	In Progress	In progress as maintenance actions are undertaken.
7	Risk Assessment Review April 2021 & October 2023	Filtration: Breakthrough (suboptimal performance) (sand and carbon filters)	High (10)	Investigate installing online turbidity meters for each filter cell. This will guide the need to backwash cell of concern. Consider automating filter backwash based on turbidity trigger (e.g. >1.0 NTU should start the backwash).	High	Operations Manager	31-Dec-22	31-Dec-25	Completed	Was not part of original upgrade works. Post filtration analyser in place only. But individual meters need to be investigated and installed in the future. Capital works project and needs hydraulic assessment also. Timeframe revised on 11/10/23. Sample taps are being investigated in the interim. Sample taps have been installed and data is being collected. upgrades will occur with the funded capital works program.
8	Risk Assessment Review April 2021 & October 2023	Whole of System: Human Resources - untrained staff, lack of motivation	Medium (6)	Organise / deliver operator training.	High	Operations Manager	30-Jun-22	31-Dec-24	Completed	2023/24 Training Schedule in place: Jackson Cobbo - Cert IV dates - TBC Justin Cobus - Cert III additional qualification Block 1-4 July 23 - April 24 Matthew Bock, Jakeem Murray & Stafford Sandow - Cert III August 23 - April 24 Safe and Healthy Drinking Water program will continue to deliver workshops in 2023. Underway but completion will take more time. Timeframe revised on 11/10/23. Training for all staff apart from Jackson Cobbo has been completed
9	Risk Assessment Review April 2021 & October 2023	Whole of System: Water Security	Medium (6)	Review the Drought Management Plan to ensure emergency water supply is captured and/or develop a procedure for emergency or alternate supply of water when required (e.g. carted water or bottled water etc).	Low	Operations Manager	30-Jun-23	31-Dec-25	In Progress	Has been mentioned to the LDMG, will be followed up. This is not a priority item but will be looked at, impact from drought is not a high risk for the supply. Timeframe revised on 11/10/23.
10	Risk Assessment Review August 2022 & October 2023	Catchment: Natural geology	Low (3)	Enhance data recording and review ability for the verification monitoring results e.g. investigate if QFSS laboratory can upload all verification data onto SWIM, or maintain an appropriate spreadsheet where all verification data is collated (when results are received) and is able to be trended and easily reviewed.	High	Operations Manager / EHO	NA	30-Jun-24	In Progress	SWIM is in use which has enhanced recording of operational data. Verification data recording is being investigated. Timeframe revised on 11/10/23. QFSS are unable to load data into SWIMS other avenues are being looked at
11	Risk Assessment Review August 2022 & October 2023	Coagulation / Flocculation: Accidental overdose of Ultrion	Low (3)	Document SOP on calibration of the all chemical dosing pumps, including the calibration frequency.	Medium	Water and Sewerage Manager / Water Team	31-Dec-23	NA	In Progress	
12	Risk Assessment Review August 2022 & October 2023	- Coagulation/flocculation: Failure of coagulation/flocculation; Underdose of Ultrion - Filtration: Breakthrough (suboptimal performance) (sand and carbon filters)	High (10)	Operators to implement daily grab sample test of clarified water turbidity and filtered water turbidity (at the analyser sampling line).	High	Water and Sewerage Manager / Water Team	31-Dec-22	31-Mar-24	Completed	Grab sample testing was not done routinely but as investigation. Has been discussed to re-start it as routine. Sample taps have been installed and daily sampling is taking place
13	Risk Assessment Review August 2022 & October 2023	Chlorination: Chlorine by-products	Medium (9)	Undertake investigation on organic matter (e.g. TOC) presence/break-through in the supply - test for TOC monthly in raw water and treated water (ideally treated sample should be post filters and prior to disinfection but this may not be possible with current set up). Based on the findings, assess need to further optimise treatment if needed e.g. enhanced coagulation.	High	EHO	30-Jun-23	31-Mar-24	Completed	This was done on one sample but not enough to see a trend. The revised timeframe is to start this investigative project, which should then be continued until next review of the DWQMP to evaluate data. An intensive water sampling program for TOC/DOC has taken place for 2 months this data was taken as part of the investigation report for the funding to upgrade the water treatment plant. funding has been approved
14	Risk Assessment Review September 2022	Reticulation: Inadequate chlorine - potential proliferation of opportunistic pathogens	Medium (6)	Investigate testing for water temperature at the reticulation site samples, when collected for bacto sampling, until the next review of the DWQMP to determine the temperature profile in the network.	Medium	EHO	30-Dec-23	31-Mar-24	To Start	The revised timeframe is to start this investigative project, which should then be continued until next review of the DWQMP to evaluate data.
15	Risk Assessment Review August 2022 & October 2023	Whole of System: Cybersecurity vulnerabilities, threats and breaches that can lead to a water quality incident / contamination	Medium (5)	Investigate and arrange for cybersecurity audit of the water and sewerage assets. Implement actions from the audit as relevant.	Medium	Operations Manager / CEO	31-Dec-23	31-Dec-24	To Start	Update 6-6-2023 Scheduled for 2024. Timeframe revised on 11/10/23.
16	Risk Assessment Review August 2022 & October 2023	Filtration: Breakthrough (suboptimal performance) (sand and carbon filters)	High (10)	Investigate installing a tap or plumbing a sampling point just after the filters (one for sand and one for carbon) to enable ease with daily grab sampling of individual filter blocks. [In the interim, the daily grab sample should be from the online turbidity meter location].	Medium	Operations Manager / Water and Sewerage Manager	31-Dec-23	NA	Completed	Sampling taps have been installed at each filter and daily sampling is being done.

17	DWQMP Review and Update 2022	NA	NA	Review and update the SCADA screen drawings following completion of all pending work i.e. refurbishment of the old CWT as Res 3.	Medium	Operations Manager / Water and Sewerage Manager	31-Dec-23	31-Dec-24	Completed	This action may take longer as the old CWT has not yet been commissioned for use as Res 3. Timeframe revised on 11/10/23. Res3 will remain offline and will be used as a storage for backwash water. Part of funded upgrade program
18	- Response to Regulators clarifications Nov 22 - Risk Assessment Review August 2022 & October 2023	Catchment: Overturn of Sunwater Dam	Low (3)	Investigate if a formal arrangement around releases and communications could be established with Sunwater.	Low	CEO	1-Dec-23	1-Dec-24	To Start	Low priority in the scheme of other priorities but will be still good to have if possible. Operations Manager to inform CEO of this action. Timeframe revised on 11/10/23.
19	Risk Assessment Review October 2023	Catchment: Animal Faeces - access and runoff	Medium (6)	Investigate banning horses from the paddock near the intake area.	Medium	Operations Manager / CEO	30-Jun-25	NA	Completed	An exclusion fence has been erected and public notified of exclusion zone for horses
20	Risk Assessment Review October 2023	Catchment: Animal Faeces - access and runoff	Medium (6)	Undertake raw water E. coli testing weekly (until next review of the DWQMP) as an investigative project to assist verify catchment vulnerability and source water class.	Medium	EHO	31-Mar-24	NA	In Progress	The timeframe is to start this investigative project, which should then be continued until next review of the DWQMP to evaluate data.
21	Risk Assessment Review October 2023	Catchment: Natural geology	Medium (6)	Ensure that heavy metals (total form) is tested in the reticulation.	Medium	EHO	31-Mar-24	NA	In Progress	The timeframe is to start this investigative project, which should then be continued until next review of the DWQMP to evaluate data.
22	Risk Assessment Review October 2023	Supernatant Return: Reuse of waste streams - supernatant return - increases risk of pathogens (protozoa) load and break-through	Medium (6)	Develop a contingency plan for bringing supernatant back online, if/when required, and checks / tests which will be needed e.g. valves to turn on/off, confirm that return is at <10% of raw water flow, BGA testing in lagoons, optimise treatment dose rates etc.	Low	Operations Manager	31-Dec-25	NA	Completed	A decision has been made to keep supernatants permanently offline due to increased risk of BGA
23	Risk Assessment Review October 2023	- Coagulation/flocculation: Failure of coagulation/flocculation; Underdose of Ultrion - Filtration: Breakthrough (suboptimal performance) (sand and carbon filters)	High (10)	Investigate and rectify accordingly the SCADA trends for the online turbidity results (clarified and filtered water). The trends appear to show elevated and out-of-spec results, which may not be the case.	High	Operations Manager	30-Jun-24	NA	Completed	Part of funded capital works upgrade.
24	Risk Assessment Review October 2023	pH Correction (optional): Overdose of soda ash (pH >8.5 can impact on chlorine efficiency)	Medium (5)	Develop a contingency plan for bringing soda ash back online, if/when required, and checks / tests which will be needed e.g. valves to turn on/off, emptying/filling of the dosing tank, dose pump calibration, optimise treatment dose rates etc.	Low	Operations Manager	31-Dec-25	NA	Completed	Part of funded capital works upgrade.
25	Risk Assessment Review October 2023	Filtration: Breakthrough (suboptimal performance) (sand and carbon filters)	High (10)	Investigate optimising the filter backwash air scour pressure rate to ensure that there is no excessive disturbance of the filter bed and excessive sand is not lost during backwashes.	High	Operations Manager / Water and Sewerage Manager	30-Jun-24	NA	Completed	Part of funded capital works upgrade.
26	Risk Assessment Review October 2023	Chlorination: Chlorination failure; Underdose of chlorine	High (10)	Evaluate CCP performance in 12 months to verify that the Disinfection CCP is being implemented and that the critical limit is not being breached.	High	Water and Sewerage Manager / Water Team	31-Oct-24	NA	In Progress	This is an ongoing routine action but more rigour should be undertaken.
27	Risk Assessment Review October 2023	Chlorination: Chlorination failure; Underdose of chlorine	High (10)	Mid-long term - Investigate chlorine top up dosing in the reservoirs via a recirculation type dosing and online chlorine monitoring. This is where chlorine is dosed into the recirculation line into the reservoir. The requirement for chlorine dosing will be based on residual trim using the feedback signal sent by the chlorine analyser to the control system. The system will only dose chlorine when the measured free chlorine residual is less than the programmed set point (which will be the chlorine CCP critical lower limit).	High	Operations Manager	31-Dec-25	NA	Completed	Capital works will take time. First step is to ensure CCPs via grab samples are working optimally and then investigate this action. Part of funded capital works upgrade.
28	Risk Assessment Review October 2023	Reservoirs: Recontamination of Reservoirs - all (Res 1, Res 2, Res 3 - old CWT and Bert Button)	High (10)	Investigate funding for upgrade or replacement of the Bert Button reservoir.	High	Operations Manager	31-Dec-25	NA	Completed	Capital works will take time. Funding application is ready for submission. Part of funded capital works upgrade.
29	Risk Assessment Review October 2023	Reservoirs: Use of the old CWT following upgrade/repairs (Reservoir 3 or old Clear Water Tank)	Medium (6)	Ensure Res 3 is cleaned and superchlorinated prior to bringing it online.	Medium	Operations Manager / Water and Sewerage Manager	30-Jun-24	NA	Completed	Res 3 was bought back online after cleaning and standard water analysis had been completed however taken offline due to low chlorine in whole of system. Res3 will remain offline and will be used as a storage for backwash water. Part of funded upgrade program
30	Risk Assessment Review October 2023	Reservoirs: Use of the old CWT following upgrade/repairs (Reservoir 3 or old Clear Water Tank)	Medium (6)	Schedule maintenance tasks for Res 3 in the maintenance program, as relevant e.g. periodic cleans, 6-monthly inspections.	Medium	Operations Manager / Water and Sewerage Manager	30-Jun-24	NA	Completed	Res 3 was bought back online after cleaning and standard water analysis had been completed however taken offline due to low chlorine in whole of system. Res3 will remain offline and will be used as a storage for backwash water. Part of funded upgrade program
31	Risk Assessment Review October 2023	Reservoirs: Use of the old CWT following upgrade/repairs (Reservoir 3 or old Clear Water Tank)	Medium (6)	Undertake daily grab sample testing of free/total chlorine at the old CWT tap as part of the Disinfection CCP.	Medium	Water and Sewerage Manager / Water Team	30-Jun-24	NA	Completed	This is to start as soon as the old CWT has been commissioned and brought back online. Not needed as res is offline
32	Risk Assessment Review October 2023	Whole of System: Human Resources - untrained staff, lack of motivation	Medium (6)	Review staff training matrix to include DWQMP exclusively.	Medium	Operations Manager	30-Jun-25	NA	Completed	Ongoing arrangement with DDPHU ensures that relevant staff are aware of the DWQMP.
33	Risk Assessment Review October 2023	Whole of System: Cybersecurity vulnerabilities, threats and breaches that can lead to a water quality incident/contamination	Medium (5)	In the interim to the cybersecurity audit, investigate cybersecurity measures being implemented by the SCADA contractor to protect Council's SCADA controls from being breached.	Medium	Operations Manager	15-Dec-24	NA	To Start	
34	Risk Assessment Review October 2023	Whole of System: Lack of chemical quality assurance program; Lack of chemical supply/quantity	Medium (8)	Ensure that records for the certificate of analysis provided by suppliers for the chemicals delivered are maintained and can be located when required (e.g. during audits).	Medium	Water and Sewerage Manager / Water Team	30-Jun-24	NA	In Progress	
35	DWQMP Review and Update 2023	NA	NA	Complete the following SOPs (as per Section 5.1 of the DWQMP): - Sampling results interpretation - SWIM Local - data management	Medium	Water and Sewerage Manager / Water Team	30-Jun-24	NA	To Start	
36	DWQMP Review and Update 2023	NA	NA	Investigate having more access and control on key SCADA features at Managerial level in Council, rather than sole reliance of the contractor.	Medium	Operations Manager	1-Jul-24	NA	Completed	Part of funded upgrade program
37	DWQMP Review and Update 2023	NA	NA	Review the process of recording of customer complaints in relation to water quality (including any complaints received by operators informally).	Medium	Operations Manager	1-Dec-24	NA	To Start	

B. SUMMARY OF VERIFICATION MONITORING

A summary of the microbiological samples tested is included in Tables B1 and B2. Council supplied compliant drinking water to its customers during the reporting period, as discussed in Table B1. Missed weekly data at CHER T is due to the backwash being in operation at the WTP at the time of sampling.

Table B1 Drinking water quality performance - *E. coli*

Location	Parameter	Frequency	Sample count	Min. result	Max. result	Water quality criteria (spec)	Non-compliant samples	Comments
CHER T (WTP)	<i>E. coli</i> (MPN/100mL)	Weekly	49	0	0	Not detected (ND)	0	✓ Compliant. <i>E. coli</i> rolling average for the reporting period was 98.4% ¹ , at least 98% is required by the Public Health Regulation 2018.
CHER 1 (Park across STP)	<i>E. coli</i> (MPN/100mL)	Weekly	52	0	0	ND	0	
CHER 2 (Depot)	<i>E. coli</i> (MPN/100mL)	Weekly	52	0	0	ND	0	
CHER 3 (Early Learning Centre)	<i>E. coli</i> (MPN/100mL)	Weekly	52	0	0	ND	0	
CHER 4 (Bert Button Lookout Reservoir)	<i>E. coli</i> (MPN/100mL)	Weekly	52	0	8	ND	4	

Table B2 Drinking water quality performance - Total Coliforms

Location	Parameter	Frequency ²	Sample count	Min. result	Max. result	Water quality criteria (spec)	Non-compliant samples	Comments
CHER T (WTP)	Total coliforms (MPN/100mL)	NA	49	0	38	NA	NA	Actions are taken on high total coliforms to ensure the system integrity remains intact and water quality is not compromised.
CHER 1 (Park across STP)	Total coliforms (MPN/100mL)	NA	52	0	6	NA	NA	
CHER 2 (Depot)	Total coliforms (MPN/100mL)	NA	52	0	11	NA	NA	
CHER 3 (Early Learning Centre)	Total coliforms (MPN/100mL)	NA	52	0	18	NA	NA	
CHER 4 (Bert Button Lookout Reservoir)	Total coliforms (MPN/100mL)	NA	52	0	>200	NA	NA	

¹ Excluding repeat samples.

² Not applicable for compliance but is tested when *E. coli* is tested.

A summary of the physio-chemical parameters tested is included in Table B3. Missed daily data is due to wet weather conditions that make it unsafe to carry out sampling or if the backwash is in operation at the WTP for CHER T.

Table B3 Drinking water quality performance – Physio-chemical

Location	Frequency	Sample count	Min. result	Max. result	Water quality criteria (spec)	Non-compliant samples	Comments
Total chlorine (mg/L)							
CHER T (WTP)	Daily	353	0.12	4.05	5 (H)	0	✓ Compliant.
CHER 1 (Park across STP)	Daily	361	0.09	1.47	5 (H)	0	
CHER 2 (Depot)	Daily	362	0.10	1.00	5 (H)	0	
CHER 3 (Early Learning)	Daily	360	0.11	3.12	5 (H)	0	
CHER 4 (Bert Button Lookout Reservoir)	Daily	359	0.10	3.66	5 (H)	0	
Free chlorine (mg/L)							
CHER T (WTP)	Daily	353	0.04	3.92	NA	NA	There is no ADWG guideline or compliance value but operationally Council endeavour to keep the results at >0.2 mg/L. Actions are taken when results fall below this.
CHER 1 (Park across STP)	Daily	362	0.0	0.79	NA	NA	
CHER 2 (Depot)	Daily	362	0.01	0.67	NA	NA	
CHER 3 (Early Learning)	Daily	360	0.02	2.68	NA	NA	
CHER 4 (Bert Button Lookout Reservoir)	Daily	359	0.01	3.15	NA	NA	
Turbidity (NTU)							
CHER T (WTP)	Daily	353	0.01	1.28	5 (A)	0	✓ Compliant.
CHER 1 (Park across STP)	Daily	362	0.0	1.98	5 (A)	0	
CHER 2 (Depot)	Daily	362	0.0	1.70	5 (A)	0	
CHER 3 (Early Learning)	Daily	360	0.01	2.00	5 (A)	0	
CHER 4 (Bert Button Lookout Reservoir)	Daily	360	0.0	1.61	5 (A)	0	
pH							
CHER T (WTP)	Daily	352	6.71	7.78	6.5-8.5 (A)	0	✓ Compliant.
CHER 1 (Park across STP)	Daily	362	6.75	7.81	6.5-8.5 (A)	0	
CHER 2 (Depot)	Daily	362	6.79	7.81	6.5-8.5 (A)	0	
CHER 3 (Early Learning)	Daily	360	6.71	7.91	6.5-8.5 (A)	0	
CHER 4 (Bert Button Lookout Reservoir)	Daily	360	6.75	7.89	6.5-8.5 (A)	0	

Location	Frequency	Sample count	Min. result	Max. result	Water quality criteria (spec)	Non-compliant samples	Comments
THMs (ug/L)							
CHER 1 (Park across STP)	Weekly	52	27	320	250 (H)	6	THMs are currently an open water quality incident. Council is working towards further reducing THM levels but also ensuring disinfection is not compromised.

A – aesthetic guidelines (spec) as per the ADWG. Does not impact public health.

H – health-based guidelines (spec) as per the ADWG. Requires investigation and corrective actions.

A summary of the metals tested is included in Table B4. Council supplied water that was compliant with ADWG limits.

Missed sampling was discussed during the review of the DWQMP and considerable improvement will be seen in the next reporting period.

Table B4 Drinking water quality performance – Metals

Location	Parameter	Frequency	Sample count	Min. result	Max. result	Water quality criteria (spec)	Non-compliant samples	Comments
CHER 2 (Depot)	Aluminium (mg/L)	Monthly	5	0.007	0.009	0.2 (A)	0	✓ Compliant.
	Arsenic (mg/L)	Monthly	5	0.0009	0.0024	0.01 (H)	0	✓ Compliant.
	Cadmium (mg/L)	Monthly	5	0.00005	0.00005	0.002 (H)	0	✓ Compliant.
	Chromium (mg/L)	Monthly	5	0.00005	0.0002	0.05 (H)	0	✓ Compliant.
	Copper (mg/L)	Monthly	5	0.004	0.033	1 (A) 2 (H)	0	✓ Compliant.
	Iron (mg/L)	Monthly	5	0.006	0.01	0.3 (A)	0	✓ Compliant.
	Lead (mg/L)	Monthly	5	0.00005	0.0003	0.01 (H)	0	✓ Compliant.
	Manganese (mg/L)	Monthly	5	0.0008	0.0098	0.5 (H)	0	✓ Compliant.
	Nickel (mg/L)	Monthly	5	0.0008	0.0011	0.02 (H)	0	✓ Compliant.
	Zinc (mg/L)	Monthly	5	0.003	0.004	3 (A)	0	✓ Compliant.

A – aesthetic guidelines (spec) as per the ADWG. Does not impact public health.

H – health-based guidelines (spec) as per the ADWG. Requires investigation and corrective actions.

A summary of the standard water analysis (SWA) testing is included in Table B5. Council supplied water with 100% compliance with the ADWG health guidelines. A couple of aesthetic parameters had results that exceeded the ADWG limits, but these are not considered to have any health impact on the public.

Table B5 Drinking water quality performance – SWA

Location	Parameter	Frequency	Sample Count	Min. result	Max. result	Water quality criteria (spec)	Non-compliant samples	Comments
CHER 2 (Depot)	Conductivity (µS/cm)	Monthly	12	650	1100	NA	NA	NA
	pH	Monthly	12	7.02	7.71	6.5 – 8.5 (A)	0	✓ Compliant.
	Total Hardness (mg CaCO ₃ /L)	Monthly	12	192	310	200 (A)	9 (A)	An aesthetic parameter with no impact on public health.
	Temporary Hardness (mg CaCO ₃ /L)	Monthly	12	109	166	NA	NA	NA
	Alkalinity (mg CaCO ₃ /L)	Monthly	12	110	170	NA	NA	NA
	Residual Alkali (meq/L)	Monthly	12	0.0	0.0	NA	NA	NA
	Silica (mg/L)	Monthly	12	12	22	80 (A)	0	✓ Compliant.
	Total Dissolved Ions (mg/L)	Monthly	12	384	632	NA	NA	NA
	Total Dissolved Solids (mg/L)	Monthly	12	330	550	600 (A)	0	✓ Compliant.
	True Colour (Hazen)	Monthly	12	4	11	15 (A)	0	✓ Compliant.
	Turbidity (NTU)	Monthly	12	0.5	2	5 (A)	0	✓ Compliant.
	pH Sat.	Monthly	12	7.5	7.9	NA	NA	NA
	Saturation Index	Monthly	12	-0.8	0.0	NA	NA	NA
	Mole Ratio	Monthly	12	2.9	3.6	NA	NA	NA
	Sodium Absorption Ratio	Monthly	12	1.4	2.4	NA	NA	NA
	Figure of Merit Ratio	Monthly	12	1.4	2.0	NA	NA	NA
	Sodium (mg/L)	Monthly	12	44	92	180 (A)	0	✓ Compliant.
	Potassium (mg/L)	Monthly	12	3.4	6.9	NA	NA	NA
	Calcium (mg/L)	Monthly	12	36	59	NA	NA	NA
	Magnesium (mg/L)	Monthly	12	23	40	NA	NA	NA
	Hydrogen (mg/L)	Monthly	12	0.0	0.0	NA	NA	NA
	Bicarbonate (mg/L)	Monthly	12	132	202	NA	NA	NA
Carbonate (mg/L)	Monthly	12	0.1	0.4	NA	NA	NA	
Hydroxide (mg/L)	Monthly	12	0.0	0.0	NA	NA	NA	
Chloride (mg/L)	Monthly	12	120	240	250 (A)	0	✓ Compliant.	

Location	Parameter	Frequency	Sample Count	Min. result	Max. result	Water quality criteria (spec)	Non-compliant samples	Comments
	Fluoride (mg/L)	Monthly	12	0.12	0.18	1.5 (H)	0	✓ Compliant.
	Nitrate (mg/L)	Monthly	12	0.05	1.3	50 (H)	0	✓ Compliant.
	Sulphate (mg/L)	Monthly	12	5.1	22	250 (A) 500 (H)	0	✓ Compliant.
	Iron - Dissolved (mg/L)	Monthly	12	0.005	0.005	0.3 (A)	0	✓ Compliant.
	Manganese – Dissolved (mg/L)	Monthly	12	0.0005	0.46	0.1 (A) 0.5 (H)	1 (A)	Only the aesthetic guideline was exceeded which has no impact on public health.
	Zinc – Dissolved (mg/L)	Monthly	12	0.03	0.03	3 (A)	0	✓ Compliant.
	Aluminium – Dissolved (mg/L)	Monthly	12	0.015	0.015	0.2 (A)	0	✓ Compliant.
	Boron – Dissolved (mg/L)	Monthly	12	0.03	0.04	4 (H)	0	✓ Compliant.
	Copper – Dissolved (mg/L)	Monthly	12	0.0015	0.016	1 (A) 2 (H)	0	✓ Compliant.

A – aesthetic guidelines (spec) as per the ADWG. Does not impact public health.

H – health-based guidelines (spec) as per the ADWG. Requires investigation and corrective actions.

Note: The dissolved metal concentration measured in a standard water analysis is only a component of the total metal concentration ADWG limit. However, for simplicity the ADWG limits have been applied to the table above.

A summary of the blue-green algae (BGA) tested is included in Table B6. Council supplied compliant water. A biovolume of $\geq 0.6 \text{ mm}^3/\text{L}$ or $>15,000 \text{ Raphidiopsis raciborskii}$ cells/mL requires further actions, which is not the case from the data.

Table B6 Drinking water quality performance – BGA

Location	Parameter	Count	Min	Mean	Max
CHER 2 (Depot)	<i>Raphidiopsis raciborskii</i> (cells/mL)	11	0	284	1000
	Total Cyanobacteria (cells/mL)	17	0	8958	30000
	Total Cyanobacteria Biovolume (mm^3/L)	17	0	0.14	0.48