



Drinking Water Service Annual Report 2022 – 2023

Service Provider: Sunwater Limited

SPID: 204

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LGA covered by this plan:

Charters Towers Regional Council, Burdekin Shire Council, Mareeba Shire Council and Central Highlands Regional Council

Water Supply Schemes covered by this plan:

North Queensland

- Burdekin Haughton WSS – Burdekin Falls Dam TWS
- Burdekin Haughton WSS – Clare TWS

Far North Queensland

- Mareeba Dimbulah WSS – Mutchilba TWS

Central Queensland

- Nogoa Mackenzie WSS – Fairbairn Dam TWS

This report has been prepared in accordance with the Queensland Government – Department of Regional Development, Manufacturing and Water 'Guideline for the preparation, review and audit of drinking water quality management plans, Including Supporting Information, Version 3, 1 October 2022'.

Delivering value through water solutions for today and tomorrow

Sunwater is Queensland's largest bulk water service provider, currently owning and managing water infrastructure assets with a replacement value of around \$13 billion and supplying approximately 40 per cent of all water used commercially in Queensland.

Sunwater owns and manages a regional network of bulk water supply infrastructure, supporting more than 5000 customers in the agriculture, local government, mining, power and industrial sectors.

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Delivering water for prosperity

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Document Information

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1 Introduction

This report documents the performance of Sunwater’s drinking water service with respect to water quality and performance in implementing the actions detailed in the Drinking Water Quality Management Plan (DWQMP) as required under the Water Supply (Safety and Reliability) Act 2008 (the Act). The report is for the period 1 July 2022 – 30 June 2023.

Sunwater is a registered service provider with identification (SPID) number 204. Sunwater is operating under an approved DWQMP to ensure the consistent supply of safe quality drinking water to protect public health. Jacobs is engaged by Sunwater to provide specialist technical services to assist with the operation and management of drinking water plants including the preparation of this report.

The report assists the Department of Regional Development, Manufacturing and Water – Water Supply Regulator (the regulator) with determining whether the approved DWQMP and any approval conditions have been complied with and provides a mechanism for providers to report publicly on their performance in managing drinking water quality.

2 Summary of schemes operated

This DWQMP annual report applies to four (4) drinking water schemes owned and operated by Sunwater across Queensland. A summary of this schemes is presented in Table 1.

Table 1. Summary of schemes

Scheme name	Water Source	Treatment processes	Treatment capacity	Towns supplied
Burdekin Falls Dam WTP	Burdekin Falls Dam	Primary sedimentation/clarification via a lamella tube settler clarifier; sand media filtration; and disinfection with chlorine dosing (sodium hypochlorite). Addition of WTS8 CC20H polymer to the raw water to assist the flocculation process.	1.44 ML/d	Two recreational facilities (non-potable), five Sunwater houses/offices, 1 caravan park.
Clare WTP	Burdekin River / Burdekin Falls Dam via Clare irrigation channel system	Clarification via single clarifier, pressure media filtration; and disinfection with chlorine dosing (sodium hypochlorite). Addition of WTS8 CC20H polymer to the raw water to assist the flocculation process (automated).	0.54 ML/d	One Sunwater house/office, thirty-six private residences, a school, community club, a shop and a public swimming pool.
Mutchilba WTP	Tinaroo Falls Dam via Mareeba Irrigation Channel System	Primary clarification by hydro cyclone (following flocculation/coagulation) primary media filtration; secondary filtration (with activated carbon filtration for organics removal; and disinfection with chlorine dosing (sodium hypochlorite). Addition of Aluminium sulphate coagulant to the raw water to assist the flocculation process (automated).	0.123 ML/d	Fifteen private residences, two commercial buildings and a school.
Fairbairn Dam WTP	Fairbairn Dam	Clarification via two standard up-flow clarifiers; dual pressure media filtration; and disinfection with chlorine dosing (sodium hypochlorite). Addition of All Clear 300 coagulant to the raw water to assist the flocculation process (automated).	0.43 ML/d	Two recreational facilities (non-potable), three Sunwater houses/offices, nine private residences and four commercial/educational facilities.

3 DWQMP Implementation

The actions undertaken to implement the DWQMP are summarised below.

Sunwater has implemented the DWQMP including setting operational limits and investigation into non-compliances, as defined in the DWQMP operational and verification monitoring programmes and site-specific work instructions.

Progress in implementing the Risk Management Improvement Program (RMIP)

Appendix E of the approved DWQMP outlines the RMIP Actions. The RMIP identifies a total of nine actions of which six are closed and three remain open.

Please refer to a summary below regarding the three open RMIP actions and progress during FY2022/2023:

- Action No. 2 (Investigate installation of online monitoring equipment at Burdekin Falls Dam) has been completed but remains open. During FY2022/2023:
 - Jacobs were engaged to undertake a feasibility assessment to refurbish or replace the existing WTP. Both options include incorporating continuous monitoring/telemetry of water quality and operational parameters via SCADA. The feasibility assessment will be finalised in FY2023/2024 to inform the WTP strategy.
- Action No. 8 (Investigate options for UV) is in progress.
 - Fairbairn Dam WTP: During FY2022/2023, Jacobs were engaged to undertake a feasibility assessment to refurbish or replace the Fairbairn Dam WTP. A draft feasibility assessment was prepared in June 2023. The feasibility assessment will be finalised in FY2023/2024 to inform the WTP strategy. The assessment also includes the installation of a UV system.
 - Mutchilba WTP: During FY2022/2023, Jacobs were engaged to undertake a feasibility assessment to refurbish or replace the Mutchilba WTP. A draft feasibility assessment was prepared in June 2023. The feasibility assessment will be finalised in FY2023/2024 to inform the WTP strategy. The assessment also includes the installation of a UV system.
- Action No. 9 (Investigate options for upgrade and/or refurbishment of WTP, including UV system and increased turbidity monitoring) is in progress. During FY2022/2023:
 - BFD WTP: During FY2022/2023, Jacobs were engaged to undertake a feasibility assessment to refurbish or replace the BFD WTP. The feasibility assessment will be finalised in FY2023/2024 to inform the WTP strategy. The assessment also includes the installation of a UV system and increased turbidity monitoring.
 - Clare WTP: During FY2022/2023, Jacobs were engaged to review and finalise the existing technical specification for the replacement of the Clare WTP with a package WTP. It was identified that a new technical specification was required to be developed which has progressed and will be finalised in FY2023/2024. The specification includes the requirement to meet HBT's.

Additional detail regarding the progress of these actions is included in Table 2.

Table 2. Risk management improvement program implementation status – Open Items

RMIP Action No.	Scheme	Ref	Component	Hazard/Event	Improvement actions	Target date	Actions taken to date	Status (and revised target date)	Responsible Officer / Position
2	Burdekin Falls Dam	BFD02	Water Treatment Plant	Biological and Chemical Hazards from non-compliant water quality	Investigate installation of online monitoring equipment to allow real time monitoring of plant performance, alarming, and plant shutdown in the event of exceedances	FY2019/2020	<p>Jacobs were engaged to complete a WTP Replacement Investigation Report (July 2020) and recommended online measurement for specific parameters. Further investigation ongoing regarding timing for installation.</p> <p>During FY2022/2023, Jacobs were engaged to undertake an options Assessment to refurbish or replace the existing WTP. Both options include incorporating continuous monitoring/telemetry of water quality and operational parameters via SCADA. The feasibility assessment will be finalised in FY2023/2024 to inform the WTP strategy.</p>	Action open. FY2023/2024.	Operations Manager
8	All	FBD04	Water Treatment Plant – Disinfection	Protozoa risk – multiple barrier treatment and log removal shortfall based on assessment against HBT manual requirements	Investigate options for UV installation to reduce protozoa risk and meet HBT requirements	FY2022/2023	During FY2022/2023, Jacobs were engaged to undertake a feasibility assessment to refurbish or replace the existing WTP's. A draft feasibility assessment was prepared in June 2023. The feasibility assessment will be finalised in FY2023/2024 to inform the WTP strategy. The assessment also includes installation of a UV system.	Action open. FY2023/2024.	Operations Manager
		MTC006							
9	Burdekin Falls Dam	BFD05	Water Treatment Plant	Biological pathogen risk – log removal shortfall for the treatment processes based on assessment against HBT manual requirements	Investigate options for upgrade and/or refurbishment of WTP, including UV system and increased turbidity monitoring	FY2022/2023	During FY2022/2023, Jacobs were engaged to undertake a feasibility assessment to refurbish or replace the existing WTP. The feasibility assessment will be finalised in FY2023/2024 to inform the WTP strategy. The assessment also includes the installation of a UV system and increased turbidity monitoring.	Action open. FY2023/2024.	Operations Manager
	Clare	CLA05			Develop and review options to upgrade WTP		During FY2022/2023, Jacobs were engaged to review and finalise the existing technical specification for the replacement of the Clare WTP with a package WTP. It was identified that a new technical specification was required to be developed which will be finalised in FY 2023/2024. The specification includes the requirement to meet HBTs.		

Water quality monitoring program to maintain compliance with water quality criteria¹

During the FY2022/2023 reporting period, the following changes were made to the operational monitoring program as per the amended DWQMP approved by the regulator on the 22 November 2022:

- Heavy metals sampling frequency was increased from annually to quarterly at BFD TWS, Clare TWS and Fairbairn TWS, which commenced in Q3 (January to March 2023). Heavy metals testing at Mutchilba TWS had increased from annually to quarterly during the previous FY2021/2022 reporting period. All schemes achieved the minimum quarterly sampling requirement.
- Sampling of iron and manganese was introduced as part of the heavy metals sampling program at all schemes, and also commenced in Q3 (January to March 2023). The majority of schemes achieved the minimum quarterly sampling requirement, however it was identified that Fairbairn Dam was tested for iron and manganese solely in June 2023 (represented by a single test result), and quarterly testing to be completed in FY2023/2024.
- Trihalomethane (THM) sampling was increased from annually to quarterly at all schemes, which commenced in Q3 (January to March 2023). All schemes achieved the minimum quarterly sampling requirement.
- Sampling of chlorate commenced at all schemes in Q3 (January to March 2023). The frequency for chlorate sampling was quarterly at all schemes as per the verification monitoring program however schemes were sampled more frequently in the period when the chlorate critical limit had been exceeded to assist in investigating and resolving the exceedances. Chlorate is being tested monthly however testing frequencies will revert to quarterly once a sufficient dataset has been obtained indicating that concentrations consistently remain below critical limits.
- Annual sampling of pesticides was completed at Mutchilba and Clare WTP in January and February 2023 respectively.

Drinking water quality is tested in accordance with ADWG limits on a number of key parameters and monitored to test for water quality and microbiological characteristics to ensure safe drinking water for consumers. The drinking water quality tests involve routine weekly testing (every 3 – 4 days) at the WTP for water chemistry (pH and turbidity) and total/residual chlorine, monthly testing of microbiology, and quarterly testing (heavy metals, THM's and chlorate) at a NATA accredited Laboratory. As noted above, chlorate testing frequencies have been increased to monthly, however testing frequencies will revert to quarterly once determined acceptable to do so. Annual pesticide testing is also undertaken at Clare and Mutchilba WTPs.

Water quality test locations (test points) are routinely sampled at the treated water and within the distribution network to provide a high level of confidence that a representative water quality analysis has been undertaken and to provide certainty that scheme is delivering safe drinking water quality to consumers. The sampling points were selected based on providing the highest probability of finding non-compliant drinking water to prevent a worst-case scenario for a public health incident. The sampling points at each scheme are located at the water treatment plant and end of the reticulation mains. Further details are provided in section '4 Operational and verification monitoring – water quality information and summary'.

¹ Refer to *Water Quality and Reporting Guideline for a Drinking Water Service* for the water quality criteria for drinking water.

Inspections of WTP infrastructure

During the FY2022/2023 reporting period, operators completed inspections of the schemes infrastructure in accordance with the relevant weekly/monthly, quarterly, bi-annual and annual work instructions located in the asset management system database. It was however noted that the annual elevated storage tank inspection by drone at Fairbairn Dam was not completed during FY2022/2023. Instead, a visual inspection was completed from the ground as there is no safe access installed on the tank. Inspection by drone will be completed during FY2023/2024.

Amendments made to the DWQMP

The DWQMP was amended during the reporting period.

An amendment to the DWQMP was submitted to the regulator on the 11 August 2022. The regulator approved the amended DWQMP on the 22 November 2022. Details are provided in section '7 DWQMP Review Outcomes'.

4 Operational and verification monitoring – water quality information and summary

The drinking water quality control parameters were developed from recommendations outlined in ADWG (2011). Key parameters for operator testing and water quality acceptance are identified in Table 3. These parameters are tested at a number of water quality sampling points.

Table 3. Drinking Water Quality Control Parameters

Parameter	Monitoring Frequency	Acceptable Limits
Residual chlorine (free) ^(Note 1)	Every 3 – 4 days	>0.5 mg/L after 30 mins
Total chlorine	Every 3 – 4 days	<5 mg/L
Raw Water pH	Every 3 – 4 days	N/A
Raw Water Turbidity	Every 3 – 4 days	N/A
Treated Water pH	Every 3 – 4 days	6.5 – 8.5
Treated Water Turbidity ^(Note 2)	Every 3 – 4 days	<1 NTU
Aluminium ^(Note 3)	Weekly	< 0.2 mg/L

Note 1: The minimum acceptable residual chlorine (free) limit of 0.5 mg/L is not a specific requirement of the ADWG and has been applied by Sunwater as an internal operational check for disinfection performance. Although residual chlorine (free) is outlined in the DWQMP as a drinking water quality control parameter to monitor operational performance, verification of the treatment process and particularly disinfection is verified by the monthly micro bacteriological sampling.

Note 2: The acceptable limit of <1 NTU for turbidity is based on effective chlorination as described in the ADWG and has been applied by Sunwater as an internal critical limit to verify the treatment performance and check disinfection.

Note 3: Aluminium testing only performed at Mutchilba WTP as this scheme undertakes aluminium sulfate dosing.

Microbiological control testing is also required to ensure compliance with ADWG and the standards in the Public Health Regulation 2005. The parameters and frequency of the monitoring is shown in Table 4.

Table 4. Microbiological Control

Parameter	Monitoring Frequency	Acceptable Limits
E.Coli	Monthly	<1 CFU
Total Coliforms	Monthly	N/A – significant changes will be investigated
Total Plate Count	Monthly	N/A – significant changes will be investigated

Trihalomethanes, chlorate and heavy metals are tested quarterly to ensure compliance with ADWG and the standards in the Public Health Regulation 2005. The parameters and frequency of the monitoring is shown below in Table 5.

Table 5. Trihalomethanes, Heavy Metals and Chlorate

Parameter ^(Note 1)	Monitoring Frequency	Acceptable Limits
Trihalomethanes (THM)	Quarterly	<0.25 mg/L
Chlorate ^(Note 2)	Quarterly	<0.8 mg/L
Arsenic (As)	Quarterly	<0.01 mg/L
Cadmium (Cd)	Quarterly	<0.002 mg/L
Chromium (Cr)	Quarterly	<0.05 mg/L
Copper (Cu)	Quarterly	<2 mg/L

Parameter (Note 1)	Monitoring Frequency	Acceptable Limits
Nickel (Ni)	Quarterly	<0.02 mg/L
Lead (Pb)	Quarterly	<0.01 mg/L
Zinc (Zn)	Quarterly	<3 mg/L (Note 3)
Iron (Fe) (Note 4)	Quarterly	<0.3 mg/L (Note 5)
Manganese (Fe) (Note 4)	Quarterly	<0.5 mg/L
Selenium (Se) (Note 6)	Quarterly	<0.01 mg/L
Uranium (U) (Note 6)	Quarterly	<0.017 mg/L

Note 1: Quarterly testing of trihalomethanes, chlorates and heavy metals commenced in Q3 (January to March 2023), following regulatory approval of the amended Sunwater DWQMP in November 2022.

Note 2: Chlorate samples were collected more frequently during February – June 2023 due to results above the Queensland Health's interim health guideline of <0.8 mg/L.

Note 3: The acceptable limit of <3 mg/L for zinc is not a health limit and is rather an Aesthetic Limit of the ADWG that has been applied by Sunwater as an internal operational check for WTP performance.

Note 4: Iron and manganese sampling was conducted at BFD (from March 2023), Clare (from February 2023), Mutchilba (from January 2023) and Fairbairn Dam (from June 2023).

Note 5: The acceptable limit of <0.3 mg/L for iron is not a Health limit and is rather an Aesthetic Limit of the ADWG that has been applied by Sunwater as an internal operational check for WTP performance.

Note 6: Testing for Selenium and Uranium are applicable to Clare WTP only.

Pesticides are tested annually at Clare and Mutchilba WTP and results compared to the ADWG. The specific pesticides tested have been selected with reference to ADWG and include a comprehensive suite of pesticides. Pesticides were tested at Clare and Mutchilba WTP on the 23/02/2023 and 25/01/2023 respectively. The results have not been presented in this annual report due to the extensive number of pesticides tested. No issues of concern were identified during the reporting period with reference to the pesticide results.

A summary of compliance with water quality criteria is displayed in Tables 7 – 11. This includes the following information:

- parameter
- unit of measure
- total number of samples collected
- number of samples that did not meet the water quality criteria
- maximum concentration or count

The water quality results during the 2022/2023 financial year did not exceed the recommended health limits in the ADWG. However, the water quality results for chlorate exceeded the Qld Health Interim Health guideline on three occasions:

- Chlorate > 0.8 mg/L at Fairbairn Dam WTP,
- Chlorate > 0.8 mg/L at Clare WTP, and
- Chlorate > 0.8 mg/L at Burdekin Falls Dam WTP.

All other water quality results met the health limits in the ADWG, however there were several events where water quality characteristics exceeded the Sunwater operational critical limits/acceptable limits.

These events are outlined in Table 6. Refer to section 5 for details on events reported to the regulator in the reporting period.

Table 6. Summary of Events during the reporting period

Site	Parameter	Critical Limit	Result	Date	Sample Location	Event
Burdekin Falls Dam	Chlorate	>0.8 mg/L	4/04/2023: 0.957 mg/L (office) 18/04/2023: 0.95 mg/L (office) 0.82 mg/L (Caravan Park) 2/05/2023 0.89 mg/L (Caravan Park)	04/04/2023 to 15/05/2023	Office and Caravan Park	Regulator notified on 17/04/2023 following confirmation to notify. Investigation report submitted to regulator on 29/06/2023.
	Turbidity	>1 NTU	25/05/2023: WTP Outlet: 8 NTU Caravan Park: 6 NTU Additional results 25/05/2023 – 26/05/2023: 1.14 – 27.4 NTU	25/05/2023 to 26/05/2023	WTP Outlet and Caravan Park	Regulator notified on 25/05/2023. Investigation report submitted to regulator on 12/06/2023.
Clare	Turbidity	>1 NTU	6/10/2022: Elevated storage tank town supply: 58 NTU School: 28 NTU Office: 29 NTU Additional results 6/10/2022 – 10/10/2022: 1.06 – 42NTU	6/10/2022 to 10/10/2022	Elevated storage tank, School and Sunwater office	Regulator notified on 06/10/2022. Investigation report submitted to regulator on 1/11/2022.
	Turbidity	>1 NTU	08/12/2022: Treated water storage tank: 14.9 NTU	8/12/2022 to 18/12/2022	Treated water storage tank, elevated	Regulator notified on 08/12/2022. Investigation report submitted to

Site	Parameter	Critical Limit	Result	Date	Sample Location	Event
			Elevated Storage tank town supply: 1.66 NTU Additional results: 08/12/2022 – 18/12/2022: 1.02 – 5.45 NTU		storage tank	regulator on 12/01/2023.
	Chlorate	> 0.8 mg/L	22/02/2023, 2/03/2023 and 17/03/2023: Tap in = 3.66, 1.23 and 1.32 mg/L WTP Outlet = 3.96, 1.26 and 1.35 mg/L Office = 3.16, 1.13 and 1.33 mg/L School = 3.6, 1.17 and 1.34 mg/L Pool = 3.65, 1.18 and 1.30 mg/L	22/02/2023 to 12/04/2023	WTP Tap In, WTP Outlet, Sunwater Office, School, Pool	Regulator notified on 28/02/2023 following confirmation to notify. Investigation report submitted to regulator on 29/06/2023.
Fairbairn	Turbidity	> 1 NTU	06/07/2022: 1.85 NTU Additional results: 07/07/2022: >1 – 1.2 NTU	06/07/2022 to 07/07/2022	Elevated water storage tank	Regulator notified on 06/07/2022. Investigation report submitted to regulator on 05/10/2022.
	Turbidity	> 1 NTU	30/10/2022: 35 NTU Additional results: 31/10/2022 – 04/11/2022: 1.01– 14.30 NTU	30/10/2022 to 04/11/2022; 10/11/2022; 07/12/2022 to 11/12/2022	WTP round clear water storage tank, elevated storage tank	Regulator notified on 30/10/2022. Investigation report submitted to regulator on 21/12/2022.

Site	Parameter	Critical Limit	Result	Date	Sample Location	Event
			10/11/2022: 1.73 NTU			
			07/12/2022 – 11/12/2022: 1.03 – 8.94 NTU			
	Chlorate	> 0.8 mg/L	01/02/2023, 20/02/2023 and 14/03/2023: WTP Outlet = 1.1, 1.0 and <1 mg/L Caravan Park = 1.1, 0.8 and <1 mg/L Kitchen Tap = 1.1, 0.8 and <1 mg/L	01/02/2023 to 16/04/2023	WTP outlet, caravan park and kitchen tap	Regulator notified on 16/02/2023 following confirmation to notify. Investigation report submitted to regulator on 29/06/2023.
Mutchilba	Turbidity	> 1 NTU	13/01/2023: Treated water storage tank: 1.2 NTU School: 1.62 NTU Additional results: 16/01/2023 – 25/01/2023: 1.17 – 8.91 NTU	13/01/2023 to 25/01/2023	Treated water storage tank and school	Regulator notified on 19/01/2023 following identification to notify. Investigation report submitted to regulator on 21/02/2023.

Table 7. Drinking water quality performance for all Sunwater schemes - verification monitoring

	Treated Water Parameter	Sampling Points	Units	No. of samples required to be collected (as per approved DWQMP)	No. of samples collected and tested	Water quality criteria (i.e. DWQMP or ADWG health guideline value)	Min	Max	Average (Mean)	No. of non-compliant samples	Comments
Burdekin Falls Dam	pH	WTP	-	Every 3-4 days	381 total samples across 1 sampling point.	6.5-8.5	6.90	7.60	7.24	0	
	Turbidity	WTP	NTU	Every 3-4 days	372 total samples across 1 sampling point.	<1	0.12	22.00	0.37	4 (Note 1)	May 2023 event: Regulator notified on the 25/05/2023 regarding turbidity >1 NTU during the 25/05/2023 – 26/05/2023. Refer to Table 6 and section 5.
	Total chlorine	WTP, Office, Caravan Park (Note 2)	mg/L	Every 3-4 days	1,153 total samples across 3 sampling points.	<5	0.17	2.90	1.72	0	
	Residual chlorine (free)	WTP, Office, Caravan Park (Note 2)	mg/L	Every 3-4 days	1,153 total samples across 3 sampling points.	>0.5 after 30 mins	0.23	2.70	1.45	27	There were several instances during the FY2022-2023 reporting period where free chlorine was reported below the action limit (<0.5 mg/L). In response, the operators followed the 'WTP Wall Chart' and increased chlorine dosing which subsequently increased free chlorine. Free chlorine was not lower than the critical limit (<0.2 mg/L) and there was no identified risk to public health. As a result, the free chlorine concentrations recorded did not represent an event. Notification to the regulator was not required.

Treated Water Parameter	Sampling Points	Units	No. of samples required to be collected (as per approved DWQMP)	No. of samples collected and tested	Water quality criteria (i.e. DWQMP or ADWG health guideline value)	Min	Max	Average (Mean)	No. of non-compliant samples	Comments
E.coli	WTP, Office, Caravan Park (Note 2)	CFU/100ml	Monthly	45 total samples across 3 sampling points.	<1	<1	<1	<1	0	
Arsenic (As)	WTP	mg/L	Quarterly (Note 3)	9 total samples across 1 sampling point.	< 0.01	<0.001	0.0020	0.0012	0	
Cadmium (Cd)	WTP	mg/L	Quarterly (Note 3)	9 total samples across 1 sampling point.	< 0.002	<0.0001	<0.0001	<0.0001	0	
Chromium (Cr)	WTP	mg/L	Quarterly (Note 3)	9 total samples across 1 sampling point.	< 0.05	<0.001	<0.001	<0.001	0	
Copper (Cu)	WTP	mg/L	Quarterly (Note 3)	9 total samples across 1 sampling point.	< 2	0.0020	0.0100	0.0031	0	
Lead (Pb)	WTP	mg/L	Quarterly (Note 3)	9 total samples across 1 sampling point.	< 0.01	<0.001	<0.001	<0.001	0	
Nickel (Ni)	WTP	mg/L	Quarterly (Note 3)	9 total samples across 1 sampling point.	< 0.02	<0.001	0.0010	0.0010	0	
Zinc (Zn)	WTP	mg/L	Quarterly (Note 3)	9 total samples across 1	< 3	0.0080	0.0290	0.0172	0	

	Treated Water Parameter	Sampling Points	Units	No. of samples required to be collected (as per approved DWQMP)	No. of samples collected and tested	Water quality criteria (i.e. DWQMP or ADWG health guideline value)	Min	Max	Average (Mean)	No. of non-compliant samples	Comments
					sampling point.						
	Iron	WTP	mg/L	Quarterly (Note 3)	6 total samples across 1 sampling point.	<0.3	<0.05	0.11	0.11	0	
	Manganese	WTP	mg/L	Quarterly (Note 3)	6 total samples across 1 sampling point.	<0.5	0.002	0.005	0.0028	0	
	Trihalomethanes (THM)	WTP, Office, Caravan Park (Note 2)	mg/L	Quarterly (Note 3)	26 total samples across 3 sampling points.	<0.25	0.011	0.233	0.124	0	
	Chlorate	WTP, Office, Caravan Park (Note 2)	mg/L	Quarterly (Note 3)	33 total samples across 3 sampling points. (Note 4)	<0.8	0.033	0.957	0.416	4	April 2023 event: Regulator notified on the 17/04/2023 regarding chlorate >0.8 mg/L during the 04/04/2023 – 15/05/2023. Refer to Table 6 and section 5.
Clare	pH	WTP	-	Every 3-4 days	388 total samples across 1 sampling point.	6.5-8.5	6.30	8.30	7.76	1	There was one instance on the 12/12/2022 (i.e pH of 6.3) where pH was reported marginally below the action limit (<6.5 and >5.99). In response, the operators followed the 'WTP Wall Chart' however no immediate actions required other than to monitor and investigate as required. pH was not lower than the critical limit (<6) and there was no identified risk to public health. As a result,

Treated Water Parameter	Sampling Points	Units	No. of samples required to be collected (as per approved DWQMP)	No. of samples collected and tested	Water quality criteria (i.e. DWQMP or ADWG health guideline value)	Min	Max	Average (Mean)	No. of non-compliant samples	Comments
										the pH recorded did not represent an event. Notification to the regulator was not required.
Turbidity	WTP	NTU	Every 3-4 days	111 total samples across 1 sampling point.	<1	0.27	51.00	1.66	12 (Note 1)	<p>October 2022 event: Regulator notified on the 06/10/2022 regarding turbidity >1 NTU during the 06/10/2022 – 10/10/2022. Refer to Table 6 and section 5.</p> <p>December 2022 event: Regulator notified on the 08/12/2022 regarding turbidity >1 NTU during the 08/12/2022 – 18/12/2022. Refer to Table 6 and section 5.</p>
Total chlorine	WTP, Office, School, Pool (Note 2)	mg/L	Every 3-4 days	1,540 total samples across 4 sampling points.	<5	0.50	4.87	1.32	0	
Residual chlorine (free)	WTP, Office, School, Pool (Note 2)	mg/L	Every 3-4 days	1,537 total samples across 4 sampling points.	>0.5 after 30 mins	0.40	5.50	1.16	1	There was one instance on the 20/03/2023 (i.e. 0.4 mg/L) where free chlorine was reported below the action limit (<0.5 mg/L). In response, the operators followed the 'WTP Wall Chart' and increased chlorine dosing which subsequently increased free chlorine. Free chlorine was not lower than the critical limit (<0.2 mg/L) and there was no identified risk to public health. As a result,

Treated Water Parameter	Sampling Points	Units	No. of samples required to be collected (as per approved DWQMP)	No. of samples collected and tested	Water quality criteria (i.e. DWQMP or ADWG health guideline value)	Min	Max	Average (Mean)	No. of non-compliant samples	Comments
										the free chlorine concentrations recorded did not represent an event. Notification to the regulator was not required.
E.coli	WTP, Office, School, Pool (Note 2)	CFU/100ml	Monthly	40 total samples across 4 sampling points.	<1	<1	<1	<1	0	
Arsenic (As)	WTP	mg/L	Quarterly (Note 3)	2 total samples across 1 sampling point.	< 0.01	<0.001	0.0010	0.0010	0	
Cadmium (Cd)	WTP	mg/L	Quarterly (Note 3)	2 total samples across 1 sampling point.	< 0.002	<0.0001	<0.0001	<0.0001	0	
Chromium (Cr)	WTP	mg/L	Quarterly (Note 3)	2 total samples across 1 sampling point.	< 0.05	<0.001	<0.001	<0.001	0	
Copper (Cu)	WTP	mg/L	Quarterly (Note 3)	3 total samples across 1 sampling point.	< 2	0.0020	0.0350	0.0133	0	
Lead (Pb)	WTP	mg/L	Quarterly (Note 3)	2 total samples across 1 sampling point.	< 0.01	<0.001	<0.001	<0.001	0	
Nickel (Ni)	WTP	mg/L	Quarterly (Note 3)	2 total samples across 1	< 0.02	<0.001	<0.001	<0.001	0	

Treated Water Parameter	Sampling Points	Units	No. of samples required to be collected (as per approved DWQMP)	No. of samples collected and tested	Water quality criteria (i.e. DWQMP or ADWG health guideline value)	Min	Max	Average (Mean)	No. of non-compliant samples	Comments
				sampling point.						
Zinc (Zn)	WTP	mg/L	Quarterly (Note 3)	2 total samples across 1 sampling point.	< 3	0.0120	0.0210	0.0165	0	
Selenium (Se)	WTP	mg/L	Quarterly (Note 3)	2 total samples across 1 sampling point.	< 0.01	<0.01	<0.01	<0.01	0	
Uranium (U)	WTP	mg/L	Quarterly (Note 3)	2 total samples across 1 sampling point.	< 0.017	<0.001	<0.001	<0.001	0	
Iron	WTP	mg/L	Quarterly (Note 3)	2 total samples across 1 sampling point.	<0.3	<0.05	<0.05	<0.05	0	
Manganese	WTP	mg/L	Quarterly (Note 3)	2 total samples across 1 sampling point.	<0.5	<0.001	0.003	0.002	0	
Chlorate	WTP, Office, School, Pool (Note 2)	mg/L	Quarterly (Note 3)	39 total samples across 4 sampling points. (Note 4)	<0.8	0.22	3.96	0.88	12	February 2023 event: Regulator notified on the 28/02/2023 regarding chlorate >0.8 mg/L during the 22/03/2023 – 12/04/2023. Refer to Table 6 and section 5.
Trihalomethanes (THM)	WTP, Office, School, Pool (Note 2)	mg/L	Quarterly (Note 3)	9 total samples across 3/4	<0.25	0.105	0.190	0.147	0	

	Treated Water Parameter	Sampling Points	Units	No. of samples required to be collected (as per approved DWQMP)	No. of samples collected and tested	Water quality criteria (i.e. DWQMP or ADWG health guideline value)	Min	Max	Average (Mean)	No. of non-compliant samples	Comments
					sampling points.						
Fairbairn Dam	pH	WTP, Kitchen Tap (Note 2)	-	Every 3-4 days	199 total samples across 2 sampling points.	6.5-8.5	6.00	7.88	7.59	1	There was one instance on the 03/11/2022 (i.e. pH of 6) where pH was reported marginally below the action limit (<6.5 and >5.99). In response, the operators followed the 'WTP Wall Chart' however no immediate actions required other than to monitor and investigate as required. pH was not lower than the critical limit (<6) and there was no identified risk to public health. As a result, the pH recorded did not represent an event. Notification to the regulator was not required.
	Turbidity	WTP	NTU	Every 3-4 days	198 total samples across 1 sampling point.	<1	0.10	2.46	0.37	6 (Note 1)	July 2022 event: Regulator notified on the 06/07/2022 regarding turbidity >1 NTU during the 06/07/2022 – 07/07/2022. Refer to Table 6 and section 5. October 2022 event: Regulator notified on the 30/10/2022 regarding turbidity >1 NTU during the 30/10/2022 – 11/12/2022. Refer to Table 6 and section 5.
	Total chlorine	WTP, Caravan Park	mg/L	Every 3-4 days	204 total samples across 2	<5	0.80	3.20	2.19	0	

Treated Water Parameter	Sampling Points	Units	No. of samples required to be collected (as per approved DWQMP)	No. of samples collected and tested	Water quality criteria (i.e. DWQMP or ADWG health guideline value)	Min	Max	Average (Mean)	No. of non-compliant samples	Comments
	(Note 2)			sampling points.						
Residual chlorine (free)	WTP, Caravan Park (Note 2)	mg/L	Every 3-4 days	204 total samples across 2 sampling points.	>0.5 after 30 mins	0.50	2.90	1.82	0	
E.coli	WTP, Caravan Park, Kitchen Tap (Note 2)	CFU/100ml	Monthly	36 total samples across 3 sampling points.	<1	<1	<1	<1	0	
Arsenic (As)	WTP	mg/L	Quarterly (Note 3)	3 total samples across 1 sampling point.	< 0.01	<0.001	<0.001	<0.001	0	
Cadmium (Cd)	WTP	mg/L	Quarterly (Note 3)	3 total samples across 1 sampling point.	< 0.002	<0.0001	<0.0001	<0.0001	0	
Chromium (Cr)	WTP	mg/L	Quarterly (Note 3)	3 total samples across 1 sampling point.	< 0.05	<0.001	<0.001	<0.001	0	
Copper (Cu)	WTP	mg/L	Quarterly (Note 3)	3 total samples across 1 sampling point.	< 2	0.0030	0.0060	0.0045	0	
Lead (Pb)	WTP	mg/L	Quarterly (Note 3)	2 total samples across 1 sampling point.	< 0.01	<0.001	<0.001	<0.001	0	

	Treated Water Parameter	Sampling Points	Units	No. of samples required to be collected (as per approved DWQMP)	No. of samples collected and tested	Water quality criteria (i.e. DWQMP or ADWG health guideline value)	Min	Max	Average (Mean)	No. of non-compliant samples	Comments
	Nickel (Ni)	WTP	mg/L	Quarterly (Note 3)	3 total samples across 1 sampling point.	< 0.02	<0.001	<0.001	<0.001	0	
	Zinc (Zn)	WTP	mg/L	Quarterly (Note 3)	3 total samples across 1 sampling point.	< 3	0.0060	0.0070	0.0065	0	
	Iron (Note 5)	WTP	mg/L	Quarterly	1 sample across 1 sampling point.	<0.3	0.03				
	Manganese (Note 5)	WTP	mg/L	Quarterly	1 sample across 1 sampling point.	<0.5	<0.005				
	Chlorate	WTP, Caravan Park, Kitchen Tap (Note 2)	mg/L	Quarterly (Note 3)	60 total samples across 3 sampling points. (Note 4)	<0.8	0.05	1.10	0.26	9	February 2023 event: Regulator notified on the 16/02/2023 regarding chlorate >0.8 mg/L during the 01/02/2023 – 16/04/2023. Refer to Table 6 and section 5.
	Trihalomethanes (THM) (Note 6)	WTP, Caravan Park, Kitchen Tap (Note 2)	mg/L	Quarterly (Note 3)	9 total samples across 3 sampling points.	<0.25	0.047	0.092	0.071	0	
Mutchilba	pH	WTP, School (Note 2)	-	Every 3–4 days	202 total samples across 2 sampling points.	6.5–8.5	6.20	7.30	6.80	14	There were several instances during January – March 2023 where pH was reported marginally below the action limit (<6.5 and >5.99). In response, the operators followed the 'WTP Wall Chart' however no

Treated Water Parameter	Sampling Points	Units	No. of samples required to be collected (as per approved DWQMP)	No. of samples collected and tested	Water quality criteria (i.e. DWQMP or ADWG health guideline value)	Min	Max	Average (Mean)	No. of non-compliant samples	Comments
										immediate actions required other than to monitor and investigate as required. pH was not lower than the critical limit (<6) and there was no identified risk to public health. As a result, the pH recorded did not represent an event. Notification to the regulator was not required.
Turbidity	WTP, School (Note 2)	NTU	Every 3-4 days	202 total samples across 2 sampling points.	<1	0.00	16.90	0.50	13 (Note 1)	January 2023 event: Regulator notified on the 19/01/2023 regarding turbidity >1 NTU during the 13/01/2023 – 25/01/2023. Refer to Table 6 and section 5.
Total chlorine	WTP, School (Note 2)	mg/L	Every 3-4 days	202 total samples across 2 sampling points.	<5	0.19	2.70	1.19	0	
Residual chlorine (free)	WTP, School (Note 2)	mg/L	Every 3-4 days	203 total samples across 2 sampling points.	>0.5 after 30 mins	0.30	2.40	1.06	4	There were several instances during January – March 2023 where free chlorine was reported below the action limit (<0.5 mg/L). In response, the operators followed the 'WTP Wall Chart' and increased chlorine dosing which subsequently increased free chlorine. Free chlorine was not lower than the critical limit (<0.2 mg/L) and there was no identified risk to public health. As a result, the free chlorine

Treated Water Parameter	Sampling Points	Units	No. of samples required to be collected (as per approved DWQMP)	No. of samples collected and tested	Water quality criteria (i.e. DWQMP or ADWG health guideline value)	Min	Max	Average (Mean)	No. of non-compliant samples	Comments
										concentrations recorded did not represent an event. Notification to the regulator was not required.
E. coli	WTP, School (Note 2)	CFU/100ml	Monthly	63 total samples across 2 sampling points.	<1	<1	<1	<1	0	
Aluminium	WTP	mg/L	Weekly	87 total samples across 1 sampling point.	<0.2	0.00	0.08	0.03	0	
Arsenic (As)	WTP	mg/L	Quarterly	6 total samples across 1 sampling point.	< 0.01	<0.001	0.0004	0.0003	0	
Cadmium (Cd)	WTP	mg/L	Quarterly	6 total samples across 1 sampling point.	< 0.002	<0.0001	<0.0001	<0.0001	0	
Chromium (Cr)	WTP	mg/L	Quarterly	6 total samples across 1 sampling point.	< 0.05	<0.001	<0.001	<0.001	0	
Copper (Cu)	WTP	mg/L	Quarterly	6 total samples across 1 sampling point.	< 2	0.0010	0.0040	0.0018	0	
Lead (Pb)	WTP	mg/L	Quarterly	6 total samples across 1 sampling point.	< 0.01	<0.001	<0.001	<0.001	0	

Treated Water Parameter	Sampling Points	Units	No. of samples required to be collected (as per approved DWQMP)	No. of samples collected and tested	Water quality criteria (i.e. DWQMP or ADWG health guideline value)	Min	Max	Average (Mean)	No. of non-compliant samples	Comments
Nickel (Ni)	WTP	mg/L	Quarterly	6 total samples across 1 sampling point.	< 0.02	<0.001	<0.001	<0.001	0	
Zinc (Zn)	WTP	mg/L	Quarterly	6 total samples across 1 sampling point.	< 3	<0.005	<0.005	<0.005	0	
Iron (Fe)	WTP	mg/L	Quarterly	2 total samples across 1 sampling point.	<0.3	<0.015	<0.015	<0.015	0	
Manganese (Mn)	WTP	mg/L	Quarterly	2 total samples across 1 sampling point.	<0.5	0.0011	0.0015	0.0013	0	
Chlorate	WTP, School (Note 2)	mg/L	Quarterly	10 total samples across 2 sampling points.	<0.8	0.39	0.51	0.44	0	
Trihalomethanes (THM)	WTP, School (Note 2)	mg/L	Quarterly	4 total samples across 2 sampling points.	<0.25	0.019	0.049	0.037	0	

Note 1: Sample result statistics are primarily comprised of routine operational monitoring results and typically do not include additional monitoring results collected during incident events unless this data is entered into the database.

Note 2: Samples from different locations at the site were combined for reporting (Refer to water quality parameters including pH, turbidity, residual chlorine (free), total chlorine, E.coli, Heavy metals, Trihalomethanes (THM) and chlorate).

Note 3: Quarterly testing of trihalomethanes, chlorates and heavy metals commenced in Q3 (January to March 2023), following regulatory approval of the amended Sunwater DWQMP in November 2022.

Note 4: Chlorate samples were collected more frequently during February – June 2023 due to results above the Queensland Health's interim health guideline of <0.8 mg/L.

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Note 5: Iron and manganese tested at Fairbairn Dam during June 2023. Results are represented by an individual sample result. Minimum, maximum and average results are not applicable.

Note 6: Total Trihalomethanes (THM) not specifically reported by the laboratory. THM measurement has been calculated from the sum of the individual THM constituents reported by the laboratory (i.e. Chloroform, Bromodichloromethane, Dibromochloromethane and Bromoform).

Drinking water scheme: Burdekin Falls Dam WTP*Table 8. E. coli compliance – Burdekin Falls Dam WTP*

Year 2022 – 2023												
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	3	3	3	3	3	3	3	3	3	3	12	3
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 (Note 2)	15	17	19	21	23	25	27	29	28	30	32	43
No. of failures for previous 12-month period	0											
% of samples that comply	100%											
Compliance with 98% annual value (Note 1)	Yes											

Note 1: The Public Health Regulation 2005 (the regulation) requires that 98 per cent of samples taken in a 12-month period should contain no E. Coli. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

Note 2: This requirement comes into effect once you have 12 months data and should be assessed every month.

Drinking water scheme: Clare WTP*Table 9. E. coli compliance – Clare WTP*

Year 2022 – 2023												
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	1	1	1	13	1	16	1	1	1	1	2	1
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 (Note 2)	13	13	13	13	25	25	40	40	39	39	39	40
No. of failures for previous 12-month period	0											
% of samples that comply	100%											
Compliance with 98% annual value (Note 1)	Yes											

Note 1: The Public Health Regulation 2005 (the regulation) requires that 98 per cent of samples taken in a 12-month period should contain no E. Coli. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

Note 2: This requirement comes into effect once you have 12 months data and should be assessed every month.

Drinking water scheme: Fairbairn Dam WTP*Table 10. E. coli compliance – Fairbairn Dam WTP*

Year 2022 – 2023												
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	4	3	3	2	3	3	3	3	3	3	3	3
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 (Note 2)	58	44	31	30	30	31	32	33	34	34	35	36
No. of failures for previous 12-month period	0											
% of samples that comply	100%											
Compliance with 98% annual value (Note 1)	Yes											

Note 1: The Public Health Regulation 2005 (the regulation) requires that 98 per cent of samples taken in a 12-month period should contain no E. Coli. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

Note 2: This requirement comes into effect once you have 12 months data and should be assessed every month.

Drinking water scheme: Mutchilba WTP*Table 11. E. coli compliance – Mutchilba WTP*

Year 2022 – 2023												
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	4	5	6	3	3	3	18	6	3	3	3	6
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 (Note 2)	58	44	33	35	36	37	38	54	58	58	59	60
No. of failures for previous 12-month period	0											
% of samples that comply	100%											
Compliance with 98% annual value (Note 1)	Yes											

Note 1: The Public Health Regulation 2005 (the regulation) requires that 98 per cent of samples taken in a 12-month period should contain no E. Coli. This requirement is referred to as the 'annual value' in Schedule 3A of the regulation.

Note 2: This requirement comes into effect once you have 12 months data and should be assessed every month.

5 Incidents Reported to the Regulator

Nine (9) incidents/events were reported to the regulator between 1 July 2022 and 30 June 2023. Refer to summary below and Table 12 for further detail regarding the incidents reported to the regulator.

All microbiological testing undertaken during the financial year revealed that there were no instances where *Escherichia coli* (E. Coli) exceeded the acceptable limit of <1 CFU/100ml.

Event or detection of a parameter with no water quality criteria

For this reporting period, there were six (6) prescribed events reported to the regulator:

- 06/07/2022 – Fairbairn Dam WTP – Turbidity > 1NTU
- 06/10/2022 – Clare WTP – Turbidity > 1 NTU
- 30/10/2022 – Fairbairn Dam WTP – Turbidity > 1NTU
- 8/12/2022 – Clare WTP – Turbidity > 1 NTU
- 19/01/2023 – Mutchilba WTP – Turbidity > 1 NTU
- 25/05/2023 – Burdekin Falls Dam WTP – Turbidity > 1 NTU

Non-compliances with the water quality – drinking water criteria

For this reporting period, there were three (3) prescribed events reported to the regulator.

- 16/02/2023 – Fairbairn Dam WTP – Chlorate > 0.8 mg/L
- 28/02/2023 – Clare WTP – Chlorate > 0.8 mg/L
- 17/04/2023 – Burdekin Falls Dam WTP – Chlorate > 0.8 mg/L.

Table 12. Incidents / Events reported to the regulator

Incident / Event date	Scheme / location	Parameter / issue	Summary and Preventive actions
Event 6/07/2022	Fairbairn Dam WTP	Turbidity > 1 NTU	<p>An elevated turbidity result of 1.85 NTU was detected in the elevated water storage tank on the 6/07/2022. The suspected cause was due to a blockage of the sand filter air valves, resulting in the filters filling with air and causing media disturbance, leading to poor filter operation. The regulator was notified of this event on the 06/07/2022.</p> <p>The following actions were identified and implemented regarding this event.</p> <p><u>Corrective actions</u></p> <ul style="list-style-type: none"> Following consultation with the regulator, a 'boil water alert' notice was issued on the 06/07/2022 to customers and the community who receive drinking water from the water supply. The 'boil water alert' notice advised all residents and visitors to boil their tap water used for drinking following an issue at the Fairbairn Dam water supply which resulted in water being produced with elevated turbidity. Backwashed the filters to produce compliant water. Flushed the treated water storage tanks with newly produced water and monitored the turbidity until the WTP produced compliant water. Additional monitoring of turbidity, chlorine (free and total) and microbiological analysis was undertaken until the event was resolved. Treated water turbidity returned to <0.5 NTU from the 07/07/2022, and chlorine disinfection was maintained at all times. All microbiological samples collected on the 07/07/2022, 08/07/2022 and 12/07/2022 indicated nil detection of E. coli. The pipes for the air valves were extended by 10 metres to prevent large particles from blocking the air valves. <p><u>Preventative actions</u></p> <ul style="list-style-type: none"> Permanently extended the air valves higher than 10 metres to prevent the large particles from blocking the air valves. More frequent inspection and maintenance of the air valves. Updates to operational work instructions to incorporate the additional inspection and maintenance requirements of the air valves including updates to procedures specific to the sand filter backwash triggers.

Incident / Event date	Scheme / location	Parameter / issue	Summary and Preventive actions
			<ul style="list-style-type: none"> Investigate the feasibility in establishing an alarm in SCADA when treated water turbidity exceeds the backwash trigger. <p>Following consultation with the regulator, the 'boil water alert' notice was rescinded on the 15/07/2022 and the potable water supply was considered suitable for customer consumption as a result of compliant water quality results and acceptable WTP performance. This event was subsequently resolved, and the event was closed on the 05/10/2022 following submission of the investigation report to the regulator.</p>
Event 6/10/2022	Clare WTP	Turbidity > 1 NTU	<p>An operator reported cloudiness in the office tap water on the 06/10/2022. Turbidity was measured at 58 NTU at the Elevated Storage Tank, 28 NTU at the school and 29 NTU at the Sunwater office. Further investigation identified that the raw water pumps were running but the treatment plant was not dosing coagulant (for coagulation/clarification) or chlorine (disinfection). The root cause of the issue was identified – a dislodged backwash relay that prevented the water treatment plant from starting chemical dosing and treatment. The regulator was notified of this event on the 06/10/2022.</p> <p>The following actions were identified and implemented regarding this event.</p> <p><u>Corrective actions</u></p> <ul style="list-style-type: none"> The backwash relay was fixed immediately and the WTP was returned to service. Operators drained the clarifiers, elevated treated water storage tank and flushed the treated water line. Once drained, commenced refilling of the clarifiers, storage tank and treated water line from the WTP. A "do not consume" notice was initially issued to local residents as a precaution; however this notification was revised to a "boil water alert" notice following consultation with the regulator. Additional monitoring of turbidity, chlorine (free and total) and microbiological analysis was undertaken until the event was resolved. Treated water turbidity returned to <1 NTU from the 11/10/2022. Chlorine disinfection was maintained at all times at the WTP and in the reticulation network since the 06/10/2022. All microbiological samples collected on the 07/10/2022, 08/10/2022 and 09/10/2022 indicated nil detection of E. coli. <p><u>Preventative actions</u></p> <ul style="list-style-type: none"> Correct instalment of backwash relay with inspection/commissioning checklist Short-term solution to investigate the installation of WTP Telemetry to alert operators of treated water quality exceedance and installation of automatic shut-off valve/flow switch to

Incident / Event date	Scheme / location	Parameter / issue	Summary and Preventive actions
			<p>prevent non-compliant water from entering the Elevated Water Storage Tank and reticulation network.</p> <ul style="list-style-type: none"> Long-term solution to investigate new automated Water Treatment Package Plant <p>The preventative measures are not reflected in the DWQMP and will be included during the next subsequent review of the DWQMP.</p> <p>Following consultation with the regulator, the 'do not consume' notice was rescinded on the 13/10/2022 and the potable water supply was considered suitable for customer consumption as a result of compliant water quality results and acceptable WTP performance. This event was subsequently resolved, and the event was closed on the 01/11/2022 following submission of the investigation report to the regulator.</p>
Event 30/10/2022	Fairbairn Dam WTP	Turbidity > 1 NTU	<p>The raw water pump (Right Bank Tower - RBT) that supplies raw water to the WTP failed on the 29/10/2022 resulting in the production of treated water ceasing. A secondary raw water pump (pontoon) was currently off-site for repairs at the time of the failure of RBT pump. It was identified that there was no standby secondary raw water pump available when the RBT raw water pump failed. In order to continue to supply treated water, potable water was supplied by a licensed potable water truck on the 30/10/2022 as water supplies were running low. The use of a licenced potable water truck allowed for potable water to be delivered to site, however the potable water was delivered at an increased flow rate directly to the treated water tanks which resulted in sediment at the bottom of the treated water tanks being stirred up. Turbidity was measured at 35 NTU at the round clear water storage tank. The regulator was notified of this event on the 30/10/2022.</p> <p>The following actions were identified and implemented regarding this event.</p> <p><u>Corrective actions</u></p> <ul style="list-style-type: none"> WTP operators initially organised for potable water to be delivered by a licensed potable water truck to the clear water round storage tank as gently as possible (to avoid stirring up any sediment in the tank) to continue to supply treated water to customers. WTP operators monitored the treated water quality (pH, turbidity, free chlorine, total chlorine) on a daily basis. The treated water quality was measured at <1NTU and brief instances of >1NTU due to the stirring up of residual sediment in the clear water and elevated storage tanks from the potable water trucks. Free chlorine remained >0.5mg/L indicating sufficient disinfection during the duration of this event.

Incident / Event date	Scheme / location	Parameter / issue	Summary and Preventive actions
			<ul style="list-style-type: none"> Operations organised a temporary diesel pump as a short-term solution to supply raw water to the WTP and return the WTP to operation whilst the replacement raw water pump (Right Bank Tower) was ordered, and whilst the secondary raw water pump (pontoon) was being repaired. <p><u>Preventative actions</u></p> <ul style="list-style-type: none"> A new raw water pump (Right Bank Tower) was ordered and was installed, tested and operational by 08/12/2022. The secondary raw water pump (pontoon) internal parts were replaced, and the pump was installed, tested and operational on 15/12/2022. The existing raw water pump (Right Bank Tower) that required repair was sent to a contractor for assessment. No obvious faults were noted on the pump so the cause of the failure couldn't be determined. Proposed to procure the replacement of wear components to make pump 'as new condition'. In summary, it was identified that additional raw water pump(s) must be available at all times as a contingency should the primary RBT pump fail. <p>This event was subsequently resolved, and the event was closed on the 21/12/2022 following submission of the investigation report to the regulator.</p>
Event 8/12/2022	Clare WTP	Turbidity > 1 NTU	<p>Identified on the 08/12/2022 that the raw water pumps at the Clare WTP were running but the treatment process was not operational. This resulted in a turbidity of 14.9 NTU at the treated water storage tank and 1.66 NTU at the elevated storage tank. The cause was identified as a faulty flow switch, which is used to start the Clare WTP treatment process upon detection of flow from the raw water pumps. Since the flow switch faulted, raw water was allowed to pass through the clarifiers (without coagulant dosing), the sand filters and to the Treated Water Storage Tank (without chlorine dosing). The regulator was notified of this event on the 08/12/2022.</p> <p>The following actions were identified and implemented regarding this event.</p> <p><u>Corrective actions</u></p> <ul style="list-style-type: none"> The flow switch paddles were replaced on the 08/12/2022. Following consultation with the regulator, a 'boil water alert' notice was issued on the 08/12/2022 to customers and the community who receive drinking water from the water supply. The 'boil water alert' notice advised all residents and visitors to boil their tap water used

Incident / Event date	Scheme / location	Parameter / issue	Summary and Preventive actions
			<p>for drinking following an issue at the Clare water supply which resulted in water being produced with elevated turbidity.</p> <ul style="list-style-type: none"> An interlock connection between the raw water pumps running and starting of treatment plant was installed on 22/12/2022. The treated water storage tank was cleaned and reticulation town water mains were flushed. Additional monitoring of turbidity, chlorine (free and total) and microbiological analysis was undertaken until the event was resolved. Treated water turbidity returned to <1 NTU from the 19/12/2022. Chlorine disinfection was maintained at all times at the WTP and in the reticulation network. All microbiological samples collected on the 19/12/2022 and 20/12/2022 indicated nil detection of E. coli. <p><u>Preventative actions</u></p> <ul style="list-style-type: none"> Short term actions involving the reconfiguration and connection of PLC, hardware, instrumentation and control elements to enable more enhanced monitoring, alarming and control of the WTP. Medium term actions to install additional clean water tanks to provide increased redundancy and easier access for maintenance and cleaning purposes; including additional upgrades to analysers, potential upgrade to dosing pumps, enhanced PLC control and programming. Long-term solution to investigate new automated Water Treatment Package Plant <p>The preventative measures are not reflected in the DWQMP and will be included during the next subsequent review of the DWQMP.</p> <p>Following consultation with the regulator, the 'boil water alert' notice was rescinded on the 22/12/2022 and the potable water supply was considered suitable for customer consumption as a result of compliant water quality results and acceptable WTP performance. This event was subsequently resolved, and the event was closed on the 01/11/2022 following submission of the investigation report to the regulator.</p>
Event 19/01/2023	Mutchilba WTP	Turbidity > 1 NTU	<p>Treated water turbidity >1 NTU identified on the 13/01/2023 as part of the routine sampling program. Turbidity was measured as 1.2 NTU in the treated water storage tank and 1.52 NTU at the School. The cause of the incident was attributed to a number of aspects including: recent rainfall resulting in overland flows in the catchment which increased raw water turbidity, inadequate communication and reporting protocols, inadequate analyser alarming and awareness of filter operation, and</p>

Incident / Event date	Scheme / location	Parameter / issue	Summary and Preventive actions
			<p>inconsistent turbidity readings from the handheld turbidity analysers. The regulator was notified of this event on the 19/01/2023.</p> <p>The following actions were identified and implemented regarding this event.</p> <p><u>Corrective actions</u></p> <ul style="list-style-type: none"> Following consultation with the regulator, a 'boil water alert' notice was issued on the 19/01/2023 to customers and the community who receive drinking water from the water supply. The 'boil water alert' notice advised all residents and visitors to boil their tap water used for drinking following an issue at the Mutchilba water supply which resulted in water being produced with elevated turbidity. Bottled water was made available to residents as required. Operators continued backwashing the media filter and activated carbon filters. The coagulation dose rate was increased. The reticulation network was scoured. The raw water supply flow rate was reduced. Additional monitoring of turbidity, chlorine (free and total) and microbiological analysis was undertaken until the event was resolved. Treated water turbidity was <1 NTU during the 03/02/2023 – 08/02/2023. Chlorine disinfection was maintained at all times at the WTP and in the reticulation network. All microbiological samples collected on the 06/02/2023 and 07/02/2023 indicated nil detection of E. coli. Operators continued to replenish the treated water storage tanks over a period of three weeks. After the tanks were filled, the silt/debris was allowed to settle and was drained from the tank. <p><u>Preventative actions</u></p> <ul style="list-style-type: none"> Improved communication (including escalation and provision of information) regarding future water quality issues when identified by internal stakeholders. Further investigation into additional monitoring alarms and installation of additional pressure gauges (for automatic backwash of filters). This will also include additional turbidity analysers at the filters for effective monitoring of turbidity and subsequent alarming. Investigation into the procurement of more reliable handheld turbidity analysers to ensure turbidity readings are accurate and/or consistent.

Incident / Event date	Scheme / location	Parameter / issue	Summary and Preventive actions
			<ul style="list-style-type: none"> A third-party training provider was engaged to provide site specific training and recommendations for plant operations. <p>Following consultation with the regulator, the 'boil water alert' notice was rescinded on the 10/02/2023 and the potable water supply was considered suitable for customer consumption as a result of compliant water quality results and acceptable WTP performance. This event was subsequently resolved, and the event was closed on the 21/02/2023 following submission of the investigation report to the regulator.</p>
Event 16/02/2023	Fairbairn Dam WTP	Chlorate > 0.8 mg/L	<p>Chlorate concentrations exceeded the QLD Health interim health guideline of 0.8 mg/L at the WTP outlet (1.1 mg/L), caravan park (1.1 mg/L) and kitchen tap (1.1 mg/L) from samples collected on the 01/02/2023 (sample analysis received on the 10/02/2023). Sodium hypochlorite is used as part of the treatment process to ensure adequate disinfection, noting that the use of sodium hypochlorite can result in chlorate formation due to the breakdown and degradation of sodium hypochlorite. Sunwater developed a recovery plan which outlined a number of actions required to be implemented to reduce chlorate concentrations. The actions involved the optimisation of operational practices in the management of sodium hypochlorite resulting in a substantial reduction in chlorate concentrations <0.8 mg/L. The regulator was notified of this event on the 16/02/2023 (following confirmation to notify).</p> <p>The following actions were identified and implemented regarding this event.</p> <p><u>Corrective actions</u></p> <ul style="list-style-type: none"> Following consultation with the regulator, a 'do not consume' notice was issued to residences and visitors of Fairbairn Dam on the 28/04/2023. Bottled water was provided to consumers whilst this advisory was in effect. Reviewing the supply chain and sourcing suppliers who turn over sodium hypochlorite more frequently to ensure shelf life is not compromised. Actively managing product inventory by ordering smaller quantities of product more frequently from suppliers to reduce sodium hypochlorite age. Consuming and replacing sodium hypochlorite with a new container each time (i.e. preventing top up of existing containers or decanting into containers).

Incident / Event date	Scheme / location	Parameter / issue	Summary and Preventive actions
			<ul style="list-style-type: none"> Cleaning and flushing of dosing recirculation lines/pipework, dosing pump and associated equipment (i.e. dosing containers/storage tanks) more frequently to remove residual chlorine and built-up crystalline chlorine. Installation of air conditioning in the sodium hypochlorite storage room. Following install, the old sodium hypochlorite was replaced with new product and the old chlorinated treated water was flushed from the tanks and was filled with fresh water. The frequency of chlorate testing was increased throughout the duration of the event to validate chlorate concentrations, and faster turnaround times were requested from NATA laboratories to receive results in a quicker timeframe. Additional chlorate results for samples collected on the 20/02/2023 and 14/03/2023 remained >0.8 mg/L, however sample results during the 17/04/2023 – 28/06/2023 were reported <0.8 mg/L as a result of the implementation of the corrective actions. <p><u>Preventative actions</u></p> <ul style="list-style-type: none"> Continued implementation of the corrective actions as per the recovery plan. Internal documentation was reviewed and updated to include refined trigger limits for chlorate so that corrective actions are undertaken prior to chlorate concentrations exceeding the QLD Health interim health guideline of 0.8 mg/L. Continued to undertake chlorate monitoring and increased the frequency of testing as required in response to situations that required additional data to verify and monitor chlorate concentrations. <p>The preventative measures are not reflected in the DWQMP and will be included during the next subsequent review of the DWQMP.</p> <p>Following consultation with the regulator, the 'do not consume' notice was rescinded on the 19/05/2023 as a result of chlorate concentrations consistently measured <0.8 mg/L. This event was subsequently resolved, and the event was closed on the 29/06/2023 following submission of the investigation report to the regulator.</p>
Event 28/02/2023	Clare WTP	Chlorate > 0.8 mg/L	Chlorate concentrations exceeded the QLD Health Interim Health Guideline of 0.8 mg/L at Clare WTP tap in (3.66 mg/L), outlet (3.96 mg/L), office (3.16 mg/L), school (3.60 mg/L) and pool (3.65 mg/L) from samples collected on the 22/02/2023 (sample analysis received on the 28/02/2023). Sodium hypochlorite is used as part of the treatment process to ensure adequate disinfection, noting that the use of sodium hypochlorite can result in chlorate formation due to the breakdown and degradation of sodium hypochlorite. Sunwater developed a recovery plan which outlined a number

Incident / Event date	Scheme / location	Parameter / issue	Summary and Preventive actions
			<p>of actions required to be implemented to reduce chlorate concentrations. The actions involved the optimisation of operational practices in the management of sodium hypochlorite resulting in a substantial reduction in chlorate concentrations <0.8 mg/L. The regulator was notified of this event on the 28/02/2023 (following confirmation to notify). Following consultation with the regulator, a 'do not consume notice' was not required due to the duration of the event whereby chlorate concentrations did not exceed 0.8mg/L for more than 12 weeks.</p> <p>The following actions were identified and implemented regarding this event.</p> <p><u>Corrective actions</u></p> <ul style="list-style-type: none"> • Reviewing the supply chain and sourcing suppliers who turn over sodium hypochlorite more frequently to ensure shelf life is not compromised. • Actively managing product inventory by ordering smaller quantities of product more frequently from suppliers to reduce sodium hypochlorite age. • Consuming and replacing sodium hypochlorite with a new container each time (i.e. preventing top up of existing containers or decanting into containers). • Installation of air conditioning in the sodium hypochlorite storage room. • Dilution of sodium hypochlorite to approx. 5% on delivery to reduce degradation of the product. • The frequency of chlorate testing was increased throughout the duration of the event to validate chlorate concentrations. Additional chlorate results for samples collected on the 02/03/2023 and 17/03/2023 remained >0.8 mg/L, however sample results during the 13/04/2023 – 21/06/2023 were reported <0.8 mg/L as a result of the implementation of the corrective actions. <p><u>Preventative actions</u></p> <ul style="list-style-type: none"> • Continued implementation of the corrective actions as per the recovery plan. • Internal documentation was reviewed and updated to include refined trigger limits for chlorate so that corrective actions are undertaken prior to chlorate concentrations exceeding the QLD Health interim health guideline of 0.8 mg/L. • Continued to undertake chlorate monitoring and increased the frequency of testing as required in response to situations that required additional data to verify and monitor chlorate concentrations.

Incident / Event date	Scheme / location	Parameter / issue	Summary and Preventive actions
			<p>The preventative measures are not reflected in the DWQMP and will be included during the next subsequent review of the DWQMP.</p> <p>The implementation of the corrective actions comprising of the optimisation of operational practices resulted in chlorate concentrations being detected <0.8mg/L. This event was subsequently resolved, and the event was closed on the 29/06/2023 following submission of the investigation report to the regulator.</p>
Event 17/04/2023	Burdekin Falls Dam WTP	Chlorate > 0.8 mg/L	<p>Chlorate concentrations exceeded the QLD Health Interim Health Guideline of 0.8 mg/L at BFD WTP at the Office (0.957 mg/L) from a sample collected on the 04/04/2023 (sample analysis received on the 17/04/2023). Sodium hypochlorite is used as part of the treatment process to ensure adequate disinfection, noting that the use of sodium hypochlorite can result in chlorate formation due to the breakdown and degradation of sodium hypochlorite. Sunwater developed a recovery plan which outlined a number of actions required to be implemented to reduce chlorate concentrations. The actions involved the optimisation of operational practices in the management of sodium hypochlorite resulting in a substantial reduction in chlorate concentrations <0.8 mg/L. The regulator was notified of this event on the 17/04/2023 (following confirmation to notify). Following consultation with the regulator, a 'do not consume notice' was not required due to the duration of the event whereby chlorate concentrations did not exceed 0.8mg/L for more than 12 weeks.</p> <p>The following actions were identified and implemented regarding this event.</p> <p><u>Corrective actions</u></p> <ul style="list-style-type: none"> • Reviewing the supply chain and sourcing suppliers who turn over sodium hypochlorite more frequently to ensure shelf life is not compromised. • Actively managing product inventory by ordering smaller quantities of product more frequently from suppliers to reduce sodium hypochlorite age. • Consuming and replacing sodium hypochlorite with a new container each time (i.e. preventing top up of existing containers or decanting into containers). • Cleaning and flushing of dosing recirculation lines/pipework, dosing pump and associated equipment (i.e. dosing containers/storage tanks) more frequently to remove residual chlorine and built-up crystalline chlorine. • Installation of air conditioning in the sodium hypochlorite storage room and dosing room. • Dilution of sodium hypochlorite to approx. 5% on delivery to reduce degradation of the product.

Incident / Event date	Scheme / location	Parameter / issue	Summary and Preventive actions
			<ul style="list-style-type: none"> The frequency of chlorate testing was increased throughout the duration of the event to validate chlorate concentrations. Additional chlorate results for samples collected on the 18/04/2023 and 02/05/2023 remained >0.8 mg/L, however sample results during the 16/05/2023 – 21/06/2023 were reported <0.8 mg/L as a result of the implementation of the corrective actions. <p><u>Preventative actions</u></p> <ul style="list-style-type: none"> Continued implementation of the corrective actions as per the recovery plan. Internal documentation was reviewed and updated to include refined trigger limits for chlorate so that corrective actions are undertaken prior to chlorate concentrations exceeding the QLD Health interim health guideline of 0.8 mg/L. Continued to undertake chlorate monitoring and increased the frequency of testing as required in response to situations that required additional data to verify and monitor chlorate concentrations. <p>The preventative measures are not reflected in the DWQMP and will be included during the next subsequent review of the DWQMP.</p> <p>The implementation of the corrective actions comprising of the optimisation of operational practices resulted in chlorate concentrations being detected <0.8mg/L. This event was subsequently resolved, and the event was closed on the 29/06/2023 following submission of the investigation report to the regulator.</p>
Event 25/05/2023	Burdekin Falls Dam WTP	Turbidity > 1 NTU	<p>Turbidity detected above the critical limit of 1 NTU at the WTP and Caravan Park on 25/05/2023. Turbidity was measured at 8 NTU at the WTP Outlet and 6 NTU at the Caravan Park. The cause of the incident was due to issues with the flocculant dosing pump whereby no flocculant was being dosed. The turbidity post-filtration remained above 60NTU indicating that the filters were not effectively treating the raw water and flocculation was not occurring. An investigation identified that a small piece of plastic entered the coagulant dosing pump inlet line which caused a blockage, ultimately resulting in the dosing pump failure. The regulator was notified of this event on the 25/05/2023.</p> <p>The following actions were identified and implemented regarding this event.</p> <p><u>Corrective actions</u></p> <ul style="list-style-type: none"> The original duty pump was removed from service and a switch was made to the standby pump to ensure continuation of flocculation dosing and restoration of the treatment process.

Incident / Event date	Scheme / location	Parameter / issue	Summary and Preventive actions
			<ul style="list-style-type: none"> Following consultation with the regulator, a 'do not drink' directive was issued to the caravan park for period 25/05/2023 – 02/06/2023. Bottled water was provided whilst the 'do not drink' directive was in place. The treated water tanks were drained and a full desludge and backwash was completed. Additional monitoring of turbidity, chlorine (free and total) and microbiological analysis was undertaken until the event was resolved. Treated water turbidity returned to <1 NTU from the 27/05/2023. Chlorine disinfection was maintained at all times at the WTP and in the reticulation network. All microbiological samples indicated nil detection of E. coli. <p><u>Preventative actions</u></p> <ul style="list-style-type: none"> Installation of a strainer on the coagulant dosing inlet line to prevent any foreign objects from entering the dosing pump. A new pump was installed as the standby pump to replace the original pump that failed. The original pump that failed was tested afterwards and found to be functional and therefore was refurbished and kept as a critical spare. <p>The preventative measures are not reflected in the DWQMP and will be included during the next subsequent review of the DWQMP.</p> <p>Following consultation with the regulator, the 'do not drink directive' was removed from site on the 02/06/2023 and the potable water supply considered suitable for customer consumption as a result of compliant water quality results and acceptable WTP performance. This event was subsequently resolved, and the event was closed on the 12/06/2023 following submission of the investigation report to the regulator.</p>

6 Customer complaints

Sunwater is required to report on the number of complaints, general details of complaints, and the responses undertaken.

Throughout the 2022/2023 reporting period, no complaints were received.

During the 2022/2023 reporting period, there were no suspected or confirmed cases of illness arising from the water supply system.

7 DWQMP review outcomes

No review was completed during the reporting period (01/07/2022 to 30/06/2023).

A DWQMP review was previously completed by Jacobs and Sunwater during the previous FY2021/2022 reporting period. A finalised report was submitted to the regulator on the 30 June 2022.

An update is provided in Table 13 regarding the status of the actions to address the review items noting that these items were due for completion during the 2022/2023 reporting period.

Table 13. DWQMP Review – Summary of review outcomes and actions

Item No.	Description	Category	DWQMP Reference	Action (Note 1)	Due Date	Status (Completed /Open)
1	Implementation of key recommendation items from the Sunwater DWQMP Audit Report 2021	DWQMP Audit Report	Section 5.21, Appendix B	Update the DWQMP and associated documents or processes (as referenced in Table 14 based on the Audit recommendation items)	Variable - Refer Table 14	
2	Raw water quality data is included up to the end of 2018 when the DWQMP was developed.	Details of Infrastructure	Section 2.1, 2.2, 2.3, 2.4	Update the DWQMP to include additional raw water quality data from 2018-2022	12/08/2022	Completed
3	WTP Infrastructure updates & Key Stakeholder List to be updated	Details of Infrastructure	Section 2.1, 2.3 and 2.5	Update the DWQMP to include updates to infrastructure: -Burdekin Falls Dam WTP (new chlorine recirculation system) -Clare WTP (filter replacement) -Fairbairn Dam WTP (new control valve, filter sample points and SCADA trending of turbidity analyser and chlorine analyser) Update Stakeholders List & contact details	12/08/2022	Completed
4	The current DWQMP does not accurately describe the incident management process	Management of Incidents	Section 5.3	Update the DWQMP to include the updated incident management process & updated water quality monitoring wall chart	12/08/2022	Completed

Item No.	Description	Category	DWQMP Reference	Action (Note 1)	Due Date	Status (Completed /Open)
	undertaken by Sunwater.					
5	The operational and verification monitoring program has been updated since the DWQMP was approved.	Operational and Verification Monitoring Programs	Section 5.2	Update the DWMP to include the updated operational and verification monitoring program. (re: THM, Chlorate, heavy metal and pesticide monitoring).	12/08/2022	Completed
6	Of the 7 actions on the RMIP, two actions have been closed, three actions have been completed and 2 items are still ongoing.	Risk Management Improvement Plan	Appendix C, RMIP	Actions 3 and 4 have been completed. Update the RMIP to reflect completion of actions 3 and 4 and include additional actions for continual improvement.	12/08/2022	Completed

Note 1: All review items were addressed by updating the DWQMP and an amended DWQMP was submitted to the regulator on the 11 August 2022 (during the FY2022-2023 reporting period). The regulator approved the amended DWQMP on the 22 November 2022.

8 DWQMP Audit findings

No DWQMP audit was completed during the reporting period (01/07/2022 to 30/06/2023).

A DWQMP audit was previously completed by an independent auditor during the previous FY2021/2022 reporting period. The audit identified a number of recommendations and actions.

An update is provided in Table 14 regarding the status of the actions to address the audit items noting that these items were due for completion during the 2022/2023 reporting period.

Table 14. DWQMP Audit – Summary of Recommendations and Actions

Item No.	Description	Recommendation /Opportunity for Improvement (OFI)	Action (Note 1)	Due Date	Status (Completed/Open)
REC-21-001	When preparing annual reports, implement a robust review process to ensure that the data reported in annual reports is accurate.	Recommendation	Recommend that DWQMP be updated to document the review process for developing annual reports (including data verification).	12/08/2022	Completed
REC-21-002	Review the monitoring wall chart to ensure it accurately reflects the monitoring for each scheme.	Recommendation	Wall chart reviewed and updated. Wallchart will be included as an Appendix in the DWQMP.	12/08/2022	Completed
REC-21-003	Update the process flow charts to clearly note the CCP monitoring locations and numbering them on the diagram.	Recommendation	Review and update the Process Flow Chart/schematic drawings for each site (via onsite validation with operations) and provide updated drawings in the DWQMP.	12/08/2022	Completed
REC-21-004	Review the CCP monitoring locations at Mutchilba WTP to ensure a filtered water turbidity sample is taken that is representative of filter performance, with consideration given to monitoring individual filter performance rather than combined.	Recommendation	Review and update the CCP monitoring locations (via onsite validation with operations at Mutchilba WTP) and provide an updated drawing in the DWQMP.	12/08/2022	Completed

Item No.	Description	Recommendation /Opportunity for Improvement (OFI)	Action (Note 1)	Due Date	Status (Completed/Open)
REC-21-005	Ensure a process to review compliance with the water quality criteria is implemented and any failure to take a sample is notified to the regulator as a non-compliance with the water quality criteria.	Recommendation	A water quality criteria compliance process shall be detailed in the DWQMP (including if monthly sample is not taken, it shall be noted as non-compliance and notified to the regulator).	12/08/2022	Completed
REC-21-006	Review the risk assessment to include assessment of protozoan risk and the adequacy of the current controls and critical limits. Where the risk is unacceptable, raise an improvement item to reduce the risk.	Recommendation	Review and update risk assessment to include assessment of protozoan risk utilising desktop catchment assessments already undertaken and raise an improvement item to reduce the risk if required for each site. To be updated in the DWQMP.	12/08/2022	Completed
REC-21-007	Investigate options for improving filter performance where filtered water turbidity is regularly above 0.5 NTU.	Recommendation	Investigation to improve filter performance at all sites (where filtered water turbidity is regularly above 0.5 NTU) and to be included as an item in the Risk Improvement Management Plan (RMIP). (Note 2)	FY2022-2023	Open. Refer section 3 RMIP - Action No. 8 and 9.
REC-21-008	Document the procedures for calibration of monitoring equipment and ensure the program includes internal and external calibrations at appropriate intervals.	Recommendation	Calibration procedure and associated requirements to be documented in the appropriate work instructions for all sites and made available to appropriate operations staff.	12/08/2022	Completed
REC-21-009	Document the chemical procurement process to ensure there is a quality assurance process to confirm that chemicals used in drinking	Recommendation	Chemical procurement process to be documented in DWQMP to ensure chemical quality assurance.	12/08/2022	Completed

Item No.	Description	Recommendation /Opportunity for Improvement (OFI)	Action (Note 1)	Due Date	Status (Completed/Open)
	water are suitable and do not introduce a hazard.				
REC-21-010	Assess the risk of mains breaks and the potential for contamination from works on the treated water mains. Establish a documented procedure or standard for working on mains that includes hygienic practices, flushing, and verifying the adequacy of the practices through taking a chlorine residual reading.	Recommendation	Risk of main breaks to be assessed as part of the Risk Assessment and documented in the DWQMP.	12/08/2022	Completed
OFI-21-001	Consider implementing a risk based internal inspection and cleaning program for tanks.	Opportunity for Improvement	Consult operations team to confirm suitable frequency of internal inspection and cleaning program for tanks with due regard to risk. Document outcome in the risk assessment of the DWQMP.	12/08/2022	Completed
OFI-21-002	Review the alerts in the Sunwater database management system to ensure that emails are sent in response to all results that are out of specification.	Opportunity for Improvement	Review and update the email alerts in the database management system to ensure notifications are submitted to internal stakeholders for results that exceed action and critical limits. (Note 3)	FY2022-2023	Completed
OFI-21-003	Consider implementing a program for refresher training on sampling and equipment calibration to ensure monitoring results are reliable.	Opportunity for Improvement	Implement refresher training (on sampling and equipment calibration for each site). (Note 4)	FY2022-2023	Completed
OFI-21-004	Consider documenting the results of the jar testing on a spreadsheet to allow for the	Opportunity for Improvement	Not identified as a requirement (not proposing to proceed due to inherent risk).	N/A	Completed

Item No.	Description	Recommendation /Opportunity for Improvement (OFI)	Action (Note 1)	Due Date	Status (Completed/Open)
	data to be analysed and a dose curve created to assist in identifying the best dose for a range of raw water turbidity values.				
OFI-21-005	Consider converting the Risk Management Improvement Plan into a living document that is kept up to date throughout the year and includes actions from processes such as incidents, reviews, audits and risk assessments.	Opportunity for Improvement	Convert the Risk Management Improvement Plan into a live document.	12/08/2022	Completed
OFI-21-006	Review and update the schematics to accurately reflect the scheme circumstances including the CCP monitoring points.	Opportunity for Improvement	Review and update the process flow charts/schematic drawings including CCP locations for each site (via onsite validation with operations) and provide updated drawings in the DWQMP (Refer Item No. REC-21-003).	12/08/2022	Completed

Note 1: The following audit items (REC-21-001 – REC-21-006; REC-21-008 – REC-21-010; OFI-21-001, OFI-21-003, OFI-21-005 and OFI-21-006) were addressed by updating the DWQMP and an amended DWQMP was submitted to the regulator on the 11 August 2022. The regulator approved the amended DWQMP on the 22 November 2022.

Note 2: Audit action REC-21-007 ongoing and to be completed in FY2023-2024 as noted in section 3 RMIP – Action No. 8 and 9.

Note 3: Audit action OFI-21-002: Notifications triggered from the database management system to internal stakeholders for results that exceed action and critical limits were considered functional as of 30 June 2023. Additional enhancements to notifications were identified however additional updates to the database form part of Sunwater's continuous improvement process.

Note 4: Audit action OFI-21-003: Internal refresher training for sampling and equipment calibration was completed as follows: Mutchilba WTP - training identified to have been previously completed early 2022, Fairbairn Dam WTP - training was completed in October 2022, Clare and Burdekin Falls Dam - training was completed in May 2023.