Drinking Water Quality Management Plan (DWQMP) Annual Report

2020 - 2021

Banana Shire Council

Service Provider ID: 504

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Contents

Glossary of terms

ADWG 2011	Australian Drinking Water Guideline (V6) 2011. Published by the National Health and Medical Research Council of Australia (Version 3.6 Updated
BSC	Banana Shire Council
CCP	Critical Control Point. A critical control point is defined as a step which control can be applied and is essential to prevent or eliminate a water safety hazard or reduce it to an acceptable level.
CFU/100ml	Colony Forming Units per 100 millilitres
DRDMW	Department of Regional Development, Manufacturing and Water
DWQMP	Drinking Water Quality Management Plan- The documents summarising how water service providers manage quality risks for consumers.
HACCP	Hazzard Analysis Critical Control Points certification for protecting drinking water quality
Mg/L	Milligrams per litre
ML/d	Megalitres per day
MPN/100ml	Most probable number per 100 millilitres
NTU	Nephelometric Turbidity Units, used to measure clarity of water
PFAS/PFOS	Per and Poly-fluoroalkyl substances, a group of man-made chemicals widely used in industrial, firefighting and household applications and are persistent in the environment
QLD Health	Public Health Regulator
SOPs	Standard Operating Procedures
THM	Trihalomethanes
UF	Ultrafiltration
The Act	The Water Supply and Reliability Act (2008)
WTP	Water Treatment Plant- processes raw water (sourced from a dam, river or bore) to make drinking water
<	Less Than
>	Greater than

1. Introduction

This report documents the performance of Banana Shire Council'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 assists the Regulator to determine 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. Overview of Operations

Banana Shire Council is a registered service provider with identification (SPID) 504.
Council operates a total of nine (9) drinking water supply schemes throughout the Shire consisting of:-

Scheme	*Water Source*	*Treatment processes*	*Treatment capacity (ML/d)*	*Towns supplied*
Banana	Dawson River (Moura Weir)	Treated at the Moura WTP Pumped from Moura, re-chlorinated	transfer	Banana
Baralaba	Dawson River (Neville Hewitt Weir)	Coagulation, flocculation, clarifiers, ultrafiltration, chlorination	1.1	Baralaba
Biloela	Callide Dam, Callide Valley Aquifer Bores	Coagulation, flocculation, clarifiers, filters, fluoridation, chlorination	10.3	Biloela, Callide Dam, Thangool
Callide Dam	Callide Dam	Treated at Biloela WTP. Coagulation, flocculation, clarifiers, filters, chlorination	transfer	Callide Dam
Goovigen	Callide Valley Aquifer Bores	Chlorination	0.2	Goovigen
Moura	Dawson River (Moura Weir)	Coagulation, flocculation, clarifiers, filters, fluoridation, chlorination	7.2	Moura, Banana
Taroom	Great Artesian Basin Bore	Aeration, Chlorination	4.3	Taroom
Thangool	Callide Dam, Callide Valley Aquifer Bores	Treated at Biloela WTP. Pumped from Biloela, re-chlorinated	transfer	Thangool
Theodore	Dawson River	Coagulation, flocculation, clarifiers, filters, chlorination	1.75	Theodore

Council also operates non-potable water supply schemes at Wowan and Cracow. The non-potable schemes are not covered by this report.

Council manages drinking water quality through its approved Drinking Water Quality Management Plan (DWQMP) which protects public health by ensuring the provision of a safe water supply.

Council operates treatment plants at Biloela (supplying Biloela, Thangool and Callide Dam communities), Moura (supplying Moura and Banana), Baralaba, Taroom and Theodore. Goovigen is a chlorinated bore supply. Council operates and maintains all water supply infrastructures in these schemes including intakes, pumping stations, treatment facilities, reservoir storages and reticulation mains.

3. Compliance with water quality criteria for drinking water

The water quality criteria mean health guideline values in the most current Australian Drinking Water Guidelines, as well as the standards in the Public Health Regulation 2005.

- The results of the verification monitoring have been summarised in Appendix A
- All schemes complied with the drinking water health guidelines throughout the financial year apart for the incidents notified to the regulator as per section 5 below.
- The Moura WTP Operations and Maintenance Manual (O & M) was reviewed and updated. This included Operator Training by an external consultant to implement the O& M Manual.

As part of the Queensland-wide testing for PFAS/PFOA in town water systems conducted in 2018, a detection was made for Perfluorohexanesulfonic acid (PFHxS) in the Biloela town water supply (sourced from groundwater bores). The detection was close the limit of what the laboratory could detect and was well below the recently established health guidelines. No adverse health effects are anticipated. A program of ongoing periodic testing commenced to monitor any changes.

In early 2021, PFAS was detected and reported publicly by CS Energy in the Callide Valley Aquifer upstream of Council's bores. Detections are widespread in several private bores and detections above the ADWG was noted in a number of non-Council bores within a 12.5km radius of the Callide Dam. There was no PFAS detected in the dam itself.

Council increased the periodic testing of PFAS to quarterly, and subsequently to monthly monitoring. Council has engaged a third-party environmental consultant to undertake this PFAS monitoring within the Council's water supply. While PFAS has been detected in Council bores, all sources have been well below the ADWG values for drinking water.

4. DWQMP Implementation

Progress in implementing the risk management improvement program

Key items of progress are highlighted in Appendix B

In summary the following items progressed during the reporting period:

- Infrastructure upgrades to the Baralaba WTP which included an installation of a new Train 2 Ultrafiltration (UF) Membrane to allow for a contingency so that supply can be maintained while Train 1 UF is being cleaned or offline. Other upgrades include a new emergency UF pump replacement.
- Infrastructure upgrades commenced at the Moura WTP to replace the existing oldest clarifier and filter.
- Infrastructure upgrades to the Thangool Booster Pump Station to ensure the disinfection residual is maintained throughout the town.
- Infrastructure upgrades to Taroom WTP to commence bore 2 and improving treatment processes to maintain the water quality and to meet the demand during the summer.
- Administrative amendments to SOPs and procedures for water treatment processes are ongoing.
- Addressing the findings from the DWQMP Audit.

5. Notifications to the Regulator under sections 102 and 102A of the Act

This financial year there were three (3) instances where the Regulator was notified under sections 102 or 102A of the Act.

Incident 1 (26/11/20)
The eight (8) treated and one (1) untreated water samples for Biloela, Moura and Thangool were sampled on Monday 23 November 2020. The samples were dispatched as per normal via TOLL PRIORITY to ensure the water samples arrive at Queensland Government Forensic & Scientific Services (QGF & SS) within the 24-hour holding period.

QGF & SS- Chief Scientist, called Banana Shire Council at 8:50 AM Wednesday 25 November 2020 to inform the Environmental Health Officer (EHO) that the samples exceeded the 24-hour holding period.

Unfortunately, the EHO was out of the office sampling and was not notified of this incident until 2:43PM on Wednesday 25 November 2020. The water sampling conducted is part of the regular weekly and monthly sampling program. The immediate impact is there is no external water sampling data for the week of 25 November 2020.

The Environmental Health Officer resampled on Thursday 26 November 2020.

If the Environmental Health Officer is out of the office, telephone communications received from Queensland Government Forensic & Scientific Services to be communicated to Senior Compliance and Reporting Officer. In the short term the Senior Compliance and Reporting Officer will call Queensland Government Forensic & Scientific Services to confirm the arrival of the samples. Toll Biloela is the only freight company in Biloela that freights water samples to Brisbane and therefore we do not have an alternative supplier.

Incident 2 (13/4/2021)
Routine monthly monitoring of Taroom's reticulation resulted in an E. coli detection found at TAR14-State School with 4 mpn/100ml E. coli and 110 mpn/100ml coliforms. On the 07/04/21, there was 3.8mm rain recorded, however there were no issues at the water plant and no main breaks. The turbidity at the water plant was 0.233 NTU and the chlorine residual at TAR14 during monitoring was 0.48 mg/L.

Additional monitoring was conducted on the 13.04.21 and 14.04.21. The clear results have been sent through to DRDMW and QLD Health.

There were no immediate issues found during the investigation, and given that the other samples within the reticulation were clear, and the chlorine residual were within operating parameters (ie 0.48 mg/L on 07.04.21 and 0.58 on 14.04.21), we presume operator error during sampling may have been the issue with this detection.

During the additional monitoring, there were coliforms found at the caravan park. Turbidity in this area has been high in comparison to the other areas too. On 20.04.21 an investigation was completed where flushing didn't reduce the turbidity levels. Check the checker for sampling was also completed. The Taroom scheme has to manage high iron in the raw water from the bores and does so by aeration and chlorination to oxidize the iron. There is a possibility of the sludge developed from the iron removal was carrying over to the reticulation network.

Quotes for air scouring have been received for all of Council's water schemes with work to be completed before the end of the FY. This should help reduce any biofilms in the lines and we should see a reduction in the turbidity and coliforms in this area.

Incident 3 (22/6/2021)
6 x treated drinking water samples and 3 x untreated samples were taken at Biloela and Moura on 16.06.21. They were sent overnight via TOLL Priority. On 22.06.21 BSC received a call from the QFSS laboratory saying that the samples taken on the 16.06.21 were received today and that they were outside of the 24hr timeframe required for testing. Samples for THM and heavy metals were also included in this esky, however they were passed by the lab for testing.

The Brisbane TOLL explained that there was a bulk sortation issue which resulted in 5 items (inclusive of our eskies) being incorrectly delivered to another customer on the 17th of June 2021. This customer booked a collection on the 21st of June for Toll to collect the incorrect deliveries. Therefore, it took 1 week for the samples to be delivered to the correct address.

Readycult samples were taken at all the reticulation sites for Moura and Biloela. All came back clear.

A complaint was lodged with TOLL (Brisbane Office). Investigations into other freight companies is ongoing. There isn't any freight companies that offer the flexibility that TOLL does when servicing Taroom and Theodore. Consideration was also given to using the local TOLL to deliver to Brisbane and use a different freight company from Brisbane. However, there would be increased cost, double handling and the chance of losing the eskies would be higher. BSC is in discussion with a different freight company to service Biloela and Moura.

6. Customer complaints related to water quality

Banana Shire Council is required to report on the number of complaints, general details of complaints, and the responses undertaken, and throughout the year the following complaints about water quality were received;

Table 1 – number of complaints about water quality, (including complaints per 1000 customers)

Scheme	Population	Pressure - drinking water	Suspected illness	Discoloured Water	Taste and Odour
Banana	377	2 (5.3)*	0	0	0
Baralaba	314	1 (3.19)*	0	1 (3.19)*	0
Biloela	5758	3 (0.52)*	0	3 (0.52)*	2 (0.347)**
Goovigen	215	1 (4.65)*	0	1 (4.65)*	1 (4.65)*
Moura	1899	0	0	8 (4.21)*	0
Taroom	869	0	0	0	0
Thangool	741	5 (6.75)*	0	0	2 (2.7)*
Theodore	483	0	0	0	0
TOTAL		12	0	13	5

*These bracketed figures equated to complaints per 1000 customer's equivalent.

** Callide Dam incident has been captured under Biloela in this instance

Suspected Illness

Complaints are occasionally received from customers who suspect their water may be associated with an illness they are experiencing. Banana Shire Council investigates each complaint relating to alleged illness from our water quality, typically by inspecting and testing the customers tap.

During 2020/2021 there were no complaints of suspected illness arising from the water supply system.

Discoloured water

A total of thirteen (13) complaints about discoloured water were received from all schemes over this period.

The Moura scheme had eight (8) complaints. The lines were flushed, and samples were taken. Water was within ADWG.

Two (2) complaints from Callide Dam. The mains were flushed, and a sample was taken on both complaints. The results were within ADWG. The resident was advised to check the internal lines.

Goovigen and Baralaba schemes had one (1) non reportable complaint each. The Goovigen incident was investigated, and the water was tested. All parameters were within the ADWG. The Baralaba incident had the lines flushed and tested. The discoloured water was related to the presence of manganese.

Taste and odour

A total of five (5) taste and odour complaints were received during the reporting period.

Two (2) incidents in Thangool reported high chlorine. The water was tested, and the chlorine was with our CCP range and ADWG.

One (1) incident at Callide Dam. The water was tested, and all parameters were within the ADWG. The resident was advised to check their internal plumbing.

One (1) incident at Biloela. The reticulation crew flushed the lines and there were no further issues.

One (1) incident at Goovigen. The water was tested, and all parameters were within the ADWG.

Pressure

There has been a total of twelve (12) complaints about low water pressure that were received this reporting period.

Five (5) pressure complaints were reported from Thangool in January 2021due to an electrical fault at the pump station.

Two (2) pressure complaints were reported in Banana, one was related to the meter being blocked and the other was to do with excessive water usage by a business, filling a water tanker at their premises.

Three (3) pressure complaints were reported in Biloela. Two of these had the pressure checked and it was within standards. The other one was due to an obstruction at the elbow after the water meter. The pressure improved after the obstruction was removed.

One (1) pressure complaint was reported in Baralaba at the time of the valve cut ins by the reticulation team.

One (1) pressure complaint was reported from Goovigen. The operators checked and adjusted the booster pump which seemed to fix the pressure issue.

Banana Shire Council takes complaints about pressure seriously, and will investigate issues at the customer's residence, usually providing advice about plumbing / pumping problems internal to the customer's property.

7. Findings and recommendations of the DWQMP auditor

Banana Shire Council completed the latest DWQMP audit in February 2021. This external audit covered the period from 2015 to 2020, with the latest DWQMP being updated in 2017. The purpose of the audit is to verify:

- the accuracy of the monitoring and performance data provided to the Regulator
- assess compliance with the DWQMP
- assess the relevance of the DWQMP in relation to the service provided

ES.3 Audit Conclusions

The audit concluded that BSC:

- Provided evidence that it has been providing accurate monitoring and performance data to the regulator;
- Generally, has implemented its DWQMP to manage risks to public health;
- Generally maintained the relevance of the DWQMP.

The overall summary of compliance is shown in Table ES1. In total 60 questions were asked. Where relevant, questions were repeated in the field to confirm that management requirements were promulgated and implemented.

Table ES.1 – Compliance Summary

Compliance Code		Number of Findings
Compliant	Compliant	25
Compliant with Opportunity for Improvement	OFI	28
Minor Non-Compliant	Minor	6
Major Non-Compliant	Major	0
Critical Non-Compliant	Critical	0
Not-applicable or combined with another observation.		1
Total		**60**

A summary of the Minor findings are listed below.

Section	Recommendation
Parameter Coverage	Ensure that the chlorine residual is above the target value of 0.2mg/L in the reticulation systems.
Compliance with Approval conditions	Ensure that all obligations including an external audit are met by the due date. A calendar and regular meeting will assist with meeting these obligations
Vermin Control	Ensure that temporary activities avoid exposing the clear water storage tank to vermin risk; Ensure that the Taroom clear water storage tank has mesh covering the air vents.
Reagent Management	Order new pH standards and ensure that they are used in anticipation of their use-by-date.
Instrument Calibration	Ensure that all instruments are included in the external calibration program. It is recommended that the daily calibrations be added to the daily operational sheets to ensure this is done.
RMIP Implementation	Actively review the RMIP to ensure that items are addressed, and their status is known.

8. Outcome of the review of the DWQMP and how issues raised have been addressed

The Banana Shire Council Drinking Water Quality Management Plan was reviewed in 2020/21 and was submitted to the regulator for review on 30 September 2021.

The amended DWQMP is under review by the Department of Regional Development, Manufacturing and Water with some minor changes required to be fully endorsed by the end of the calendar year 2021.

Appendix A – Summary of compliance with water quality criteria

Pages 1 to 11 summarise the test results for microbiological contamination, specifically looking for *Escherichia coli*, a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk.

The reported statistics do not include results derived from repeat samples, or from emergency or investigative samples undertaken in response to an elevated result.

The results reported are 90% Nata approved verification testing and 10% Readycult internally approved testing, as per the DWQMP.

Drinking water scheme: Banana (BAN01, BAN02, BAN04)

Year	*2020 to 2021*											
Month	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	1	0	1	2	0	2	7	4	4	1	4	0
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	13	12	12	13	12	13	19	22	25	26	27	26
No. of failures for previous 12 month period	1	1	1	1	1	1	1	1	1	1	0	0
% of samples that comply	92.3%	91.7%	91.7%	92.3%	91.7%	92.3%	94.7%	95.5%	96.0%	96.2%	100.0%	100.0%
Compliance with 98% annual value	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES

Drinking water scheme: Baralaba (BAR02, BAR03, BAR04, BAR05)

Year	*2020 to 2021*											
Month	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	2	2	2	1	2	2	2	2	2	2	2	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	23	23	23	22	22	22	22	24	24	24	23	24
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Drinking water scheme: Biloela (BIL03, BIL04, BIL05, BIL06, BIL07, BIL08, BIL09, BIL10, BIL11, BIL12, BIL13, BIL14, BIL15, BIL16, BIL17, BIL1

Year	*2020 to 2021*											
Month	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***Jun***
No. of samples collected	19	12	12	12	14	10	16	16	20	16	23	30
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	176	176	173	173	165	157	154	158	154	164	182	197
No. of failures for previous 12 month period	1	1	1	0	0	0	0	0	0	0	0	0
% of samples that comply	99.4%	99.4%	99.4%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

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 refered to as the 'annual value' in Schedule 3A of the regulation.

This requirement comes into effect once you have 12 months data and should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Callide Dam (CAL01 & CAL02)

Year	*2020 to 2021*											
Month	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	2	0	1	1	1	1	1	1	1	1	1	5
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	21	20	20	20	16	13	12	12	12	12	13	16
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Drinking water scheme: GOOVIGEN (GOOV03 AND GOOV04)

Year	*2020 to 2021*											
Month	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	1	1	1	1	1	1	1	1	1	1	5	7
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	20	20	20	20	21	17	15	16	12	12	16	22
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Drinking water scheme: MOURA (MOU03, MOU04, MOU06, MOU07, MOU08, MOU09, MOU11)

Year	*2020 to 2021*											
Month	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***Jun***
No. of samples collected	15	12	12	12	13	16	33	32	39	13	16	9
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	154	154	154	154	155	156	165	181	199	206	216	213
No. of failures for previous 12 month period	2	2	2	2	2	1	1	1	0	0	0	0
% of samples that comply	98.7%	98.7%	98.7%	98.7%	98.7%	99.4%	99.4%	99.4%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

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 refered to as the 'annual value' in Schedule 3A of the regulation.

This requirement comes into effect once you have 12 months data and should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: Taroom (TAR03, TAR04, TAR05, TAR06, TAR07, TAR14)

Year	*2020 to 2021*											
Month	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	2	6	6	6	10	7	7	6	10	21	10	15
No. of samples collected in which *E. coli* is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	1	0	0
No. of samples collected in previous 12 month period	62	61	64	63	64	65	66	67	70	77	81	87
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	1	1	1
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	98.7%	98.8%	98.9%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

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 refered to as the 'annual value' in Schedule 3A of the regulation.

This requirement comes into effect once you have 12 months data and should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme: THANGOOL (THAN01, THAN02, THAN03, THAN04, THAN05)

Year	*2020 to 2021*											
Month	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	6	0	2	2	2	2	3	2	2	4	4	5
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	36	34	34	34	30	27	26	27	25	27	29	34
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Drinking water scheme: Theodore (THEO03, THEO04, THEO05, THEO06, THEO08, THEO09)

Year	*2020 to 2021*											
Month	***July***	***Aug***	***Sept***	***Oct***	***Nov***	***Dec***	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***Jun***
No. of samples collected	6	6	6	6	6	6	9	9	11	10	7	13
No. of samples collected in which *E. coli* is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	63	63	63	63	63	63	66	73	77	87	88	95
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 3 B – Verification monitoring – Metals

SCHEME NAME	CHEMICAL PARAMETER #	UNITS OF MEASUREMENT	TOTAL COUNT OF TESTS	NO OF TEST PASSED	% COMPLIANCE	LABORATORY NAME	PLANNED COUNT
Baralaba	Metals	mg/L	8	8	100	QH	8
Biloela	Metals	mg/L	37	37	100	QH	48
Goovigen	Metals	mg/L	4	4	100	QH	4
Moura	Metals	mg/L	8	8	100	QH	8
Taroom	Metals	mg/L	15	15	100	QH	12
Theodore	Metals	mg/L	10	10	100	QH	8

Comments: Chemical parameters* - (Heavy Metal Analysis) - which includes - Aluminium, Arsenic, Boron, Cadmium, Chromium, Copper, Iron, Lead, Manganese, Nickel and Zinc.
The schedule is quarterly monitoring. Most sites (bar Goovigen), have 2 or more sampling sites, therefore the planned count has included all sample sites multiplied by the frequency. The Biloela bores did not meet the quarterly schedule, sampled 2-3 times for the year instead of 4 times. This is due to some bores being offline during the monitoring period and not being caught up.

Biloela also covers Thangool & Callide. Moura also covers Banana.

SCHEME NAME	PHYSICAL PARAMETER	TOTAL COUNT OF TESTS	NO OF TEST PASSED	% COMPLIANCE	LABORATORY NAME	PLANNED COUNT
Baralaba	Physical	9	9	100	QH	8
Biloela	Physical	32	32	100	QH	48
Goovigen	Physical	4	4	100	QH	4
Moura	Physical	9	9	100	QH	4
Taroom	Physical	12	12	100	QH	12
Theodore	Physical	8	8	100	QH	8

Table 3 C – Verification monitoring – Standard Water Analysis

Comments: Physical Parameters: includes - Conductivity, pH, Total Hardness*, Alkalinity, Residual Alkalinity, Total Dissolved Solids, Total Dissolved Ions, True Colour, Turbidity. *Total Hardness is an aesthetic property and has no health guideline value; any aesthetic considerations are not included in this table. The Biloela bores did not meet the quarterly schedule, sampled 2-3 times for the year instead of 4 times. This is due to some bores being offline during the monitoring period and not being caught up.

Biloela also covers Thangool & Callide. Moura also covers Banana.

Table 3 D – Verification monitoring – Herbicides / Pesticides

SCHEME NAME	PESTICIDES	TOTAL COUNT OF TESTS	NO OF TEST PASSED*	% COMPLIANCE	LABORATORY NAME	PLANNED COUNT
Baralaba	Herbicides / Pesticides	8	8	100	QH	8
Biloela	Herbicides / Pesticides	23	23	100	QH	48
Goovigen	Herbicides / Pesticides	2	2	100	QH	4
Moura	Herbicides / Pesticides	6	6	100	QH	8
Taroom	Herbicides / Pesticides	7	7	100	QH	12
Theodore	Herbicides / Pesticides	6	6	100	QH	8

*Includes non-recordable detections of analytes. Biloela also covers Thangool & Callide. Moura also cover Banana.

** At Biloela each bore was sampled for herbicides and pesticides during the reporting period. All bores did not meet the quarterly schedule, either sampled 2-3 times for the year instead of 4 times. This is due to some bores being offline during the monitoring period and not being caught up.

Biloela also covers Thangool & Callide. Moura also covers Banana.

Table 3 E – Verification monitoring – Radiological

SCHEME NAME	RADIOLOGICAL PARAMETER	TOTAL COUNT OF TESTS	NO OF TEST PASSED	% COMPLIANCE	LABORATORY NAME	PLANNED FREQUENCY
Baralaba	Corrected Activity	1	1	100	QH	5 YEARLY
Biloela	Corrected Activity	8	8	100	QH	5 YEARLY – Source Water 2 YEARLY - Bores
Goovigen	Corrected Activity	1	1	100	QH	2 YEARLY
Moura	Corrected Activity	1	1	100	QH	5 YEARLY
Taroom	Corrected Activity	3	3	100	QH	2 YEARLY
Theodore	Corrected Activity	1	1	100	QH	5 YEARLY

* All sites were monitored this year
** Biloela also covers Thangool & Callide. Moura also cover Banana.
*** Source Water and Bores completed- Missed BIL10 and BIL12

Table 3 F – Verification monitoring – Disinfection By-Products

SCHEME NAME	PARMETER	UNITS OF MEASUREMENT	TOTAL COUNT OF TESTS	% COMPLIANCE	LABORATORY NAME	NO OF TEST PASSED	PLANNED COUNT
Baralaba	THMS	µg/L	12	100	QH	100	12
Biloela	THMS	µg/L	20*	100	QH	100	24
Goovigen	THMS	µg/L	3**	100	QH	100	4
Moura	THMS	µg/L	12	100	QH	100	12
Taroom	THMS	µg/L	12	100	QH	100	12
Theodore	THMS	µg/L	12	100	QH	100	12

* July and October rounds missed
** June round missed

Appendix B – Implementation of the DWQMP Risk Management Improvement Program

Table 4 – Key items of progress against the risk management improvement program in the approved DWQMP

Task	Scheme	Plant	Process Step	Description	Action	Status 21-22 FY	Status 22-23 FY	Status 23-24 FY	Comments
1	Baralaba (BAR)	Baralaba WTP	Raw water intake	Intake of contaminated water during wet weather even and moderate or major flood	Consider installation of automatic level sensors connected to telemetry and automated plant shut down on increased raw water turbidity and river level			Future Upgrade	
2	Baralaba (BAR)	Baralaba WTP	Treated Water	Treatment chemical storage needs to meet A/S	Upgrade chemical storage and bunding	Planned Capital Project			
3	Baralaba (BAR)	Baralaba WTP	Filtration	A 2nd Train installed to allow water production to continue while train 1 is turned off for any reason.	Finish the commissioning of the Train 2 UF	Planned Capital Project			
4	Baralaba (BAR)	Baralaba WTP	Raw Water intake	Rerouting and redesigning the chemical lines to prevent sun exposed chemical lines failing.	Replacement of the chemical lines at the raw water tank	Planned Capital Project.			
5	Baralaba (BAR)	Baralaba WTP	Treated Water	There is no current iosolation on the CWT. Operators are unable to isolate the tank in an emergency, resulting in a loss of stored water.	Installation of clear water tank isolation valve.	Planned Capital Project.			
6	Biloela (BIL)	Biloela Bores	Monitoring	Investigation into PFAS concentrations in the surrounding groundwater to ensure ADWG are met.	Routine monitoring and evaluation of the results to ensure the water is safe.	In Progress			
7	Biloela (BIL)	Biloela WTP	Monitoring	Lack of ventilation in the laboratory poses a safety hazard during monitoring and the use of chemicals.	Install Fume hoods in the laboratory	Planned Capital Project.			
7	Biloela (BIL)	Biloela WTP	Treated Water	Filtered water pipe is corroding due to exposure to chlorine gas.	Replace the corroded pipework and implement preventatives to stop from recurring.	Planned Capital Project.			
8	Biloela (BIL)	Biloela WTP	Clarified water	Monitor the water turbidity prior to entering the filters.	Install online turbidity meter at the clarified water outlet (before the filters)	Planned Capital Project.			
9	Biloela (BIL)	Biloela WTP	Backwash/clarified water	Increasing the flow of water to the ponds will allow quicker draining of the clarifiers and improve efficiency.	Upgrade the splitter box to increase the flow of water to the ponds.	Planned Capital Project.			
10	Goovigen (GOOV)	Bores	Raw Water	The submersible pump is required to maintain the Goovigen water supply.	Replace the existing above ground motor with a submersible pump	Planned Capital Project.			
11	Moura (MOU)	Moura WTP	Filtration	Clarifier 2 referbishment- completion	The existing clarifier 2 will be replaced with a new clarifier. The WTP capacity will increase to 110L/s which will meet the peak day demands	Planned Capital Project			
12	Moura (MOU)	Moura WTP	Filtration	Installation of valves to run half of train 3 during cleaning or breakdowns	The ability to split train 3 clarifier will allow for water to be produced during cleaning and breakdowns, increasing efficiency.	Planned Capital Project			
13	Moura (MOU)	Moura WTP	Disinfection	Reducing the risk of chlorine injection failing due to pipe breaks.	Replace the underground poly section of Cl2 at train 2 that breaks.	Planned Capital Project			
14	Moura (MOU)	Moura WTP	Filtration	6mm underground airlines have failed. It is impossible to track down multiple leaks. This has caused our compressors to be overworked.	Renewal of air-lines for actuated valves both underground and inside the old lab pit.	Planned Capital Project			
15	Moura (MOU)	Moura WTP	Filtration	Existing filters wil be refurbished to meet the new clarifier capacity.	Refurbish Filter 3 and 4 to include sandblast, patch, add new media and new nozzles.	Planned Capital Project			
16	Taroom (TAR)	Taroom WTP	Treated Water	Assess the structural integrity of the roof support for clear water tank	Roof support condition investigation and design proposal	Design Phase	Construction Phase		
17	Taroom (TAR)	Bore Intake	Raw water intake	Contamination of water	Improve onsite monitoring capability	In Progress			
18	Taroom (TAR)	Taroom WTP	Aeration	Contamination of water	Investigate enclosing aerator to prevent contamination	In progress			Aeration, chlorination and reticulation upgrade in progress
19	Taroom (TAR)	Taroom WTP	Clear Water Tank	Poor water quality leaving clear water tank	Investigate implementing turbidity monitoring	Future Upgrade			To be included in future upgrade
20	Thangool (THA)	Biloela WTP	Treated Water	Strengthen the monitoring and control tank water levels.	Float backups for transducers for reservoir control/alarms	Planned Capital Project			
21	Theodore (THE)	Theodore WTP	Raw water intake	Intake of contaminated water during wet weather even and moderate flood	Consider installation of automatic level sensors connected to telemetry and automated plant shut down on increased raw water turbidity and river level				Part of the WTP automation project
22	Theodore (THE)	Theodore WTP	Raw water intake	Preliminary design and tender document for the construction of a new raw water intake	Design of a new RWPS.	Design Phase	Tender Phase		
23	Theodore (THE)	Theodore WTP	Coagulation / Flocculation	Underdose of coagulant	Install duty/standby coagulant dosing pump (Spare pump stored at the WTP)				Currently, one pump working, one spare - to Include in Future Tender Specs

Task	Scheme	Plant	Process Step	Description	Action	Status 21-22 FY	Status 22-23 FY	Status 23-24 FY	Comments
24	Theodore (THE)	Theodore WTP	Activated carbon adsorption	Underdose PAC, Inefficient algal toxin removal	Consider installing automatic PAC dosing system			Future Upgrade	To include in Future Tender Specs
25	Theodore (THE)	Theodore WTP	Activated carbon adsorption	Overdose PAC	Consider installing automatic PAC dosing system			Future Upgrade	To include in Future Tender Specs
26	Theodore (THE)	Theodore WTP	Filtration	Breakthrough and mud balls	Consider installing automatic backwash system			Future Upgrade	WTP automation
27	Theodore (THE)	Theodore WTP	Treated water	WHS	Extend the safety railing at the clear water tank to access the hatch and the water level.	Planned Capital Project			
28	Theodore (THE)	Theodore WTP	Treated water	Eliminate dead zones within the clear water tank where no chlorine is present.	Clear water tank/Chlorine contact installation of baffle/ring main or mixer to prevent short circuiting of Cl2 dosed water.	Planned Capital Project			
29	Theodore (THE)	Theodore WTP	Treated water	Assess the structural integrity of the roof support for clear water tank	Roof support condition investigation and design proposal	Design Phase	Construction Phase		
30	General	General	General	Failure of equipment	Develop and implement maintenance management system including maintenance procedures, register of spares and requirements	Being implemented (assetic)	Ongoing	In Progress	Currently under way. O & M manuals used to develop maintenance procedures.
31	General	General	General	Failure of equipment	Develop register of spares and requirements	Underway			Currently working on - updated to Assetic program
32	General	General	General	Inadequate calibration leading to incorrect readings/operations	Review calibration methodologies and frequencies	Underway	Ongoing		Procedures for verification of calibration to be included in BSC Laboratory manual procedures.
33	General	General	General	DW Audit Report	Implement corrective and preventative action for all findings from the DW Audit	Underway			
34	General	General	Reticulation	Contamination of water from use of contaminated spares	Specify requirements for mains installations for developers and contractors	To be reviewed			tender specification (mains disinfection)

Appendix C – Summary of DWQMP review actions identified

Table 5 – Action status

Action	Detail	Complete	Comment
Amend stakeholders relevant to the management of drinking water Quality	Added chemical suppliers, updated phone numbers	Y	
Amended the authorities in section 1.4	Changed the titles of new roles that have commenced	Y	
Updated water quality data	Verification that the CCPs are appropriate and achievable for all the schemes	Y	Graphs
Update the schematics	This was for plants that have had major changes in the treatment step processes	Y	
Update the risk assessments for all schemes	Considered new risks to the drinking water and the residual risks after controls are implemented	Y	
Updated all the CCPs	Turbidity, Fluoridation, Disinfection, Filtration, and pH	Y	
Updated the monitoring program	Completed risk assessment to allow for amendments to the sampling program for all schemes	Y	
Included an appendix for drinking water treatment chemical contaminant	Calculation of the concentration for the residual contaminants found in drinking water after treatment	Y	
Updated the Incident and Emergency Response Plan	Completed the review for all sites	Y	
Updated the Laboratory Manual	Updated the procedure for sampling and testing of analytes	Y	
Updated the Risk Management Improvement Program	Included all the current and future projects occurring at all the sites.	Y	

Appendix D – Water testing summary results.

The results from the verification monitoring program have been compared against the levels of the water quality criteria specified by the Regulator in the Water Quality and Reporting Guideline for a Drinking Water Service.

This report is best read in conjunction with the Australian Drinking Water Guidelines, the relevance of each parameter is explained in detail. The reason for the non-compliance is a result of resourcing (inability to fill operator roles) and operational changes during this period. We are working on actioning the resourcing issue.

Scheme name	Parameter	No. of samples required to be collected (as per approved DWQMP)	No. of samples actually collected and tested in FY20/21	Water quality criteria (i.e. ASWG health guideline value)	No. of non-compliant samples	Comments
Biloela	pH	1242	932	6.5-8.5		
	Turbidity	1242	922	5 NTU		Taken from treated water, 8 bores, 8 reticulation locations and pre and post mixing.
	True Colour	1242	857	Aesthetic: 15 HU		
	Total Iron	1242	905	No health guidelines set		
	Soluble Iron	96	52			Taken from the bores only
	Conductivity	96	81			
	Total Manganese	1094	812	0.5 mg/l		
	Alkalinity	1242	920			
	Fluoride	1242	847	1.5 mg/L		
	E.coli	520	200	0 MNP/100ml		

- Soluble Manganese, Total Phosphorus, Total Nitrogen and Apparent Colour are sampled in the raw (untreated water) not in the treated and have been removed from this analysis.

Scheme name	Parameter	No. of samples required to be collected (as per approved DWQMP)	No. of samples actually collected and tested in FY20/21	Water quality criteria (i.e. ASWG health guideline value)	No. of non-compliant samples	Comments
Biloela	Total Coliforms	520	200			
	Trihalomethanes	24	22	0.250 mg/l		
	Salinity	148	37			
	Free Chlorine	1218	890	5mg/l		
	Heavy Metals	28	34	ADWG 2011 Chapter 10 Table 10.6		Extra samples taken at some points
	Pesticide Residue	24	22	ADWG 2011 Chapter 10 Table 10.6		
	Standard Water Analysis	28	28	ADWG 2011 Chapter 10 Table 10.6		
Thangool Reticulation	pH	156	51	6.5-8.5		Taken from 3 sampling locations
	Free Chlorine	156	81	5mg/l		
	Turbidity	156	51	5 NTU		
	Total Iron	156	51	No health guidelines set		
	Alkalinity	156	51	NA		
	Total Manganese	156	46	0.5 mg/l		
	True Colour	156	43	15 HU		
	Total Coliforms	24	32			
	E.coli	24	32	0mpn/100ml		

Scheme name	Parameter	No. of samples required to be collected (as per approved DWQMP)	No. of samples actually collected and tested in FY20/21	Water quality criteria (i.e. ASWG health guideline value)	No. of non-compliant samples	Comments
Callide Dam Village	pH	104	36	6.5-8.5		Taken from 2 sampling locations
	Free Chlorine	104	49	5mg/l		
	Turbidity	104	36	5 NTU		
	Total Iron	104	36	No health guidelines set		
	Alkalinity	104	36			
	Total Manganese	104	34	0.5 mg/l		
	True Colour	104	16	Aesthetic: 15 HU		
	Total Coliforms	24	15	NA		
	E.coli	24	15	0mpn/100ml		
Goovigen	pH	208	112	6.5-8.5		Taken from 4 sampling locations
	Free Chlorine	208	104	5mg/l		
	Turbidity	208	111	5 NTU		
	Apparent Colour	208	100			
	True Colour	208	108	Aesthetic: 15 HU		
	Total Iron	208	110	No health guidelines set		
	Conductivity	208	112			
	Alkalinity	208	112			
	Salinity	208	109			
	Total Manganese	208	104	0.5mg/l		
	E.coli	60	44	0mpn/100ml		
	Trihalomethanes	4	4	0.250mg/l		
	Standard Water Analysis	4	3	ADWG 2011 Chapter 10 Table 10.6		

Scheme name	Parameter	No. of samples required to be collected (as per approved DWQMP)	No. of samples actually collected and tested in FY20/21	Water quality criteria (i.e. ASWG health guideline value)	No. of non-compliant samples	Comments
Goovigen	Heavy Metals	4	4	ADWG 2011 Chapter 10 Table 10.6		
	Pesticide Residue	2	2	ADWG 2011 Chapter 10 Table 10.6		
Banana	pH	208	93	6.5-8.5		Taken from 3 sampling locations
	Free Chlorine	208	101	5mg/l		
	Turbidity	208	94	5 NTU		
	Total Iron	208	28	No health guidelines set		
	Alkalinity	208	NR	NA		No Alkalinity was monitored at Banana due to administrative error.
	Total Manganese	208	84	0.5 mg/l		
	True Colour	208	93	Aesthetic: 15 HU		
	E.coli	36	26	0mpn/100ml		
	Total Coliforms	36	26	NA		

Scheme name	Parameter	No. of samples required to be collected (as per approved DWQMP)	No. of samples actually collected and tested in FY20/21	Water quality criteria (i.e. ASWG health guideline value)	No. of non-compliant samples	Comments
Baralaba	pH	208	90	6.5-8.5		Taken from 3 sampling locations
	Alkalinity	208	103			
	Apparent Colours	104	44			
	True Colour	24	24	Aesthetic: 15 HTU		
	Turbidity	208	77			
	E. coli	48	25	0 mpn/100ml		
	Coliforms	48	25			
	Free Chlorine	220	100	5mg/l		
	Soluble Manganese	104	40	0.5mg/L		
	Total Manganese	104	62	0.5mg/L		
	Total Iron	208	70	No Health Guideline set		
	Heavy Metals	4	4	ADWG 2011 Chapter 10 Table 10.6		
	Pesticide	4	4	ADWG 2011 Chapter 10 Table 10.6		
	Standard Water Analysis	4	4	ADWG 2011 Chapter 10 Table 10.6		
	Trihalomethanes	12	12	0.250mg/l		

Scheme name	Parameter	No. of samples required to be collected (as per approved DWQMP)	No. of samples actually collected and tested in FY20/21	Water quality criteria (i.e. ASWG health guideline value)	No. of non-compliant samples	Comments
Theodore	pH	625	610	6.5-8.5		
	Turbidity	625	601	5NTU		
	True Colour	625	605	15HU		
	Total Iron	625	586	No guideline set		
	Alkalinity	365	365	No guideline set		
	Total Manganese	625	550	0.5mg/L		
	Free Chlorine	761	629	5mg/L		
	E.coli	72	90	0 MPN/100ml		
	Total Coliforms	72	90			
	Trihalomethanes	12	12	0.250mg/l		
	Standard Water Analysis	4	4	ADWG 2011 Chapter 10 Table 10.6		
	Pesticide Residue	4	3	ADWG 2011 Chapter 10 Table 10.6		
	Heavy Metals	4	5	ADWG 2011 Chapter 10 Table 10.6		

Scheme name	Parameter	No. of samples required to be collected (as per approved DWQMP)	No. of samples actually collected and tested in FY20/21	Water quality criteria (i.e. ASWG health guideline value)	No. of non-compliant samples	Comments
Taroom	pH	625	612	6.5-8.5		
	Turbidity	625	621	5 NTU		
	True Colour	365	365	Aesthetic guideline:15 HU		
	Total Iron	625	621	No health guideline set		
	Total Manganese	625	621	0.5 mg/l		
	Alkalinity	573	621	NA		
	E.coli	72	106	0mpn/100ml	1	Reported to DEWS
	Coliforms	72	106			Additional sampling conducted at the reticulated water locations.
	Free Chlorine	625	709	5mg/l		
	Heavy Metals	4	5	ADWG 2011 Chapter 10 Table 10.6		
	Pesticide Residue	2.5	4	ADWG 2011 Chapter 10 Table 10.6		
	Standard Water Analysis	4	4	ADWG 2011 Chapter 10 Table 10.6		
	Trihalomethanes	12	12	0.250mg/l		

Scheme name	Parameter	No. of samples required to be collected (as per approved DWQMP)	No. of samples actually collected and tested in FY20/21	Water quality criteria (i.e. ASWG health guideline value)	No. of non-compliant samples	Comments
Moura	pH	625	682	6.5-8.5		
	Turbidity	625	682	5 NTU		
	Alkalinity	625	682	NA		
	E.coli	312	223	0mpn/100ml		
	Total Coliforms	312	222			
	Free Chlorine	625	625	5mg/l		
	True Colour	625	682	15HU		
	Total Manganese	625	682			
	Total Iron	625	430	No health guidelines set		
	Fluoride	12	4	1.5mg/L		
	Trihalomethanes	12	12	0.250 mg/l		
	Heavy Metals	4	4	ADWG 2011 Chapter 10 Table 10.6		
	Pesticide Residue	4	4	ADWG 2011 Chapter 10 Table 10.6		
	Standard Water Analysis	4	4	ADWG 2011 Chapter 10 Table 10.6		