



Drinking Water Management System

Annual Review Report 2024 and 2025

June 2026



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EXECUTIVE SUMMARY

Water suppliers in New South Wales (NSW) are required to establish and adhere to a 'quality assurance program', referred to as a Drinking Water Management System (DWMS). An annual review of the DWMS is recommended to ensure that it is valid and being implemented effectively. Furthermore, an Annual Report is required to be prepared and submitted to the local Public Health Unit (PHU), NSW Health.

Viridis Consultants Pty Ltd (Viridis) was engaged by Bogan Shire Council (BSC) to assist in preparing the DWMS Annual Report for 2025, which covers a 24-month reporting period from 1 January 2024 to 31 December 2025.

BSC is responsible for treating and distributing water to the township of Nyngan. There have been no material changes to the supply processes, including treatment, to impact the risk profile.

The critical control points (CCPs) were mostly maintained within the critical limits. The asset age and condition of the filters and plant present ongoing challenges in maintaining turbidity below 0.2 NTU. There were 9 samples across all filters that exceeded the 0.5 NTU critical limit, all of which were within the range of 0.5-0.7 NTU. Free chlorine generally exceeded the upper alert limit, which does not present a health risk, though there were 3 breaches of the lower critical limit (two in June and one in October of 2025). Fluoridation was offline throughout the reporting period, and consequently, no fluoride data was recorded. Monthly reservoir inspections were completed across all 24 months with no issues identified, although inspections will occur on a weekly basis going forward.

Verification monitoring results demonstrated 98.88% compliance with ADWG health-based guidelines for *E. coli*, with one detection recorded in December 2024, which was considered a sampling error. There were 7 total coliform detections out of 89 samples (not health-based), and free chlorine was maintained above 0.2 mg/L across all reticulation sampling locations. Chemistry analysis results were 100% compliant with ADWG health-based guidelines, although aluminium and pH were outside aesthetic guidelines. Some sampling was missed during the reporting period; 2024 achieved 96.15% of expected microbiology samples conducted and 50% of expected chemistry samples conducted, while 2025 achieved 89% of expected microbiology samples conducted and no chemistry sampling was conducted.

The *E. coli* detection and the ongoing fluoridation outage were reported to the PHU over the reporting period.

BSC recorded no water quality complaints for the Nyngan scheme during the reporting period, indicating greater customer satisfaction.

An Improvement Plan is part of a management system and demonstrates the continual improvement process in place for an organisation. The Improvement Plan for BSC was reviewed and updated as part of the preparation for this annual report. There were no new improvement actions identified during the annual review.

The outcome of the annual review is that there is need to comprehensively review the DWMS, including the risk assessment and CCPs, as the last risk assessment workshop and DWMS update were both undertaken in 2021. CCP critical limit breaches should also be reported to the PHU as required.

There was no formal audit undertaken for DWMS implementation over the reporting period. The external audit frequency will be implemented as guided by NSW Health.

1. INTRODUCTION

Water suppliers in New South Wales (NSW) are required to establish and adhere to a 'quality assurance program', referred to as a Drinking Water Management System (DWMS). The DWMS is a risk-based approach to managing drinking water quality.

An annual review of the DWMS is recommended to ensure that it is valid and is being implemented effectively. In addition, an Annual Report is required to be prepared and submitted to the local Public Health Unit (PHU), NSW Health.

Viridis Consultants Pty Ltd (Viridis) was engaged by Bogan Shire Council (BSC) to assist in preparing the DWMS Annual Report for the period 2024 and 2025.

This report covers a 24-month reporting period from 1 January 2024 to 31 December 2025. It summarises BSC's drinking water quality performance for the reporting period, any changes or improvements needed, and progress on the implementation of the improvement plan.

2. SUPPLY SCHEME

BSC operates and manages the Nyngan water supply scheme. Water is sourced from the Bogan River Weir Pool and treated at the water treatment plant. The treatment train comprises of sedimentation, filtration, disinfection by chlorine, and fluoridation. Water is then pumped through the reticulation to the town reservoirs.

3. SCHEME CHANGES

The Nyngan Supply Scheme has had no significant changes to the water supply processes, including treatment, during the reporting period to impact on the risk profile. However, a raw water pump was replaced in 2025, and in 2026, there will be an update to the PAC system.

4. CRITICAL CONTROL POINTS

The current CCPs are presented in Table 1. The implementation of the current CCPs is discussed in this section.

Table 1 Current CCPs

CCP	Control Parameter	Target	Alert	Critical Limit
CCP 1 – Filtration	Filtered water turbidity – individual filters	<0.2 NTU	≥0.2 NTU	>0.5 NTU
CCP 2 - Disinfection	Free chlorine leaving the WTP	1.5 – 2.0 mg/L	<1.5 mg/L or >2 mg/L	<1.0 mg/L
CCP 3 – Fluoridation	Fluoride leaving the WTP	1.0 mg/L	<0.9 mg/L or >1.1 mg/L	>1.5 mg/L
CCP 4 – Tank / Reservoirs	Inspection of CWT and reservoirs	Secure, vermin-proof and rainwater runoff proof	Evidence of breaches or potential breaches	Evidence of vermin inside

4.1. CCP 1 Filtration - Turbidity

Turbidity trend of each of the five filters with turbidity analysers is shown in Figure 1.

The asset age and condition of the filters and the plant present challenges in maintaining turbidity at <0.2 NTU, as seen in Figure 1, where the median turbidity for each filter is 0.2. Across 2024-2025, there have been 9 samples across all filters which have exceeded the 0.5 NTU critical limit, all of which are within the turbidity range of 0.5-0.7 NTU. One outlier was removed from the analysis because it was a suspected data entry error, in which a Filter 4 turbidity sample in January 2024 had a recording of 4 NTU.

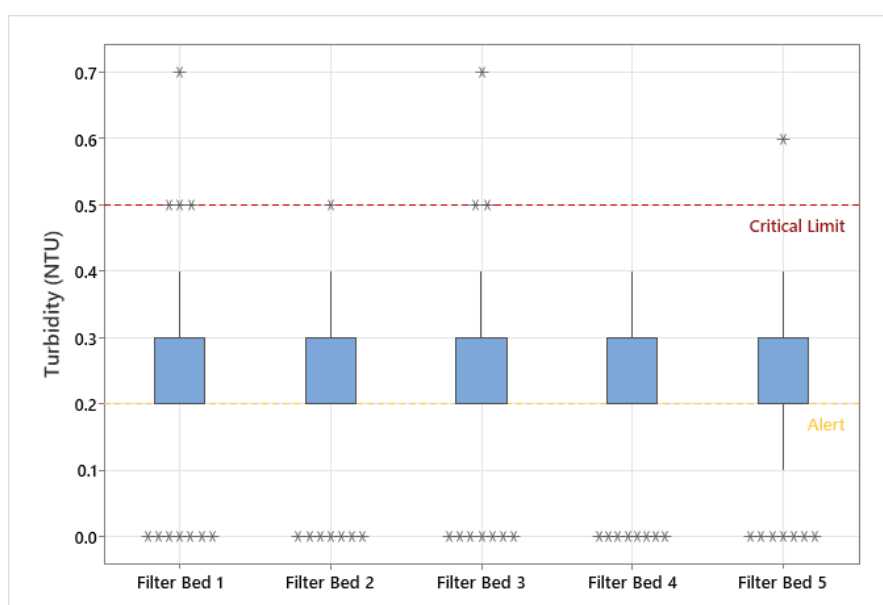


Figure 1: CCP 1 Filtration – Turbidity

4.2. CCP 2 Disinfection – Free Chlorine

Free chlorine data of the treated water is shown in Figure 2. Most values exceeded the upper alert limit, but this does not present a health risk. There were 3 breaches of the critical limit: 0.99 (28/06/2025), 0.27 mg/L (29/06/2025), 0.31 mg/L (26/10/2025). A few results were notably low in the late June/early July period of 2025.

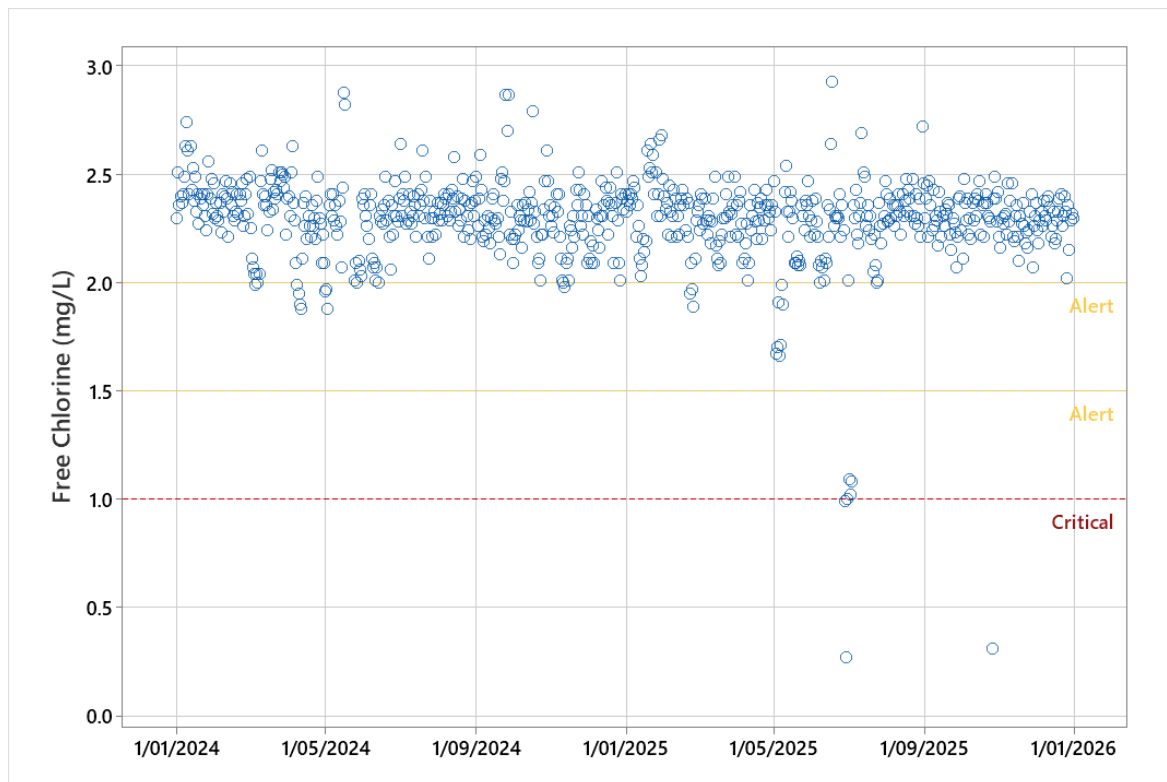


Figure 2: CCP 2 Disinfection – Free Chlorine

4.3. CCP 3 Fluoridation – Fluoride

Fluoride was not tested in 2024 and 2025 since the fluoride plant was offline. Consequently, no fluoride data was recorded during the reporting period. Fluoride data will be recorded going forward in 2026, when the fluoride system is operational.

4.4. CCP 4 – Tank / Reservoir Integrity

Maintaining the integrity of the distribution system is an important barrier in keeping the supply safe from potential recontamination. This includes ensuring that the service reservoirs are not vulnerable to contamination, for example, by vermin, birds or rainwater runoff ingress.

In-house inspections of Reservoir 1 (Terangion St) and Reservoir 2 (Cobar St) were undertaken monthly using the inspection checklist. In the reporting period, all inspections were carried out in all 24 months, with no issues noted from the reservoir inspections. Inspections will be conducted weekly going forward.

Both reservoirs undergo a full cleaning process once every 5 years. This was last carried out in July and August 2022, and they were found to be in good condition, with no corrosion and minimal sedimentation. The next full cleaning process will be conducted in 2027.

5. VERIFICATION MONITORING PERFORMANCE

Verification of drinking water quality provides an assessment of the overall performance of the system and the ultimate quality of drinking water being supplied to consumers. This incorporates monitoring drinking water quality as well as assessment of consumer satisfaction.

5.1. Reticulation Water Quality Monitoring

Drinking water quality monitoring is a wide-ranging assessment of the quality of water in the reticulation or distribution system and importantly, as supplied to the consumer. It includes regular sampling and testing to assess whether water quality is complying with ADWG values. Monitoring of drinking water is regarded as the final check that, overall, the barriers and preventive measures implemented to protect public health are working effectively.

5.1.1. Microbiological Sampling

As shown in Table 2, across 2024-2025, except for *E. coli*, there was 100% compliance against the ADWG health-based guidelines. There was 1 *E. coli* detected from a sample collected in December 2024, and total coliforms were detected in 7 samples out of 89 (not health-based). As shown in Figure 3, free chlorine was maintained above 0.2 mg/L operational limit across the reticulation. While the range of free chlorine differed, free chlorine was roughly similar across the sampling locations.

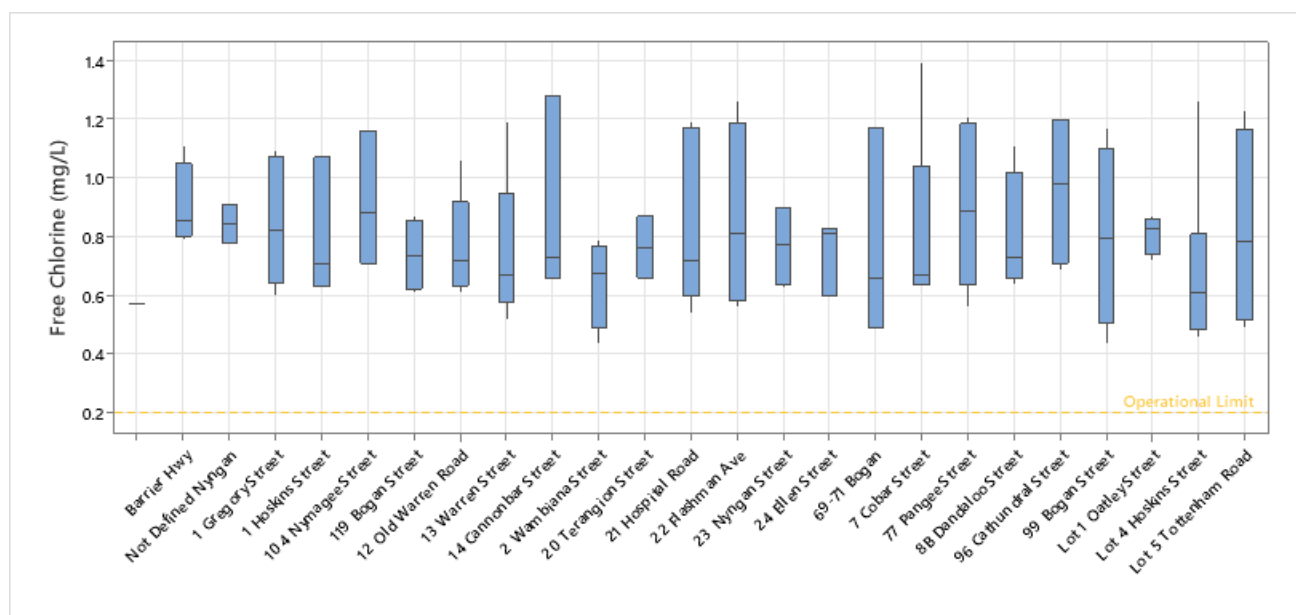


Figure 3: Free Chlorine in Reticulation by Sampling Location

5.1.2. Chemistry analysis

As shown in Table 2, there was 100% compliance against the ADWG health-based guidelines. Aluminium and pH samples were outside of the aesthetic guidelines (See Table 2).

5.1.3. Required Sampling Count

Broadly-speaking, 2024 had 96.15% of expected microbiology samples collected and had 50% of expected chemistry samples collected. 2025 had 88.46% of expected microbiology samples collected and had 0% of expected chemistry samples collected.

For both years, January had low sampling, with 3 out of the 7 parameters missing a sampling in 2024, and all parameters missing a sampling in 2025. December of 2025 had only 1 sampling for all parameters.

The missing samples and records have been discussed with Council as part of the preparation of this report. A regular challenge is with transporting of the microbial samples to the testing laboratory within the sample holding times. While effort is made by BSC to ensure sample validity, this is not always possible with the remote location and the route/timeframes for sending samples to the testing laboratory in Sydney.

As per the DWMS, chemistry analysis is required twice a year. This requirement was not met; only one sample for each parameter in the chemistry analysis suite was recorded in 2024, and there were no samples conducted in 2025.

Table 2: Verification Monitoring annual chemistry and microbiology testing summary

Analysis Type	Characteristic	Guideline Value	Units	Mean	Median	Standard Deviation	Min	Max	Sample Count	Exception Count	95th%ile	5th%ile	% meeting guideline values
Microbiology	<i>E. coli</i>	0	MPN/100 mL	0.0337	0	0.318	0	3	89	1	0	0	98.88
	Free Chlorine	0.2 – 5	mg/L	0.8055	0.725	0.2283	0.4	1.4	98	0	1	0	100
	pH	6.5 – 8.5		7.7031	7.7	0.0843	7.4	7.8	98	0	8	8	100
	Temperature	30	°C	15.557	16	4.1552	4.6	25	98	0	22	9	100
	Total Chlorine	5	mg/L	1.1373	1.075	0.2236	0.8	1.9	98	0	2	1	100
	Total Coliforms	0	MPN/100 mL	2.9438	0	21.3219	0	200	89	7	11	0	92.13
	Turbidity	5	NTU	0.346	0.3	0.0898	0.2	0.8	98	0	1	0	100
Chemistry	Aluminium	0.2	mg/L	3.85	3.85	0.000	3.85	3.85	1	1	3.85	3.85	0.00
	Antimony	0.003	mg/L	0.0001	0.0001	0.000	0.0001	0.0001	1	0	0.0001	0.0001	100.00
	Arsenic	0.01	mg/L	0.0005	0.0005	0.000	0.0005	0.0005	1	0	0.0005	0.0005	100.00
	Barium	2	mg/L	0.0568	0.0568	0.000	0.0568	0.0568	1	0	0.0568	0.0568	100.00
	Boron	4	mg/L	0.0322	0.0322	0.000	0.0322	0.0322	1	0	0.0322	0.0322	100.00
	Cadmium	0.002	mg/L	0.00005	0.00005	0.000	0.00005	0.00005	1	0	0.00005	0.00005	100.00
	Calcium	10000	mg/L	6	6	0.000	6	6	1	0	6	6	100.00
	Chloride	250	mg/L	12	12	0.000	12	12	1	0	12	12	100.00
	Chromium	0.05	mg/L	0.0005	0.0005	0.000	0.0005	0.0005	1	0	0.0005	0.0005	100.00
	Copper	2	mg/L	0.028	0.028	0.000	0.028	0.028	1	0	0.028	0.028	100.00
	Fluoride	1.5	mg/L	0.05	0.05	0.000	0.05	0.05	1	0	0.05	0.05	100.00
	Iodine	0.5	mg/L	0.01	0.01	0.000	0.01	0.01	1	0	0.01	0.01	100.00

Analysis Type	Characteristic	Guideline Value	Units	Mean	Median	Standard Deviation	Min	Max	Sample Count	Exception Count	95th%ile	5th%ile	% meeting guideline values
	Iron	0.3	mg/L	0.05	0.05	0.000	0.05	0.05	1	0	0.05	0.05	100.00
	Lead	0.005	mg/L	0.0003	0.0003	0.000	0.0003	0.0003	1	0	0.0003	0.0003	100.00
	Magnesium	10000	mg/L	2.71	2.71	0.000	2.71	2.71	1	0	2.71	2.71	100.00
	Manganese	0.1	mg/L	0.0165	0.0165	0.000	0.0165	0.0165	1	0	0.0165	0.0165	100.00
	Mercury	0.001	mg/L	0.0004	0.0004	0.000	0.0004	0.0004	1	0	0.0004	0.0004	100.00
	Molybdenum	0.05	mg/L	0.0001	0.0001	0.000	0.0001	0.0001	1	0	0.0001	0.0001	100.00
	Nickel	0.02	mg/L	0.0018	0.0018	0.000	0.0018	0.0018	1	0	0.0018	0.0018	100.00
	Nitrate	50	mg/L	2	2	0.000	2	2	1	0	2	2	100.00
	Nitrite	3	mg/L	0.05	0.05	0.000	0.05	0.05	1	0	0.05	0.05	100.00
	pH	6.5 - 8.5		4.5	4.5	0.000	4.5	4.5	1	1	4.5	4.5	0.00
	Selenium	0.004	mg/L	0.0035	0.0035	0.000	0.0035	0.0035	1	0	0.0035	0.0035	100.00
	Silver	0.1	mg/L	0.0001	0.0001	0.000	0.0001	0.0001	1	0	0.0001	0.0001	100.00
	Sodium	180	mg/L	14	14	0.000	14	14	1	0	14	14	100.00
	Sulphate	250	mg/L	62	62	0.000	62	62	1	0	62	62	100.00
	Total Dissolved Solids (TDS)	10000	mg/L	110	110	0.000	110	110	1	0	110	110	100.00
	Total Hardness as CaCO3	200	mg/L	26.1	26.1	0.000	26.1	26.1	1	0	26.1	26.1	100.00
	True Colour	15	Hazen Units (HU)	8	8	0.000	8	8	1	0	8	8	100.00
	Turbidity	5	NTU	1.6	1.6	0.000	1.6	1.6	1	0	1.6	1.6	100.00
	Uranium	0.02	mg/L	5E-05	0.00005	0.000	0.00005	0.00005	1	0	0.00005	0.00005	100.00
	Zinc	3	mg/L	0.03	0.03	0.000	0.03	0.03	1	0	0.03	0.03	100.00

6. INCIDENTS REPORTED TO NSW HEALTH

The following incidents or issues were reported to the PHU over the reporting period:

- Fluoridation was offline during the reporting period. Fluoride data will be recorded going forward in 2026, when the system is operational.
- The *E. coli* detection from December 2024 was reported. This detection was considered a sampling error; there was re-sampling conducted the next day and no issue was found.

7. WATER QUALITY CUSTOMER COMPLAINTS

Monitoring of consumer complaints can provide valuable information on potential problems that may not have been identified by performance monitoring of the water supply system. Consumer satisfaction with drinking water quality is largely based on a judgment that the aesthetic quality of tap water is 'good', which usually means that it is colourless, free from suspended solids and has no unpleasant taste or odour.

There were no water quality complaints for the Nyngan scheme, which indicates great customer satisfaction.

8. IMPROVEMENT PLAN IMPLEMENTATION

An Improvement Plan is part of a management system and demonstrates the continual improvement process in place for an organisation. Council has an Improvement Plan, which is part of their DWMS.

8.1. Status

The status of the Improvement Plan has been updated from Council input as part of the preparation for this report. Refer to Appendix A for progress of the Improvement Plan, including commentary.

8.2. New Additions

There were no new improvement actions identified during the annual review of the DWMS.

9. DWMS REVIEW OUTCOMES

The annual review of the DWMS is guided by the review areas in Table 3. The table has been completed from discussions undertaken in other sections of this Annual Report and from annual review discussions between Council and Viridis on 6 May 2026. The participants for the annual review discussions meeting included:

- Bogan Shire Council – Trevor Waterhouse
- Bogan Shire Council – Cameron Bourke
- Viridis – Tasleem Hasan and Emily Cox

Table 3: Review Details

Review area	Discussions	Related action/s, as relevant
Supply system details, including schematics.	Refer to Section 3. There have been no significant changes to the scheme.	NA
Drinking water quality performance	Discussed in Section 5. The compliance with ADWG health-based guidelines has been good, although there was one <i>E. coli</i> detection in Dec 2024. Some sampling has been missed during the reporting period and was discussed.	Implementation of the sample schedule (for external monitoring) will be clarified to the operators.
CCP performance	Discussed in Section 4. There were 9 samples which exceeded the turbidity critical limit. There were 3 samples which exceeded the free chlorine critical limit. No fluoride data was presented for the fluoridation CCP.	Report CCP critical limit breaches to the PHU as required.
Outcomes of drinking water quality incidents and emergencies	Discussed in Section 6. There was one <i>E. coli</i> detection, which was reported to the regulator. Without this exception, there have been no water quality incidents or emergencies.	NA
Any significant changes to the risk register	The last risk assessment workshop was undertaken in 2021. The DWMS was also last updated in 2021.	Review the DWMS, including the risk profiles and CCPs.
Concerns of consumers (customer complaints)	Discussed in Section 7. There were no complaints during the reporting period.	NA
Improvement plan progress	Discussed in Section 8.	NA
Audit outcomes	Discussed in Section 10. Not applicable at this stage.	NA
Any concerns from NSW Health and Department of Climate Change, Energy, Environment and Water (DCCEEW)	Nothing new.	NA

The outcome of the review, as per Table 3, is that there is a need to comprehensively review the DWMS, including the risk assessment and CCPs.

10. DWMS AUDIT OUTCOMES

There was no formal audit undertaken for DWMS implementation over the reporting period. The external audit frequency will be implemented as guided by NSW Health.

DOCUMENT HISTORY AND TRACKING

Document History

Version	Section/s Modified	Brief Description of Amendment	Author	Approver	Issue Date
0.1	NA	Draft for internal review	Emily Cox	Tasleem Hasan	29/05/2026
0.2	NA	Draft for client review	Emily Cox	Tasleem Hasan	3/06/2026
1.0	None	Final	Emily Cox	Tasleem Hasan	10/06/2026

Document Tracking

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A. IMPROVEMENT PLAN PROGRESS

DWMS Improvement Plan

Revision due: As required and at least annually when the DWMS annual report is compiled.

Responsible Person: Manager Works & Service - Engineering (or delegate)

Version	Date created / reviewed	Prepared / Reviewed by	Details / changes made
1.0	2-Nov-20	Stacey Edwards and Tasleem Hasan (Viridis)	Excel spreadsheet developed to consolidate all improvement actions and recommendations from original DWMS 2012 and further NSW Health support projects in 2015 and 2018. Status of some actions reported in DWMS Annual Reports were included. Other actions were rationalised and comments included.
1.1	5-Nov-20	Trevor and Cameron - BSC Tasleem and Stacey - Viridis	Status of actions was discussed and updated via videoconference on 5/11/20, some further information provided by Trevor via emails on 11/11/20.
1.2	29-Apr-21	Risk team - BSC and Viridis	Status of actions of version 1.1 was reviewed and updated at the onsite risk workshop (day 2) on 29/4/21.
2.0	1-Jun-21	Tasleem Hasan (Viridis)	Version 1.2 tab archived. Current Improvement Plan tab (version 2.0) created from pending actions from 1.2 version and actions identified from the risk assessment register.
2.1	18-Mar-22	Trevor and Cameron - BSC Tasleem and Maddie - Viridis	Status of actions reviewed and updated as part of preparation of the DWMS Annual Report 2021.
2.2	2-May-23	Trevor - BSC Tasleem and Kristy - Viridis	Status of actions reviewed and updated as part of preparation of the DWMS Annual Report 2022.
2.3	9-May-24	Trevor - BSC Tasleem and Kristy - Viridis	Status of actions reviewed and updated as part of preparation of the DWMS Annual Report 2023.
2.4	6-May-26	Trevor - BSC Tasleem and Emily - Viridis	Status of actions reviewed and updated as part of preparation of the DWMS Annual Report 2024-25.

Bogan Shire Council DWMS Improvement Plan - Current

No.	Reference	Actions	Priority Level	Responsible Position	Timeframe (original)	Timeframe (revised)	Status (May 26)	Comments
1	2012 DWMS IP 1.2 #22	Ensure regular (weekly or fortnightly) toolbox style meetings are held with technical and operational staff to ensure staff understands the practical implications and application of formal and regulatory requirements and to allow two way communication of issues. Minutes should be kept of these meetings.	Low	Manager Works and Service	Dec-21	NA	Completed	Minutes started since last 3 minutes, will be put in TRIM. Meeting is every Wed morning.
2	2016 Review IP 1.2 #43	Undertake investigative work to determine suitable upgrading method for existing Nyngan WTP.	High	Manager Works and Service	Dec-22	Dec-31	In Progress	Critical works in progress, new plant has been approved - funding. Plan is get a new plant but this will take a while. Timeframe revised accordingly. Public works have appointed a new project manager. Tender for emergency works - actuators will be renewed and backwash on filters (sand condition looks okay). New filtration plant funding, site has been decided, hopefully in next 5 years.
3	2016 Review IP 1.2 #46	When the Water Strategic Business Plan is updated, ensure that levels of service include public health/water quality objectives, document public health/water quality implications of the operating environment review, and the operating review captures responsibilities in other documents such as Codes of Practice and Standards.	Medium	Manager Works and Service	Jun-22	Jul-26	In Progress	Review underway.
4	2016 Review IP 1.2 #79	Include online record keeping for the fluoride operation, dosing estimates and the fluoride levels in the water after the current PLC/SCADA upgrade.	Medium	Manager Works and Service	Dec-21	Dec-27	To Start	Fluoride plant was offline all of 2022 & 2023 and is a continuing issue. Trevor will check with Mark Nave on requirements etc. Fluoride Code is being revised by NSW Health. Still offline.
5	2018 Atom Consulting Recommendation IP 1.2 #97	Cover the clear water channel to exclude birds and vermin.	Medium	Manager Works and Service	Dec-22	Dec-31	To Start	Its inside the plant and not outside so risk is low but still there. Focusing on emergency work at this stage. The plant will be upgraded in the next few years and this might not be necessary. Timeframe revised accordingly. Not done yet.
6	DWMS risk assessment register 2021	Develop a documented checklist for the Channel inspection	Low	Team Leader - water and sewer	Dec-22	NA	Completed	Done
7	DWMS risk assessment register 2021	Investigate possibility of enclosed pipeline from the Dam to the WTP, as emergency supply when needed and for improved raw water quality. The Channel may still need to be operational for irrigation and environmental needs.	Medium	Manager Works and Service	Jun-23	Dec-31	To Start	Emergency works is focus at the moment. Looking at possibility of off river storage dams (1300 ML) pumping directly to filtration plant. Will hopefully happen at new plant; there have been talks about it.
8	DWMS risk assessment register 2021	Document a BGA response protocol, including triggers (e.g. high levels upstream, increase in pH, conditions at Weir, visual indication) and testing requirements.	Medium	Manager Works and Service	Jun-22	Dec-24	Completed	Hasn't been an issue in 2021 - 2023 with rain and river flowing. To be done. Timeframe extended. There has been a little bit of algae in the summer months, but it hasn't been too bad.

No.	Reference	Actions	Priority Level	Responsible Position	Timeframe (original)	Timeframe (revised)	Status (May 26)	Comments
9	DWMS risk assessment register 2021	Investigate iron and manganese testing in-house for raw and final water (suitable benchtop equipment will need to be purchased). Aluminium can be tested in-house as well for the final treated water (as aluminium based coagulants are used).	Medium	Manager Works and Service / Team Leader - water and sewer	Dec-21	Dec-27	In Progress	There is in-house aluminium testing. Still to look into in-house testing of iron and manganese. Timeframe still extended.
10	DWMS risk assessment register 2021	Fix the online raw water turbidity monitoring and ensure that it is hooked up to SCADA, which can provide more instantaneous alerts to guide need for jar testing.	High	Manager Works and Service	Jun-22	Dec-27	In Progress	HACH came onsite and looked at all online monitoring analysers. HACH technician due to come back in June 24 to replace actuators. SCADA still to be done. Timeframe still extended. Still not 100% accurate.
11	DWMS risk assessment register 2021	Record Jar testing in plant diary.	Medium	Team Leader - water and sewer	Dec-21	Dec-22	Completed	Form in place.
12	DWMS risk assessment register 2021	Investigate a pipeline directly from the off-creek storage being built to the WTP.	High	Manager Works and Service	Dec-22	Dec-27	To Start	Will be investigated more with new WTP, timeframe revised accordingly. The plan is to have two: one from the off-creek and one from the dam.
13	DWMS risk assessment register 2021	Upgrade the PAC dosing plant.	High	Manager Works and Service	Dec-22	Jul-26	In Progress	Funding in capital works budget. Will be investigated more with new WTP. In discussions with ProMinent. Timeframe revised accordingly. Will be done in 2026 early new financial year.
14	DWMS risk assessment register 2021	Upgrade the chemical dosing system. Investigate whether to use both alum powder and liquid or just the liquid alum.	High	Manager Works and Service	Dec-22	Dec-23	Completed	Done
15	DWMS risk assessment register 2021	Verify that there is an online monitoring turbidity meter already available for measuring turbidity of the small clarifier settled water (prior to filters). Fix (or install) the online turbidity meter for measuring settled water turbidity for the small clarifier. Ensure it is hooked up to SCADA for alarms.	High	Manager Works and Service / Team Leader - water and sewer	Jun-22	Dec-26	In Progress	There is a meter, needs to be hooked up to SCADA. Oeprators manually check reading. HACH technician due to come back in June 24. He has come a couple of times since then, but hasn't completely rectified the problem. Analyser behaves temporarily. Timeframe still extended.
16	DWMS risk assessment register 2021 [also 2018 Atom Consulting Rec IP 1.2 #94]	Replace the old sludge rake and link a fault alarm to SCADA.	High	Manager Works and Service	Dec-22	Dec-23	Completed	Done
17	DWMS risk assessment register 2021	Fix the online monitoring for settled water for the big clarifier and ensure that it is hooked up to SCADA with alarms.	High	Manager Works and Service	Dec-22	Dec-26	In Progress	HACH came onsite and looked at all online monitoring analysers. HACH technician due to come back in June 24. SCADA still to be done. He has come a couple of times since then, but hasn't completely rectified the problem. Analyser behaves temporarily. Timeframe still extended.
18	DWMS risk assessment register 2021	Fix the online monitoring for individual filter turbidity and ensure that it is hooked up to SCADA with alarms and limits match the CCP limits.	High	Manager Works and Service	Dec-22	Dec-26	In Progress	HACH came onsite and looked at all online monitoring analysers. HACH technician due to come back in June 24. SCADA still to be done. Timeframe extended.

No.	Reference	Actions	Priority Level	Responsible Position	Timeframe (original)	Timeframe (revised)	Status (May 26)	Comments
19	DWMS risk assessment register 2021 [also 2018 Atom Consulting Recs IP 1.2 #104 and #105]	Automate the backwashing process, including triggers based on filtered water turbidity, time and headloss.	High	Manager Works and Service	Dec-22	Dec-31	To Start	Automation is not part of the emergency works, new plant will consider this. Update backwash piping is part of emergency works, just replacement. The plant will be upgraded in the next few years and this might not be necessary. Timeframe revised accordingly. Will be considered with the new treatment plant.
20	DWMS risk assessment register 2021	Investigate refurbishment of the filters, if <0.5 NTU cannot be achieved for individual filters.	High	Manager Works and Service	Dec-22	Dec-23	Completed	Turbidity readings are generally <0.5 NTU. But recording of individual filter readings to commence. In Dec 21 there was a boil water alert, tannins caused a lot of problems. Discussed that any result >0.5 NTU should be reported to the PHU, even if its fixed promptly. Annual full filter inspection is taken.
21	DWMS risk assessment register 2021	Fix the online monitoring for final water chlorine and ensure that it is hooked up to SCADA with alarms and limits match the CCP limits.	High	Manager Works and Service	Dec-22	Dec-26	In Progress	HACH came onsite and looked at all online monitoring analysers. HACH technician due to come back in June 24. SCADA still to be done. Timeframe extended.
22	DWMS risk assessment register 2021	Replace the clear water tank, considering high risk from clarifier sludge pipe going through the tank, integrity concerns (vermin, rain etc could get in) and chlorine C.t is not being achieved (which is critical).	High	Manager Works and Service	Dec-22	Dec-31	To Start	With new plant, at the moment monitoring and CCPs implementation will be relied upon. Timeframe revised accordingly. Will be done with the new plant.
23	DWMS risk assessment register 2021	Develop relevant SOPs for new fluoride system in place.	Medium	Team Leader - water and sewer	Jun-22	Dec-26	In Progress	To be done, timeframe extended. Plant has been offline and SOP will be looked at when it becomes operational. SOP Fluoride and SOP Fluoride Drop Test have been completed.
24	DWMS risk assessment register 2021	Fix the online monitoring for final water pH and ensure that it is hooked up to SCADA with alarms.	High	Manager Works and Service	Dec-22	Dec-26	In Progress	HACH came onsite and looked at all online monitoring analysers. HACH technician due to come back in June 24. SCADA still to be done. Timeframe extended.
25	DWMS risk assessment register 2021	Include / document reservoir cleaning every four years in the periodic schedule of tasks.	Medium	Manager Works and Service	Dec-21	NA	Completed	In a checklist for ongoing tasks.
26	DWMS risk assessment register 2021	Lock the hatch of the reservoirs as an additional security barrier.	Medium	Team Leader - water and sewer	Dec-21	NA	Completed	Locked - top and bottom
27	DWMS risk assessment register 2021	Include a note on the result sheet on whether the plant is on or offline when the weekly reservoir chlorine reading is taken (will indicate if the reading is for the water out of the reservoir or not).	Medium	Team Leader - water and sewer	Dec-21	Dec-26	To Start	This will be added to the checklist.
28	DWMS risk assessment register 2021	Confirm that there is a procedure for manual dosing using chlorine tablets. If not, then document the procedure.	Medium	Team Leader - water and sewer	Dec-21	Dec-26	To Start	To be done, timeframe revised. Not a consistent/documented process for tablets.
29	DWMS risk assessment register 2021	Upgrade the fill station to a card system and ensure adequate backflow prevention is in place.	Medium	Manager Works and Service	Dec-22	NA	Completed	Done, upgraded.

No.	Reference	Actions	Priority Level	Responsible Position	Timeframe (original)	Timeframe (revised)	Status (May 26)	Comments
30	DWMS risk assessment register 2021	Document an appropriate backflow prevention program e.g. identify high risk properties, implement annual testing of backflow devices, where the customer is external (not Council property) the results of the annual test should be provided to Council etc.	Medium	Manager Works and Service	Jun-23	Dec-26	To Start	Not many around who need BFDs, to be documented. Need to involve Environment section. Timeframe extended. Trevor to check if the abattoir has a BFD. There are roughly half a dozen backflow devices. Should be documented, including their location and when they should be tested.
31	DWMS risk assessment register 2021 Catchment profile 2021	Undertake baseline THMs testing project in treated water in discussions with the PHU (monthly for 12 months). Undertake baseline pesticide testing project in raw water in discussions with the PHU (monthly for 12 months). Undertake baseline chemical and heavy metal testing project in raw water in discussions with the PHU (monthly for 12 months).	High	Manager Works and Service	Jun-22	Dec-26	In Progress	Trevor to speak with Mark Nave. Timeframe extended. Pesticides have been done. Additionally, PFAS testing is going to be done. Should do Special projects THMs.
32	DWMS risk assessment register 2021	Enrol the junior operators (water supply labourers) to undertake formal water operations courses.	High	Manager Works and Service	Dec-22	Dec-24	Completed	Jak & Joel (have left). Jet & Ryan will be doing Cert 3. Cameron has Cert 3 & Cert 4.
33	DWMS risk assessment register 2021 [also 2012 DWMS IP 1.2 #3]	Develop a procedure or document the process to ensure chemical quality is ensured (e.g. supplier assessment, chemical receival process, supplier contacts, inventory etc)	Medium	Manager Works and Service	Dec-22	Dec-24	Completed	To be done, timeframe revised.
34	DWMS risk assessment register 2021 [also 2018 Atom Consulting Rec IP 1.2 #100]	Implement external calibration program for the online monitoring equipment, when these are fixed.	High	Manager Works and Service	Jun-23	Dec-24	Completed	HACH technician due to come back in June 24. To be closed when all analysers are hooked to SCADA. Timeframe revised accordingly.
35	DWMS risk assessment register 2021	Investigate removal of internet browsing capability from the SCADA computer. When the online monitoring is fixed, investigate password protection at Team Leader/Manager level for any changes to the CCP alerts and limits. Confirm and implement regular anti-virus and anti-malware software updates and data backups from the SCADA computer.	Medium	Manager Works and Service	Dec-22	Dec-26	To Start	Trevor spoke with IT - to follow up and see if they are doing cyber security checks for all assets including water and sewer. There are individual passwords for each team member. Timeframe revised. Will be looked into by Trevor and excel cell will be updated accordingly.
36	DWMS risk assessment register 2021	Obtain from Hunter H2O and Indratel their cyber security measures in relation to accessing Council's SCADA e.g. a) authorised person/s list – who all from their organisation has access? How is this controlled so that not anyone can have access? b) administrative privileges – what things can they change - dose rates, CCPs? c) what is their process of removing access (terminate username/password) for employees who no longer work for them?	Medium	Manager Works and Service	Jun-22	Dec-26	In Progress	Trevor to follow up with the contractors. Will be looked into by Trevor and excel cell will be updated accordingly.
37	DWMS risk assessment register 2021	Complete the off-creek storage project.	High	Manager Works and Service	Dec-22	Dec-23	Completed	Done.
38	DWMS update 2021	Consider development and endorsement of a drinking water policy.	Medium	Manager Works and Service	Dec-21	NA	Completed	Adopted at Council meeting in Aug 21.

No.	Reference	Actions	Priority Level	Responsible Position	Timeframe (original)	Timeframe (revised)	Status (May 26)	Comments
39	DWMS annual review report 2021 - developed March 22	Develop a simple sampling schedule (for external verification monitoring) which can be used to record or tick off that microbiological and chemical samples have been collected at the required frequency and sent off to the lab for testing.	Medium	Team Leader - water and sewer	Jun-22	Dec-26	In Progress	Issue also that samples often reach the lab late due to transportation issues from a regional place. Chemistry samples taken are logged in the works diary. To be looked into. Timeframe extended. Will be looked into with Mark. Cell will be updated accordingly.
40	DWMS annual review report 2022 - developed May 23	Document in-house reservoir cleaning process, including checks and tests prior to bringing it back online.	Medium	Manager Works and Service	Dec-24	NA	Completed	Added as part of DWMS Annual Report 2022 preparation.