

Drinking Water Service Annual Report 2022-2023



December 2023

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1 Executive Summary

Mount Isa Water Board (MIWB) is a registered Water Service Provider (SPID: 199) under the Water Supply (Safety and Reliability) Act 2008.

Key business activities include:

- managing the infrastructure required to transport bulk water from storages at Lake Moondarra and Lake Julius to customers and applying appropriate water treatment processes to comply with MIWB's legislative and commercial requirements;
- conducting ongoing investigations and planning for future infrastructure requirements relevant to MIWB operations;
- constructing, operating, and maintaining the bulk water transport and treatment infrastructure necessary to MIWB operations, and;
- acting as trustee for the Water and Recreation R48 Reserve (R48 Reserve) on behalf of the Department of Natural Resources and Mines, as administrator of the Land Act 1994.

Mount Isa Water Board supplies drinking water to its sole potable water customer, Mount Isa City Council (MICC). MIWB's Drinking Water Quality Management Plan (DWQMP) is a risk-based management plan that considers the key hazards to consumers and to MIWB's ability to supply water, the events that may result in these hazards, and an assessment of the risks that these hazards and hazardous events pose.

The DWQMP details the operational and verification monitoring undertaken by MIWB to ensure that any drinking water quality issues are rapidly identified and responded to in accordance with the Emergency Management Framework (EMF). The verification monitoring program in the reporting period has been undertaken in accordance with the DWQMP. Sampling and part of the analyses have been undertaken by MIWB, while the other part of the analyses have been undertaken by an external NATA accredited laboratory. During this reporting period, MIWB's drinking water supply has been compliant with the health guidelines for both verification monitoring and operational monitoring against the water quality criteria in the DWQMP.

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

2 Introduction

This annual report documents the performance of the Mount Isa Water Board (MIWB), a registered Water Service Provider, with respect to its Drinking Water Quality Management Plan (DWQMP) as required under the *Water Supply (Safety and Reliability) Act 2008* (the Act) for the Financial Year 2022 – 2023.

Using the Australian Drinking Water Guidelines and a risk-based approach, the MIWB DWQMP has been developed with the goal of protecting public health through the identification and minimisation of any public health related risks associated with drinking water.

Several microbial, physical, and chemical parameters have been monitored throughout the year inclusive of *Escherichia coli*, cryptosporidium, giardia, soluble metals and disinfection by-products; and are summarised below.

2.1 Overview of 2022 – 2023 Outcomes

Drinking water treated by MIWB for our sole potable water customer, Mount Isa City Council (MICC), continued to meet the ADWG, throughout the reporting period.

There were no detections of *E.coli* in any of the drinking water test samples. Despite the on-going blue-green algae (BGA) bloom in Clear Water Lagoon (CWL), cyanotoxins were controlled by oxidation with chlorine to below the limit of detection when using a NATA accredited method.

A solar-powered ultrasonic algal control system has been installed in the Crocodile Pond adjacent to the Clear Water Lagoon. Algal counts consistently exceed millions of cells per millilitre making it the ideal trial location. The water body contains both toxic and non-toxic blue-green algae species and will not impact water quality in Clear Water Lagoon whilst the trial is underway. The trial is expected to reduce all algae cell numbers, which in turn will improve levels of cyanotoxins as well as undesirable taste and odour compounds.

The concentrations of disinfection by-products also continued to meet the ADWG, throughout the reporting period.

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3 Summary of schemes operated

Mount Isa Water Board operates a single scheme which encompasses both Lake Julius and Lake Moondarra. Lake Moondarra is the primary supply, with use of Lake Julius during periods of low supply in Lake Moondarra, or to supplement for the purposes of water quality. Lake Julius represents a drought mitigation strategy for the city of Mount Isa.

Table 1 – Summary of schemes

	<i>Water Source</i>	<i>Treatment processes</i>	<i>Treatment capacity</i>	<i>Towns supplied</i>
Lake Moondarra and Lake Julius	Lake Moondarra*	Reed bed filtration, microfiltration, chlorination	27.57 ML/day	Mount Isa
Lake Moondarra and Lake Julius	Lake Julius*	Reed bed filtration, microfiltration, chlorination	27.57 ML/day	Mount Isa
*Note: Either water source can be used to supply the treatment plant to produce up to 27.57ML/day for the Mount Isa City Council (MICC)				

4 DWQMP implementation

The actions undertaken to implement the DWQMP are summarised below.

Two critical control points (CCPs), membrane filtration, and final disinfection have been identified within the system which are actively monitored. These CCPs can be actioned to prevent process excursions leading to non-compliant water. There were no CCP events in the reporting period FY2022- 2023. Raw water extraction at Lake Moondarra is an operational control point (OCP) that applies to the quality of the non-potable supply. Loss of control of OCPs does not lead to a non-compliant product, however, is still an important process that is monitored regularly.

Governance and Change Management

During the reporting period, the Operations Superintendent and the Management Team held regular meetings to consider water quality processes, circumstances, and outcomes. Water quality discussions are also held with the Maintenance Team and the Capital Works Team on a regular basis.

The Operations division is involved in Change Management Risk Assessments for operational and infrastructure changes as necessary to identify any implications for water quality and how these risks (if any) will be mitigated. Refer to Table 2 – Risk management improvement program implementation status for further details of risk management and improvement processes.

Microbiological Contamination

MIWB has historically identified presence of protozoa, such as cryptosporidium and giardia, intermittently within the source water. However, zero detections continue in this reporting period in both lakes Moondarra and Julius.

The UV disinfection project, which was identified in the previous risk management improvement plan to achieve adequate log reduction values for virus and protozoa, has been renamed as the 'second barrier investigation project'. A review of additional treatment barriers is underway to achieve the required log reduction values, meet future health-based targets and manage emerging contaminants.

Disinfection By-Products

Disinfection by-products continue to be influenced by the organic load in the source water. Lake Julius water typically has a lower disinfection by-product forming potential than Lake Moondarra. The current operational strategy is for Lake Julius water to directly pump into Clear Water Lagoon.

Installation of an online UVT and TOC analyser commenced during the current reporting period and the benefit will be to provide more information about the disinfection by-product forming potential of the source water.

To ensure a safe and reliable supply of water during drought conditions, a capital program to overhaul the high voltage electrical system at Lake Julius was initiated by the Mount Isa Water Board. The project was initiated in the second half of 2021-22 and is nearing completion. This will ensure long-term reliability of water supply to MIWB's bulk water customers.

Security

As recommended in the Queensland Audit Office (QAO) "Report 19: Security of critical water infrastructure (2016-17)" MIWB has implemented several physical and cyber security measures and has a current project implementing steps to improve the safeguarding of critical water infrastructure and reliability dependence.

In the reporting period, FY 2022-23, MIWB continues to have:

- a governance structure;
- vulnerability risk assessments of water assets;
- multiple cyber security safeguards;
- cyber security control processes, including a threat detection system; and

- a back-up recovery system for operational (i.e. SCADA) and corporate technology which is routinely updated.

Risk Improvement Program

The actions undertaken to implement the Risk Management Improvement Program (RMIP) are discussed in Table 2.

The risk improvement action items include one carry-over item from DWQMP version 5.0 as well as indicating the status of the risk improvement projects identified in the two-yearly review of the DWQMP completed in June 2021; and approved by the Water Supply Regulation group within the Department of Regional Development, Manufacturing and Water (DRDMW) in February 2022.

Table 2 – Risk management improvement program implementation status

Scheme name	Ref	Component	Improvement actions	Target date	Actions taken to date	Status and revised target date	Responsible Officer / Position
Lake Julius and Lake Moondarra	DWQMP RMIP 5.0 (WS-2)	Whole of System	RPZ or multiple backflow prevention valves with MIWB maintenance where there may currently be only one valve.	2018-19	RPZ valves installed on all customer off-takes.	Complete	General Manager - Capital Works
Lake Julius and Lake Moondarra	DWQMP RMIP 6.1 (HE-3)	Lake Julius	Finalise Review of BGA Plan	2020-21	BGA Management Plan has been reviewed and finalised.	Complete	Operations Superintendent
Lake Julius and Lake Moondarra	DWQMP RMIP 6.1 (HE-11/25/28)	Lake Moondarra	UV Disinfection Project (Renamed to second barrier investigation project)	2023	Wholistic review of second barriers/treatment to achieve current and future HBT and emerging contaminants. A consultant has been engaged for this process.	Ongoing.	Operations General Manager - Capital Works
Lake Julius and Lake Moondarra	DWQMP RMIP 6.1 (HE-15/18)	Lake Moondarra	Ultrasonics for Lake Moondarra has been investigated	June 30, 2023	The project is underway. Ultrasonic system installed in the Crocodile Pond. Algae level and physical parameters monitored weekly	Complete	General Manager - Capital Works
Lake Julius and Lake Moondarra	DWQMP RMIP 6.1 (HE-31)	MITR	High point shut down for chlorine to be explored	June 30, 2023	Completed with changes to SCADA coding.	Complete	Maintenance Superintendent

Scheme name	Ref	Component	Improvement actions	Target date	Actions taken to date	Status and revised target date	Responsible Officer / Position
Lake Julius and Lake Moondarra	DWQMP RMIP 6.1 (HE-34)	MITR	Discuss source selection with customers to agree to use Lake Julius to lower HAAs. However, requires agreement from the customers who own the water (RMIP from 2018). 21/22 Online TOC & SUVA analysis at MITR lead indicator for chlorination strategy. UV disinfection project may assist in chlorine optimisation and meeting LRVs. New gas chlorination to provide better control of chlorination	June 30, 2023	Completed One of the On-line TOC and UV-T analysers was installed and awaiting commissioning.	Ongoing, Expected completion by June 2024	Operations
Lake Julius and Lake Moondarra	DWQMP RMIP 6.1 (HE-35)	MITR	Potential cross connection will be removed.	June 30, 2022		Complete	General Manager - Capital Works
Lake Julius and Lake Moondarra	DWQMP RMIP 6.1 (HE-37)	Clean Water Tanks	Aerator to be installed in Clean Water Tanks	October, 2021	Contractor availability delays caused significant disruption to the project	Expected completion in Feb 2024	General Manager - Capital Works
Lake Julius and Lake Moondarra	DWQMP RMIP 6.1 (WS-2)	MITR	Actuated valve on raw water outlet of 50ML to be programmed to close when not pumping to MIM.	June 30, 2022	Engineering review undertaken which has clarified the issue, which is captured in the RMIP for chlorine return lines	Expected completion in June 2024	Asset Management Coordinator
Lake Julius and Lake Moondarra	DWQMP RMIP 6.1 (WS-5)	Whole of System	Upgraded gas chlorine for better control of chlorination.	June 30, 2022	A requirement was identified to modify the project scope to utilise containerised system	Expected completion in April 2024.	General Manager - Capital Works

5 Verification monitoring - water quality information and summary

This section discusses the compliance with the water quality criteria.

Table 3 – Drinking water quality performance - verification monitoring

Scheme name	Parameter	No. of samples required to be collected (as per the approved DWQMP)	No. of samples actually collected and tested	Min.	Max.	Average (Mean)	Water quality criteria (i.e ADWG health guideline value)	No. of non-compliant samples	Comments
Lake Julius and Lake Moondarra	<i>Escherichia coli</i>	52	58	<1	<1	<1	< 1 MPN/100mL	0	Results below detection limit were considered to have a value of zero for statistical analysis.
	Total Coliforms	52	58	<1	<1	<1	N/A	0	Results below detection limit were considered to have a value of zero for statistical analysis.
	Cyanotoxins	As required by BGA manual	60	<0.05	0.61	0.21	<1 µg/L	0	Results below detection limit were considered to have a value of zero for statistical analysis.
	Ammonia	4	4	<0.01	0.01	0.003	<0.5 mg/L*	0	Results below detection limit were considered to have a value of zero for statistical analysis.
	Cyanide	1	1	<0.004	<0.004	<0.004	<0.08 mg/L	0	Results below detection limit were considered to have a value of zero for statistical analysis.
	Nitrate	4	4	<0.01	0.04	0.02	<50 mg/L	0	Results below detection limit were considered to have a value of zero for statistical analysis.
	Nitrite	4	5	<0.01	<0.01	<0.01	<3 mg/L	0	Results below detection limit were considered to have a value of zero for statistical analysis.
	Aluminium	52	54	<0.005	0.028	0.004	<0.2 mg/L*	0	Results below detection limit were considered to have a value of zero for statistical analysis.
	Antimony	4	5	<0.001	0.002	0.0008	<0.003 mg/L	0	Results below detection limit were considered to have a value of zero for statistical analysis.
	Arsenic	4	5	<0.002	0.002	0.001	<0.01 mg/L	0	Results below detection limit were considered to have a value of zero for statistical analysis.
	Cadmium	4	5	<0.0001	<0.0001	<0.0001	<0.002 mg/L	0	Results below detection limit were considered to have a value of zero for statistical analysis.
	Chromium	4	5	<0.001	<0.001	<0.001	<0.05 mg/L	0	Results below detection limit were considered to have a value of zero for statistical analysis.

Scheme name	Parameter	No. of samples required to be collected (as per the approved DWQMP)	No. of samples actually collected and tested	Min.	Max.	Average (Mean)	Water quality criteria (i.e ADWG health guideline value)	No. of non-compliant samples	Comments
Lake Julius and Lake Moondarra	Copper	12	15	0.002	0.004	0.002	<2 mg/L*	0	
	Iron	52	54	<0.05	<0.05	<0.05	<0.3 mg/L*	0	Results below detection limit were considered to have a value of zero for statistical analysis.
	Lead	52	54	<0.001	0.001	1.85x10 ⁻⁵	<0.01 mg/L	0	Results below detection limit were considered to have a value of zero for statistical analysis.
	Manganese	52	54	<0.001	0.023	0.002	<0.5 mg/L	0	Results below detection limit were considered to have a value of zero for statistical analysis.
	Nickel	4	5	<0.001	<0.001	<0.001	<0.02 mg/L	0	Results below detection limit were considered to have a value of zero for statistical analysis.
	Zinc	12	15	<0.005	<0.005	<0.005	<3 mg/L*	0	Results below detection limit were considered to have a value of zero for statistical analysis.
	Chloride	4	5	20	40	29	<250 mg/L*	0	
	Fluoride	4	5	0.2	0.4	0.32	<1.5 mg/L	0	
	Hydrogen Sulphide	4	4	<0.01	<0.01	<0.01	<0.05 mg/L*	0	Results below detection limit were considered to have a value of zero for statistical analysis.
	Sodium	4	5	20	36	28	<180 mg/L*	0	
	Sulphate	4	5	8	12	10	<250 mg/L*	0	
	Total Trihalomethanes	12	15	28	93	59.333	<0.250 mg/L	0	
	Total Halo Acetic Acids	12	54	28	93	52.3	<0.1 mg/L**	0	
	2-Methylisoborneol (MIB)	1	2	4.6	73.3	38.95	N/A		
	Geosmin	1	1	3.8	3.8	3.8	N/A		
	Total Dissolved Solids	4	5	128	186	164.4	<600 mg/L*	0	
	Conductivity	52	55	212	379	311	N/A		
	Hardness	4	5	66	81	74	<200 mg/L*	0	Hardness as CaCO ₃

Table 3A – Drinking water quality performance - Operational monitoring

Scheme name	Scheme component	Parameter	Number of samples required to be collected as per DWMP	Total No. of samples actually collected	Min	Max	Average (Mean)	Water Quality Criteria (eg ADWG limit)	Number of non-compliant samples	Comments
Lake Julius and Lake Moondarra	MITR	Dissolved Oxygen	52	52	86.5	104.2	97.5	<85 % saturation*	0	
	MITR	pH	52	52	6.97	8.17	7.56	6.5 – 8.5*	0	
	MITR	Apparent Colour	52	52	0	8	3	N/A	N/A	
	MITR	True Colour	12	13	0	5	2	<15 HU*	0	
	MITR	Turbidity	52	52	0.07	0.41	0.23	< 5 NTU	0	
	MITR	Free Chlorine	365	348	1.25	2.02	1.61	<5 mg/L	0	Manual free chlorine analysis was not completed on several occasions due to unavailability of staff. The online chlorine analyser readings were used during this time.
	MITR	Total Chlorine	52	52	1.07	2.20	1.82	<5 mg/L	0	
	MITR	Algal cell count	As per BGA Manual	3	0	0	0	N/A	N/A	Total cell count

*Note: Aesthetic guideline values only

**Note: No ADWG limit; Queensland Health Department advisory limit

Table 4 - E. coli compliance with annual value

Drinking Water Scheme	Lake Julius and Lake Moondarra											
Year	2022 - 2023											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	4	5	4	5	5	4	5	4	6	4	5	4
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	53	53	53	53	54	54	54	54	53	55	55	56
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

6 Incidents reported to the regulator

There were no incidents reported to the regulator during the FY 2022-2023

7 Customer complaints

This section discusses details of any complaints received about the drinking water service.

MIWB did not receive any formal water quality complaints from its drinking water customer for the 2022 - 2023 financial year.

Table 6 – Customer complaints about water quality

Scheme	Health concern	Dirty water	Taste and odour	Other
Lake Julius and Lake Moondarra	0			
Total	0			

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8 DWQMP review outcomes

No reviews were completed during the 2022-23 reporting period.

9 DWQMP audit findings

No audits were completed during the 2022-23 reporting period.

10 Glossary

ADWG	Australian Drinking Water Guidelines (2011) Published by the National Health and Medical Research Council of Australia
BGA	Blue Green Algae
CCP	Critical control point is the process step to which control can be applied and is essential to prevent a safety hazard
CFU/100mL	Colony forming units per 100 millilitres
CWL	Clear Water Lagoon
DBPs	Disinfection by-products
DRDMW	Department of Regional Development, Manufacturing and Water
<i>E coli</i>	<i>Escherichia coli</i> , a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk
HAA	Haloacetic acid, a disinfection by-product formed by the reaction of halogens and organic acids
HU	Hazen units
>	Greater than
<	Less than
mg/L	Milligrams per litre
MITR	Mount Isa Terminal Reservoir
NTU	Nephelometric Turbidity Units
MPN/100mL	Most probable number of microorganisms per 100 millilitres
NATA	National Association of Testing Authorities
RMIP	Risk Management Improvement Programme
RPZ	Reduced Pressure Zone
SCADA	Supervisory Control And Data Acquisition
µg/l	Micrograms per litre
THMs	Trihalomethanes, a disinfection by-product formed by the reaction of halogens and organic compounds