



Drinking Water Quality Management Plan Report

Mount Isa Water Board

SPID: 199

Financial Year 2021 to 2022

This report has been prepared in accordance with the Drinking Water Quality Management Plan Report Guidance Note.

Table of contents

1	Introduction	2
1.1	Overview of 2021 – 2022 Outcomes	2
2	Summary of schemes operated	3
3	DWQMP implementation	4
4	Verification monitoring - water quality information and summary	10
5	Incidents reported to the regulator	14
6	Customer complaints	15
7	DWQMP review outcomes	15
8	DWQMP audit findings	15

Table of tables

Table 1 – Summary of schemes	3
Table 2 – Risk management improvement program implementation status	6
Table 3 – Drinking water quality performance - verification monitoring	10
Table 3A – Drinking water quality performance - Operational monitoring	12
Table 4 - E. coli compliance with annual value	13
Table 5 – Incidents reported to the regulator	14
Table 6 – Customer complaints about water quality	15

1 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 2021 – 2022.

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 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.

1.1 Overview of 2021 – 2022 Outcomes

Drinking water treated by MIWB for our sole potable water customer, Mount Isa City Council (MICC), continued to meet or exceed the health-based requirements under the ADWG, throughout the reporting period. The installation of the new Clean Water Tanks at the Mount Isa Terminal Reservoir (MITR) has allowed chlorine dosing to stabilise at a lower level whilst maintaining contact times. This has also contributed to an improvement in disinfection by-product formation. The concentrations of disinfection by-products are continuing to decrease within the drinking water supply, year-on-year. The moving averages over the last five years for both total trihalomethanes (THM's) and total haloacetic acids (HAA's) is shown below.

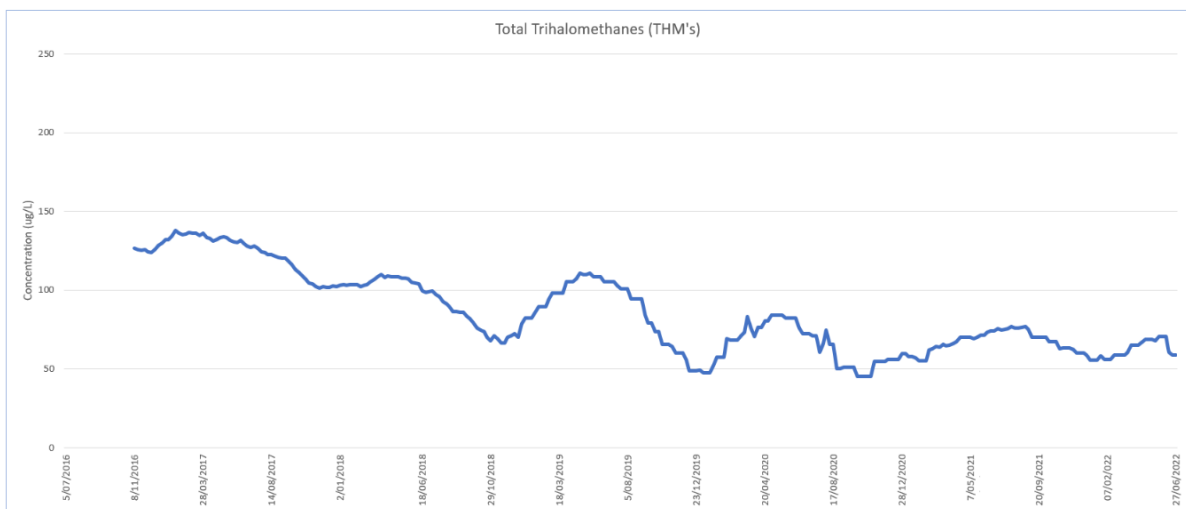


Figure 1: Moving average of Total Trihalomethane (THM) concentrations in drinking water supply

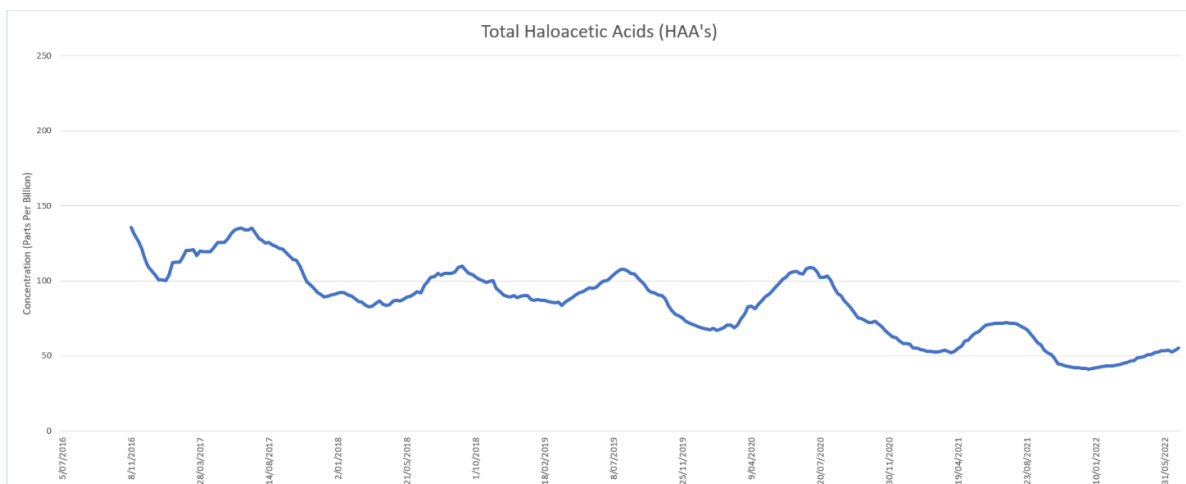


Figure 2: Moving average of Haloacetic Acid (HAA) concentrations in drinking water supply

All drinking water test samples were free from *E.coli*. 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.

The two-yearly review of the DWQMP for MIWB was 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.

2 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 routine intermittent 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	30ML/day	Mount Isa
Lake Moondarra and Lake Julius	Lake Julius*	Reed bed filtration, microfiltration, chlorination	30ML/day	Mount Isa
*Note: Either water source can be used to supply the treatment plant to produce up to 30ML/day for the Mount Isa City Council (MICC)				

3 DWQMP implementation

The actions undertaken to implement the DWQMP are summarised below.

Several critical control points (CCPs) have been identified within the system which are actively monitored. These CCPs can be actioned to prevent process excursions leading to non-compliant water. In the reporting period FY2021 - 2022 there were no CCP events.

Governance and Change Management

The Operations Superintendent and Chief Executive Officer meet on a regular and periodic basis via the Water Quality Committee and Management Team Meeting 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 Superintendent 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 that protozoa, such as cryptosporidium and giardia, have been present intermittently within the source water. However, no positive detections occurred during the reporting period in either Lake Moondarra or Lake Julius.

Since the commissioning of the Clean Water Tanks, significant improvement in heterotrophic plate counts (HPC's) in potable water continues to be observed. The data is shown in Figure 3.

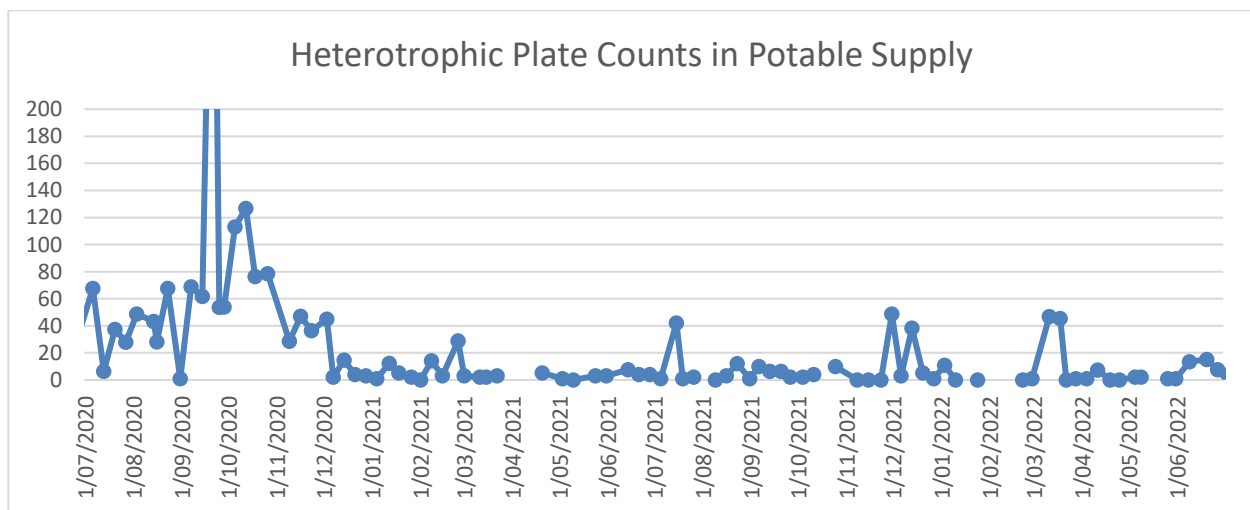


Figure 3: HPC's in potable water supply

Commitment to reducing the risk of microbial contamination continues and has resulted in a capital works project for ultra-violet disinfection to commence by providing another disinfection barrier. This forms part of the DWQMP RMIP.

Disinfection By-Products

Disinfection by-products continue to be influenced by the organic load in the source water. Lake Julius water at times 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.

To ensure a safe and reliable supply of water during drought conditions, the Mount Isa Water Board has initiated a capital program to overhaul the high voltage electrical system at Lake Julius. Works were initiated in the second half of 2021-22, with the expected completion to be 2023. Completion of this project will provide long-term reliability of water supply to MIWB's bulk water customers.

Installation of an aerator for the Clean Water Tanks also commenced during the current reporting period and the benefit will not only improve dissolved oxygen in potable supply, but also have a positive influence on reducing tri-halomethanes.

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 in the previous reporting period to improve the safeguarding of critical water infrastructure and reliability dependence.

As of 30 June 2022, 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	RPZs or multiple backflow prevention valves with MIWB maintenance where there may currently be only one valve.	2018-19	RPZs installed on all customer off-takes. One was removed however, due to pressure problems for the customer	Engineering design is being undertaken to address the problem	General Manager - Capital Works
Lake Julius and Lake Moondarra	DWQMP RMIP 5.0 (HE-27)	MITR	CT from MITR to MICC is low - plan to reduce pump rate. Negotiating with MICC and should be implemented in 2018. New South Tank will address concern when North Tank taken out of service.	2018-19	Clean Water tanks installed and commissioned. South Tank demolished, North tank and header tank decommissioned. Chlorination added to Clean Water tanks to improve CT's	Complete	General Manager - Capital Works
Lake Julius and Lake Moondarra	DWQMP RMIP 5.0 (HE-28)	MITR	Asset management plan to replace Header/ Nth and South in 2018/19.	2018-19	Clean Water tanks installed and commissioned. South Tank demolished, North tank and header tank decommissioned.	Complete	General Manager - Capital Works
Lake Julius and Lake Moondarra	DWQMP RMIP 5.0 (HE-34)	MITR	Discuss source selection with customers to agree to use Lake Julius to lower	2018-19	The new Clean Water Tanks have allowed for greater control of chlorine dosing within the	Complete	Operations Superintendent

Scheme name	Ref	Component	Improvement actions	Target date	Actions taken to date	Status and revised target date	Responsible Officer / Position
			HAA's. However, requires agreement from the customers who own the water.		system, resulting in HAA's being brought under control.		
Lake Julius and Lake Moondarra	DWQMP RMIP 5.0 (WS-5)	Whole of system	A comprehensive review of all operational procedures is required to ensure that they reflect the DWQMP. Some procedures need to be developed, as identified. MIWB is actively engaged on improving O&M contracts/ arrangements.	2018-19	All operational procedures have been reviewed and converted to Safe Work Method Statements (SWMS)	Complete	Maintenance Superintendent
Lake Julius and Lake Moondarra	DWQMP RMIP 6.1 (HE-2)	Lake Julius	Installation of sonde at Lake Julius will enable improved source selection	2020-21	Sonde installed and commissioned. Connected to the cloud via satellite allowing for remote monitoring	Complete	Operations Superintendent
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. Awaiting Management team feedback and peer review before publishing	Ongoing to be completed by 30 June 2023	Operations Superintendent
Lake Julius and Lake Moondarra	DWQMP RMIP 6.1 (HE-11/25/28)	Lake Moondarra	UV Disinfection Project	2023	Original concept design was not deemed suitable, and additional resources have been procured, including an engineering consultancy to recommence design	Ongoing, delayed to 2024	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	Business case for trial location presented to Board of Directors and scope under development	Ongoing, expected completion for December 30, 2023	General Manager - Capital Works

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-31)	MITR	High point shut down for chlorine to be explored	June 30, 2023	NIL	Ongoing, expected completion for June 30, 2023	Maintenance Superintendent
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	On-line TOC analyser installed and awaiting commissioning. Delays due to COVID-19 and manufacturing constraints for the UVT analyser resulted in the instrument not arriving at MITR until November 2022. Installation expected by December 31, 2022	Ongoing, expected completion for June 30, 2023	Operations Superintendent
Lake Julius and Lake Moondarra	DWQMP RMIP 6.1 (HE-35)	MITR	Potential cross connection will be removed Online turbidity monitoring to be installed on final water	June 30, 2022	Contractor availability caused delays in separating the pipeline	Ongoing, June 2023	General Manager - Capital Works
					On-line turbidity analyser has been installed and operational	Complete	Operations Superintendent
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	Ongoing, new completion dates are to be determined	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	NIL	Ongoing, expected completion for June 30, 2023	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 (WS-5)	Whole of System	Upgraded gas chlorine for better control of chlorination	June 30, 2022	Gas chlorination project suffered delays due to contractor availability	Ongoing, new completion dates are to be determined	General Manager - Capital Works
			Real time monitoring of WQ - turbidity, TOC, colour, DO, Conductivity, pH, Temp, UVT		On-line instrumentation for monitoring WQ parameters installed and operational	Complete	Operations Superintendent

4 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	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	52	< 1 MPN/100mL	0	
	Total Coliforms	52	52	N/A	2***	12/07/2021 1 MPN/100mL. Follow up on 15/07/2021 <1MPN/100mL. 25/10/2021 count of 1 MPN/100mL. No follow up recorded for 25/10/2021 Laboratory restructure and new dedicated laboratory technician employed as of April 2022
	Cyanotoxins	52	52	<1 µg/L	0	
	Ammonia	4	4	<0.5 mg/L*	0	
	Cyanide	1	1	<0.08 mg/L	0	
	Nitrate	4	4	<50 mg/L	0	
	Nitrite	4	4	<3 mg/L	0	
	Aluminium	52	52	<0.2 mg/L*	0	
	Antimony	4	4	<0.003 mg/L	0	
	Arsenic	4	4	<0.01 mg/L	0	
	Cadmium	4	4	<0.002 mg/L	0	
	Chromium	4	4	<0.05 mg/L	0	
	Copper	12	12	<2 mg/L*	0	
	Iron	52	52	<0.3 mg/L*	0	

Scheme name	Parameter	No. of samples required to be collected (as per the approved DWQMP)	No. of samples actually collected and tested	Water quality criteria (i.e ADWG health guideline value)	No. of non-compliant samples	Comments
Lake Julius and Lake Moondarra	Lead	52	52	<0.01 mg/L	0	
	Manganese	52	52	<0.5 mg/L	0	
	Nickel	4	4	<0.02 mg/L	0	
	Zinc	12	12	<3 mg/L*	0	
	Chloride	4	4	<250 mg/L*	0	
	Fluoride	4	4	<1.5 mg/L	0	
	Hydrogen Sulphide	4	4	<0.05 mg/L*	0	
	Sodium	4	4	<180 mg/L*	0	
	Sulphate	4	4	<250 mg/L*	0	
	Total Trihalomethanes	12	12	<0.250 mg/L	0	
	Total Halo Acetic Acids	12	12	<0.1 mg/L**	0	
	Taste and Odour	1	1	N/A		2-Methylisoborneol (MIB) and Geosmin analysis
	Total Dissolved Solids	4	4	<600 mg/L*	0	
	Conductivity	52	52	N/A		
	Hardness	4	4	<200 mg/L*	0	

*Note: Aesthetic guideline values only

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

***Note: No ADWG limit

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	Conductivity	52	52	230	369	298	N/A (µS/cm)	N/A	
	MITR	Dissolved Oxygen	52	52	83.0	116.4	93.8	<85 % saturation*	2*	03/01/22 83.0%, 14/03/22 84.3% Reported to regulator on 22/03/22 when it was realised aesthetic non-compliances needed reporting. An aerator project is underway to address this problem
	MITR	pH	52	50	7.11	8.52	7.65	6.5 – 8.5*	1	2 samples missing due to broken pH probe, 1 sample outside of the aesthetic limit, not reported
	MITR	Apparent Colour	52	51	0	16	5	N/A	N/A	1 sample missing, no explanation by operators
	MITR	True Colour	12	12	0	4	2	<15 HU*	0	
	MITR	Turbidity	52	52	0.08	0.67	0.23	< 5 NTU	0	
	MITR	Free Chlorine	52	52	1.06	2.02	1.60	<5 mg/L	0	
	MITR	Total Chlorine	52	52	1.32	2.20	1.84	<5 mg/L	0	

*Note: Aesthetic guideline values only

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

***Note: No ADWG limit

In order to improve the reliability of MIWB's internal laboratory service, an operational restructure was completed in late 2021 whereby a dedicated Laboratory Technician position was created to complete the in-house analyses. This position was filled by April 2022.

Table 4 - E. coli compliance with annual value

Drinking water scheme:

Lake Julius and Lake Moondarra

Year	2021 - 2022											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	4	5	4	4	5	4	5	5	4	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	52	53	53	53	53	53	53	54	53	53	53	53
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

5 Incidents reported to the regulator

The incidents reported to the regulator and management actions undertaken over the financial year are provided in this section.

Table 5 – Incidents reported to the regulator

Incident date	Scheme / location	Parameter / issue	Preventive actions
10/11/2021	Whole of System	Grid-wide power failure disrupting water treatment operations	<ul style="list-style-type: none"> - Installation of a diesel-powered generator at Clear Water Lagoon - Installation of an automated chlorine dosing system to operate with the emergency generator at MITR
22/03/2022	MITR	Aesthetic non-compliance of dissolved oxygen in drinking water	<ul style="list-style-type: none"> - Installation of an aerator in the Clean Water Tanks RMIP 6.1 (HE-37)
29/05/2022	Clear Water Lagoon	Electronic gate on the perimeter fence malfunctioned leaving the location open	<ul style="list-style-type: none"> - Routine inspection of the electronic gate at Clear Water Lagoon has been added to Operator tasks

6 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 2021 - 2022 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			

Health Concern

Note: A complaint was received from a member of the public regarding high chlorine in their domestic tap water. The complainant was contacted by MIWB and advised that the Mount Isa City Council are responsible for customer issues. MIWB also directly contacted the Mount Isa City Council Water and Sewer Manager to advise them of the complaint. MICC advised that there was a problem with a chlorine dosing system within the council system at that time.

Whilst this is not a customer complaint for Mount Isa Water Board, it has been noted.

7 DWQMP review outcomes

No reviews were completed during the 2021-22 reporting period

8 DWQMP audit findings

No reviews were completed during the 2021-22 reporting period