Gippsland Water

Annual Report

on drinking water quality

2022-2023

Acknowledgement of Country

We acknowledge the Traditional Custodians of the land we live and work on, the Gunaikurnai and Bunurong People, and recognises their continuing connection to the land and waterways.

We pay our respects to their Elders past, present and emerging and extend this to all Aboriginal and Torres Strait Islander People.

Our 2023-2024 Annual Report on drinking water quality is available for viewing or download from our website.

Our Service Area

We acknowledge the Traditional Custodians of the land we live and work on, the Gunaikurnai and Bunurong People, and recognise their continuing connection to the land and waterways. We pay our respects to their Elders past, present and emerging and extend this to all Aboriginal and Torres Strait Islander People.

We cover areas of two traditional landowner groups:

- Gunaikurnai Land and Waters Aboriginal Corporation
- Bunurong Land Council Aboriginal Corporation

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1. Introduction

Characterisation of the system

We are the Central Gippsland Region Water Corporation, and trade as Gippsland Water. We are a regional water corporation in Victoria established under the Water Act 1989 and constituted on 21December 1994.

This Annual Report on Drinking Water Quality 2022-23 is prepared for compliance with section 26 of the Safe Drinking Water Act 2003 (SDWA) and regulations 16 and 17 of the Safe Drinking Water Regulations 2015 (SDWR).

With over 300 operational, engineering, financial, environmental, and administrative employees, we are a major local employer for the region serving a population base of approximately164,034.

We deliver water to 75,662 customers and wastewater services to 68,092 customers in 43 towns. Our customers include major industries, some of which are of state and national significance.

These towns are grouped into 35 localities for the purposes of monitoring and reporting in accordance with the SDWR.

Our service area spans from Drouin in the west, to Loch Sport in the east, from Briagolong in the north, to Mirboo North in the south. This covers approximately 5,000 square kilometres in the municipalities of Latrobe City, Baw Baw, South Gippsland Shire, and Wellington Shires.

Introduction continued

The way we treat water depends on where it is sourced. We take water from 13 different sources including aquifers, rivers, creeks and reservoirs. Our largest storage is Moondarra Reservoir, south of Erica, with a capacity of 30,458ML. We also take water from storages managed by Southern Rural Water (Blue Rock Dam and Lake Glenmaggie) and Melbourne Water (Tarago Reservoir).

We are the second largest regional water corporation in Victoria in terms of revenue earned and is the largest in terms of the total volume of water supplied and wastewater collected.

We own and maintain a $1 billion infrastructure network which includes:

More than 2,000 kilometres of water mains

- 14 water treatment plants
- 14 wastewater treatment plants
- 65 treated water storages
- 48 pump stations
- More than 1,700 kilometres of sewer mains
- 199 sewer pump stations
- Two ocean outfalls
- Gippsland Regional Organics
- Gippsland Regional Agribusiness
- We are committed to providing responsible asset management, quality management, incident management and operational audit of the reticulated urban water supply system to ensure that customer service levels are achieved according to its Customer Charter targets and SDWA.

A major objective for the corporation is to achieve and maintain community confidence in the safety, reliability and quality of their water supply.

To ensure customers are provided with safe drinking water, we maintain a 'risk based' drinking water quality management system, which covers the entire water supply system fr om the catchment to customers' taps.

The system entails:

- Detailed water quality risk identification processes;
- Audited control measures to manage risks;
- Continuous improvement project to increase system capability, manage risk and improve customer experiences; and
- Verification systems, including an independent water quality monitoring program.

In 2022-23, we made many improvements to ensure our customers' water quality was maintained, including:

- Ongoing water treatment plant process enhancements associated with
  - Filter upgrades/refurbishment.
  - Chemical dosing system upgrade and refurbishments.
  - Secondary disinfection site and monitoring upgrade and refurbishments.
- Ongoing implementation of water reticulation mains air scouring, flushing, and cleaning programs
- Ongoing replacement and upgrade of water quality on-line and field instrumentation
- Catchment bushfire preparedness inspections with CFA and Forest Fire Management Vic
- Planned fuel reduction burns in catchment areas
- Asset and infrastructure investment including:
  - Replacement of treated water storage cover and liner.
  - Installation of Ultra Violet (UV) disinfection barriers.

Introduction continued

- Treated water storage basins and tank condition assessments as part of the ongoing inspection, maintenance, and cleaning program. For more detail refer to section.
- Interconnection of transferring drinking water from Heyfield water treatment plant to the Coongulla basin completed supply with Heyfield water treatment plant completed.
- Continued the treated water storage cover and liner replacement program with the Warragul North
- Sanders Basin (Churchill) covers and liners replaced.
- The chlorine contact tank at Tyers was renovated due to evident areas of corrosion that may impact water quality.
- The newly commissioned water treatment chemical dosing system at Moe WTP was completed and Water Treatment Technicians trained in its operation;
- Remote Operated Vehicle (ROV) inspections were undertaken at Warragul South treated water storage basins.
- The treated water basin at Tyers WTP was taken offline to facilitate an internal inspection of the basin and floating roof and undertake critical refurbishment works;
- Replacement of food grade plastic floating plates on the Heyfield WTP raw water storage to reduce the risk of BGA blooms and water losses due to evaporation.
- A new disinfection facility was constructed and commissioned as part of the Heyfield-Coongulla interconnection project;
- Maintaining and refreshing the 'Five Cs for Protecting Water Quality' initiative for unplanned water main breaks. Our teams refer to the five Cs to ensure:
  - Clean pipes – check before installing.
  - Clearance – stop contaminated water running into pipes.
  - Chlorination – flush after repair.
  - Cleanliness – clean tools and separate from contamination.
  - Clothing – wear appropriate clothing.
- Continued delivery of our preventative maintenance air scouring program to maintain water quality in our reticulation networks by cleaning reticulation pipes in the Mirboo North and Heyfield townships.
- Commenced construction of the new 25ML water storage basin at Moe WTP to increase security of supply to the Moe and Warragul systems.
- A comprehensive two-day training program on Dam inspection and monitoring was conducted or the Water Treatment staff to ensure compliance with ANCOLD inspection requirements for water treatment storages;
- Maffra WTP installation and commissioning of the UV disinfection systems as an additional barrier for drinking water protection;
- Undertook chemical trials during the Alum supply chain issue to identify alternative treatment chemicals as part of our business continuity and risk management process.
- Include training activities – Peter Mosse (water treatment competency and capability)
- Disinfection trailer – hypo for safety and transport to remote sites
- Storage and tank inspection and maintenance program to maintain integrity and water quality.
- What about catchment activities – commenced review of sanitary surveys to assess catchment risk and future investment to protect water quality.
- Continue to optimise processes associated with chemical dosing, sludge managements, filter performance.

Our Vision and Values

We take pride in partnering with the community in providing quality water and waste services so we can enjoy a healthy and sustainable Gippsland for generations to come.

SAFETY AND WELLBEING

'Go home safe'

The safety and wellbeing of our employees and community is our priority. Always.

ACCOUNTABILITY

'Make it happen'

We each take ownership and deliver on what we say.

CUSTOMER FOCUSED

'Customer first'

Customers are at the heart of everything we do.

COLLABORATION

'Working together'

We work in partnership with our colleagues, customers, and stakeholders.

INNOVATION

'Clever solutions'

We challenge our thinking, learn and embrace change.

INTEGRITY AND RESPECT

'Treat others as we wish to be treated'

We are transparent, honest, inclusive, and treat people fairly.

2023-28 Strategic Priorities Framework.

Gippsland Water

Our values

Safety and wellbeing
'Go home safe'
The safety and wellbeing of our employees and community is our priority.

Customer focused
'Customer first'
Customers are at the heart of everything we do.

Accountability
'Make it happen'
We each take ownership and deliver on what we say.

Collaboration
'Working together'
We work in partnership with our colleagues, customers, and stakeholders.

Innovation
'Clever solutions'
We challenge our thinking, learn and embrace change.

Integrity and respect
'Treat others as we wish to be treated'
We are transparent, honest and inclusive, and treat people fairly.

Our focus areas

- Safety – people and customers
- Crisis and emergency management
- Organisational culture environment
- Talent attraction and development
- Empowering and enabling our people
- Diversity and inclusion
- Traditional owners - spiritual and economic outcomes
- Recreational values
- Environmental outcomes
- Circular economy
- Sustainable livable communities
- Climate – be prepared/proactive
- Future communities
- Sustainable business and environment
- Asset management and resources
- Land and water – farming/ land management
- Water security
- Industry transition in our region
- Cost to serve customers
- Business development
- Efficient operations
- Asset optimization
- Risk mitigation
- Technology
- Leadership
- Advocacy
- Research and development
- Customer engagement
- 2050 Vision
- Government stakeholder relations

2. Drinking water quality management framework

The regulatory environment in which we operate is to provide safe drinking water at all times. Safe drinking water is water that does not cause illness in those who consume it. To achieve this, the water must be free of pathogens and harmful chemicals.

Guidance regarding the structure of this report has been provided by the Department of Health (DH) in accordance with the Safe Drinking Water Act 2003 (section 26) and the current Water Quality Annual Report Guidance, June 2017.

Drinking water supplied by us must meets the obligations under SDWA and SDWR. The Australian Drinking Water Guidelines 2011 (ADWG) are used as a benchmark for safe drinking water. The guidelines provide a framework for good management of drinking water supplies that if implemented, will ensure safety at the point of use.

The ADWG include two types of guideline values:

- A health-related guideline value, which is the concentration or measure of a water quality characteristic that, based on present knowledge, does not result in any significant risk to health of the consumer over a lifetime of consumption; and
- An aesthetic guideline value, which is the concentration or measure of a water quality characteristic that is associated with acceptability of water to the consumer, such as appearance, taste, and odour.

The regulatory environment that provides guidance in the production of safe drinking water consists of:

Safe Drinking Water Act 2003 (SDWA)

The Victorian State Government passed the Safe Drinking Water Act 2003 in June 2003. This Act provides details of further requirements for Victorian water corporations.

The purpose of the Safe Drinking Water Act (2003) is to make provision for the supply of safe drinking water. In outline this Act:

- Requires water suppliers and water storage managers to prepare and implement plans to manage risks in relation to drinking water and some types of non-potable water.
- Provides for the auditing of those plans by approved auditors.
- Requires water suppliers to ensure that the drinking water they supply meets quality standards specified by the regulations.
- Requires water suppliers to disclose to the public information concerning the quality of drinking water.
- Provides for the variation, after community consultation, of water quality standards that relate only to aesthetic factors.
- Requires the reporting of known or suspected contamination of drinking water to the Secretary to the Department of Health.
- Empowers the Secretary to enforce this Act.

Drinking water quality management framework continued

Safe Drinking Water Regulations 2015 (SDWR)

The Victorian State Government passed the Safe Drinking Water Regulations 2005 in July 2005. These Regulations provides details of further requirements for Victorian water corporations. The Safe Drinking Water Regulations 2015 came into operation on 18 July 2015 with the Safe Drinking Water Regulations 2005 being revoked.

The purpose of the Safe Drinking Water Regulations 2015 is to make further provision for the supply of safe drinking water. In outline, the regulations include:

- Setting out further matters to be addressed in risk management plans and the risks to be addressed in those plans; and
- Specifying the documents to be made available for inspection in a risk management plan audit; and
- Specifying the issues relating to the quality of drinking water and regulated water that are to be dealt with by a water supplier and water storage manager in an annual report; and
- Providing for other matters required to be prescribed under the Safe Drinking Water Act 2003.

Australian Drinking Water Guidelines 2011 (ADWG)

The purpose of the Australian Drinking Water Guidelines 2011 is to provide the authoritative reference for use within Australia's administrative and legislative framework to ensure the accountability of drinking water suppliers. The ADWG are not mandatory legally enforceable standards.

Drinking water quality management framework continued

The guidelines set the framework for the management of drinking water quality known as the 12 elements. We have adopted the 12 elements of the ADWG 2011 that guides the design of a structured and systematic approach for the management of drinking water quality from catchment to consumer, to assure its safety and reliability.

Health (Fluoridation) Act 1973

The Health (Fluoridation) Act 1973 ('the Fluoridation Act') regulates the safe and effective addition of fluoride into drinking water supplies in Victoria.

Under the Fluoridation Act, the Secretary to the Department of Health has the power to direct water supply authorities to commence water fluoridation.

Code of Practice for Fluoridation of Drinking Water Supplies; Second Edition (2018) – Health (Fluoridation) Act 1973.

This code provides details of further requirements for Victorian water corporations.

The objective of the code is to provide for the safe and effective addition of fluoride into the drinking water supply. This will be achieved by specifying:

(a) The optimum fluoride levels for drinking water supplies and the design control limits for fluoridation plants.

(b) The minimum requirements for the safe and effective addition of fluoride chemicals to drinking water supplies, covering the design and operation of a fluoridation plant; and

(c) Monitoring and reporting requirements for the proposed fluoridation scheme.

The code also includes works undertaken on fluoridation plants and integrates the practices with the SDWA through:

(a) The inclusion of water fluoridation into the corporations' risk management plan under the SDWA; and

(b) Integration and compliance with the auditing, notification and reporting requirements of the SDWA.

The code also describes the gap analysis and subsequent works program associated with water fluoridation plant through:

a) The regulatory framework including the procedure to fluoridate;

b) Safety in design.

c) Requirements for the design and control of fluoridation facilities; and

d) Requirements for plant operation including monitoring, training or personnel, occupational health and safety, security and environmental protection.

Health Based Targets (HBT)

The National Health and Medical Research Council (NHMRC) released a discussion paper in 2009 on introducing a health-based target (HBT) for microbial water quality in the Australian Drinking Water Guidelines (ADWG). In December 2011, Water Services Association of Australia's (WSAA) Water Quality Network considered the HBT proposition at their annual meeting. Outcomes from that meeting formed the basis of a subsequent WSAA submission to the National Health and Medical Research Council (NHMRC).

The WSAA Drinking Water Source Assessment and Treatment Requirements Manual for the Application of Health-Based Treatment Targets Release No. 2 September 2015 was adopted by Gippsland Water for assessing the microbiological risk associated with its catchments and treatment processes in place (log removal requirements) to manage these risks.

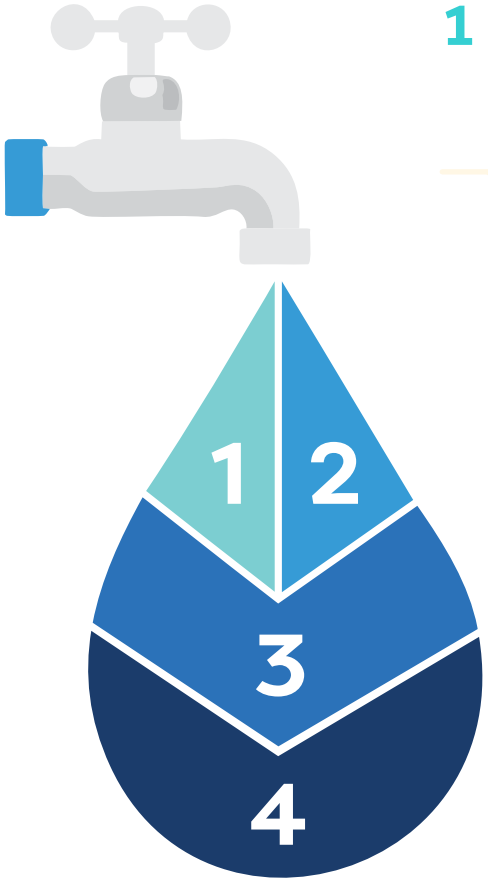
The HBT comprises four parts:

(a) Source water assessment (microbial risk). Pathogen risk assessment is conducted in accordance with the Water Service Association of Australia's (WSAA) Manual for the Application of Health-Based Treatment Targets Release No 2 and is consistent with the ADWG 2011 Framework. Figure 1 below sets out WSAA's approach to quantitative risk assessment that has been adopted by the Corporation.

(b) Water treatment plant process assessment. The water treatment assessment involves assigning estimates of pathogen reduction to the treatment processes deployed at a source.

(c) Water safety assessment. Comparing the log reduction required from the source assessment with the log reduction values claimable from the water treatment assessment.

(d) Water Safety Improvement Plan The water safety improvement plan involves planning improvements to improve water safety. Where the HBT is not achieved, the water supplier should undertake improvements.



1 Source Water Assessment

Tier 1 Assessment	**Mandatory**
Tier 2 Assessment	**Optional**
Determine Pathogen Reduction	**Required**

2 Water Treatment Assessment

Review Operational Data

Confirm Actual Performance

Determine Pathogen Reduction **Achieved**

3 Water Safety Assessment

Compare Pathogen Reduction Required with that Achieved.

Plot on Water Safety Continuum

Determine Need for **Improvement**

4 Water Safety Improvement Plan

Consider Additional Monitoring to Reduce Uncertainty

Consider Reducing Source Challenge through Catchment and Source Management

Consider Improving Water Treatment Performance/Barriers

Determine **Actions and Urgency**

Figure 1: WSAA Water Safety Assessment Process

3. Drinking Water Quality Policy

1. Policy statement and purpose

Gippsland Water is committed to managing its water supply systems to provide safe drinking water for customers at all times. This is achieved by managing catchments, treatment and water supply assets and systems in an efficient and sustainable manner reflecting the current and future commitments.

Drinking water is managed in accordance with our Drinking Water Quality Manual that outlines the strategic and operational processes which reflect our attitude to our customers, our product, our service delivery and each other, in a matter which demonstrates that we:

- Understand our obligations to public health
- Are committed to high quality products and services
- Behave openly, ethically and fairly
- Focus on customer satisfaction
- Promote innovative solutions
- Strive to get the best out of our systems all of the time

2. Our commitments

To continually improve our drinking water quality performance by:

- Meeting all of our legislated drinking water quality requirements, and moving our practices beyond compliance with relevant legislation only, where sustainable and economic opportunities are identified;
- Managing the water quality aspects of all our activities by training our people, incorporating water quality objectives and targets into our business planning activities, and implementing appropriate risk based approaches to ensure we provide safe drinking water at all times;
- Working with our customers and suppliers to jointly understand and be more effective in the management of water quality products and services supplied to us; and
- Undertaking whole-of-water supply catchment to tap assessments as part of an integrated approach to the sustainable management of our water resources and treatment activities.

To communicate with our community by:

- Openly sharing and publishing information on our drinking water quality activities and performance.
- Utilising our water industry partners, advisory committees and other consultative mechanisms, to seek community involvement in policy development and planning processes and by contributing to initiatives and activities that educate and enhance community awareness of water resources, catchments, water treatment and water quality issues; and
- Co-operating with all stakeholders within the community to identify, influence and participate in sustainable solutions to global and regional water quality priorities.

4. Drinking water supply systems

4.1 Source of water

We operate 14 water treatment systems supplying 35 water sampling localities, and 42 towns in 2022-23. The water for these systems is sourced from a variety of water supplies including stream off-takes, reservoirs, and groundwater (bore water). The table below provides information on where the raw water is sourced for each water sampling locality, identifies the raw water storage (if one exists prior to each water treatment plant) and details the water treatment processes used to produce safe drinking water.

We interact with many stakeholders regarding catchment management. For details regarding catchment management activities refer to section 9.6.

Table 1: Gippsland Water - water sampling locality source water and water treatment processes

Water sampling Locality	Estimated Population Serviced[1]	Source water	Raw Water Storage	Water Treatment Plant	Treatment process										Sludge Thickening Dewatering	Added substances						
						Clarification		Filtration		Disinfection				Other								
					Coagulation & Flocculation	Sedimentation / Clarification	Dissolved Air Flotation	Granular Media Filter	Membrane	Chlorine Gas	Chloramination	Sodium Hypochlorite	Calcium Hypochlorite	Activated Carbon (PAC / GAC)[2]		Lime / Soda Ash	Alum Based Coagulants	Iron Based Coagulants	Potassium Permanganate	Polymers	Sodium Fluoride / Hydrofluorosilicic Acid	Calgon sodium hexametaphosphate
Maffra	5,580	Macalister River	NA	Maffra	X	X		X		X		Stratford and Boisdale		X		Soda Ash	Alum/PACI-23* (High Turbidity)			LT22	Sodium Fluoride	X
Stratford	2,980																					
Boisdale	80																					
Briagolong	1,133	Bore - Wa De Lock Aquifer	NA	Briagolong	X			X				X				Soda Ash		Polymerised Ferric Sulphate		1115 & 1160		

1. The listed populations are for the water sampling localities calculated using Gippsland Water's number of residential water connections, the 2021 ABS census data of number of persons per dwelling and adjusted for estimates of permanent occupation rates. Figures have been rounded to the nearest 10 people. 2. PAC/GAC used as required to treat for taste and odour compounds.

* PACI-23 used as required to treat high turbidity raw water. **X** 1 Plant capability for activated carbon dosing (not currently in use).

Table 1 (Cont.): Gippsland Water - water sampling locality source water and water treatment processes

Water sampling Locality	Estimated Population Serviced[1]	Source water	Raw Water Storage	Water Treatment Plant	Treatment process										Sludge Thickening Dewatering	Added substances						
						Clarification		Filtration		Disinfection				Other								
					Coagulation & Flocculation	Sedimentation / Clarification	Dissolved Air Flotation	Granular Media Filter	Membrane	Chlorine Gas	Chloramination	Sodium Hypochlorite	Calcium Hypochlorite	Activated Carbon (PAC / GAC)[2]		Lime / Soda Ash	Alum Based Coagulants	Iron Based Coagulants	Potassium Permanganate	Polymers	Sodium Fluoride / Hydrofluorosilicic Acid	Calgon sodium hexametaphosphate
Morwell	15,900	Tyers River	Moondarra	Morwell	X	X		X		X		Morwell, Churchill, Jumbuk, Hazelwood Nth, Boolarra	Traralgon South			Soda Ash	Alum			LT20	Sodium Fluoride	
Boolarra	973																					
Churchill	5,540																					
Yinnar	1,450																					
Jumbuk	390																					
Traralgon South/ Hazelwood North	1,930																					
Tyers/ Glengarry	2,300	Tyers River	Moondarra	Tyers (Plant 1)	X			X				Tyers, Rosedale & Toongabbie			X	Soda Ash	Alum			1115 & 1160		
Rosedale	1,760				X																	
Toongabbie	990			Tyers (Plant 2)	X		X	X								Soda Ash	Alum					
Cowwarr	310																					
Traralgon	30,190	Tyers River	Moondarra	Traralgon	X		X	X		X						Soda Ash	Alum/ACH			LT20		Sodium Fluoride

1. The listed populations are for the water sampling localities calculated using Gippsland Water's number of residential water connections, the 2021 ABS census data of number of persons per dwelling and adjusted for estimates of permanent occupation rates. Figures have been rounded to the nearest 10 people. 2. PAC/GAC used as required to treat for taste and odour compounds.

X 1 Plant capability for activated carbon dosing (not currently in use).

Table 1 (Cont.): Gippsland Water - water sampling locality source water and water treatment processes

Water sampling Locality	Estimated Population Serviced[1]	Source water	Raw Water Storage	Water Treatment Plant	Treatment process											Added substances						
						Clarification		Filtration		Disinfection				Other								
					Coagulation & Flocculation	Sedimentation / Clarification	Dissolved Air Flotation	Granular Media Filter	Membrane	Chlorine Gas	Chloramination	Sodium Hypochlorite	Calcium Hypochlorite	Activated Carbon (PAC / GAC)[2]	**Sludge Thickening Dewatering**	Lime / Soda Ash	Alum Based Coagulants	Iron Based Coagulants	Potassium Permanganate	Polymers	Sodium Fluoride / Hydrofluorosilicic Acid	Calgon sodium hexametaphosphate
Warragul (Incl Nilma, Drouin East, Darnum)	21,830	Pederson Weir (Tarago River) Tarago Reservoir - (supplementary supply)	Tarago Reservoir (supplementary supply)	Warragul	X		X	X		X		Warragul South & Drouin		X[1]	X	Lime	Alum			LT20	Sodium Fluoride	
Warragul South	670																					
Drouin	17,470																					
Rokeby/Buln Buln	570																					
Heyfield	2,070	Thomson River	Heyfield raw water storage	Heyfield	X			X		X				X	X	Soda ASH		PFS (Polymerised Ferric Sulphate)		1115, 1160		X
Coongulla/ Glenmaggie[3]	830																					
Rawson	360	Trigger Creek	Amours Basins	Rawson	X		X	X				Rawson WTP, Parkers Corner			X	Soda ASH		PFS (Polymerised Ferric Sulphate)		1160		
Erica	250																					

1. The listed populations are for the water sampling localities calculated using Gippsland Water's number of residential water connections, the 2021 ABS census data of number of persons per dwelling and adjusted for estimates of permanent occupation rates. Figures have been rounded to the nearest 10 people. 2. PAC/GAC used as required to treat for taste and odour compounds. 3. Coongulla Water Treatment Plant was decommissioned in 2022, with supply to Coongulla and Glenmaggie being source via pipeline from Heyfield from 2022.

X 1 Plant capability for activated carbon dosing (not currently in use).

Table 1 (Cont.): Gippsland Water - water sampling locality source water and water treatment processes

Water sampling Locality	Estimated Population Serviced[1]	Source water	Raw Water Storage	Water Treatment Plant	Treatment process										Sludge Thickening Dewatering	Added substances						
						Clarification		Filtration		Disinfection				Other								
					Coagulation & Flocculation	Sedimentation / Clarification	Dissolved Air Flotation	Granular Media Filter	Membrane	Chlorine Gas	Chloramination	Sodium Hypochlorite	Calcium Hypochlorite	Activated Carbon (PAC / GAC)[2]		Lime / Soda Ash	Alum Based Coagulants	Iron Based Coagulants	Potassium Permanganate	Polymers	Sodium Fluoride / Hydrofluorosilicic Acid	Calgon sodium hexametaphosphate
Mirboo North	1,810	Little Morwell River	N/A	Mirboo North	X	X	X	X				X			X	Soda ASH	PASS			LT20		
Moe (inc Darnum[3])	10,300	Tanjil River and Narracan Creek	N/A	Moe	X	X		X		X	Newborough, Yallourn North, Trafalgar, Yarragon & Darnum				X	Soda ASH	Alum			LT20	LSodium Fluoride	X
Newborough	7,180																					
Yallourn North	1,600																					
Trafalgar	4,330																					
Yarragon	2,200																					
Neerim South	1,580	Tarago River	Tarago Reservoir	Neerim South	X		X	X			X (Noojee System)	X (Neerim South)			X	Soda ASH		PFS (Polymerised Ferric Sulphate)		1115, 1160		X
Noojee	240																					
Sale/Wurruk	17,350	Bore (Boisdale Aquifer)	N/A	Sale				X		X						Lime			X		Sodium Fluoride	

1. The listed populations are for the water sampling localities calculated using Gippsland Water's number of residential water connections, the 2021 ABS census data of number of persons per dwelling and adjusted for estimates of permanent occupation rates. Figures have been rounded to the nearest 10 people. 2. PAC/GAC used as required to treat for taste and odour compounds. 3. Coongulla Water Treatment Plant was decommissioned in 2022, with supply to Coongulla and Glenmaggie being source via pipeline from Heyfield from 2022.

X 1 Plant capability for activated carbon dosing (not currently in use).

Table 1 (Cont.): Gippsland Water - water sampling locality source water and water treatment processes

Water sampling Locality	Estimated Population Serviced[1]	Source water	Raw Water Storage	Water Treatment Plant	Treatment process											Added substances						
						Clarification		Filtration		Disinfection				Other								
					Coagulation & Flocculation	Sedimentation / Clarification	Dissolved Air Flotation	Granular Media Filter	Membrane	Chlorine Gas	Chloramination	Sodium Hypochlorite	Calcium Hypochlorite	Activated Carbon (PAC / GAC)[2]	Sludge Thickening Dewatering	Lime / Soda Ash	Alum Based Coagulants	Iron Based Coagulants	Potassium Permanganate	Polymers	Sodium Fluoride / Hydrofluorosilicic Acid	Calgon sodium hexametaphosphate
Seaspray	770	Merrimans Creek	Seaspray raw water storage	Seaspray	X			X				X				Soda ASH	Alum 90			1115, 1160		
Thorpdale (Water carting from Moe water sampling locality)	180	Tanjil River & Narracan Creek (September 2015 - ongoing)	N/A	Moe	X	X		X		X		Newborough, Yallourn North, Trafalgar, Yarragon & Darnum			X	Soda ASH	Alum			LT20	Sodium Fluoride	X
Willow Grove	450 (September 2015 - ongoing)	Tanjil River	Blue Rock Lake	Willow Grove	X			X			X					Soda ASH	Alum			1115, 1160		

1. The listed populations are for the water sampling localities calculated using Gippsland Water's number of residential water connections, the 2021 ABS census data of number of persons per dwelling and adjusted for estimates of permanent occupation rates. Figures have been rounded to the nearest 10 people. 2. PAC/GAC used as required to treat for taste and odour compounds.

X 1 Plant capability for activated carbon dosing (not currently in use).

4.2 Water quality management system

The Safe Drinking Water Act 2003 (SDWA) provides a regulatory framework for drinking water quality including a risk management framework and water quality standards. The SDWA requires all Victorian Water Corporations to prepare, implement and review a risk management plan. To assist with this requirement, we have made a commitment to establish and maintain a Drinking Water Quality Management System (DWQMS) that considers the principles of the Framework for the Management of Drinking Water Quality within the Australian Drinking Water Guidelines 2011 (ADWG). This quality management framework is specific for the water industry and incorporates a preventive risk management approach from catchment to consumer.

We utilise the ADWG Framework principles in its Water Quality Management System for the supply of safe drinking water. The ADWG Framework is based on 12 elements outlined in Chapter 2.

The 12 elements of the Water Quality Management System must be met, and the key processes undertaken to meet these requirements include:

4.2.1 Hazard and risk identification

To determine the key risk to a water supply to enable control measures to be implemented, we undertake an extensive hazard assessment process from the catchment to the end user involving management, operational staff, system operators and key stakeholders.

The risks identified during this process are reviewed regularly to identify changes to risks, new risks, or when processes and system changes occur.

4.2.2 Control measures

Control measures are established to reduce the key risk or likelihood of the risk occurring. The intent is to manage or reduce the risk to an acceptable level. Within our Drinking Water Quality Management System, this consists of:

- Critical Control Points (CCPs) that are alarmed and have the ability to stop processes before a water quality failure occurs. The CCPs are documented and apply to critical process steps in the treatment process;

4.2.2 Control measures continued

- Maintenance programs that include preventive maintenance of critical assets used in the treatment process and control systems such as dosing systems, monitoring instrumentation for key assets and system-based maintenance such as mains flushing, air scouring, tank and basin cleaning as well as asset maintenance and replacement programs; and
- Trained and competent water treatment technicians manage the operation and maintenance of water treatment plants and water supply systems. All technicians undertake industry-based training to ensure a high level of knowledge of treatment processes and associated risks. Our technicians are trained in accordance with the Water Industry Operator Certification Framework 2018: Drinking Water, Wastewater, Recycled Water effective 1 July 2019 requirements to Certificate 3 and Certificate 4 level in water industry operations.

4.2.3 Verification and monitoring

Verification and monitoring is used to confirm and authenticate the performance of water treatment processes and water supply systems to ensure compliance with SDWR 2015 standards and ADWG health related and aesthetic guideline values. Our verification and monitoring includes:

- Supervisory control and data acquisition systems (SCADA) at:
  - Individual water treatment plants;
  - Secondary disinfection systems; and
  - Water supplies treated water tanks, storages and pump stations.
- System-wide telemetry and alarms 24 hours a day, 7 days a week;
  - Critical Control Point (CCP) alert and critical process alarms;
- Water treatment and water quality Technicians on-call 24 hours a day, 7 days a week for system monitoring and alarm verification and response;
- A drinking water quality monitoring program covering the catchment, water treatment plant process and water supply system testing and undertaken by an independent National Association of Testing Authorities (NATA) accredited laboratory that include:
  - Pathogenic microorganisms;
  - Inorganic chemicals, including inorganic disinfection by-products;
  - Organic chemicals, including pesticides, pesticide residues and organic disinfection by-products;
  - Radiological parameters; and
  - Algal toxins (as required when algal events occur).
- A water treatment chemical quality assurance program undertaken by an independent laboratory that includes certificates of analysis prior to receipt of chemicals for use;
- Calibration programs of on-line and benchtop critical instruments used for process control and alert and critical alarm processes by independent service providers; and
- Customer feedback captured through our water quality complaint resolution procedure.

4.2.4 System auditing

- Internal and external auditing programs have been established to assess compliance of the Water Quality Management System. This includes auditing:
- Water treatment plant records, systems and processes;
- Water supply system infrastructure (water mains repairs, treated water storage tanks and basins);
- Challenging testing CCP alert and critical alarms; and
- Behavioural audits to verify compliance with control, verification and monitoring requirements.

4.3 Water treatment processes

- The source waters for our 16 water supply systems are treated prior to distribution with the objective of providing safe drinking water at all times. The treatment varies for each water supply system with the specific treatment process dependent on the quality and risks of the source water.
- ***Table 1*** identifies the regular treatment process for each of the water localities and lists the added substances and any periodic treatment activities. The treatment process used depends on the source and quality of the water to be treated. The corporation uses the following treatment processes to produce safe drinking water:

4.3.1 Coagulation/flocculation

- Coagulation is a process to remove very fine suspended particles often associated with turbidity, colour or colloidal matter in water. These particles have a negative charge that causes them to repel each other and stay suspended in water. The addition of a suitable 'coagulant' of iron and/or aluminium salt with a positive charge neutralises or destabilises the negative charge enabling the fine particles to join together to form larger particles. The flocculation (floc) process involves stirring the water gently after the coagulant has been added. This allows the particles to come into contact, and eventually causes it to stick together and form floc. This process removes the fine particles, dirt and colour present in the water.
- Chemicals used for coagulation/flocculation at the water treatment plants include aluminium sulphate, ferric sulphate and poly-aluminium silicate sulphate solution (PASS).

4.3.2 Clarification/sedimentation

- The clarification or sedimentation of the floc particles formed during the coagulation/flocculation process is usually carried out under still conditions (e.g. in the sedimentation tank or clarifier). A sedimentation tank relies on gravity to separate the floc from the water, which is heavy and falls to the bottom of the tank – leaving the 'cleaner' water on top. A clarifier uses a mechanical process to separate the floc, and the water is collected in troughs at the surface. Once the floc has been removed the clean water is sent to filters.

4.3.3 Filtration

- The clarified water is passed through a filter consisting of several types of graded filter media (sand, gravel and coal) to remove any remaining particles, floc or dissolved chemicals that may have passed through the clarification/sedimentation process.
- Another method used utilises Dissolved Air Flotation and Filtration (DAFF) which relies on the injection of microscopic air particles into the water stream, cusing the flocculated particles to float to the surface. These particles are then drawn off the surface and off the filtration tank and removed to waste. The clear water then is filtered, as above, through graded filter media.
- Over time, the filters gradually become clogged with trapped particles. A filter backwash is carried out to clean the filters, returning it to optimum condition. Air and water is forced up through the filter nozzles to agitate the filter bed and remove any trapped particles.

The final turbidity of water leaving the filters, during normal plant operation, is less than 0.1 NTU (Nephelometric Turbidity Units - unit of measure for turbidity).

- The backwash water produced during the filter cleaning process is discharged to the sludge thickening system to separate solids from process water. To maximise water use, the separated process water is then returned to the treatment plant and mixed with new raw water to recommence the treatment process.

4.3.4 Sequestration

- Sequestration involves the addition of sequestering agents followed by chlorination which keeps dissolved iron and manganese from oxidising and precipitating.

4.3.5 Disinfection

- Drinking water is disinfected to prevent the spread of waterborne pathogens that cause diseases such as dysentery, cholera, typhoid and gastroenteritis.
- A low residual level of disinfection also ensures that the water remains disinfected once it leaves the water treatment plant until it arrives at the customer's tap.
- In our service area, chlorination is the most commonly used disinfectant because of its reliability and cost effectiveness. Chlorine is the most widely used disinfectant for drinking water supplies in the world. The other disinfection treatment process used in our region is chloramination.

Chlorination

- Chlorine is widely used throughout the world to disinfect drinking water and control disease causing organisms. The type of chlorine used at our plants is either chlorine gas or sodium hypochlorite.

4.3.4 Filtration continued

Chloramination

- Chloramination is also used throughout the world as a means of disinfecting drinking water to control disease causing organisms. Small amounts of chlorine and ammonia are added to the water to form chloramines, providing a relatively long-lasting process to safely disinfect water.

Secondary disinfection

- Disinfectant residuals decrease with time as water passes throughout the distribution system and within storage tanks. Secondary water disinfection plants are used to maintain adequate disinfection levels within the distribution system.

Ultra violet (UV) disinfection

- Gippsland Water has recently introduced an ultra violet (UV) disinfection system to its water treatment processes. The UV light, a type of electromagnetic radiation, possesses incredible potential in disinfecting water by neutralising harmful, including chlorine tolerant, microorganisms. This process involves the UV light damaging the DNA of these microorganisms, rendering them unable to reproduce and cause infections. When used in combination with the other treatment processes, it ensures the provision of a multi-barrier approach to managing water quality.

4.3.6 Added Substances

Lime/Soda ash

To assist with the treatment process and to ensure the pH level in the raw water (before treatment chemicals are added) and filtered water (after treatment) is within the required ranges, lime or soda ash is added. Lime or soda ash is added to the raw water to adjust the pH to ensure the optimum level for chemical reactions to occur in the coagulation/flocculation process.

Lime or soda ash is also added to the water before it leaves the water treatment plant to maintain the pH in the desired range to optimise the effectiveness of disinfection chlorinated systems and to minimise the risk of corrosion and improve water taste.

Potassium permanganate

Potassium permanganate can be added to the water supply as required to reduce iron and manganese levels. When present in higher concentrations, these metals can cause staining of laundry and plumbing fixtures and contribute to 'dirty water' events.

Powdered activated carbon

Powdered activated carbon can be added to the water supply as required to remove compounds that contribute to taste and odour issues, usually associated with higher levels of certain algae in raw water.

Fluoridation

In accordance with Department of Health requirements, we fluoridate the drinking water supplies at 6 of our 15 water treatment plants (Moe, Morwell, Maffra, Traralgon, Sale, and Warragul). Any fluoride present in those systems that do not have fluoride dosing systems is due to naturally occurring sources. For information about the health issues associated with the water fluoridation program, contact the Department of Health (Department of Health) on 1800 651 723.

Sodium hexametaphosphate

Sodium hexametaphosphate can be added to the water supply as required as a sequestration agent to prevent the oxidation of trace levels of manganese in the water supply that can contribute to dirty water issues.

4.3.7 Distribution

After water is filtered and disinfected, it is relayed to customers through a vast network of tanks, basins, pumps and pipes. We use positive pressure, gravity and backflow prevention to ensure safe drinking water. Positive pressure pushes contaminants away from the water supply system if leaks occur. The corporation requires high risk properties install and maintain a testable backflow prevention device before connecting to the water supply network.

Where works are required on water mains, the safety of drinking water is maintained through pro-actively managing any risks. Programs such as our 5Cs (clean pipes, clearance, chlorination, cleanliness, clothing) is specifically designed to address any contamination risk. ***See Figure 2.***

The water distribution system is also strategically flushed to remove build-up of naturally occurring sediments from pipes that can cause customers to experience dirty water.

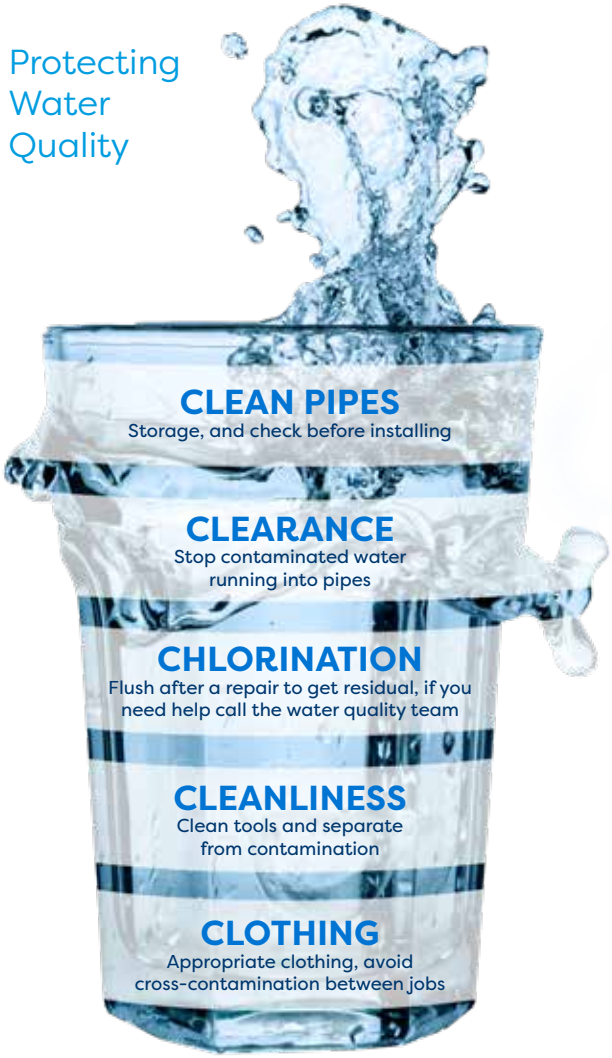


Figure 2: Gippsland Water's 5Cs program

5. System issues for 2022-23

During the 2022-23 reporting period, there were three events reportable under section 22 of the SDWA, with details discussed in section 6.4 of this report.

5.1: Section 18 and 22 Notification

There were no events reportable under section 18 of the SDWA.

5.2. Non Reportable System Issues

Any other non-reportable systems issues were dealt with through the customer water quality complaints process outlined in Section 6.

6. Quality of drinking water 2022-23

The SDWR require a water quality monitoring program to be undertaken to verify compliance or non-compliance of specified water quality parameters as listed in the regulations. The quality of water is measured across each of the 35 localities to determine that the water meets the specified quality standard. Over the reporting period, more than 3,600 samples were collected for quality testing and over 56,000 tests performed. The following section provides a summary of the results against the water quality parameters monitored through the year at the required sampling frequency.

A brief explanation of the required water quality parameters is provided below. A more detailed explanation can be obtained from the ADWG prepared by the National Health and Medical Research Council (NHMRC).

6.1 Water quality standards (SDWR 2015)

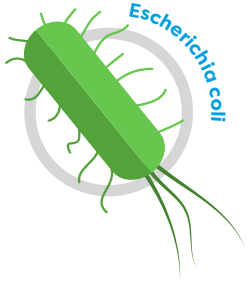
Escherichia coli (E. coli) – E. coli is the most common thermo-tolerant coliform present in faeces and is regarded as the most specific indicator of recent faecal contamination from warm blooded animals. The presence of E. coli in the water supply can therefore indicate the potential for other pathogenic bacteria to be present. Results from samples taken within the water sampling locality that exceed the maximum level of this parameter are reported to Department of Health, as required under section 22 of the SDWA.

Trihalomethanes (THM) – Trihalomethanes are a category of by-products produced in drinking water, principally as a result of disinfection chemicals (chlorine) reacting with naturally occurring organic matter derived from the decay of aquatic and terrestrial vegetative matter present in water supplies.

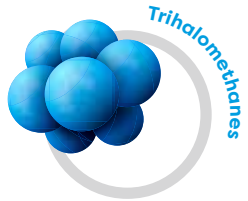
Results from samples taken within the water sampling locality that exceed the maximum level of this parameter are reported to Department of Health, as required under section 18 of the SDWA.

Turbidity – Turbidity is caused by the presence of fine suspended matter such as clay, silt, colloidal particles, algae and other microscopic organisms in the water. In high levels, this matter gives the water the appearance of being dirty, muddy or milky. Turbidity is best removed by coagulation and filtration treatment processes. Results from samples taken within the water sampling locality that exceed the maximum level of this parameter are reported to Department of Health, as required under section 18 of the SDWA.

The Safe Drinking Water Regulations (2015) monitoring requirements are summarised in Table 2:



All samples of drinking water collected are found to contain **no Escherichia coli per 100 millilitres**, with the exception of any false positive sample.



Less than or equal to 0.25 mg/L.

The **95th percentile** of results for samples in any 12 month period **must be less than or equal to 5.0** Nephelometric Turbidity Units.

Table 2: Summary of the Safe Drinking Water Regulations 2015 (Schedule 2):

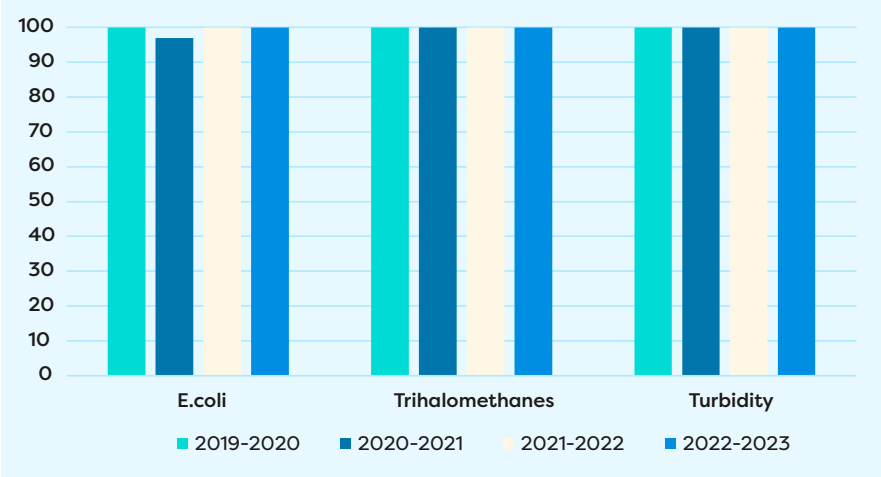


Figure 3: Percentage Compliance by Water Sampling Locality with Water Quality Standards – Schedule 2 (SDWR) 2015

For the 2022-2023 reporting period, 100% compliance was achieved with the Schedule 2 parameters, which was equivalent to the 2019-2020 and 2021-2022 result, and sustained improvement over the 2020-2021 result where 97% compliance was achieved. This demonstrated Gippsland Water's commitment to ensure compliance with the water quality standards

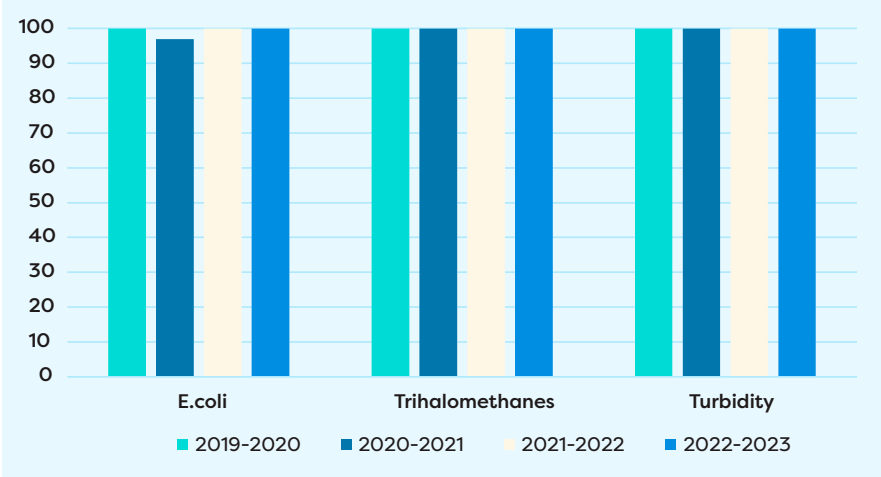


Figure 4: Percentage Compliance by Population with Water Quality Standards – Schedule 2 (SDWR) 2015

For the 2022-2023 reporting period, 100% compliance was achieved with the Schedule 2 parameters, which was equivalent to the 2019-2020 and 2021-2022 result, and sustained improvement over the 2020-2021 result. This demonstrated consistent compliance with the water quality standards.

6.2 Water quality standards

We must ensure that all drinking water supplied to our localities complies with the quality standards specified under Part 3 of the SDWA (2003). As well as the above parameters that are required under Schedule 2 of the SDWR (2015), many other tests are conducted to ensure that the water supplied is safe to drink. These parameters are determined by assessing the risks to each water supply system and monitoring to verify that these risks are being controlled effectively.

The quality standards applied for the additional parameters in most instances are derived from the ADWG.

6.3 Emergency/incident management

We have aligned our incident/emergency management approach to the Australasian Inter-service Incident Management Systems (AIIMS) as part of its SDWA and SDWR emergency and incident management processes.

We continually review our All-Hazards Incident Management Plan to ensure ongoing compliance with the requirements of Part 7a of the Emergency Management Act (2013).

6.4 Incidents and potential water quality events

Section 18 of the SDWA states:

'A water supplier must notify the Secretary in writing if it becomes aware that the drinking water it is supplying to another person does not comply, or is not likely to comply, with any relevant water quality standard and must do so within 10 days after it becomes aware of the fact.'

In 2022-23, the water quality events reported to the Department of Health pursuant to section 18 of the SDWA are summarised below.

Water sampling Locality	There were no notification made to the Department of Health pursuant to section 18 of the SDWA
Date and duration of incident	
Location of incident	
Nature of the incident	
Drinking water supplies affected	
Safe Drinking Water Regulations (Schedule 2) – Standard Not Met	

Table 3: Summary of notifications under section 18

Refer to section 6.5 for information on events and actions taken to manage and return the drinking water supply to specification, and preventative actions.

6.5 Emergencies and water quality events

Section 22 of the SDWA states:

(1) This section applies if an officer of a water supplier believes or suspects on reasonable grounds that the water supplied, or to be supplied for drinking purposes –

(a) may be the cause of illness; or

(b) may be the means by which an illness is being, has been or will be transmitted; or

(c) may contain any pathogens, substance, chemical or blue-green algae toxin, whether alone or in combination, at levels that may pose a risk to human health; or

(d) may cause widespread public complaint.

(2) On forming that belief or suspicion, the officer must immediately report his or her belief or suspicion to the Secretary and must make the report in the form required by the Secretary.'

During the 2022-23 reporting year, there were three reportable events that required notification to the Drinking Water Regulatory Unit of Department of Health, under section 22 of the SDWA. These notifications are summarised below:

Table 4: Summary of incidents and actions taken under section 22

Water Sampling Locality Affected	Date and duration of incident	Location of incident	Nature of the incident	Drinking water supplies affected	Actions taken in response to the incident	Was the community notified
Traralgon	2 August 2022	Traralgon Reticulation	E. coli exceedance	Traralgon	Resampling and retesting of the reticulation system including the water storage tanks and all surrounding sampling points.	No.
					Flushing to increase chlorine residuals and improve water quality.	Corrective actions implemented quickly as the issue was resolved.
					Asset inspections and risk assessment of the water system.	No further detections occurred.
					Two repeat sampling events of the reticulation 24 hrs apart.	Investigation report submitted to Department of Health which determined detection was a false positive (as defined in Schedule 2 of the SDWR (2015).
Yinnar	4 January 2023	Yinnar Reticulation	E. coli exceedance	Yinnar	Resampling and retesting of the reticulation system including the water storage tanks and all surrounding sampling points.	No.
					Flushing to increase chlorine residuals and improve water quality.	Corrective actions implemented quickly as the issue was resolved.
					Asset inspections and risk assessment of the water system.	No further detections occurred.
					Two repeat sampling events of the reticulation 24 hrs apart.	Investigation report submitted to Department of Health which determined detection was a false positive (as defined in Schedule 2 of the SDWR (2015).
Warragul / Drouin / Rokeby & Buln Buln	21 March 2023	Warragul / Drouin / Rokeby & Buln Buln Reticulations	Wide-spread Public Complaint regarding Taste and Odour		Source of taste and odour compounds removed from the system.	Yes
					Wide-spread flushing undertaken to refresh system.	Customer information provided via social media
					Continuous monitoring undertaken to monitor the levels of taste and odour compounds	Treatment and removal of algae causing the issue from components of the Water Treatment Plant process.

6.5.1 Traralgon E. coli detection (August 2022)

A routine water quality compliance sample was collected on Monday 1 August 2022 at approximately 1:35pm in the Traralgon distribution system. A preliminary, unconfirmed sample result for E. coli of 3 org/100mL was phoned through to Gippsland Water (GW) on Tuesday 2 August 2022 at approximately 10:35am.

The Department of Health (DH) was advised and a Section 22 notification was submitted.

An investigation into the detection was initiated immediately upon receiving the notification. The investigation included collecting additional samples, flushing, assessment of storage integrity, system breaks and repairs, along with Water Treatment Plant performance at the time of sample collection, as well as one week prior.

Remedial/precautionary actions undertaken immediately were:

- The Traralgon system was resampled prior to any works
- The disinfection (chlorine) dosing set-point at the Water Treatment Plant was increased
- The Traralgon reticulation network was flushed to draw fresh water through the system
- A repeat set of samples were collected for microbiological analysis on 2nd August 2022.
- An addition sample set for microbiological analysis was collected on 3rd August 2022.

All pre and post flushing reticulation samples collected on 2 August 2022 returned no E. coli detections per 100mL.

All samples collected on 3rd August 2022 from the Traralgon reticulation also returned no E. coli detections per 100mL.

No significant degradation of plant or infrastructure was identified during the investigation period, including no recorded or identified WTP system or process failures at the Traralgon WTP.

Based on the performance of the Treatment Plant, and the sampling results for the Water Storage, it is considered very unlikely that any contaminated water originated from the Traralgon Water Treatment Plant and flowed through to the reticulated water network.

Routine testing of the raw, untreated water entering the Water Treatment Plant (WTP) at Traralgon showed no signs of abnormal E. coli contamination or no unusual turbidity readings.

The system storages were inspected with no floating debris was evident which suggests that there is no structural issues or vermin access that could have contributed to the E. coli detection.

The sample point where the E. coli was detected was inspected and found to have a cracked cover, potentially allowing contaminants to accumulate of the surface of the sample tap. This was suspected to be the cause of the contamination.

The investigation concluded that the sample collected on 2 August 2022 which returned the positive E. coli result was not representative of the water supplied to customers in the Traralgon reticulated water network, and that the detection is a False Positive in accordance with the Safe Drinking Water Regulation 2015, Schedule 2 definition. This conclusion was supported by Department of Health.

Water Sampling Locality Affected	**Traralgon**
Number of samples	**45**
E. coli Maximum detected (orgs/100mL)	**3**
Free chlorine reticulation and tanks Range (mg/L)	**0.49 to 0.72**
Turbidity Range(NTU)	**0.1 to 0.5**

Table 5: Traralgon E. coli Detection Water quality results during investigation

6.5.2 Yinnar E. coli detection (January 2023)

A routine water quality compliance sample was collected on Tuesday 3 January 2023 at 12:50pm in the Yinnar distribution system. A preliminary, unconfirmed sample result for E. coli of 1 org/100mL was phoned through to Gippsland Water on Wednesday 4th January 2023 at 11:25am.

The DH was advised, and a Section 22 notification was submitted.

An investigation into the detection was initiated immediately upon receiving the notification. The investigation included collecting additional samples, flushing, assessment of storage integrity, system breaks and repairs, along with Water Treatment Plant performance at the time of sample collection, as well as one week prior.

Remedial/precautionary actions undertaken immediately were:

- The Yinnar and Churchill system was resampled prior to any works
- The disinfection (chlorine) dosing set-point at the Sanders Basin Disinfection site was increased
- The Yinnar reticulation network was flushed to draw fresh water through the system
- A repeat set of samples were collected for microbiological analysis on 4th January 2023.
- An addition sample set for microbiological analysis was collected on 5th January 2023.

All pre and post flushing reticulation samples collected on 4th January 2023 returned no E. coli detections per 100mL.

All samples collected on 5th January 2023 from the Yinnar reticulation also returned no E. coli detections per 100mL.

No significant degradation of plant or infrastructure was identified during the investigation period, including no recorded or identified WTP system or process failures at the Morwell WTP or further disinfection sites located at Buckley's Hill, Ridge Reservoir, Brodribb Road, and Sanders Basin.

Based on the performance of the Treatment Plant, and the sampling results for the Water Storage, it is considered very unlikely that any contaminated water originated from the Morwell Water Treatment Plant and flowed through to the reticulated water network.

Routine testing of the raw, untreated water entering the Water Treatment Plant (WTP) at Morwell showed no signs of abnormal E. coli contamination or no unusual turbidity readings.

The system storages were inspected, with no floating debris was evident which suggests that there is no structural issues or vermin access that could have contributed to the E. coli detection.

The sample point where the E. coli was detected was inspected, with the presence of snails and slugs around the fitting detected. These potentially contributed to the positive E. coli detection.

The investigation concluded that the sample collected on 4th January 2023 which returned the positive E. coli result was not representative of the water supplied to customers in the Yinnar reticulated water network, and that the detection is a False Positive in accordance with the Safe Drinking Water Regulation 2015, Schedule 2 definition. This conclusion was supported by Department of Health.

Water Sampling Locality Affected	**Yinnar**
Number of samples	**30**
E. coli Maximum detected (orgs/100mL)	**1**
Free chlorine reticulation and tanks Range (mg/L)	**0.10 to 0.80**
Turbidity Range(NTU)	**0.2 to 3.1***

* - higher turbidity results were detected after flushing indication sediment in the main was resuspended.

Table 6: Yinnar E.coli Detection Water quality results during investigation

The incident-based water quality sampling data has not been included in the data presented in section 9. As required by Department of Health, only samples scheduled as part of the risk management plan monitoring programs are included for data analysis and statistics.

6.5.3 Warragul / Drouin / Rokeby & Buln Buln Wide-spread Public Complaint (March 2023)

During March 2023, Gippsland Water's Service Centre received several customer calls regarding the taste and odour of the water in the Warragul and Drouin systems. The number of customer calls escalated of the following week indicating a wide-spread issue.

Suspecting taste and odour compounds, Geosmin and Methyl-Isoborneol (MIB), a panel of Gippsland Water staff collected and tested water samples from Pederson Weir, Rokeby pump station, the raw water sources for the systems. In addition to collecting samples from the raw water sources, samples were also collected from the Warragul and Drouin reticulation systems.

Geosmin and MIB are naturally occurring compound that is produced by certain types of bacteria and algae is commonly found in soil and water. It has a distinctive earthy smell and taste and can be detected in water even at very low concentrations (0.05ng/L). Whilst neither Geosmin or MIB are harmful to human health, their presence in drinking water can affect its taste and odour, which is why water treatment facilities work to remove it during the treatment process.

Initially it was suspected that one of the raw water sources for the Warragul WTP may have been the potential source, but on further investigation it was determined that the source of the taste and odour compounds was the supernatant return water from the sludge lagoon and clarifier. Samples were collected from the supernatant return system and produced results with a concentration of 3,700ng/L MIB. The supernatant return and sludge lagoon process water from the cleaning of the filters (backwashing) and the solids removed via floatation.

In order to address this issue, the supernatant return was isolated and diverted to sewer, and the sludge system clarifier was emptied and cleaned. The sludge lagoon was also drained down to remove the remaining MIB.

The complaint period continued on for a period of time, which is attributed to the size of the Warragul basin, which resulted in receiving a significant number of complaints. Due to the level of complaints, the Department of Health was notified as required under section 22 of the Safe Drinking Water Act (2003) due to a widespread customer complaint.

Figure 5 - The sludge basin at Warragul WTP which contained high level of MIB.

Figure 6 - The sludge clarifier at Warragul WTP which contained high level of MIB. Water from here is typically returned to the head of the plant for recycling.

Water Sampling Locality Affected	Warragul / Drouin System
Number of samples	**72**
Reticulation levels of Geosmin Range (ng/L)	**<1**
Reticulation levels of 2-Methylisoborneol Range (ng/L)	**<1 - 17**

Table 7: Water quality results during investigation

The incident-based water quality sampling data has not been included in the data presented in section 9. As required by Department of Health, only samples scheduled as part of the risk management plan monitoring programs are included for data analysis and statistics.

6.6 Other events not reportable

In 2022-23, there were no other water quality events.

7. Complaints

7.1 Water quality complaints

We are committed to providing safe drinking water to our customers at all times. We record all complaints relating to drinking water quality. The types of water quality complaints logged by us are classified as follows:

- Discoloured/dirty water;
- Taste/odour;
- Blue water;
- Air in water;
- Alleged illness.

The complaints are compared to the number of customers (per 100 customers) to enable comparisons with other water supplies and localities. A summary of customer complaints we received relating to the quality of drinking water supplied is reported below.

Each water quality complaint received is responded to as per Figure 7 whereby the customer complaint is logged by our Customer Service or after-hours staff, and a Gippsland Water representative responds to the complaint and initiates any corrective actions as required.

The total number of complaints we received during the 2022-23 reporting period increased when compared to 2020-21 and 2021-22. The higher complaint numbers are attributed to the 74 complaints relating to the taste and odour compounds (Geosmin & MIB) in the water at Warragul & Drouin supply system during March 2023.

Without the contribution of the higher taste and odour complaint numbers, the number of complaints is then comparable to the 2020-21 period.

Type of Complaint	2022-23		2021-22		2021-22	
	No. of Complaints	Complaints per 100 customers	No. of Complaints	Complaints per 100 customers	No. of Complaints	Complaints per 100 customers
Discoloured water	80	0.123	58	0.089	71	0.105
Taste / Odour	118	0.181	32	0.049	48	0.071
Blue water	4	0.006	0	0.000	0	0.000
Air in water	11	0.017	13	0.020	20	0.030
Alleged illness	10	0.015	9	0.014	5	0.007
Total	223	0.342	112	0.172	144	0.213

Table 8: Water quality complaints per 100 customers supplied

7.1 Water quality complaints cont.

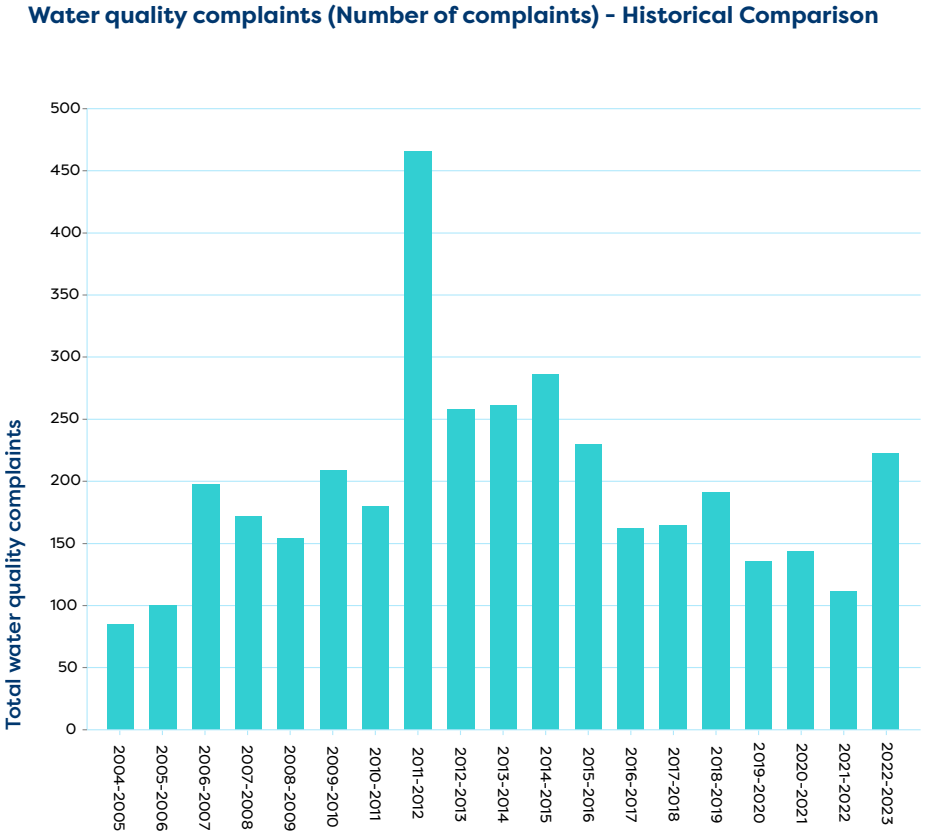


Figure 7: Total customer complaints for 2004-05 to 2022-23

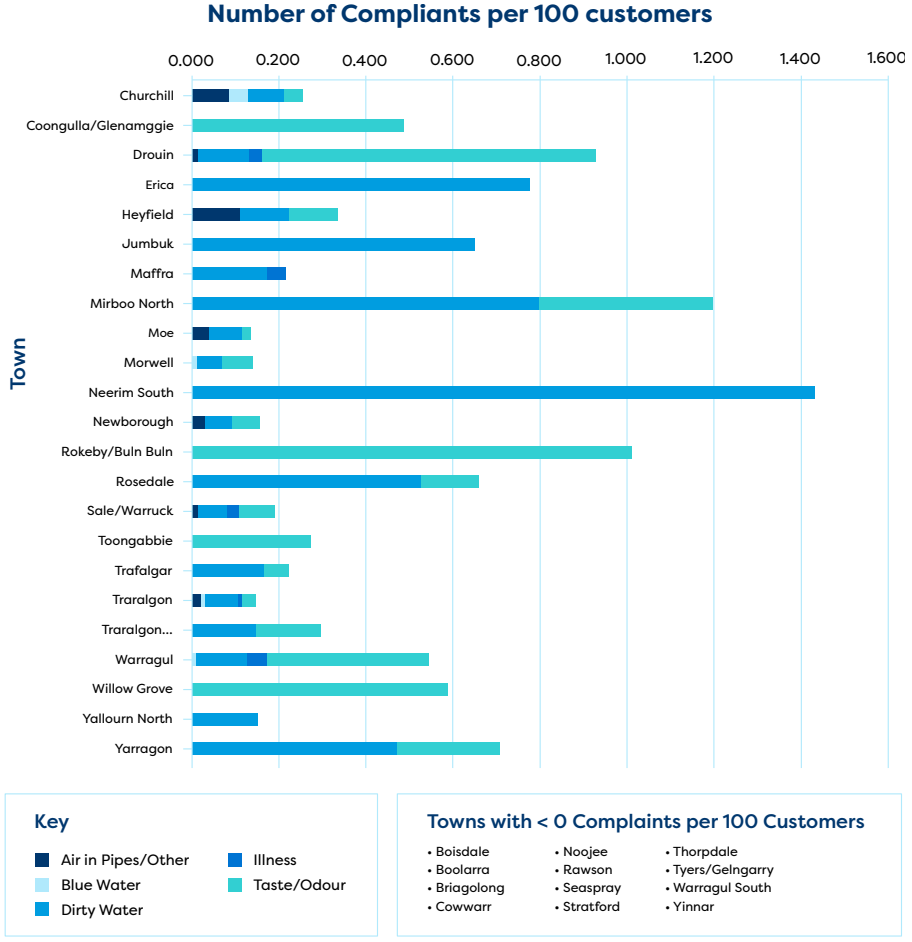


Figure 8: Customer complaints per 100 customers for 2022-23

When calculating the number of complaints per 100 customers, there were no localities within our supply district which exceeded four complaints per 100 customers, as represented in the figure above.

7.1 Water quality complaints cont.

Customer Complaints by Type - Cumulative
01 July 2022 - 30 June 2023

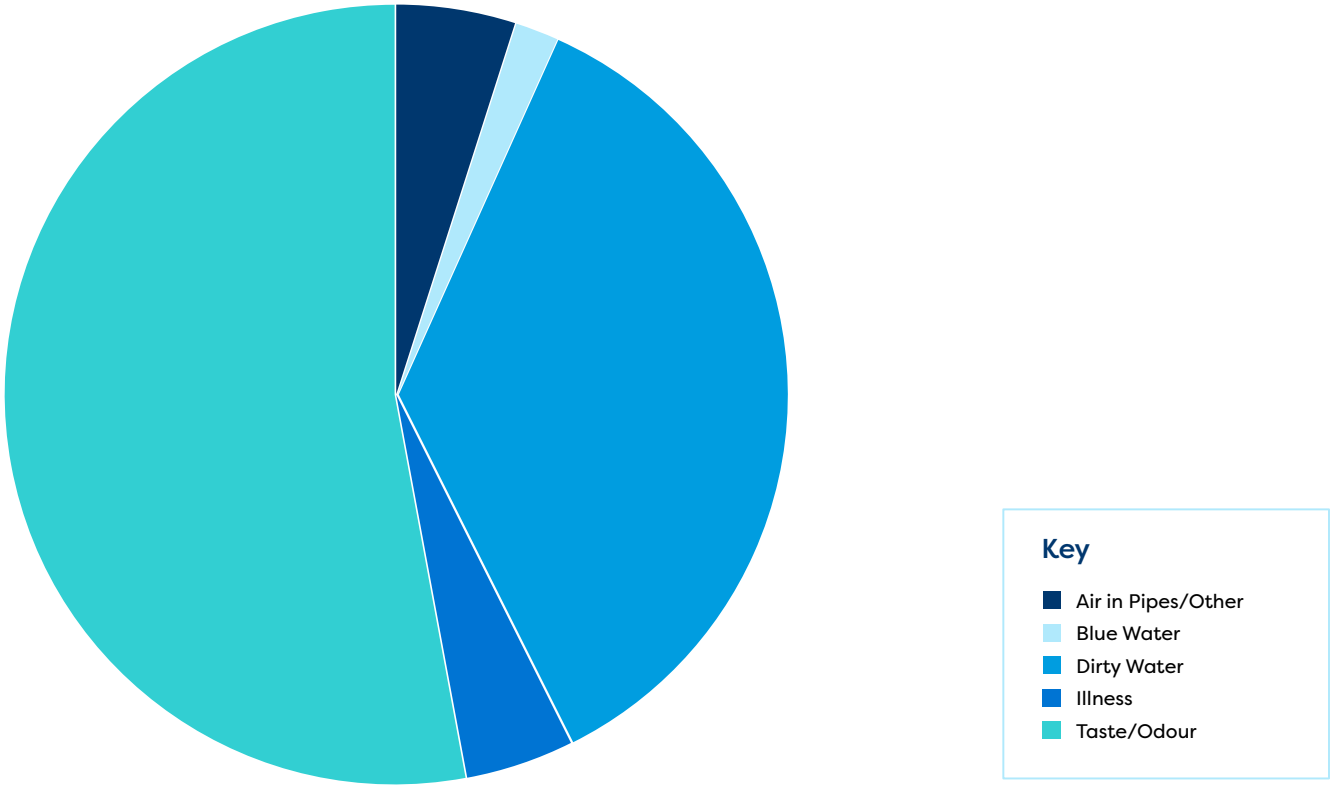


Figure 9: Customer water quality complaints by type 2022-23

The majority of customer complaints for the 2022-23 period (as in Figure 7) related to taste and odour issues in water followed by discoloured (dirty) water.

7.1 Water quality complaints cont.

Water Sampling Locality	Population (Customers = Number of Connections)	Total Complaints Received 2022-23	No. Complaints per 100 customers 2022-23
Boisdale	31	0	0.000
Boolarra	296	0	0.673
Briagolong	326	0	0.000
Churchill	2410	6	0.213
Coongulla/Glenmaggie	414	2	0.000
Cowwarr	113	0	0.000
Drouin	6986	63	0.059
Erica	130	1	0.000
Heyfield	900	3	0.558
Jumbuk	154	1	0.000
Maffra	2323	5	0.174
Mirboo North	755	9	0.932
Moe	5148	7	0.176
Morwell	7225	10	0.112
Neerim South	633	9	0.318
Newborough	3265	5	0.062
Noojee	125	0	0.000
Rawson	173	0	0.000
Rokeby / Buln Buln	200	2	0.000
Rosedale	766	5	0.132
Sale / Wurruk	7462	14	0.122
Seaspray	351	0	0.000
Stratford	1119	0	0.000
Thorpdale	76	0	0.000
Toongabbie	368	1	0.543
Trafalgar	1804	4	0.112
Traralgon	13127	19	0.077
Traralgon South / Hazelwood Nth	679	2	0.442
Tyers / Glengarry	841	0	0.487
Warragul	8831	47	0.288
Warragul South	224	0	0.000
Willow Grove	171	1	0.588
Yallourn North	667	1	0.150
Yarragon	850	6	0.707
Yinnar	604	0	0.000

Table 9: Customer complaints summary for each water sampling locality 2022-23

7.2 A summary of the customer complaint process

Customer complaints are managed according to the following summary procedure:

- Customer complaints received by our Customer Contact Centre are recorded in a corporate database. Details include information of who, where time and nature of complaint.
- The Water Quality Group investigates by contacting the customer and visiting the site if necessary to determine details of the water quality problem.
- For complaints associated with taste and odour, dirty water, and air in pipes, field measurements are performed, the reticulation system is typically flushed then field measurements are taken again to verify the problem has been corrected.
- Follow up contact may be made with the customer to determine if they are satisfied with the quality of service, or alternatively our standard contact card is left with the customer. This also encourages customers to keep us informed of any re-occurrence of water quality problems.
- Details of actions undertaken are entered into a database to provide a record/history of the site, to document issues for maintenance programs, and to inform capital upgrade requirements where a history of system failures occurs.

This procedure is presented in more detail in the figure on the following page.

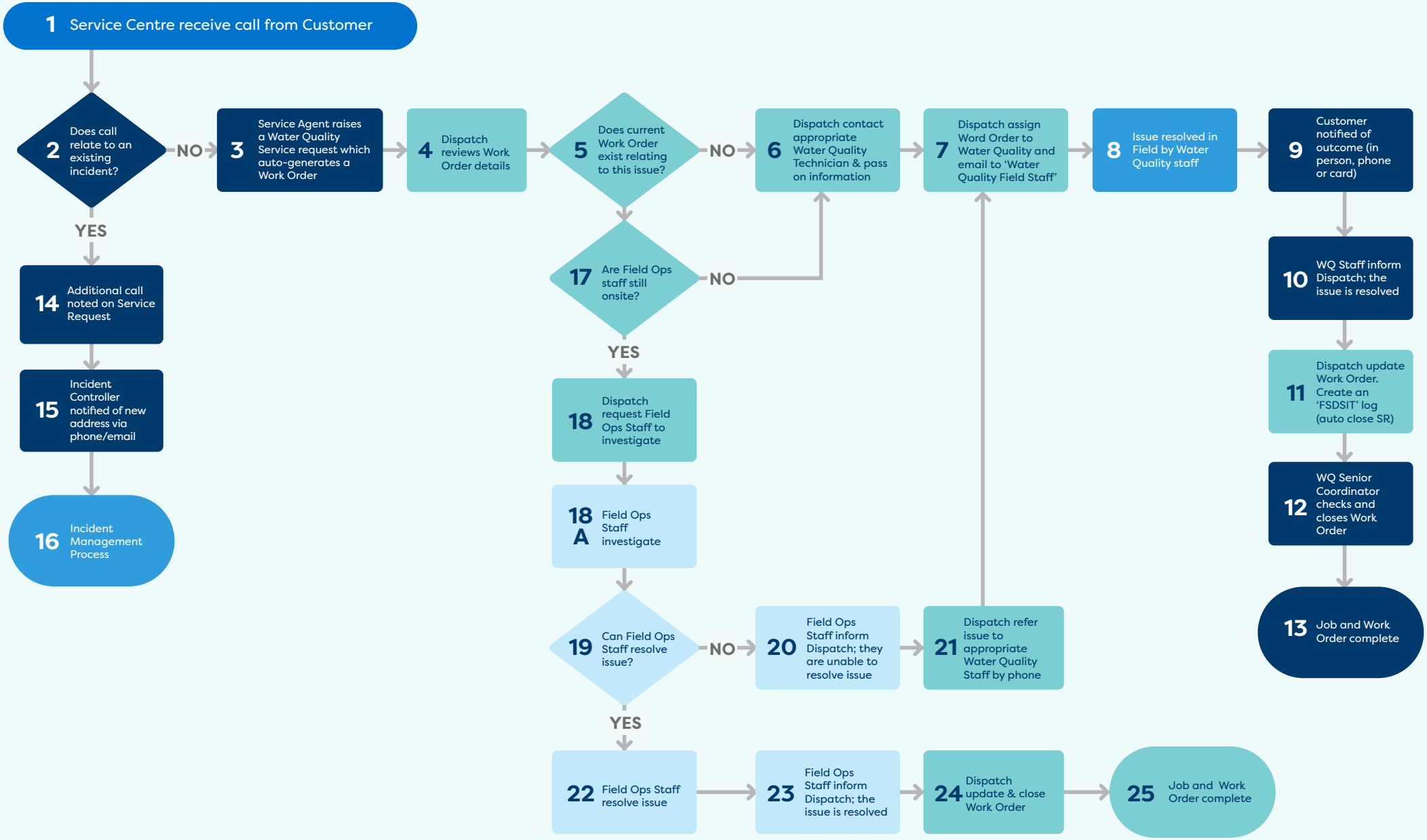


Figure 10: Water quality complaints resolution procedure

8. Risk management plan audit

Our Water Quality Risk Management Plan has been operational since 2005 and adopts the 12 elements outlined in the ADWG and preventative risk management strategies outlined in the SDWA.

During the reporting period, Gippsland Water Safe Drinking Water Act 2003 regulatory audit was undertaken in March 2023 by Department of Health approved (Exemplar Global) auditor for compliance with section 7(1) of the SDWA 2003. The audit period being from 1 January 2021 to 31 December 2022. The audit was undertaken by Viridis Consultants.

Gippsland Water's regulatory compliance was assessed against the Safe Drinking Water Act (SDWA) 2003 and Safe Drinking Water Regulations (SDWR) 2015. The audit found that:

Gippsland Water has not complied with the obligations imposed by section 7(1) of the Safe Drinking Water Act 2003 during the audit period.

Two minor non-compliances were noted in relation to:

- Failure to collect and analyse small number of samples listed in water sampling program, and the absence of an effective process to identify missed samples.
- Chemical parameters that were sampled from the same location within a sampling location on two or more consecutive occasions.

The non-compliances were considered minor as there is a low potential for a risk situation, and the potential

impact of the non-compliance is not likely to be a serious or imminent risk to public health, or compromise public health.

A summary of the audit findings resulted in two minor non-compliances, multiple highlights and positive initiatives noted, along with three additional Opportunities for Improvement (OFI) being identified.

An action plan has been developed and work is underway to address the minor non-compliances and opportunities for improvements identified.

The SDWA audit identified the following key findings:

- Gippsland Water's Drinking Water Quality Management Plans (DWQMP) satisfy the requirements of the SDWA and Regulations, including identification of risks, risk assessments, and development of preventative measures and controls.
- During the audit, Gippsland Water demonstrated that implementation of the DWQMP is standard business practice, which is an indicator of a mature risk-based management system.
- Operational teams had a high level of awareness and demonstrated a strong sense of personal responsibility for providing safe drinking water and that processes and procedures are consistently implemented across regions.
- Gippsland Water has a culture of continuous improvement and has reviewed, revised and updated the plan as required.
- The sampling program is detailed and meets the requirements of the legislation however, there were two minor non-compliance finding noted where:
  - a small number of E.coli samples were missed in the Sale water supply system during the reporting period.
  - scheduled chemical parameters, including monthly sampled trihalomethanes (THM's) were taken from the same sample point on consecutive sampling occasions.
  - These instances were not reported separately to DH
- Gippsland Water has robust document control and records keeping processes that were observed in the audit.
- Operational monitoring results and trending confirm the treatment processes are well operated.
- Water quality compliance monitoring results demonstrate consistent compliance with the water quality standards.

A copy of the audit certificate dated 26 March 2023, is attached in Appendix 2.

8.1 Audit Outcomes

The SDWA audit has concluded that:

- Gippsland Water was found to be not fully compliant with the requirements of the SDWA and Regulations based on the two minor non-compliances detailed above.
- Gippsland Water has prepared and implemented a DWQMP that is consistent with the Act and Regulations.
- Two minor non-compliances were noted in relation to the implementation of the sampling program, where samples were missed, and sites were monitored consecutively.
- Gippsland Water provided verifiable records to demonstrate implementation of the DWQMP
- The Gippsland Water DWQMP was found to be adequate to manage risk.
- Gippsland Water has implemented actions for continuous improvement and to close out actions from previous audits.

8.2 Audit Grades

The outcome of the Safe Drinking Water Act audit is assigned a grade based on the level of compliance with the act and regulations. The below table identifies the grades used for this audit.

Compliance Grade	Definition
Compliant (including with identified opportunities for improvement - OFIs)	Sufficient evidence to confirm that the agency has undertaken, prepared or implemented all actions in accordance with the legislation and their risk management plan. OFIs have been documented.
Minor Non-compliance	Noncompliance where there is a low potential for a risk situation, and the potential impact of the noncompliance is not likely to be a serious or imminent risk to public health or compromise public health.
Major Non-compliance	Noncompliance where there is a high potential for a risk situation that is likely to compromise public health if the noncompliance is not rectified.
Critical Non-compliance	Noncompliance where a serious or imminent risk to public health is identified.

Table 10: Customer complaints summary

8. Risk management plan audit cont.

The following Opportunities for Improvement and Minor Non-Compliances were identified during the audit:

Table 11: Risk Management Plan outcomes

2023 Audit Outcomes	GW Action Identified and Status
Minor Non-compliance (MNC) OFI-2023-002: Ensure the sampling program is fully implemented and missed samples are rapidly identified to comply with regulation r.8(1)(d)(iv).	A data reconciliation program has been developed in WIMS, and was commissioned and demonstrated to the auditor that will automatically identify these issues and raise alerts. The Manager Water Treatment and Quality met with the contract manager at ALS and explained the cause of the noncompliance. ALS have engaged a consultant to review their current scheduling software and eliminate relevant risks. In addition, a secondary check will be taken internally to review the programs before they are undertaken (month ahead view) to identify compliance with the monitoring program and ensure no consecutive samples are collected.
Minor Non-compliance (MNC) OFI-2023-003: Develop and implement a process for reviewing monitoring schedules to ensure samples are not taken from the same collection point within a water sampling locality on two consecutive occasions to comply with regulation r.8(1)(d)(v).	A data reconciliation program has been developed in WIMS, and was commissioned and demonstrated to the auditor that will automatically identify these issues and raise alerts. The Manager Water Treatment and Quality met with the contract manager at ALS and explained the cause of the noncompliance. ALS have engaged a consultant to review their current scheduling software and eliminate relevant risks. In addition, a secondary check will be taken internally to review the programs before they are undertaken (month ahead view) to identify compliance with the monitoring program and ensure no consecutive samples are collected
Opportunity for Improvement (OFI) OFI-2023-001: Consider reviewing the condition of all vermin proofing to ensure it remains effective.	Review our existing storage and tank inspection and maintenance program to ensure we clearly inspect and document vermin proofing assessment and document actions in our asset management system where identified.
Opportunity for Improvement (OFI) OFI-2023-004: Consider adding a water quality and environmental policy component to the general induction process.	An environmental & public health induction has already been developed and is yet to be rolled out. The induction session provides information that staff members need to be aware of and apply to effectively manage key environmental protection considerations. Currently in the final phase of rollout with Organisational Development. A hard copy of the induction was provided to the auditor as evidence.
Opportunity for Improvement (OFI) OFI-2023-005: To ensure consistent sanitary survey results, document the survey methodology and ensure it is consistent with the identified HBT framework (e.g. HBT Manual or ADWG).	A program had already been developed to review our Health Based Target by a third-party independent contractor. The consultant was engaged in late 2022 and to complete the review across 2023 for our 14 water treatment plants. A plan has been developed and is in place for the review of our catchment and existing sanitary surveys by the Catchment Officer from the Environmental team. This is expected to be completed in March 2024.

8.3 Action Plan to Address the Minor Non compliances and OFI's

The outcomes of the SDWA audit were discussed with the auditor to understand the available options to address the minor non-compliant findings. Other Stakeholders were engaged to identify and undertake the necessary measures to close out the OFI's, and to ensure that all risks to water quality and safety are identified, assessed, and appropriate control measures are in place to mitigate those risks to an acceptable level.

Gippsland Water's DWQMP includes a detailed sampling program, specifying the parameters for which samples will be tested, and the frequency at which tests will be conducted for each parameter. Whilst the sampling program has been developed in-house, the scheduling of samples is carried out by an external Service Provider. The two minor non-compliant findings were the result of a scheduling error. Table 11 shows a summary of the outcomes and actions required to achieve compliance with the SDWA and Regulations, and close out the 2 audit minor non-compliance findings, and three additional OFI's being identified.

9. Water quality results for 2022-23

9.1 Escherichia coli (E. coli)

9.1.1 E. coli results

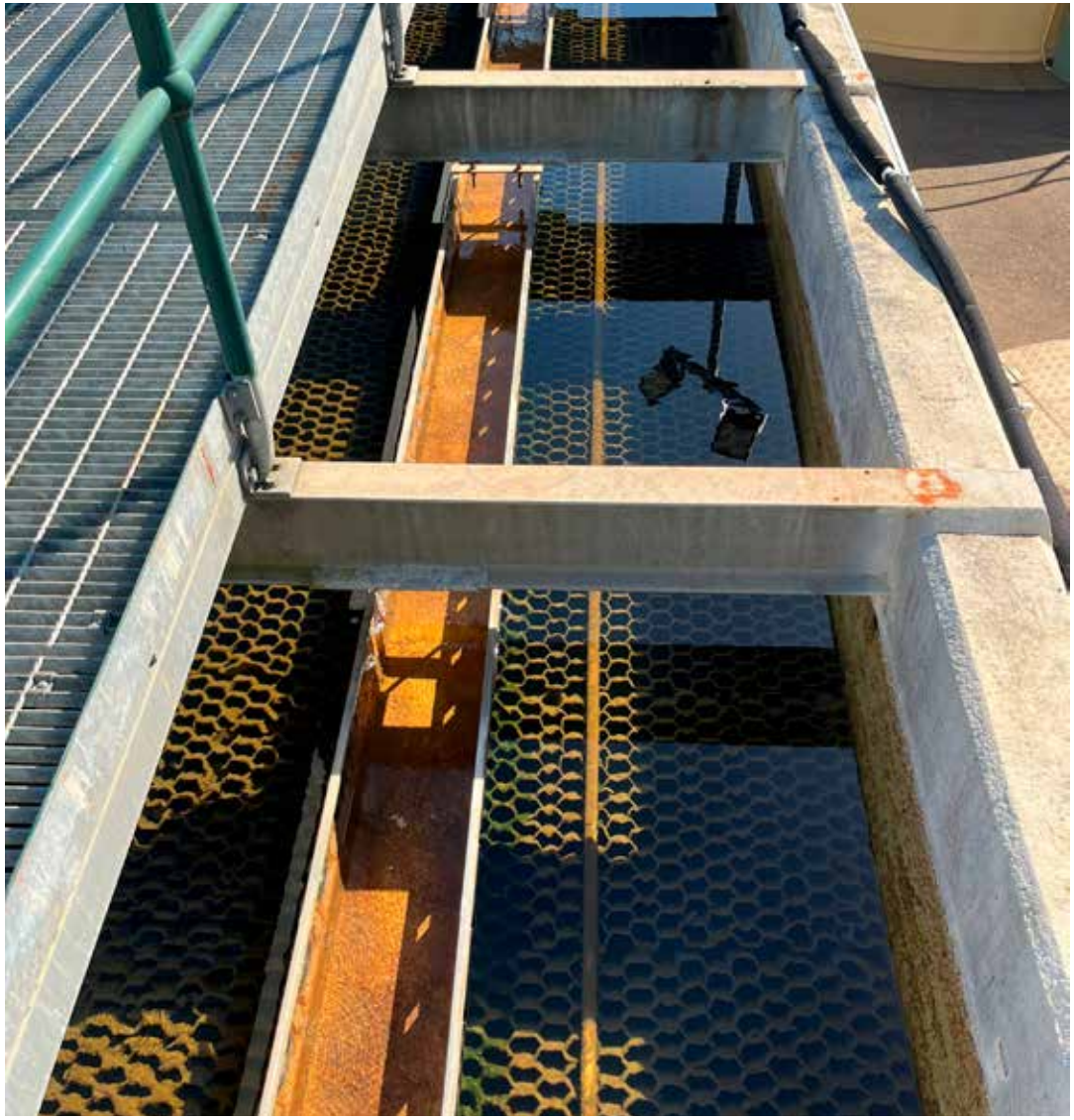
Compliance under the SDWR (2015) requires all samples of drinking water collected within a water sampling locality to contain no E. coli organism/100mL of drinking water, except for any false positive sample. All our localities achieved compliance with this standard for the 2022-23 reporting period.

For further details of the detection and declaration of false positive water quality results for Traralgon and Yinnar, refer to section 6.5.

Tables 12 and 13 below details all E. coli notifications for the reporting period 1 July 2022 to 30 June 2023 under the SDWR.

Water Sampling Locality	No. of investigations conducted (s.22)	No. of confirmed false positives	No. of investigations where standard not met (s.18)
Traralgon	1	1	0
Yinnar	1	1	0

Table 12: E. coli detections for water sampling localities 2022-23



9. Water quality results for 2022-23 cont.

Table 13: E. coli results for all water sampling localities for 2022-23

Water Sampling Locality	Frequency of Sampling	Number of samples*	Maximum Detected (orgs/100mL)	No. of detections and investigations conducted (s.22)	No. of samples where standard was not met (s.18)
Boisdale	Weekly	104	0	0	0
Boolarra	Weekly	104	0	0	0
Briagolong	Weekly	104	0	0	0
Churchill	Weekly	168	0	0	0
Coongulla-Glenmaggie	Weekly	104	0	0	0
Cowwarr	Weekly	52	0	0	0
Drouin	Weekly	152	0	0	0
Erica	Weekly	52	0	0	0
Heyfield	Weekly	104	0	0	0
Jumbuk	Weekly	52	0	0	0
Maffra	Weekly	116	0	0	0
Mirboo North	Weekly	154	0	0	0
Moe#	Weekly	156	0	0	0
Morwell	Weekly	256	0	0	0
Neerim South	Weekly	104	0	0	0
Newborough#	Weekly	115	0	0	0
Noojee	Weekly	156	0	0	0
Rawson	Weekly	104	0	0	0
Rokeby-Buln Buln	Weekly	52	0	0	0
Rosedale	Weekly	104	0	0	0
Sale-Wurruk	Weekly	192	0	0	0
Seaspray	Weekly	104	0	0	0
Stratford	Weekly	52	0	0	0
Thorpdale	Weekly	104	0	0	0
Toongabbie	Weekly	104	0	0	0
Trafalgar	Weekly	104	0	0	0
Traralgon	Weekly	166	3	1	0#
Traralgon South/ Hazelwood North	Weekly	52	0	0	0
Tyers-Glengarry	Weekly	104	0	0	0
Warragul	Weekly	203	0	0	0
Warragul South	Weekly	104	0	0	0
Willow Grove	Weekly	104	0	0	0
Yallourn North#	Weekly	104	0	0	0
Yarragon	Weekly	104	0	0	0
Yinnar	Weekly	52	1	1	0#

* The number of samples collected is based on the population of the water sampling locality and is calculated based on the guidance provided in ADWG (2011) - Table 9.4 Recommended minimum frequency of E. coli monitoring.

Refer to section 6.5 for details of the E coli detection in the Traralgon and Yinnar localities

9. Water quality results for 2022-23 cont.

Table 14: Comparison of E. coli results for previous years (2020-2022)

Water Sampling Locality	2022 - 2023		2021 - 2022		2020 - 2021	
	Maximum Detected (orgs/100mL)	No. of samples where standard was not met (s.18)	Maximum Detected (orgs/100mL)	No. of samples where standard was not met (s.18)	Maximum Detected (orgs/100mL)	No. of samples where standard was not met (s.18)
Boisdale	0	0	0	0	1	1
Boolarra	0	0	0	0	0	0
Briagolong	0	0	1	0	0	0
Churchill	0	0	0	0	0	0
Coongulla/Glenmaggie	0	0	0	0	0	0
Cowwarr	0	0	0	0	0	0
Drouin	0	0	0	0	0	0
Erica	0	0	0	0	0	0
Heyfield	0	0	0	0	0	0
Jumbuk	0	0	0	0	0	0
Maffra	0	0	0	0	0	0
Mirboo North	0	0	0	0	0	0
Moe	0	0	0	0	0	0
Morwell	0	0	0	0	0	0
Neerim South	0	0	0	0	0	0
Newborough	0	0	0	0	0	0
Noojee	0	0	0	0	0	0
Rawson	0	0	0	0	0	0
Rokeby/Buln Buln	0	0	0	0	0	0
Rosedale	0	0	0	0	0	0
Sale/Wurruk	0	0	0	0	0	0
Seaspray	0	0	0	0	0	0
Stratford	0	0	0	0	0	0

9. Water quality results for 2022-23 cont.

Table 14: Comparison of E. coli results for previous years (2020-2022) (cont.)

Water Sampling Locality	2022 - 2023		2021 - 2022		2020 - 2021	
	Maximum Detected (orgs/100mL)	No. of samples where standard was not met (s.18)	Maximum Detected (orgs/100mL)	No. of samples where standard was not met (s.18)	Maximum Detected (orgs/100mL)	No. of samples where standard was not met (s.18)
Thorpdale	0	0	0	0	0	0
Toongabbie	0	0	0	0	0	0
Trafalgar	0	0	0	0	0	0
Traralgon	3	0	0	0	0	0
Traralgon South/ Hazelwood North	0	0	0	0	0	0
Tyers/Glengarry	0	0	0	0	0	0
Warragul	0	0	0	0	0	0
Warragul South	0	0	0	0	0	0
Willow Grove	0	0	0	0	0	0
Yallourn North	0	0	0	0	0	0
Yarragon	0	0	0	0	0	0
Yinnar	1	0	0	0	0	0

Results obtained for the 2022-23 reporting period for each of the localities were similar to that of previous years.

E. coli has not been previously detected in the Traralgon or Yinnar systems, and these results were not consistent with historic E. coli test results.

After reviewing the investigation reports, the Department of Health supported Gippsland Water's conclusion that, in both instances, the results were false positives and not representative of the water quality in their respective systems.

9.1.2 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

9.2 Chlorine based disinfection by-product chemicals

9.2.1 Trihalomethanes (THM) results

For compliance with the SDWR (2015), a sample result must not exceed 0.25 mg/L trihalomethanes. All our sites achieved 100% compliance with this standard for the 2022-23 reporting period.

Table 15: Trihalomethanes results for all localities for 2022-23

Water Sampling Locality	Frequency of sampling	No. of samples	No. of non-complying samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Boisdale	Monthly	12	0	0.059	0.027	Yes
Boolarra	Monthly	12	0	0.130	0.057	Yes
Briagolong	Monthly	12	0	0.023	0.010	Yes
Churchill	Monthly	12	0	0.087	0.033	Yes
Coongulla-Glenmaggie	Monthly	12	0	0.033	0.014	Yes
Cowwarr	Monthly	12	0	0.100	0.050	Yes
Drouin	Monthly	12	0	0.075	0.040	Yes
Erica	Monthly	12	0	0.034	0.014	Yes
Heyfield	Monthly	12	0	0.036	0.014	Yes
Jumbuk	Monthly	12	0	0.089	0.057	Yes
Maffra	Monthly	12	0	0.051	0.014	Yes
Mirboo North	Monthly	12	0	0.040	0.024	Yes
Moe	Monthly	12	0	0.050	0.019	Yes
Morwell	Monthly	12	0	0.058	0.022	Yes
Neerim South	Monthly	12	0	0.080	0.047	Yes
Newborough	Monthly	12	0	0.063	0.027	Yes

Table 15: Trihalomethanes results for all localities for 2022-23 (cont)

Water Sampling Locality	Frequency of sampling	No. of samples	No. of non-complying samples	Max (mg/L)	Min (mg/L)	Complying (Yes/No)
Noojee	Monthly	12	0	0.057	0.031	Yes
Rawson	Monthly	12	0	0.021	0.011	Yes
Rokeby-Buln Buln	Monthly	12	0	0.071	0.035	Yes
Rosedale	Monthly	12	0	0.170	0.048	Yes
Sale-Wurruk	Monthly	12	0	0.027	0.009	Yes
Seaspray	Monthly	12	0	0.170	0.086	Yes
Stratford	Monthly	12	0	0.057	0.016	Yes
Thorpdale	Monthly	12	0	0.088	0.044	Yes
Toongabbie	Monthly	12	0	0.076	0.047	Yes
Trafalgar	Monthly	12	0	0.044	0.021	Yes
Traralgon	Monthly	12	0	0.061	0.013	Yes
Traralgon South-Hazelwood North	Monthly	12	0	0.068	0.037	Yes
Tyers-Glengarry	Monthly	12	0	0.066	0.033	Yes
Warragul	Monthly	12	0	0.091	0.031	Yes
Warragul South	Monthly	12	0	0.086	0.041	Yes
Willow Grove	Monthly	12	0	0.003	0.001	Yes
Yallourn North	Monthly	12	0	0.067	0.037	Yes
Yarragon	Monthly	12	0	0.049	0.022	Yes
Yinnar	Monthly	12	0	0.073	0.038	Yes

9. Water quality results for 2022-23 cont.

Table 16: Comparison of Trihalomethane (THM) results for previous years (2020-2023)

Water Sampling Locality	2022 - 2023		2021 - 2022		2020 - 2021	
	Maximum THM in a sample (mg/L)	Complying (Yes/No)	Maximum THM in a sample (mg/L)	Complying (Yes/No)	Maximum THM in a sample (mg/L)	Complying (Yes/No)
Boisdale	0.059	Yes	0.092	Yes	0.052	Yes
Boolarra	0.130	Yes	0.130	Yes	0.100	Yes
Briagolong	0.023	Yes	0.024	Yes	0.014	Yes
Churchill	0.087	Yes	0.140	Yes	0.094	Yes
Coongulla/Glenmaggie	0.033	Yes	0.029	Yes	0.018	Yes
Cowwarr	0.100	Yes	0.100	Yes	0.091	Yes
Drouin	0.075	Yes	0.082	Yes	0.076	Yes
Erica	0.034	Yes	0.043	Yes	0.035	Yes
Heyfield	0.036	Yes	0.039	Yes	0.031	Yes
Jumbuk	0.089	Yes	0.160	Yes	0.087	Yes
Maffra	0.051	Yes	0.080	Yes	0.037	Yes
Mirboo North	0.040	Yes	0.039	Yes	0.036	Yes
Moe	0.050	Yes	0.053	Yes	0.059	Yes
Morwell	0.058	Yes	0.063	Yes	0.052	Yes
Neerim South	0.080	Yes	0.080	Yes	0.049	Yes
Newborough	0.063	Yes	0.034	Yes	0.060	Yes
Noojee	0.057	Yes	0.049	Yes	0.044	Yes
Rawson	0.021	Yes	0.029	Yes	0.022	Yes
Rokeby/Buln Buln	0.071	Yes	0.071	Yes	0.073	Yes
Rosedale	0.170	Yes	0.210	Yes	0.092	Yes
Sale/Wurruk	0.027	Yes	0.027	Yes	0.022	Yes
Seaspray	0.170	Yes	0.160	Yes	0.170	Yes

Table 16: Comparison of Trihalomethane (THM) results for previous years (2020-2023)

Water Sampling Locality	2022 - 2023		2021 - 2022		2020 - 2021	
	Maximum THM in a sample (mg/L)	Complying (Yes/No)	Maximum THM in a sample (mg/L)	Complying (Yes/No)	Maximum THM in a sample (mg/L)	Complying (Yes/No)
Stratford	0.057	Yes	0.077	Yes	0.051	Yes
Thorpdale	0.088	Yes	0.086	Yes	0.070	Yes
Toongabbie	0.076	Yes	0.090	Yes	0.069	Yes
Trafalgar	0.044	Yes	0.045	Yes	0.045	Yes
Traralgon	0.061	Yes	0.086	Yes	0.038	Yes
Traralgon South/ Hazelwood North	0.068	Yes	0.083	Yes	0.048	Yes
Tyers/Glengarry	0.066	Yes	0.230	Yes	0.060	Yes
Warragul	0.091	Yes	0.076	Yes	0.078	Yes
Warragul South	0.086	Yes	0.066	Yes	0.078	Yes
Willow Grove	0.003	Yes	0.001	Yes	0.001	Yes
Yallourn North	0.067	Yes	0.067	Yes	0.056	Yes
Yarragon	0.049	Yes	0.049	Yes	0.052	Yes
Yinnar	0.073	Yes	0.110	Yes	0.085	Yes

Results obtained for each of the localities was similar to the previous two reporting periods.

9.2.2 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

9.3 Turbidity

9.3.1 Turbidity results

For compliance with the SDWR (2015), the 95th percentile of results for samples of drinking water collected in any 12-month period, must be less than or equal to 5.0 NTU (Nephelometric Turbidity Unit). All of our water sampling localities achieved 100% compliance with this standard for the 2022-23 reporting period for the scheduled sampling results.

Table 17: Turbidity results for all water sampling localities in 2022-23

Water Sampling Locality	Frequency of Sampling	Number of Samples	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*	No. of 95th Percentile of results in any 12 months above standard (s.18)	Complying (Yes/No)
Boisdale	Weekly	52	1.2	0.2	0	Yes
Boolarra	Weekly	52	0.6	0.3	0	Yes
Briagolong	Weekly	52	0.2	0.2	0	Yes
Churchill	Weekly	64	0.3	0.2	0	Yes
Coongulla/ Glenmaggie	Weekly	52	0.4	0.2	0	Yes
Cowwarr	Weekly	52	0.3	0.2	0	Yes
Drouin	Weekly	51	1.7	0.5	0	Yes
Erica	Weekly	52	0.8	0.5	0	Yes
Heyfield	Weekly	52	0.4	0.3	0	Yes
Jumbuk	Weekly	52	0.2	0.2	0	Yes
Maffra	Weekly	52	0.2	0.1	0	Yes
Mirboo North	Weekly	52	1.6	0.2	0	Yes
Moe	Weekly	52	0.3	0.2	0	Yes
Morwell	Weekly	52	0.6	0.3	0	Yes
Neerim South	Weekly	52	0.8	0.8	0	Yes
Newborough	Weekly	52	0.2	0.1	0	Yes

9. Water quality results for 2022-23 cont.

Table 17: Turbidity results for all water sampling localities in 2022-23

Water Sampling Locality	Frequency of Sampling	Number of Samples	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*	No. of 95th Percentile of results in any 12 months above standard (s.18)	Complying (Yes/No)
Noojee	Weekly	52	0.8	0.5	0	Yes
Rawson	Weekly	52	0.3	0.2	0	Yes
Rokeby/Buln Buln	Weekly	52	0.2	0.2	0	Yes
Rosedale	Weekly	52	0.6	0.2	0	Yes
Sale/Wurruk	Weekly	52	0.4	0.3	0	Yes
Seaspray	Weekly	51	1.0	0.5	0	Yes
Stratford	Weekly	52	0.6	0.3	0	Yes
Thorpdale	Weekly	52	5.5	0.4	0	Yes
Toongabbie	Weekly	52	0.7	0.5	0	Yes
Trafalgar	Weekly	52	0.2	0.1	0	Yes
Traralgon	Weekly	52	0.2	0.2	0	Yes
Traralgon South/						
Hazelwood North	Weekly	52	0.4	0.2	0	Yes
Tyers/Glengarry	Weekly	52	0.5	0.3	0	Yes
Warragul	Weekly	103	0.5	0.2	0	Yes
Warragul South	Weekly	52	0.2	0.1	0	Yes
Willow Grove	Weekly	52	0.4	0.2	0	Yes
Yallourn North	Weekly	52	0.5	0.2	0	Yes
Yarragon	Weekly	52	0.6	0.2	0	Yes
Yinnar	Weekly	52	0.3	0.3	0	Yes

* = For calculation purposes, all results reported as <0.1 NTU were rounded to 0.1 NTU for calculating the maximum 95th percentile.

9. Water quality results for 2022-23 cont.

Table 18: Comparison of Turbidity results for previous years (2020-2023)

Water Sampling Locality	2022 - 2023		2021 - 2022		2020 - 2021	
	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*
Boisdale	1.2	0.2	0.1	0.1	0.1	0.1
Boolarra	0.6	0.3	0.3	0.2	0.2	0.2
Briagolong	0.2	0.2	0.1	0.1	0.1	0.1
Churchill	0.3	0.2	0.4	0.3	0.6	0.4
Coongulla/Glenmaggie	0.4	0.2	0.9	0.3	0.3	0.3
Cowwarr	0.3	0.2	0.3	0.2	0.6	0.2
Drouin	1.7	0.5	0.2	0.2	0.1	0.1
Erica	0.8	0.5	0.4	0.4	0.8	0.4
Heyfield	0.4	0.3	0.6	0.3	0.3	0.2
Jumbuk	0.2	0.2	0.7	0.2	1.3	0.2
Maffra	0.2	0.1	0.1	0.1	0.1	0.1
Mirboo North	1.6	0.2	0.2	0.1	0.3	0.2
Moe#	0.3	0.2	0.5	0.3	0.9	0.4
Morwell	0.6	0.3	0.5	0.2	1.4	0.5
Neerim South	0.8	0.8	0.7	0.6	0.8	0.7
Newborough#	0.2	0.1	0.9	0.2	0.9	0.4
Noojee	0.8	0.5	0.6	0.5	0.8	0.4
Rawson	0.3	0.2	0.6	0.3	1.0	0.3
Rokeby/Buln Buln	0.2	0.2	0.4	0.2	0.2	0.1
Rosedale	0.6	0.2	0.3	0.3	1.4	0.4
Sale/Wurruk	0.4	0.3	0.1	0.1	0.2	0.1

Table 18: Comparison of Turbidity results for previous years (2020-2023)

Water Sampling Locality	2022 - 2023		2021 - 2022		2020 - 2021	
	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*	Maximum turbidity in a sample (NTU)	Maximum 95th Percentile of turbidity results in any 12 months (NTU)*
Seaspray	1.0	0.5	0.4	0.2	0.3	0.3
Stratford	0.6	0.3	0.1	0.1	0.7	0.1
Thorpdale	5.5	0.4	2.2	0.8	2.4	0.4
Toongabbie	0.7	0.5	0.2	0.2	0.2	0.1
Trafalgar	0.2	0.1	0.2	0.1	0.1	0.1
Traralgon	0.2	0.2	0.8	0.3	0.2	0.1
Traralgon South/	0.068	Yes	0.083	Yes	0.048	Yes
Hazelwood North	0.4	0.2	0.2	0.2	0.3	0.1
Tyers/Glengarry	0.5	0.3	0.3	0.2	0.2	0.2
Warragul	0.5	0.2	0.4	0.2	0.3	0.1
Warragul South	0.2	0.1	0.2	0.1	0.2	0.1
Willow Grove	0.4	0.2	0.2	0.1	0.1	0.1
Yallourn North#	0.5	0.2	0.2	0.1	0.2	0.1
Yarragon	0.6	0.2	0.2	0.1	0.2	0.1
Yinnar	0.3	0.3	0.4	0.3	0.3	0.2

*For calculation purposes, all results reported as <0.1 NTU were rounded to 0.1 NTU for calculating the maximum 95th percentile.

Results obtained for each of the localities was similar to the previous two reporting periods.

9.3.2 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

9.4 Fluoride

Fluoride testing has been performed in the water supply systems where fluoride is added to the water. This includes the Maffra, Warragul, Sale, Traralgon, Morwell and Moe systems reaching over 90% of our population.

We have sampled localities on a weekly basis even though some of the localities listed in Table 17 require monthly samples according to section 5.1.3 of the Code of Practice for Fluoridation of Drinking Water Supplies (second edition) 2018 (i.e. if a fluoride plant supplies five or more water sampling localities then the corporation must take a sample each month from a water sampling point in each water sampling locality supplied from those plants such that a sample is collected from the distribution system at least once per week).

9.4.1 Fluoride results

Based on health considerations and the Health (Fluoridation) Act 1973, no single sample concentration of fluoride in drinking water should exceed 1.5 mg/L, and the average optimum concentration of fluoride should not exceed 1.0 mg/L. All our sites achieved 100% compliance with this standard for the 2022-23 reporting period.

The Code of Practice for Fluoridation of Drinking Water Supplies (second edition) 2018, section 4.2.2, defines the operating range of annual average concentration of fluoride being the operating target set by the Department of Health (0.9mg/L for our plants) plus/minus 0.1 mg/L of fluoride. The drinking water fluoridation system in Morwell, Traralgon and Sale achieved operating averages which met the target for the reporting period. The fluoridation systems for Maffra, Warragul and Moe achieved an operating average ranging from 0.74 to 0.79 mg/L, just below the operating target. For 2023-24, the dosing setpoint will be increased to achieve the 0.9 mg/L target.

9. Water quality results for 2022-23 cont.

Table 19: Fluoride results for all fluoridated localities in 2022-23

Treatment Plant	Water Sampling Locality	Frequency of Sampling	Number of Samples	Operating Target	Max (mg/L)	Min (mg/L)	Overall Average1 (mg/L)	Operating Average2 (mg/L)	Comply3 (Yes /No)	Meeting Obligations4 (Yes/No)
Maffra	Boisdale	Weekly	52	0.9	0.82	0.66	0.74	0.74	Yes	No
	Maffra	Weekly	104	0.9	0.96	0.51	0.74	0.75	Yes	No
	Stratford	Weekly	52	0.9	0.84	0.67	0.74	0.74	Yes	No
Morwell	Churchill	Monthly	52	0.9	0.86	0.07	0.79	0.80	Yes	Yes
	Boolarra	Monthly	52	0.9	0.85	0.72	0.79	0.79	Yes	No
	Jumbuk	Monthly	52	0.9	0.88	0.72	0.80	0.80	Yes	Yes
	Morwell	Weekly	104	0.9	0.88	0.58	0.80	0.80	Yes	Yes
	Traralgon South/ Hazelwood North	Monthly	52	0.9	0.85	0.72	0.79	0.79	Yes	No
Moe	Yinnar	Monthly	52	0.9	0.86	0.72	0.79	0.79	Yes	No
	Moe	Weekly	104	0.9	0.94	0.66	0.78	0.78	Yes	No
	Newborough	Monthly	52	0.9	0.90	0.06	0.76	0.78	Yes	No
	Trafalgar	Monthly	52	0.9	0.91	0.59	0.77	0.78	Yes	No
	Yallourn North	Monthly	52	0.9	0.83	0.66	0.77	0.77	Yes	No
	Thorpdale5	Monthly	52	0.9	0.82	0.08	0.76	0.77	Yes	No
	Sale	Monthly	52	0.9	0.92	0.57	0.78	0.78	Yes	No
Sale	Sale/Wurruk	Weekly	104	0.9	0.89	0.06	0.81	0.84	Yes	Yes
Traralgon	Traralgon	Weekly	104	0.9	0.94	0.14	0.78	0.80	Yes	Yes
Warragul	Drouin	Weekly	51	0.9	0.88	0.09	0.66	0.78	Yes	No
	Rokeby/Buln Buln	Weekly	52	0.9	0.90	0.11	0.68	0.79	Yes	No
	Warragul	Weekly	103	0.9	0.89	0.08	0.68	0.77	Yes	No
	Warragul South	Weekly	52	0.9	0.79	0.06	0.71	0.74	Yes	No

1. The overall average value calculated based on all monitoring conducted over the 2022-23 reporting period, including when dosing did not occur.
2. The operating average is calculated excluding the times where dosing did not occur (concentration decreased below 0.2mg/L).
3. Complying is defined as any sample not exceeding 1.5 mg/L, or the 12-month rolling average not exceeding 1.0 mg/L.
4. Meeting obligation is defined as the annual average concentration of fluoride was within the operating target plus/minus 0.1mg/L excluding when dosing did not occur.
5. Water carting to Thorpdale from the Moe system (Trafalgar) commenced in September 2015.

9. Water quality results for 2022-23 cont.

Table 20: Comparison of Fluoride results for previous years (2020-2023)

Treatment Plant	Water Sampling Locality	2022 - 2023			2021 - 2022			2020 - 2021		
		Max (mg/L)	Min (mg/L)	Overall Average1 (mg/L)	Max (mg/L)	Min (mg/L)	Overall Average1 (mg/L)	Max (mg/L)	Min (mg/L)	Overall Average1 (mg/L)
Maffra	Boisdale	0.82	0.66	0.74	0.78	0.54	0.70	0.88	0.67	0.79
	Maffra	0.96	0.51	0.74	0.87	0.36	0.70	0.96	0.30	0.78
	Stratford	0.84	0.67	0.74	0.85	0.43	0.70	0.88	0.65	0.79
Morwell	Churchill	0.86	0.07	0.79	0.88	0.67	0.81	0.85	0.72	0.80
	Boolarra	0.85	0.72	0.79	0.86	0.72	0.80	0.84	0.74	0.79
	Jumbuk	0.88	0.72	0.80	0.86	0.75	0.81	0.86	0.72	0.80
	Morwell	0.88	0.58	0.80	0.94	0.06	0.80	0.91	0.32	0.79
	Traralgon South/ Hazelwood North	0.85	0.72	0.79	0.88	0.70	0.81	0.89	0.37	0.79
	Yinnar	0.86	0.72	0.79	0.88	0.71	0.81	0.84	0.70	0.79
Moe	Moe	0.94	0.66	0.78	0.97	0.13	0.75	0.87	<0.05	0.77
	Newborough	0.90	0.06	0.76	0.93	0.45	0.76	0.86	0.20	0.77
	Trafalgar	0.91	0.59	0.77	0.94	0.23	0.76	0.89	0.34	0.79
	Yallourn North	0.83	0.66	0.77	0.85	0.64	0.77	0.87	0.32	0.77
	Thorpdale5	0.82	0.08	0.76	0.88	0.70	0.79	0.86	0.51	0.78
	Yarragon	0.92	0.57	0.78	0.93	0.22	0.76	0.91	0.34	0.80
Sale	Sale/Wurruk	0.89	0.06	0.81	0.89	0.44	0.82	0.90	0.72	0.82
Traralgon*	Traralgon	0.94	0.14	0.78	0.93	0.07	0.72	0.91	<0.05	0.75
Warragul	Drouin	0.88	0.09	0.66	0.85	0.47	0.79	0.87	0.64	0.82
	Rokeby/Buln Buln	0.90	0.11	0.68	0.88	0.42	0.79	0.91	0.71	0.83
	Warragul	0.89	0.08	0.68	0.89	0.52	0.79	0.89	0.63	0.82
	Warragul South	0.79	0.06	0.71	0.83	0.59	0.77	0.85	0.76	0.81

1. The average value calculated based on all monitoring conducted over the 2022-23 reporting period, including when dosing did not occur.

The fluoride dosing systems of Sale, Traralgon and Morwell performed within requirements for the 2022-23 reporting period. The systems for Maffra, Warragul and Moe were operating slightly below the operating target. Overall system performance is similar in terms of overall average achieved when compared to the 2020-21 and 2021-22 reporting periods.

9.4.2 Actions taken in relation to non-compliance

All systems achieved compliance against the standard (no single sample concentration of fluoride in drinking water should exceed 1.5 mg/L, and the average level of fluoride should not exceed 1.0 mg/L).

9.4.3 Fluoride dosing systems performance and maintenance 2022-23

Under the Code of Practice for Fluoridation of Drinking Water Supplies (second edition) 2018, we are required to notify the Department of Health if the fluoride concentration in drinking water, measured at the fluoridation plant, is less than 0.6 mg/L for a continuous period of greater than 72 hours. Notifications are included under each fluoride plant.

A number of maintenance activities were undertaken during the reporting period which necessitated that the fluoridation systems be shut down for a period of time to allow the works to proceed.

- **TRARALGON**
  The fluoride dosing system at the Traralgon Water Treatment Plant was operational for the duration of the reporting period.
- **MAFFRA**
  The fluoride dosing system at the Maffra Water Treatment Plant was operational for the duration of the reporting period.

- **WARRAGUL**
  The fluoride dosing system at the Warragul Water Treatment Plant was operational for the duration of the reporting period. During February – April 2023, the system was turned off for a period of 66 days to allow the saturator to flush clean before the saturator media was removed and replaced as part of our programmed maintenance activities.
- **SALE**
  The fluoride dosing system at the Sale Water Treatment Plant was operational for the duration of the reporting period. During February/March 2023, the system was turned off for a period of 18 days to allow the saturator to flush clean before the saturator media was removed and replaced as part of our programmed maintenance activities.
- **MORWELL**
  The fluoride dosing system at the Morwell Water Treatment Plant was operational during the reporting period.
- **MOE**
  The fluoride dosing system at the Moe Water Treatment Plant was operational during the reporting period.

9.5 Water treatment and quality projects and programs undertaken

During the 2022-23 reporting period, we undertook several works, programs and projects to ensure that continual improvements were made for the provision of safe drinking water to our customers. These included:

- Interconnection water main from Heyfield water treatment plant to the Coongulla basin.
- Replacement of the cover and liner on the Warragul North basin.
- The chlorine contact tank at Tyers WTP was inspected and maintenance activities undertaken.
- Repairs undertaken on the cover of Sale WTP Basin No. 2;
- A new chemical dosing system upgrade at Moe WTP was completed.
- Treated water storage basins and tank condition assessments as part of the ongoing inspection, maintenance and cleaning program.
- Replacement of the algae control floating discs on the raw water storage at Heyfield WTP.
- A new disinfection facility was constructed at the Coongulla Basin.
- Decommissioning of the Coongulla WTP.
- Continued delivering air scouring works to maintain water quality in our reticulation networks by cleaning pipes in Mirboo North and Heyfield townships;
- Commenced construction of the new 25ML water storage basin at Moe WTP underway;
- A comprehensive two day training program on Dam inspection and monitoring was conducted for the Water Treatment staff to ensure they are well equipped to identify features that may lead to concerns if not addressed;
- Recommissioning the Sanders Basin (Churchill) that was taken offline in 2022 to have the cover and liner replaced;
- Addition of ultra-violet (UV) treatment Maffra WTP;
- Undertook chemical trials during the Alum supply chain issue to identify alternative treatment chemicals as part of our business continuity and risk management process.
- Upgrades of remote secondary disinfection sites and monitoring installations
  - Warragul South Basin
  - Stratford (Avon River)
- Ongoing replacement and upgrade of water treatment plant and water quality site on-line and field instrumentation;
- Catchment bushfire preparedness inspections with CFA and Forest Fire Management Vic
- Planned fuel reduction burns in catchment areas
- Weed and pest control in catchment areas in conjunction with stakeholders

The following figures depict some of our projects and programs:

Figure 11: installation of a new secondary disinfection site at newborough

Construction of a new water storage basin at Moe Water Treatment Plant

9.6 Catchment projects and programs undertaken

We work in partnership with West Gippsland Catchment Management Authority (WGCMA), Landcare groups and local councils to improve and preserve our waterway ecosystems.

We are a stakeholder in the review of the West Gippsland Regional Catchment Strategy and West Gippsland Waterway Strategy. These strategies are due to be reviewed in the coming year. We are working with WGCMA to ensure water quality considerations include potable water supply catchments. The recently reviewed Environment Protection Act 2017 (Vic) and Environmental Protection Regulations (2021) will sharpen the focus on the public health implications of potable water supply protection in these regional strategies.

Our biodiversity management programs and extensive carbon sequestration plantings at Dutson Downs also contribute to key objectives in the Regional Catchment Strategy and to improving the overall health of the Ramsar-listed Gippsland Lakes through revegetation and threatened species preservation.

We maintained a project from the Gippsland Integrated Water Management Plan, which involved planting native shrubs and grasses at Willow Grove to protect Blue Rock Lake from pollutants. We partnered with Southern Rural Water, WGCMA, Tanjil Landcare, the grazier who leases the land and Baw Baw Shire Council to revegetate a section of land by the lake to capture pollutants in stormwater coming from nearby homes. We will monitor the impacts of this project on water quality at this site for five years.

9. Water quality results for 2022-23 cont.

Table 21: Gippsland Water - water supply locality water source and activities undertaken

Source water	Raw Water Storage	Water Treatment Plant	Water Sampling Locality	Water Storage Manager	Catchment Management Authority	Catchment Activity Interactions
Macalister River	Lake Glenmaggie	Maffra WTP	Maffra Stratford Boisdale	Southern Rural Water	West Gippsland Catchment Management Authority	• Water Licence applications referrals – water quality assessments • Planning application assessments: including coordination with Southern Rural Water, as co-referral authority. • Participation as a stakeholder in DEECA Gippsland Strategic Fuel Breaks Project • Liaison with SRW on Newry Pipeline (irrigation upgrade) project • Sharing of water quality data with WGCMA and SRW for environmental & recreational water monitoring • Sharing of water quality data with horticultural producers • Participation in pre-bushfire season briefing with Forest Fire Management Victoria Heyfield
Bore - Wa De Lock Aquifer	N/A	Briagolong WTP	Briagolong	Southern Rural Water	West Gippsland Catchment Management Authority	• PFAS/PFOA monitoring • Water Licence applications referrals – water quality assessments • Participation as a stakeholder in DEECA Gippsland Strategic Fuel Breaks Project • Engagement with Friends of Blue Pools, Landcare group • Test bore and monitoring to investigate future water security options
Tyers River (Including Trigger Creek)	Moondarra Reservoir	Morwell WTP	Morwell Boolarra Churchill Yinnar Jumbuk Traralgon South/ Hazelwood North	Gippsland Water	West Gippsland Catchment Management Authority	• Implementation of the Moondarra Land Use Options Plan • Road Maintenance • Participation as a stakeholder in DEECA Gippsland Strategic Fuel Breaks Project • Pre-bushfire season orientation with fire agencies. • Planning application assessments for water quality risks • Ongoing participation in the Regional Water Monitoring Partnership. • Timber production from GW-owned pine plantation: including harvest & site preparation for re-establishment. • Ongoing liaison with Friends of Tyers State Park • Liaison with Baw Baw shire as major road maintenance manager. • Gathering of intelligence data for trespass into closed catchment area • Participation in DEECA Sustainable Water Strategy Review, specific to recreation • Review of forest plantation pesticide application operational plans • Weir maintenance and inspection at Trigger Creek • Reporting of rubbish dumping on Crown land to DEECA & Parks Victoria • Bulk Water shoreline assessments of Moondarra Reservoir
		Tyers WTP	Tyers/ Glengarry Rosedale Toongabbie Cowwarr			
		Traralgon WTP	Traralgon			
	Amours Basins	Rawson WTP	Rawson Erica			

Table 21: Gippsland Water - water supply locality water source and activities undertaken

Source water	Raw Water Storage	Water Treatment Plant	Water Sampling Locality	Water Storage Manager	Catchment Management Authority	Catchment Activity Interactions
Pederson Weir (Tarago River) Tarago Reservoir - (supplementary supply)	Tarago Reservoir (supplementary supply)	Warragul WTP	Warragul (including Nilma, Drouin East) Warragul South Drouin Rokeby/Buln Buln	Melbourne Water	West Gippsland Catchment Management Authority	• Planning application assessments, including liaison with Melbourne Water • Ongoing liaison with Melbourne Water, specific to Tarago Reservoir water quality. • Engagement with VicForests for timber production coupe over GW pipeline in Tarago state forest • Participation in DEECA Sustainable Water Strategy Review, specific to recreation
		Neerim South WTP	Neerim South Noojee			
Bore (Boisdale Aquifer)	N/A	Sale WTP	Sale / Wurruk	Southern Rural Water	West Gippsland Catchment Management Authority	• PFAS/PFOA monitoring • Water Licence applications referrals – water quality assessments
Merriman Creek	Seaspray raw water storage	Seaspray WTP	Seaspray	Gippsland Water	West Gippsland Catchment Management Authority	• PFAS/PFOA monitoring • Ongoing monitoring of algae control measures in raw water basins • Forestry Spray application program review • Forestry pesticide application, on ground observance and infield monitoring data gathering with HVP Plantations • Ongoing working relationship with Merriman Creek Landcare • Water Licence applications referrals – water quality assessments
Tanjil River	Blue Rock Lake	Willow Grove WTP	Willow Grove	Southern Rural Water	West Gippsland Catchment Management Authority	• Engagement with SRW and WGCMA regarding water quality protection • Monitoring of the stormwater gully revegetation works

Table 21: Gippsland Water - water supply locality water source and activities undertaken

Source water	Raw Water Storage	Water Treatment Plant	Water Sampling Locality	Water Storage Manager	Catchment Management Authority	Catchment Activity Interactions
Thomson River	Heyfield raw water storage	Heyfield WTP	Heyfield	Gippsland Water	West Gippsland Catchment Management Authority	• Planning application assessments, including coordination with Melbourne Water • Participate in Gippsland Strategic Bushfire Fuel Management Planning Project • Discussion with DEECA regarding future catchment declaration • Liaise with Melbourne Water, including Thomson dam visit by Bulk Water staff • Ongoing participation in Victorian Environmental Water Holder's, Thomson River Environmental Water Advisory Group • Coordination of planning of major project to connect Heyfield WTP to Coongulla supply system • Water Licence applications referrals – water quality assessments
Little Morwell River	N/A	Mirboo North WTP	Mirboo North	N/A	West Gippsland Catchment Management Authority	• Engagement with upstream landholders and assessment of sediment runoff mitigation potentials • Reporting of rubbish dumping in State Forest to DEECA • Water Licence applications referrals – water quality assessments
Tanjil River and Narracan Creek	N/A	Moe WTP	Moe Newborough Yallourn North Trafalgar Yarragon Darnum Thorpdale (water carting from Moe water sampling locality)	N/A	West Gippsland Catchment Management Authority	• Planning application assessments, including liaison with SRW • Ongoing participation in the Regional Water Monitoring Partnership. • Continued monitoring of the DEECA - funded Integrated Water Management Project at Willow Grove to intercept stormwater, prior to discharge into Blue Rock Lake. • Water Licence applications referrals – water quality assessments • Water Act, irrigation dam work permit referrals.

9.7 Other algae, pathogen, chemical or substance not specified that may pose a risk to human health

Table 22: Other sampled parameter results for all localities in 2022-23 (Health Based Parameters)

Parameter	Frequency of sampling	2022-23 No. of Samples	2022-23 Maximum Value Recorded for All Localities (mg/L)	2021-22 Maximum Value Recorded for All Localities (mg/L)	2020-21 Maximum Value Recorded for All Localities (mg/L)	Health Based Guideline value (mg/L)	Result
Nitrite	Weekly*/6 Monthly	296	0.005	0.013	0.031	< 3	**All results below ADWG health guideline values**
Mercury	Quarterly	152	0.0001	0.0002	0.0009	< 0.001	
Chromium	Quarterly	152	<0.001	<0.001	<0.001	< 0.05	
Cadmium	Quarterly	152	<0.0002	<0.0002	<0.0002	< 0.002	
Nitrate	Weekly*/Quarterly	296	1.2	1.3	1.8	< 50	
Nickel	Annually	47	0.005	0.003	0.010	< 0.02	
Arsenic	Annually/Quarterly	140	<0.001	<0.001	<0.001	< 0.01	
Cyanide	Annually	35	<0.005	<0.005	<0.005	< 0.08	
Selenium	Annually/Quarterly	140	<0.001	<0.001	<0.001	< 0.01	
Beryllium	Annually/6 Monthly	35	<0.001	<0.01	<0.01	< 0.06	
Nitrosodimethylamine	Monthly**	17	0.000013	0.000008	0.000016	< 0.0001	
2,4,6-Trichlorophenol	Monthly***	12	<0.001	<0.001	<0.001	< 0.02	
2,4-Dichlorophenol	Monthly***	12	<0.001	<0.001	<0.01	< 0.2	
2- Chlorophenol	Monthly***	12	<0.001	<0.001	<0.001	< 0.3	
Pentachlorophenol	Monthly	12	<0.001	<0.001	<0.001	< 0.01	
Chloride	Annually/Quarterly	288	120	120	220	<250	
Zinc	Annually	47	0.023	0.012	0.023	<3	
Hardness (CaCO3)	Annually/Quarterly	271	90	87	78	<200	
Total dissolved solids	Annually/Quarterly	140	310	340	320	<600	
Silica	Annually/Quarterly	140	16	15	15	<80	
Sulphate	Annually/Quarterly	172	70	61	130	<250	

* Weekly monitoring undertaken on chloraminated systems ** Monthly monitoring undertaken on chloraminated systems *** Frequency Increased from quarterly to monthly during reporting period

9.7.1 Overall results

During the reporting period, the corporation monitored for the following health-related aspects of the drinking water supplied to customer taps. The following table lists the parameters and the frequency of samples taken across all localities, comparing the results to the ADWG and the health-based guideline value.

Monitoring for other parameters such as radiological, pesticides, protozoan organisms is conducted routinely. A complete list of raw water parameters monitored is included in Appendix 1. Additional monitoring is performed on a risk basis and as the need arises.

Blue Green Algae (BGA) monitoring is undertaken across our storages based on visual and water quality triggers. Major raw water supply/storages are routinely monitored for BGA as part of the routine catchment monitoring program. The frequency of sampling is determined by the assessed risk and historical bloom occurrences.

For water storages not managed by us, the Water Storage Manager (Melbourne Water – Tarago, Southern Rural Water – Blue Rock and Lake Glenmaggie) undertakes monitoring and advise us of the results in accordance with their respective algae management plans.

Table 23: Routine BGA monitoring for raw water supplies in 2021-22 (samples per month collected)

Location	Jul '22	Aug '22	Sept '22	Oct '22	Nov '22	Dec '22	Jan '23	Feb '23	Mar '23	Apr '23	May '23	Jun '23
Maffra Weir	2	2	2	4	5	4	5	4	4	4	2	2
Heyfield Raw Water Storage	2	2	2	4	5	4	5	4	4	4	2	2
Neerim South Tarago Reservoir	1	1	1	1	1	1	1	1	1	1	1	1
Warragul WTP Inlet to Plant (Pedersen Weir or Tarago Reservoir)	1	1	1	1	1	1	1	1	1	1	1	1
Rawson Amours Basin				1	1	1	1	1	1	1	1	1
Seaspray Raw Water Storage	1	2	4	4	5	4	5	4	4	4	2	2
Seaspray – Merriman Creek	1	1	2	2	2	2	2	2	1	2	1	1
Blue Rock Lake (Southern Rural Water BGA Program)	Southern Rural Water (SRW) BGA Monitoring Program											
Willow Grove WTP Inlet (Blue Rock Lake)	1	1	1	1	1	1	1	1	1	1	1	1
Lake Glenmaggie (Southern Rural Water BGA Program)	Southern Rural Water (SRW) BGA Monitoring Program											
Coongulla WTP Inlet – Lake Glenmaggie	2	2	Coongulla Water Treatment Plant Decommissioned									
Tarago Reservoir (Melbourne Water BGA Program)	Melbourne Water BGA Monitoring Program											
Moondarra Surface	1	1	1	1	1	1	1	1	1	1	1	1
Moondarra pipeline	1	1	1	1	1	1	1	1	1	1	1	1

During the reporting period, although there were algae and blue green algae blooms, none of these impacted the water treatment process or the production of safe drinking water.

9.7.2 Manganese

Manganese can be naturally present in raw water supplies as either a soluble or insoluble form.

When concentrations exceed the aesthetic guideline of 0.1 mg/L, manganese can create unacceptable tastes in water, as well as stain fixtures and laundry.

The ADWG guideline value is measured against the health guideline value of 0.5 mg/L in ADWG.

Table 24: Manganese results for all water sampling localities in 2022-23

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Boisdale	Monthly	12	0.001	0.002	<0.001	Yes
Boolarra	Weekly	12	0.001	0.003	<0.001	Yes
Briagolong	Weekly	64	0.001	0.001	<0.001	Yes
Churchill	Monthly	36	0.003	0.035	<0.001	Yes
Coongulla/Glenmaggie	Weekly	64	0.003	0.007	0.002	Yes
Cowwarr	Monthly	12	0.002	0.012	<0.001	Yes
Drouin	Monthly	12	0.002	0.005	<0.001	Yes
Erica	Monthly	12	0.008	0.023	0.004	Yes
Heyfield	Weekly	64	0.010	0.021	0.002	Yes
Jumbuk	Monthly	12	0.001	0.002	<0.001	Yes
Maffra	Weekly	64	0.014	0.088	<0.001	Yes
Mirboo North	Weekly	114	0.005	0.230	0.001	Yes
Moe	Weekly	116	0.009	0.071	<0.001	Yes
Morwell	Weekly	171	0.009	0.150	<0.001	Yes
Neerim South	Weekly	64	0.021	0.063	0.004	Yes
Newborough	Monthly	12	0.001	0.003	<0.001	Yes
Noojee	Monthly	12	0.012	0.043	0.004	Yes
Rawson	Weekly	64	0.005	0.047	<0.001	Yes
Rokeby/Buln Buln	Monthly	12	0.001	0.003	<0.001	Yes
Rosedale	Monthly	12	0.001	0.003	<0.001	Yes

* Average unable to be calculated as all results for reporting period were below detection level

Average values calculated using the detection limit value for sample results showing less than detection limit.

^ Based on the maximum value being below the ADWG guideline health limit of 0.5 mg/L.

Table 24: Manganese results for all water sampling localities in 2022-23

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Sale/Wurruk	Weekly	64	0.002	0.009	<0.001	Yes
Seaspray	Weekly	64	0.004	0.007	0.002	Yes
Stratford	Monthly	12	0.004	0.019	<0.001	Yes
Thorpdale	Weekly	64	0.001	0.006	<0.001	Yes
Toongabbie	Monthly	19	0.001	0.004	<0.001	Yes
Trafalgar	Weekly	64	0.003	0.071	<0.001	Yes
Traralgon	Weekly	64	0.001	0.003	<0.001	Yes
Traralgon South/Hazelwood North	Monthly	12	0.001	0.002	<0.001	Yes
Tyers/Glengarry	Weekly	63	0.002	0.005	<0.001	Yes
Warragul	Weekly	120	0.002	0.013	<0.001	Yes
Warragul South	Monthly	12	0.001	0.003	<0.001	Yes
Willow Grove	Weekly	64	0.002	0.017	<0.001	Yes
Yallourn North	Monthly	12	0.001	0.001	<0.001	Yes
Yarragon	Weekly	64	0.002	0.054	<0.001	Yes
Yinnar	Monthly	12	0.001	0.003	<0.001	Yes

* Average unable to be calculated as all results for reporting period were below detection level # Average values calculated using the detection limit value for sample results showing less than detection limit.

^ Based on the maximum value being below the ADWG guideline health limit of 0.5 mg/L.

9.7.3 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

9.7.4 Lead

Lead can be present in drinking water due to dissolution from natural sources or from household plumbing.

Based on health considerations in the ADWG guidelines, concentrations of lead in drinking water should not exceed 0.01 mg/L.

Our sites achieved 100% ADWG guideline value against lead guideline values for all customer tap sites.

Table 25: Lead results for all water sampling localities in 2022-23

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Boisdale	Quarterly	4	<0.001	<0.001	<0.001	Yes
Boolarra	Quarterly	4	<0.001	<0.001	<0.001	Yes
Briagolong	Quarterly	4	<0.001	<0.001	<0.001	Yes
Churchill	Quarterly	4	<0.001	<0.001	<0.001	Yes
Coongulla/Glenmaggie	Quarterly	4	<0.001	<0.001	<0.001	Yes
Cowwarr	Quarterly	4	<0.001	<0.001	<0.001	Yes
Drouin	Quarterly	4	<0.001	<0.001	<0.001	Yes
Erica	Quarterly	4	<0.001	<0.001	<0.001	Yes
Heyfield	Quarterly	4	<0.001	<0.001	<0.001	Yes
Jumbuk	Quarterly	4	<0.001	<0.001	<0.001	Yes
Maffra	Quarterly	4	<0.001	<0.001	<0.001	Yes
Mirboo North	Quarterly	4	<0.001	<0.001	<0.001	Yes
Moe	Quarterly	4	<0.001	<0.001	<0.001	Yes
Morwell	Quarterly	4	<0.001	<0.001	<0.001	Yes
Neerim South	Quarterly	4	<0.001	<0.001	<0.001	Yes
Newborough	Quarterly	4	<0.001	<0.001	<0.001	Yes
Noojee	Quarterly	4	<0.001	<0.001	<0.001	Yes
Rawson	Quarterly	4	<0.001	<0.001	<0.001	Yes
Rokeby/Buln Buln	Quarterly	4	<0.001	<0.001	<0.001	Yes

* Average unable to be calculated as all results for reporting period were below detection level

Average values calculated using the detection limit value for sample results showing less than detection limit.

^ Based on the maximum value being below the ADWG guideline health limit of 0.5 mg/L.

Table 25: Lead results for all water sampling localities in 2022-23 cont.

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Rosedale	Quarterly	4	<0.001	<0.001	<0.001	Yes
Sale/Wurruk	Quarterly	4	<0.001	<0.001	<0.001	Yes
Seaspray	Quarterly	4	<0.001	<0.001	<0.001	Yes
Stratford	Quarterly	4	<0.001	<0.001	<0.001	Yes
Thorpdale	Quarterly	4	<0.001	<0.001	<0.001	Yes
Toongabbie	Quarterly	4	<0.001	<0.001	<0.001	Yes
Trafalgar	Quarterly	4	<0.001	<0.001	<0.001	Yes
Traralgon	Quarterly	4	<0.001	<0.001	<0.001	Yes
Traralgon South/ Hazelwood North	Quarterly	4	<0.001	<0.001	<0.001	Yes
Tyers/Glengarry	Quarterly	4	<0.001	<0.001	<0.001	Yes
Warragul	Monthly	16	<0.001	<0.001	<0.001	Yes
Warragul South	Quarterly	4	<0.001	<0.001	<0.001	Yes
Willow Grove	Quarterly	4	<0.001	<0.001	<0.001	Yes
Yallourn North	Quarterly	4	<0.001	<0.001	<0.001	Yes
Yarragon	Quarterly	4	<0.001	<0.001	<0.001	Yes
Yinnar	Quarterly	4	<0.001	<0.001	<0.001	Yes

* Average unable to be calculated as all results for reporting period were below detection level # Average values calculated using the detection limit value for sample results showing less than detection limit.

^ Based on the maximum value being below the ADWG guideline health limit of 0.5 mg/L.

9.7.5 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

9.7.6 Copper

Copper is present in raw water supplies at very low concentrations. Copper can be found in higher concentrations in drinking water as a result of corrosion of copper pipes and fittings.

Based on health considerations in the ADWG guideline, concentrations of copper in drinking water should not exceed 2 mg/L.

The aesthetic guideline value is 1 mg/L. Our sites achieved 100% ADWG guideline value against both copper guideline values.

Table 26: Copper results for all water sampling localities in 2022-23

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Boisdale	Quarterly	4	0.005	0.007	0.002	Yes
Boolarra	Quarterly	4	0.005	0.006	0.003	Yes
Briagolong	Quarterly	4	0.017	0.056	0.003	Yes
Churchill	Quarterly	4	0.005	0.007	0.003	Yes
Coongulla/Glenmaggie	Quarterly	4	0.003	0.003	0.002	Yes
Cowwarr	Quarterly	4	0.017	0.058	<0.001	Yes
Drouin	Quarterly	4	0.006	0.010	0.004	Yes
Erica	Quarterly	4	0.008	0.014	0.002	Yes
Heyfield	Quarterly	4	0.014	0.027	0.007	Yes
Jumbuk	Quarterly	4	0.006	0.009	0.003	Yes
Maffra	Quarterly	4	0.010	0.020	<0.001	Yes
Mirboo North	Quarterly	4	0.007	0.011	0.003	Yes
Moe	Quarterly	4	0.006	0.017	<0.001	Yes
Morwell	Quarterly	4	0.002	0.003	<0.001	Yes
Neerim South	Quarterly	4	0.011	0.014	0.008	Yes
Newborough	Quarterly	4	0.006	0.009	<0.001	Yes
Noojee	Quarterly	4	0.003	0.005	0.002	Yes
Rawson	Quarterly	4	0.016	0.040	<0.001	Yes
Rokeby/Buln Buln	Quarterly	4	0.013	0.023	0.004	Yes

* average unable to be calculated as all results for reporting period were below detection level # average values calculated using the detection limit value for sample results showing less than detection limit.

^ Based on the maximum value being below the ADWG guideline health limit of 2 mg/L.

Table 26: Copper results for all water sampling localities in 2022-23 cont

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Rosedale	Quarterly	4	0.003	0.009	<0.001	Yes
Sale/Wurruk	Quarterly	4	0.019	0.054	0.002	Yes
Seaspray	Quarterly	4	0.019	0.024	0.008	Yes
Stratford	Quarterly	4	0.004	0.006	<0.001	Yes
Thorpdale	Quarterly	4	0.004	0.007	0.001	Yes
Toongabbie	Quarterly	4	0.008	0.020	0.002	Yes
Trafalgar	Quarterly	4	0.002	0.003	<0.001	Yes
Traralgon	Quarterly	4	0.007	0.017	<0.001	Yes
Traralgon South/Hazelwood North	Quarterly	4	0.004	0.007	0.001	Yes
Tyers/Glengarry	Quarterly	4	0.009	0.017	<0.001	Yes
Warragul	Monthly/Qrtyy	16	0.002	0.005	<0.001	Yes
Warragul South	Quarterly	4	0.002	0.004	<0.001	Yes
Willow Grove	Quarterly	4	0.006	0.008	0.002	Yes
Yallourn North	Quarterly	4	0.003	0.004	<0.001	Yes
Yarragon	Quarterly	4	0.005	0.007	0.003	Yes
Yinnar	Quarterly	4	0.004	0.009	0.002	Yes

* average unable to be calculated as all results for reporting period were below detection level # average values calculated using the detection limit value for sample results showing less than detection limit.

^ Based on the maximum value being below the ADWG guideline health limit of 2 mg/L.

9.7.7 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

9.8 Aesthetics

9.8.1 pH results

In addition to the monitoring of parameters to determine compliance against the SDWA regulations, pH is routinely monitored in the reticulation system.

The ADWG guidelines suggest that the drinking water be between pH 6.5 and pH 8.5. The pH results for all towns are provided below.

Table 27: pH results for all water sampling localities in 2022-23

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Boisdale	Weekly	52	7.7	8.0	7.6	Yes
Boolarra	Weekly	52	7.4	7.8	7.1	Yes
Briagolong	Weekly	52	7.2	7.4	7.0	Yes
Churchill	Weekly	64	7.4	7.8	7.1	Yes
Coongulla/Glenmaggie	Weekly	52	7.8	8.3	7.2	Yes
Cowwarr	Weekly	52	7.5	8.0	7.2	Yes
Drouin	Weekly	51	7.1	7.7	7.0	Yes
Erica	Weekly	52	7.7	9.0	7.2	No
Heyfield	Weekly	52	7.2	7.7	7.0	Yes
Jumbuk	Weekly	52	7.4	7.6	7.1	Yes
Maffra	Weekly	52	7.4	7.9	7.2	Yes
Mirboo North	Weekly	52	7.4	7.8	7.1	Yes
Moe	Weekly	52	7.3	7.5	7.1	Yes
Morwell	Weekly	52	7.2	7.7	7.0	Yes
Neerim South	Weekly	52	7.7	8.0	7.0	Yes
Newborough	Weekly	52	7.4	9.3	7.0	No
Noojee	Weekly	52	7.9	8.1	7.1	Yes
Rawson	Weekly	52	7.4	7.8	7.1	Yes
Rokeby/Buln Buln	Weekly	52	7.1	7.5	6.9	Yes

^= Based on the minimum and maximum values being within the ADWG guideline aesthetic operating range of 6.5 – 8.5.

Table 28: Copper results for all water sampling localities in 2022-23 cont

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Rosedale	Weekly	52	7.8	9.2	7.3	No
Sale/Wurruk	Weekly	52	7.4	7.8	7.2	Yes
Seaspray	Weekly	51	7.3	8.0	7.0	Yes
Stratford	Weekly	52	7.5	7.7	7.4	Yes
Thorpdale	Weekly	52	8.0	8.6	7.6	No
Toongabbie	Weekly	52	7.2	7.7	7.1	Yes
Trafalgar	Weekly	52	7.3	7.6	7.1	Yes
Traralgon	Weekly	52	7.2	7.6	6.8	Yes
Traralgon South/Hazelwood North	Weekly	52	7.4	7.6	7.1	Yes
Tyers/Glengarry	Weekly	52	7.3	8.1	7.0	Yes
Warragul	Weekly	103	7.3	8.3	6.0	Yes
Warragul South	Weekly	52	7.5	8.1	7.2	Yes
Willow Grove	Weekly	52	7.7	8.0	7.3	Yes
Yallourn North	Weekly	52	7.4	7.8	7.1	Yes
Yarragon	Weekly	52	7.4	8.0	7.2	Yes
Yinnar	Weekly	52	7.4	7.7	7.2	Yes

^= Based on the minimum and maximum values being within the ADWG guideline aesthetic operating range of 6.5 – 8.5.

9.8.2 Actions taken in relation to non-compliance

Some systems experienced elevated pH results (Erica, Newborough, Rosedale & Thorpdale) as a result of long residence times of water in the reticulation, cement-lined pipes in parts of the reticulation, and reduced flushing programs due to permanent water saving rules in place. All average pH results were within the range of 6.5 to 8.5.

We continue to monitor pH variations and modify system operation where possible to reduce variability.

Automatic flushing devices have been installed in some locations to manage pH changes from excessive “water age”. These also have the benefit of improving chlorine residual in the extremities of the systems.

Reactive flushing of mains based on routine water sampling results is assessed on a case-by-case basis to manage pH, chlorine residuals and customer water supply pressures.

ADWG states that cement mortar lined pipes can significantly increase the pH and a value up to 9.2 may be tolerated provided monitoring indicates no deterioration in the microbiological quality. No deterioration in the microbiological quality of the water was observed.

9.8.3 Iron results

Iron can become apparent in taste in water at about 0.3 mg/L and above.

High concentrations can give water a rust-brown appearance and cause staining of laundry and plumbing fittings.

Based on aesthetic considerations the concentration in the ADWG guidelines of iron in drinking water should not exceed 0.3 mg/L, however no health-based guideline value has been set for iron.

Table 29: Iron results for all water sampling localities in 2022-23

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Boisdale	Monthly	12	0.01	<0.01	<0.01	Yes
Boolarra	Weekly	12	0.05	0.03	0.10	Yes
Briagolong	Weekly	64	0.01	<0.01	0.02	Yes
Churchill	Monthly	36	0.03	<0.01	0.14	Yes
Coongulla/Glenmaggie	Weekly	64	0.02	<0.01	0.18	Yes
Cowwarr	Monthly	12	0.01	<0.01	0.02	Yes
Drouin	Monthly	12	0.01	<0.01	0.01	Yes
Erica	Monthly	12	0.11	0.03	0.31	Yes
Heyfield	Weekly	64	0.01	<0.01	0.02	Yes
Jumbuk	Monthly	12	0.03	<0.01	0.07	Yes
Maffra	Weekly	64	0.01	<0.01	<0.01	Yes
Mirboo North	Weekly	114	0.01	<0.01	0.04	Yes
Moe	Weekly	116	0.01	<0.01	0.06	Yes
Morwell	Weekly	168	0.02	<0.01	0.54	Yes
Neerim South	Weekly	64	0.02	<0.01	0.05	Yes
Newborough	Monthly	12	0.01	0.01	0.01	Yes
Noojee	Monthly	12	0.02	<0.01	0.05	Yes
Rawson	Weekly	64	0.02	<0.01	0.14	Yes
Rokeby/Buln Buln	Monthly	12	0.01	<0.01	0.02	Yes

* average unable to be calculated as all results for reporting period were below detection level # average values calculated using the detection limit value for sample results showing less than detection limit.

^ Based on the maximum value being below the ADWG guideline aesthetic limit of 0.3 mg/L.

Table 29: Iron results for all water sampling localities in 2022-23

Water Sampling Locality	Frequency of Sampling	No. of Samples	Average# (mg/L)	Max (mg/L)	Min (mg/L)	Drinking Water Quality Standard Met (ADWG) (Yes/No)^
Rosedale	Monthly	12	0.02	0.01	0.04	Yes
Sale/Wurruk	Weekly	64	0.01	<0.01	0.08	Yes
Seaspray	Weekly	64	0.07	0.01	0.15	Yes
Stratford	Monthly	12	0.01	<0.01	0.04	Yes
Thorpdale	Weekly	64	0.03	0.02	0.05	Yes
Toongabbie	Monthly	12	0.01	<0.01	0.02	Yes
Trafalgar	Weekly	64	0.01	<0.01	0.03	Yes
Traralgon	Weekly	64	0.01	<0.01	0.04	Yes
Traralgon South/ Hazelwood North	Monthly	12	0.01	<0.01	0.02	Yes
Tyers/Glengarry	Weekly	63	0.03	<0.01	0.05	Yes
Warragul	Weekly	116	0.01	<0.01	0.06	Yes
Warragul South	Monthly	12	0.01	<0.01	0.01	Yes
Willow Grove	Weekly	64	0.01	<0.01	0.01	Yes
Yallourn North	Monthly	12	0.01	<0.01	0.04	Yes
Yarragon	Weekly	64	0.01	<0.01	<0.01	Yes
Yinnar	Monthly	12	0.03	<0.01	0.09	Yes

* average unable to be calculated as all results for reporting period were below detection level # average values calculated using the detection limit value for sample results showing less than detection limit.

^ Based on the maximum value being below the ADWG guideline aesthetic limit of 0.3 mg/L.

9.8.4 Actions taken in relation to non-compliance

All localities complied with this water quality parameter.

10. Analysis of Results

Comparison to previous years

For the 2022-23 reporting period, all samples analysed complied with the relevant health-based water quality standards. The water quality standards required under the SDWR have been represented as trend data over three financial years. This information allows for a comparison of data for the major towns.

An analysis by the percentage of water sampling localities where the drinking water complied with each of the health-based parameters, over three reporting periods, is shown below. The table also shows an analysis of the percentage of customers supplied with drinking water that complied with the standards.

Table 30: Compliance by water sampling locality and population

	Percentage by Water Sampling Locality			Percentage by Population		
Parameter	**2022-23**	**2021-22**	**2020-21**	**2022-23**	**2021-22**	**2020-21**
Aluminum	100%	100%	100%	100%	100%	100%
Chloroacetic Acid	100%	100%	100%	100%	100%	100%
Dichloroacetic Acid	100%	100%	100%	100%	100%	100%
E. coli	100%	100%	97%	100%	100%	99.96%
Trichloroacetic Acid	100%	100%	100%	100%	100%	100%
Trihalomethanes	100%	100%	100%	100%	100%	100%
Turbidity	100%	100%	100%	100%	100%	100%
Chlorine (Total)	100%	97.1%	100%	100%	99.5%	100%
Nitrite	100%	100%	100%	100%	100%	100%
Nitrate	100%	100%	100%	100%	100%	100%
Fluoride	100%	100%	100%	100%	100%	100%
Mercury	100%	100%	100%	100%	100%	100%
Chromium	100%	100%	100%	100%	100%	100%
Cadmium	100%	100%	100%	100%	100%	100%
Nickel	100%	100%	100%	100%	100%	100%
Arsenic	100%	100%	100%	100%	100%	100%
Selenium	100%	100%	100%	100%	100%	100%
Beryllium	100%	100%	100%	100%	100%	100%
Copper	100%	100%	100%	100%	100%	100%
Barium	100%	100%	100%	100%	100%	100%
Lead	100%	100%	100%	100%	100%	100%
Manganese	100%	97.1%	100%	100%	98.9%	100%
Cyanide	100%	100%	100%	100%	100%	100%
Selenium	100%	100%	100%	100%	100%	100%
Molybdenum	100%	100%	100%	100%	100%	100%
Acrylamide	100%	100%	100%	100%	100%	100%
Boron	100%	100%	100%	100%	100%	100%
Chloryl Hydrate	100%	100%	100%	100%	100%	100%
2, 4-Dichlorophenoxy acetic acid	100%	100%	100%	100%	100%	100%
Nitrosodimethylamine	100%	100%	100%	100%	100%	100%
2,4,6-Trichlorophenol	100%	100%	100%	100%	100%	100%
2,4-Dichlorophenol	100%	100%	100%	100%	100%	100%
2- Chlorophenol	100%	100%	100%	100%	100%	100%
Pentachlorophenol	100%	100%	100%	100%	100%	100%

11. Undertakings under section 30 of the SDWA

We have no undertakings relevant to the 2022-23 reporting year.

12. Exemptions under section 20 of the SDWA

We have no exemptions relevant to the 2022-23 reporting year.

13. Variation in aesthetic standards

We have no variations in aesthetic standards sought under section 19 of the SDWA.

14. Regulated water

Regulated water is water that is not intended for drinking but could reasonably be mistaken as drinking water and declared under section 6 of the Safe Drinking Water Act 2003

We do not manage any regulated water supplies.

15 Glossary of terms

Table 31: Glossary of terms

ADWG	Australian Drinking Water Guidelines 2011 prepared by National Health and Medical Research Council that details a framework for the management of drinking water.
Department of Health	Department of Health.
CCP	A physical (critical control) point in treatment processes that can be controlled either by SCADA, or manually, and has a significant impact on water quality.
Detection limit	The lowest concentration of analytical parameter in the sample that can be detected by the process laboratory.
Drinking Water Supply systems	Towns supplied with water from a common water source (WTP, supply mains and reticulation pipework).
E. coli	Escherichia coli.
Water Sampling Locality	Under the SDWR, a specified area that is supplied with drinking water by a water supplier.
mg/L	Milligram per litre.
NHMRC	National Health and Medical Research Council.
NTU	Nephelometric Turbidity Units.
Properties	A registered customer connection to the drinking water supply.
RMP	Risk Management Plan.
SCADA system	A Supervisory Control and Data Acquisition (SCADA) system consists of human-machine interface, computerised logics, telemetry communication system, electronically actuated instruments and sensors. SCADA allows remote control and monitor of all key processes
SDWA	Safe Drinking Water Act 2003 Act No.46/2003.
SDWR	Safe Drinking Water Regulations 2015 S.R No.88/2015.
Source Water	Raw water supply for town, prior to treatment.
THM	Trihalomethane.
WSAA	Water Services Association Australia.
WTP	Water Treatment Plant - A facility where raw water is directed through various treatment processes and produces treated water fit for human consumption
100mL	100 millilitres.
<	Less than.
>	Greater than.
≤	Less than or equal to.
≥	Greater than or equal to.

16. Further information

The Safe Drinking Water Act **(2003) No.46/2003, Section 23, requires us to disclose water quality monitoring information publically. We publish this Annual Drinking Water Report on the following website :**

www.gippswater.com.au/residential/about-us/corporate-documents/drinking-water-reports

Customers and members of the public may request further drinking water quality information by phoning 1800 050 500, or visiting our websites:

www.gippswater.com.au or,

www.gippswater.com.au/residential/what-we-do/water-quality

17. References

National Health and Medical Research Council. ***Australian Drinking Water Guidelines 2011.***
Web address: www.nhmrc.gov.au

Department of Health and Human Services - Guidance: *Water Quality Annual Report* Section 26 of the Safe Drinking Water Act 2003 Regulations 16 and 17 of the Safe Drinking Water Regulations 2015 – June 2017

Safe Drinking Water Act (2003) No.46/2003

Safe Drinking Water Regulations (2015) S.R No.88/2015

Health (Fluoridation) Act (1973)

Code of Practice for Fluoridation of Drinking Water Supplies; Second Edition (2018)

Appendix

1: Raw water monitoring

Source water	Water Sampling Locality	Nature of other raw water monitoring programs			
		Weekly/Fortnightly	Monthly	Annual/Quarterly	
Moondarra Reservoir via Tyers River	Morwell Churchill Yinnar Jumbuk Boolarra Traralgon South/ Hazelwood North	**Physicals** • Absorbance (254nm) • Colour True (465nm) • Dissolved Oxygen • SUVA (245nm) • Turbidity • Electrical Conductivity @25oC • pH **Microbiological** • Escherichia coli • Total Coliforms • Heterotrophic Plate Count **Metals*** • Iron Total • Manganese Total • Mercury	**Physicals** • Alkalinity Bicarbonate as CaCO3 • Alkalinity Total as CaCO3 • Dissolved Organic Carbon (DOC) • Total Organic Carbon (TOC) • Total Dissolved Solids (TDS) • SUVA (245nm) • Chlorophyll a **Chemical inorganic** • Ammonia as N • Bromide • Chloride • Fluoride • Nitrate as N • Nitrite as N • Organic Nitrogen as N • Phosphorous, Reactive as P • Phosphorous Total as N • Sulphate • Total Kjeldahl Nitrogen as N • Total Nitrogen as N **Biological** • Algae • Blue Green Algae (sampling frequency may vary depending on the season and results received)	**Physicals*** • Total Dissolved Solids (TDS) • Suspended Solids • • Chemical inorganic • Cyanide • Dissolved Organic Carbon (DOC) • Total Organic Carbon (TOC) • Bromide • Fluoride **Metals*** • Aluminium Total • Arsenic Total • Selenium • Cadmium Total • Copper Total • Lead Total • Mercury • Zinc Total **Radiological** • Gross Alpha Activity • Gross Beta Activity **Microbiological** • *Cryptosporidium spp* • *Giardia spp*	**Pesticides, Herbicides and Chemical Organics**** • 2,4,5-T (Herbicide) • 2,4,5-Tp (Silvex) • 2,4,6-T • 2,4-D • 2,4-Db • 2,4-Dp • 2,6-D • 3-Hydroxy Carbofuran • 4-Cpa • 4 Chlorophenoxy Acetic Acid • 4,4-Ddd • 4,4-Dde • 4,4-Ddt • Abamectin • Acephate • Alachlor • Aldicarb • Aldrin • Ametryn • Aminopyralid • Amitraz • Ampa • Asulam • Atrazine • Atrazine-Desethyl • Atrazine-Desisopropyl
	Traralgon				
	Tyers/Glengarry Rosedale Cowwarr Toongabbie				
Macalister River	Maffra				
	Stratford				
	Boisdale				
Bore – Wa De Lock Aquifer	Briagolong				
Pederson Weir (Tarago River)	Warragul (including Nilma, Darnum, Drouin East)				
Tarago Reservoir (supplementary supply)	Warragul South				
	Drouin				
	Rokeby/Buln Buln				
Macalister River	Coongulla/Glenmaggie				
Trigger Creek	Rawson				
	Erica				
Thomson River	Heyfield				
Little Morwell River	Mirboo North				

*Reduced frequency of monitoring in some catchments based on risk profile. ** Note all pesticides, herbicides and chemical organics results were within ADWG guideline values.
Not all parameters were measured at all localities or source waters. Purpose of monitoring - risk management within catchments and raw water supply systems.
Comprehensiveness (frequency) – weekly, fortnightly, monthly, quarterly and annual monitoring or as risks identified.

1: Raw water monitoring cont.

Source water	Water Sampling Locality	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	**Monthly**	**Annual/Quarterly**
Tanjil River and Narracan Creek	Moe		**Metals** • Aluminium Total • Arsenic Total • Calcium Total • Cadmium Total • Copper Total • Iron Total • Iron Soluble • Lead Total • Mercury • Potassium • Magnesium • Manganese Total • Manganese Soluble • Selenium • Zinc Total **Chlorophenols (Sale Bores Only)** • 2,3,4,5 Tetrechlorophenol • 2,6-Dichlorphenol • 2-Chlorophenol • 4-Chloro-3-Methylphenol • Total Phenols (Halogenated) • Pentachlorophenol • 2,4,5-Trichlorophenol **PFOS/PFOA suite** (Seaspray, Sale Bores, Briagolong Bores and reticulation)	• Azinphos-Ethyl • Azinphos-Methyl • Azoxystrobin • Bendiocarb • Benomyl • Bensulfuron Methyl • Bensulide • Bentazon • BHC (Alpha) • BHC (Beta) • BHC (Delta) • Bifenthrin • Boscalid • Brodifacoum • Bromacil • Bromophos-Ethyl • Bromoxynil • Butachlor • Carbaryl • Carbendazim • Carbofenothion • Carbofuran • Carboxin • Carfentrazone-Ethyl • Chlorantraniliprole • Chlordane (Cis) • Chlordane (Trans) • Chlorfenvinphos	• Chlorothalonil • Chloroxuron • Chloropyrifos • Chloropyrifos - Methyl • Chlorsulfuron • Clopyralid • Coumaphos • Cyanazine • Cyfluthrin • Cypermethrin • Cyproconazole • Cyprodinil • Cypromazine • Cyromazine • Deltamethrin • Demeton-O • Demeton-S • Demeton-S-Methyl • Diazinon • Dicamba • Dichlobenil • Dichlorprop • Dichlorprop-P • Dichlorvos • Diclofop-Methyl • Dicofol • Dieldrin • Difenoconazole
	Newborough			
	Yallourn North			
	Trafalgar			
	Yarragon			
Tarago River	Neerim South			
	Noojee			
Bore (Boisdale Aquifer)	Sale/Wurruk			
Merrimans Creek	Seaspray			
Tanjil River and Narracan Creek	Thorpdale			
Tanjil River	Willow Grove			

*Reduced frequency of monitoring in some catchments based on risk profile. ** Note all pesticides, herbicides and chemical organics results were within ADWG guideline values.
Not all parameters were measured at all localities or source waters. Purpose of monitoring - risk management within catchments and raw water supply systems.
Comprehensiveness (frequency) – weekly, fortnightly, monthly, quarterly and annual monitoring or as risks identified.

Appendix

1: Raw water monitoring cont.

Source water	Water Sampling Locality	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	Monthly	Annual/Quarterly
				• Diflufenican • Dimethoate • Dinoseb • Diphenamid • Diquat • DiflubenzuronDiuron • ENDOSULFAN (Alpha) • ENDOSULFAN (Beta) • Endosulfan Sulphate • Endothal • Endrin • Endrin Aldehyde • Endrin Ketone • Epn • Eptc • Ethion • Ethoprophos • Etridiazole • Fenamiphos • Fenarimol • Fenchlorphos (Ronnel) • Fenitrothion • Fenoxycarb • Fensulfothion • Fenthion • Fenvalerate • Fipronil • Flamprop Methyl • Fluometuron • Flupropanate • Fluroxypyr • Flusilazole • Formothion • Fosetyl Aluminium • Glyphosate • Haloxyfop • Heptachlor • Heptachlor Epoxide • Hexachlorobenzene • Hexaconazole • Hexaflurate • Hexazinone • Imazapyr • Indoxacarb • Iodosulfuron Methyl • Iprodione • Irgarol • Isoproturon • Lindane • Malathion • Mcpa • Mcpb • Mecoprop • Metalaxyl • Metalaxyl-M • Metaldehyde • Methidathion • Methiocarb

*Reduced frequency of monitoring in some catchments based on risk profile. ** Note all pesticides, herbicides and chemical organics results were within ADWG guideline values.
Not all parameters were measured at all localities or source waters. Purpose of monitoring - risk management within catchments and raw water supply systems.
Comprehensiveness (frequency) – weekly, fortnightly, monthly, quarterly and annual monitoring or as risks identified.

1: Raw water monitoring cont.

Source water	Water Sampling Locality	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	**Monthly**	**Annual/Quarterly**
				• Methomyl • Methoxychlor • Metolachlor • Metribuzin • Mevinphos • Molinate • Monocrotophos • Myclobutanil • Naftalofos • Napropamide • Nicarbazin • Nitralin • Norfluazon • Novaluron • Omethoate • Oryzalin • Oxamyl • Oxychlordane • Oxyfluorfen • Paclobutrazole • Paraquat • Parathion • Parathion-Methyl • Pebulate • Penconazole • Pendimethalin • Permethrin • PFAS • Phorate • Picloram • Pirimicarb • Pirimiphos-Ethyl • Pirimiphos-Methyl • Prochloraz • Profenofos • Promecarb • Prometon • Prometryn • Propachlor • Propamocarb • Propanil • Propargite • Propazine • Propiconazole • Propyzamide • Prothiofos • Pyraclostrobin • Pyrasulfatole • Pyrazophos • Pyrimethanil • Pyriproxyfen • Pyroxsulam • Quinclorac • Rimsulfuron • Siduron • Silvex

*Reduced frequency of monitoring in some catchments based on risk profile. ** Note all pesticides, herbicides and chemical organics results were within ADWG guideline values.
Not all parameters were measured at all localities or source waters. Purpose of monitoring - risk management within catchments and raw water supply systems.
Comprehensiveness (frequency) – weekly, fortnightly, monthly, quarterly and annual monitoring or as risks identified.

Appendix

1: Raw water monitoring cont.

Source water	Water Sampling Locality	Nature of other raw water monitoring programs		
		Weekly/Fortnightly	Monthly	Annual/Quarterly
				• Simazine • Simetryn • Spirotetramat • Sulfotep • Sulprofos • Tebuconazole • Tebuthiuron • Temephos • Terbacil • Terbufos • Terbuthylazine • Terbutryn • Tertbutryn • Tetrachlorvinphos • Tetraconazole • Thiamethoxam • Thiobencarb • Thiodicarb • Thiometon • Toltrazuril • Trans Chlordane • Triadimefon • Triadimenol • Triazophos • Trichlorfon • Trichloronate • Triclopyr • Trifloxystrobin • Trifloxysulfuron-Sodium • Trifluralin • Trinexapac Ethyl • Vernolate

*Reduced frequency of monitoring in some catchments based on risk profile. ** Note all pesticides, herbicides and chemical organics results were within ADWG guideline values.
Not all parameters were measured at all localities or source waters. Purpose of monitoring - risk management within catchments and raw water supply systems.
Comprehensiveness (frequency) – weekly, fortnightly, monthly, quarterly and annual monitoring or as risks identified.

2: Safe Drinking Water Act Audit Certificate

Risk Management Plan Audit Certificate
Safe Drinking Water Regulations 2015

Certificate Number: 188
Audit period: 1 January 2021 – 31 December 2022

To:
Mr Muneeb Sunna
Manager Water Treatment and Quality
Gippsland Water
55 Hazelwood Road
Traralgon VIC 3844

Australian Business Number (ABN): 75 830 750 413

I, Karen Pither, after conducting a risk management plan audit of the water supplied by Gippsland Water, am of the opinion that—

> Gippsland Water *has not* complied with the obligations imposed by section 7(1) of the *Safe Drinking Water Act 2003* during the audit period.

Two minor non-compliances were noted in relation to:

- Failure to collect and analyse small number of samples listed in water sampling program, and the absence of an effective process to identify missed samples.
- Chemical parameters that were sampled from the same location within a sampling location on two or more consecutive occasions.

The non-compliances were considered minor as there is a low potential for a risk situation, and the potential impact of the non-compliance is not likely to be a serious or imminent risk to public health, or compromise public health.

27 April 2023

Gippsland Water

PO Box 348
55 Hazelwood Road
Traralgon VIC 3844

General enquiries 1800 050 500
Faults and emergencies 1800 057 057

contactus@gippswater.com.au
www.gippswater.com.au

ABN 75 830 750 413