Greater Western Water

Drinking water quality report 2023–24

Acknowledgement of Country

The Greater Western Water region covers Bunurong, Wurundjeri Woi Wurrung, Wadawurrung, Djaara and Taungurung Country.

We respectfully acknowledge the Kulin Nations as the Traditional Owners of the lands and waters upon which we work, operate and rely. We acknowledge the continued cultural, social and spiritual connections that First Nations people have with Country.

We recognise and value that First Nations people have cared for and protected Country for thousands of generations. Country describes land, water, air, sky, people, animals and spirits to which First Nations people are connected[1].

We are committed to working in partnership with local Traditional Owners and First Nations people, to harness collective wisdom to inform the future of the water management landscape while maintaining their cultural and spiritual connections to Country.

1. Source: Australian Institute of Aboriginal and Torres Strait Islander Studies website

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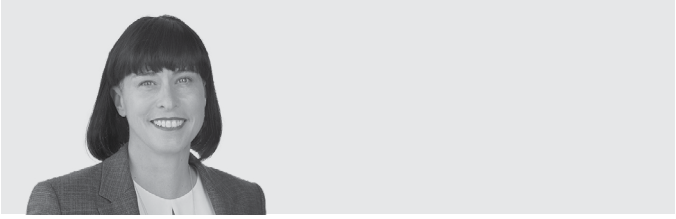
Message from the Managing Director

We are proud to provide the Greater Western Water (GWW) *Drinking water quality report* for the 2023-24 reporting year.



Maree Lang
Managing Director

During the year, GWW met its commitment to provide safe and efficient water services to enhance community resilience and liveability across our service region.

The report provides a detailed overview of our drinking water quality performance for the year and demonstrates the high quality of 123,569 megalitres of water supplied to more than 1.43 million GWW customers.

We carried out approximately 93,000 independent chemical and microbial tests this year, which confirmed that the quality of our drinking water continued to meet the standards set out in Victoria's *Safe Drinking Water Act 2003* and Safe Drinking Water Regulations 2015. In addition to monitoring the quality of water supplied, we rely on feedback from our customers to help identify local issues. This feedback is recorded as water quality related customer complaints. During 2023-24, we received 280 complaints per 100,000 customers, most complaints related to discoloured water, which occurs because of resuspension of natural sediment in our pipe network and variable colour from the bulk Melbourne Water supply but does not impact on the safety of the water supplied.

Our 2023-24 customer satisfaction survey indicated an overall satisfaction of 82% with the quality of water supplied to our customers. We use the feedback provided by this survey to inform our water quality improvement initiatives. We also continued to progress actions from our strategic benchmark review on water quality, investing in increased water quality expertise across the organisation and a continued focus on growing our drinking water quality knowledge base through best practice learning for our people.

This year we finalised development of our first GWW price submission through extensive engagement with customers and stakeholders. This determines the services we will provide and the prices customers will pay from 2024 to 2028. The Essential Services Commission has approved our submission which we have commenced implementing. Through the development of the price submission, we heard from our customers that they expect consistency in water supply across our region. We are now using these customer insights to help develop further improvement initiatives and investments in water quality for the coming years.

We reported one water quality event under s. 22 of the *Safe Drinking Water Act 2003* to the Department of Health. The event related to higher-than-expected chlorine residuals in one locality that indicated a possible challenge with our network. Our systems and procedures ensured we were able to respond and recover promptly, maintaining safe and pleasant drinking water to our customers.

We continued to improve the reliability of our sampling program to ensure coverage and compliance across the entire GWW service area with no missed samples for the reporting period. This included full compliance against Regulation 13 of the Safe Drinking Water Regulations 2015. We also recommenced our condition inspection programs across our key assets, completing numerous health checks on several tanks that service our region.

A quality system known as Hazard Analysis and Critical Control Points (HACCP) is also used to ensure we deliver high quality drinking water. We successfully completed our first whole of GWW HACCP certification audit in May 2024, a fantastic outcome that verifies our production of safe drinking water for the communities we service. We have worked hard over the last few years to strengthen our practices and consolidate the individual certificates which were held by Western Water and City West Water. Bringing this key framework together under a single GWW certification is another important milestone for our business.

This report details the delivery of a comprehensive program of work to ensure quality drinking water is supplied to support a resilient community. We remain committed to providing reliable, high quality, safe drinking water to all our customers and communities to meet their needs and expectations in a diverse and fast-growing region.

Maree Lang
Managing Director

1. Overview

Greater Western Water (GWW) provides services to a population of more than 1.4 million people across an area of 3,700 square kilometres extending from Melbourne's central business district (CBD) and inner-west and north-west suburbs, through the Melton and Sunbury growth corridors to Bacchus Marsh, Myrniong and Macedon Ranges townships.

Table 1: Drinking water supply and assets

Data	2023-24
Connected water customers - number (total)	**631,537**
Residential	583,127
Non-residential	48,410
Water consumption ML (total)	**131,568**
Residential	82,289
Non-residential	41,280
Water losses (ML)	16,633
Total water supplied/delivered (ML)	**140,202**
Water filtration plants (number)	7
New drinking water mains (km)	142
Drinking water mains – total (km)	7850
Drinking water network storage tanks (number)	42
Drinking water network pump stations (number)	47
Secondary chlorinators (number)	24
Carbon dioxide dosing units (number)	1
Water sampling localities (number)	34

1.1 Our commitment to quality

2023-24 highlights

- Safely delivered over 130 billion litres of drinking water to our communities.
- Increased the size of our network by 142 kilometres of drinking water pipework.
- Achieved water quality satisfaction level of 82% for residential customers and 85% for non-residential customers.
- Continued to implement actions from the completion of the Department of Health regulatory audit of our drinking water risk management plan.
- Full compliance with the Safe Drinking Water Regulations 2015.
- Reviewed and updated our Drinking Water Risk Management Plan.
- Continued to refine our Drinking Water Quality Sampling Program to ensure ongoing verification of the quality of the drinking water.
- Completed upgrade works at Merrimu Water Filtration Plant, replacing backwash pumps, cleaning both supply storages and commissioning a new fluoride dosing facility.

GWW is committed to managing the quality of the drinking water supplied to customers across our unique service area which includes metropolitan Melbourne, the growth areas of the west and north-west, and regional supply zones. Our purpose of providing 'trusted water services for our communities and future generations' is inextricably linked to the safety of the drinking water we supply. We are proud to provide services that reflect public health considerations and community expectations.

Victoria's drinking water systems are developed, managed and monitored in accordance with the *Safe Drinking Water Act 2003* and the Safe Drinking Water Regulations 2015. GWW implements this comprehensive regulatory framework, incorporating a risk-based approach to the management of drinking water systems from catchment to tap. The Australian Drinking Water Guidelines 2011 is the key industry document that provides information on health limits and aesthetic limits that GWW adheres to.

Our strong focus and commitment to safeguarding drinking water quality continued to be independently recognised through the consistent retention of the internationally recognised Hazard Analysis and Critical Control Point (HACCP) certification of our Drinking Water Quality Management System. During this reporting period we maintained certification and, for the first time, our certification covers the entire GWW service area as one entity.

Melbourne Water manages the catchment, dams and primary treatment for the drinking water it supplies as a wholesaler. GWW sources bulk treated water from Melbourne Water via large network mains that interconnect with our service area. This supply is managed under a Bulk Water Supply Agreement, which clearly assigns the rights and obligations of both parties. Risks associated with the supply are shared between the wholesaler (Melbourne Water) and the retailer (GWW) and the agreement is managed closely with both parties meeting on a regular basis to discuss potential issues with water supply or quality. Both organisations have cross-business contingency plans and operational arrangements to enact during incidents.

GWW's Drinking Water Quality Policy sets out our approach and commitment to deliver safe, reliable and aesthetically acceptable drinking water to our customers, achieving our objectives and customer commitments for drinking water quality as part of our customer charter. The policy applies to all GWW employees, suppliers, delivery partners and contractors responsible for the management, treatment, operations, maintenance and monitoring of our drinking water treatment and supply network from catchment to tap. A copy of this policy is available on the GWW website.

With this publicly available report, GWW complies with s. 23 of the *Safe Drinking Water Act 2003*, which requires public disclosure of all water quality monitoring information. Water quality results from our monitoring program are also provided to customers upon request. A copy of this report is provided to the Secretary of the Department of Health in compliance with s. 26 of the *Safe Drinking Water Act 2003*.

In addition to this report, water quality information is available to customers on the GWW website.

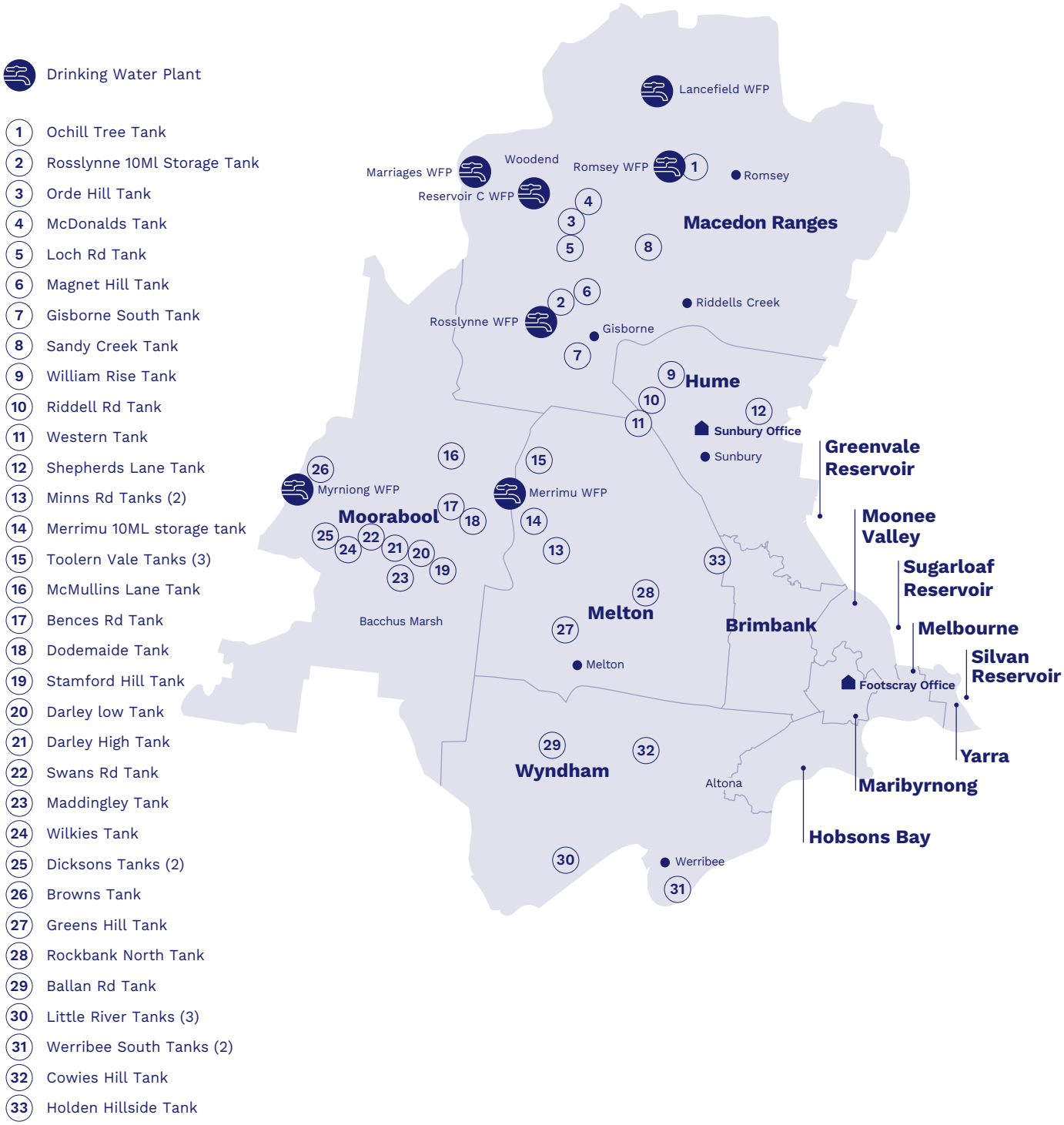
2. The water supply system and sampling localities

2.1 System features

Our water quality is monitored at 34 water sampling localities, published by the Department of Health in the *Victoria Government Gazette*. Each locality is determined by the origin of the water, the location of treatment and storage facilities, and the associated delivery system. These localities form the basis of our water sampling program. In this reporting period there were no changes to water sampling locality names or boundaries from previous years. The bulk water transfer arrangements with Melbourne Water and Southern Rural Water are routinely varied for supply purposes to these localities. Refer to Appendix A for a map of GWW localities and results from our monitoring program.

GWW's drinking water supply network includes seven local water filtration plants, 42 water storage tanks, typically constructed of concrete or metal and are fully enclosed, 47 drinking water pump stations, 24 disinfection plants to provide secondary chlorination and one chemical correction unit to adjust pH. GWW regularly undertakes asset condition inspections at these sites to ensure continued water safety and security.

Figure 1 Greater Western Water service area



2.2 Source water system

GWW manages its drinking water systems through three distinct operations:

1. Receiving bulk treated drinking water from Melbourne Water.
2. Receiving bulk untreated water from Southern Rural Water, which is then treated at a GWW water filtration plant.
3. Receiving untreated water from GWW owned and operated dams, bores and reservoirs, which is then treated at a GWW water filtration plant.

As a result, there are seven water supply systems delivering drinking water into GWW's service area: bulk drinking water from Melbourne Water, Southern Rural Water supply to Rosslynne, Merrimu and Myrniong, and local systems at Romsey, Lancefield and Woodend.

2.3 Melbourne Water supplies

Most of the water supplied to GWW is sourced from forested, protected water supply catchments and reservoir systems (Upper Yarra, Thomson and the Yarra Valley tributaries) that lie primarily to the east of Melbourne and extend as far as Thomson Reservoir, approximately 120 kilometres from our service area. These larger catchments and tributaries feed into three major storages that service GWW: Silvan, Sugarloaf and Greenvale.

Table 2: 2023-24 Summary of GWW supply systems, source water and treatment plants

Supply system	Source water	Catchment/Storage	Treatment plant
Melbourne system			
Melbourne system (consisting of bulk treated water supplies from Melbourne Water systems Greenvale, Silvan (including Desalinated Water) and Winneke)			
Greenvale	Transfer from Silvan Reservoir (after treatment at Silvan) or from Winneke water treatment plant. See Silvan and Winneke water supply systems		Greenvale St Albans Greenvale Sydenham
Silvan	Thomson catchment, Upper Yarra catchment O'Shannassy catchment		Silvan-Olinda Silvan-Preston Silvan-Waverley
	Treated water from Desalination plant via Cardinia		Wonthaggi Desalination Plant via Cardinia and Silvan (including transfer from treatment plant to Silvan to Greenvale Reservoir)
Winneke	Transfer from Maroondah Reservoir, Yarra River	Sugarloaf Reservoir	Winneke Water Treatment Plant

Local supply systems			
Rosslynne system (includes Sunbury system)	Rosslynne Reservoir (Southern Rural Water - SRW)	Upper Maribyrnong catchment, Jacksons Creek catchment	Rosslynne Water Filtration Plant (WFP)
Merrimu system (includes Melton system)	Merrimu Reservoir (SRW)	Lerderderg River, Goodman Creek, Pyrites Creek catchment	Merrimu WFP
	Djerriwarrh Reservoir	Djerriwarrh catchment	
Lancefield system	Garden Hut Reservoir	Deep Creek catchment	Lancefield WFP
	Kerrie Reservoir	Upper Bolinda Creek	
	Monument Creek Weir	Monument Creek catchment	
	Bore No. 3 Romsey Bore	Local aquifer	
Woodend system	Campaspe Reservoir	Campaspe River catchment	Marriages WFP
	Graham Brock Reservoir	Falls/Smokers Creek and Graham Brock Reservoir and Reservoir C catchments	Reservoir C WFP
Myrniong system	Pykes Creek Reservoir (SRW)	Werribee River and Pykes Creek catchment	Myrniong WFP
Romsey system	Kerrie Reservoir	Romsey Bore	Upper Bolinda Creek
	Local aquifer	Romsey WFP	

2.3.1 Silvan, Sugarloaf and Greenvale reservoirs

Bulk drinking water is supplied to GWW from three major storages within the Melbourne Water managed system:

- Silvan Reservoir (near Mount Dandenong)
- Sugarloaf Reservoir (near Yarra Glen)
- Greenvale Reservoir (filled by transfer of water from Silvan or Winneke system) (near Somerton).

The proportion of water supplied from the three storages varies, due to factors such as local water demands, weather conditions, maintenance works and longer-term population changes. The supply from Silvan Reservoir comes from protected, natural catchments where activities such as industry, farming, urbanisation and tourism are highly restricted. Silvan Reservoir receives inflows from Thomson Reservoir, Upper Yarra Reservoir, O'Shannassy Reservoir and other small tributaries to the Yarra River. During 2023-24, Greenvale Reservoir, which does not have a catchment, received all its water supply from transfers from Silvan Reservoir after treatment at Silvan or from Winneke Water Treatment Plant (WTP).

Long storage periods (ranging between months and years) in these protected reservoirs enhance water quality. As a result, the only active water treatment process that is applied to this water is chlorination at Silvan and Greenvale, with pH correction managed with Calcium Oxide (lime). Sugarloaf Reservoir draws most of its water from the mid-point of the Yarra River where the catchment is unprotected, containing urban areas, light industry, and agricultural activities. A smaller proportion also comes from Maroondah Reservoir via the Maroondah Aqueduct. On average, the source waters pumped into Sugarloaf Reservoir are stored for months before being treated (via aluminium-based coagulation and flocculation, sand filtration, sodium hypochlorite chlorination and pH correction with calcium oxide (lime) at Melbourne Water's Winneke WTP.

During 2023-24, GWW bulk supply from Melbourne Water reservoirs was 64% Sugarloaf, 13% Silvan and 23% Greenvale. Table 3 shows the percentage of drinking water supplied by Melbourne Water's three main reservoirs to GWW and GWW's local reservoir supply. Refer to last year's annual report for historical information on water system supply.

Table 3: Melbourne reservoirs and GWW local supplies %

	2022-23	2023-24
Melbourne Water reservoir supplies		
Silvan Reservoir	15%	13%
Sugarloaf Reservoir	57%	64%
Greenvale Reservoir	28%	23%
GWW Local reservoir supplies		
Rosslynne Reservoir	1.3%	38%
Merrimu Reservoir	10%	41%
Local supplies*	8%	20%

* Local supplies were used to supplement local areas of the Woodend, Myrniong, Lancefield and Romsey regions, refer to Table 2.

2.3.2 Wonthaggi desalinated water supply

Between 1 July 2023 and 30 June 2024, there was no transfer of water from the Victorian Desalination Plant or from Melbourne Water's Cardinia Reservoir into the Silvan Reservoir that reached GWW water supply.

2.4 Melbourne supply system

Drinking water comes into our network in various locations that have a range of controls, such as disinfection at Greenvale Reservoir and Kew.

The water is distributed to GWW's customers through an extensive network of over 7,850 kilometres of water mains, 47 pumping stations, 42 water storage tanks and 24 secondary chlorinators. This network encompasses central and western Melbourne, including inner suburbs such as Fitzroy, Collingwood, Richmond and the CBD, to outer suburbs as far west as Little River. Water supplies from Greenvale Reservoir also feed the GWW Sunbury/Rosslynne supply system and the Merrimu/Melton supply system. Details of supply systems for all localities are outlined in tables 3, 4 and 7.

The supply network is fully enclosed and pressurised, protecting the water from possible contamination during its delivery to customers.

Table 4: 2023-24 GWW water sampling localities supply system

Water sampling locality	Population supplied (2021 census)	Supply system
Altona	143,150	Melbourne system
Bulla	590	Melbourne system
Caroline Springs	106,810	Melbourne system
Darley	5,420	Melbourne system
		Merrimu system
Deer Park	84,790	Melbourne system
Diggers Rest	5,630	Melbourne system
		Rosslynne system
East Keilor	42,650	Melbourne system
Eynesbury	2,830	Melbourne system
		Merrimu system
Gisborne	12,730	Melbourne system
		Rosslynne system
Lancefield	2,270	Lancefield system
		Melbourne system
		Rosslynne system
Lerderderg	8,500	Melbourne system
		Merrimu system
Little River	650	Melbourne system

Macedon	2,440	Woodend system (Marriages)
		Woodend system (Reservoir C)
		Melbourne system
		Rosslynne system
Maddingley	8,890	Melbourne system
		Merrimu system
Maribyrnong	123,360	Melbourne system
Melton South	56,800	Melbourne system
		Merrimu system
Merrimu	18,420	Melbourne system
		Merrimu system
Moonee Ponds	74,720	Melbourne system
Mount Macedon	720	Melbourne system
		Rosslynne system
Myrniong	290	Myrniong system
		Melbourne system (when carting)
		Merrimu system (when carting)
Parkville	169,190	Melbourne system
Richmond	25,330	Melbourne system
Riddells Creek	4,420	Melbourne system
		Rosslynne system
Rockbank	16,300	Melbourne system
		Merrimu system
Romsey	5,560	Romsey system
		Melbourne system
		Rosslynne system
Strathmore	8,270	Melbourne system
Sunbury	38,930	Melbourne system
		Rosslynne system
Taylors Lakes	72,670	Melbourne system
Toolern Vale	450	Melbourne system
		Merrimu system
Tullamarine	11,680	Melbourne system
Werribee	158,690	Melbourne system
Werribee South	2,300	Melbourne system
Williamstown	47,530	Melbourne system
Woodend	6,190	Woodend system
		Rosslynne system
		Melbourne system

2.5 Local supply systems

Most towns in the outer north-western service region are connected to at least two drinking water sources: the Melbourne water supply system and a local reservoir. The largest local reservoirs are managed by Southern Rural Water and include Rosslynne Reservoir near Gisborne, Pykes Creek near Myrniong, and Merrimu Reservoir near Bacchus Marsh. In addition, several smaller local reservoirs and bores supply water to some towns in the Macedon Ranges.

Local water sources are used for drinking water supply. The large refill event in the last few years has increased the local reservoir volumes significantly. The ongoing impacts of climate change and sustained population growth mean that the region's future water supply security is dependent on GWW maintaining access to Melbourne water supplies.

Southern Rural Water supplies water for treatment to the Merrimu, Rosslynne and Myrniong systems, while Woodend, Romsey and Lancefield each have their own local supply systems with additional water supplemented from bulk entitlements in nearby systems. In times of drought, water from the Melbourne supply system can supplement these local supplies via an interconnected water transfer network.

2.5.1 Rosslynne system

Gisborne, Riddells Creek, Macedon and Mount Macedon typically receive treated water from the Rosslynne WFP, which is supplied from Rosslynne Reservoir. In 2023-24, the plant ran at full capacity; it produced 2,368 ML of drinking water. This was due to significant inflow events throughout 2022 that provided high levels of storage in the Rosslynne Reservoir.

2.5.2 Merrimu system

Bacchus Marsh, Merrimu and Toolern Vale receive treated water from the Merrimu WFP, which is supplied from Merrimu Reservoir.

Merrimu Reservoir receives water from the Pyrites Creek Catchment and experienced a significant fill event during 2022-23, making local water the preferred source for 2023-24. During 2023-24, 2.55 GL was supplied from the Merrimu Reservoir.

2.5.3 Woodend

Woodend receives treated water from two local sources: Campaspe Reservoir via the Marriages WFP near Woodend and the Graham Brock Reservoir via Reservoir C WFP on Mt Macedon. When local sources are full, GWW treats local water to supply Woodend.

Due to various operational requirements, the Woodend system can be augmented by the Rosslynne system.

During 2023-24, Woodend was supplied with volume from Campaspe Reservoir and from the Graham Brock Reservoir, which also receives bulk entitlement from Macedon.

2.5.4 Romsey

Romsey receives treated water from the Romsey WFP, which is supplied with water from Kerrie Reservoir. Supplementary water can be sourced from Wright Reservoir in Riddells Creek. In the past year, Romsey WFP received 444 ML from Kerrie Reservoir. Extra inflows were sent to Romsey from the Riddells Creek and Maribyrnong bulk entitlements and bore water was used to supplement surface water storages for Romsey.

2.5.5 Lancefield

The Lancefield WFP can receive and treat surface water, bore water or a mixture of both. In 2023-24, 209 ML of water was produced from Lancefield WFP, where a mixture of bore water and surface water from Garden Hut Reservoir supplements the total volume for Lancefield. The transfer network from Romsey to Lancefield also allowed for water to be transferred from the Romsey, Riddells Creek and Maribyrnong bulk entitlements during the year.

2.5.6 Myrniong

Myrniong receives its water supply from Pykes Creek Reservoir after treatment at the Myrniong WFP. A total of 15 ML was taken from the storage during the reporting period in compliance with its bulk entitlement. Significant inflows resulted in a storage increase during the year.

2.6 Source water monitoring

The quality of the bulk water supply is monitored by Melbourne Water before it enters GWW's distribution system. This monitoring has two components:

- Sites upstream of treatment, comprising rivers, streams, aqueducts and reservoirs, are monitored at varying frequencies, largely to characterise overall long-term background water quality and to monitor for seasonal and possible longer-term changes. Parameters tested include organic chemicals, nutrients and microbes.
- Sites downstream of water treatment, where the monitoring is more intense than at upstream sites and is largely focused on verifying the quality of post-treatment drinking water. Frequencies of this

monitoring ranged between continuous at chlorine dosing points and daily or weekly, depending on the sites and parameters measured (for example, testing for water clarity and purity, as well as microbial levels).

GWW implements an extensive water quality monitoring program, which involves sampling and assessing water quality results from the source, through to treatment, into the distribution system and at customer taps. This key activity is outlined in GWWs Risk Management Plan. The program involves monitoring and identifying hazards and events that have the potential to compromise drinking water quality. By monitoring and assessing these multiple barriers, GWW verifies the quality of the drinking water against the *Safe Drinking Water Act 2003* and the Safe Drinking Water Regulations 2015.

In 2023-24, a comprehensive source water monitoring program was implemented through an independent National Authority of Testing Association (NATA) accredited laboratory. Appendix A provides an overview of the parameters tested, frequency of testing at each sampling location for pesticides, chemicals (organics and in-organics), metals, physical and radiological parameters, and their results.

2.6.1 Microbiological monitoring

In addition to the source water monitoring conducted by an independent NATA accredited laboratory, source water samples at various sampling locations were taken routinely for physical microbiological analysis by specialist biological scientists. This involves the determination of any flagellates, diatoms, algae and cyanobacteria (blue green algae) that were present in the source water samples. General observations provided by these assessments in relation to any water discolouration, the levels of detritus and the presence of any odour in the source water provided valuable information in assessing the quality of the source water at various times during 2023-24. This information allows GWW to monitor the changes in conditions of source water supplies and assess their potential impacts on drinking water quality.

2.6.2 Blue green algae

For Merrimu, Rosslynne and Pykes Creek reservoirs, GWW monitored blue green algae (BGA) and shared data with water storage manager Southern Rural Water. Regular BGA results in the three reservoirs allowed for the timely assessment of adverse impacts and our ability to treat and provide safe drinking water to customers. Monthly water quality reports were provided by Melbourne Water for algae monitoring at Greenvale Reservoir, including information on algal populations.

Melbourne Water is required to notify GWW of any major changes in treated water quality for supplies from the Melbourne system. That includes any changes that have potential to impact on our ability to supply safe drinking water to customers and meet the Australian Drinking Water Guidelines.

Reporting to Department of Energy, Environment and Climate Action (DEECA) was implemented for local water sources Lancefield Basin, Garden Hut Reservoir, Reservoir C and Reservoir B, and several other connecting storages. The results documented included biovolume of the various species of BGA detected. Garden Hut Reservoir also activated reporting to Department of Health Water Unit for elevated BGA levels. The report included biovolume and toxin testing of the Garden Hut Reservoir supply. Garden Hut was closely managed for BGA throughout the reporting period. Refer to section 4 for further detail.

2.6.3 Assessment of water quality data

GWW has collected an extensive history of water quality data at water source, treatment plants and customer taps. Data collected from the water quality monitoring programs informs operational responses and activities, strategies and projects to maintain and supply safe drinking water. See section 5 for more details on the drinking water quality monitoring programs implemented by GWW.

3. Preventative measures and multiple barrier risk management approach

The adoption of preventative strategies for the protection of drinking water supplies is one of the key elements of the Framework for Management of Drinking Water Quality, developed under the Australian Drinking Water Guidelines.

A key aspect of this risk-based approach to the production of safe drinking water is the use of multiple water treatment and protection practices, also known as the multiple barrier approach. At GWW, drinking water provided to customers is subject to a multiple barrier approach to ensure safe and aesthetically acceptable drinking water supplies.

Operating to adhere to the *Safe Drinking Water Act 2003* and Safe Drinking Water Regulations 2015, GWW manages health risks associated with drinking water through the Hazard Analysis Critical Control Point (HACCP) risk management system. This system was audited during the 2023-24 reporting period, with GWW retaining its HACCP certification.

The Department of Health conducts Risk Management Plan audits to ensure GWW is adhering to the processes and procedures put in place for the management and supply of safe drinking water. The most recent independent external audit of the Risk Management Plan was in 2023. Further details on the risk management plan progress of actions are in section 9.1.

3.1 Catchment protection

Supporting effective water quality management from catchment to tap requires engagement and progress from all stakeholders. GWW works closely with water storage managers Southern Rural Water and Melbourne Water to ensure the ongoing protection and improvement of water quality within our catchments.

Protected reservoirs and storage tanks are crucial in this process. The amount of time water is held in surface water supply reservoirs is a key element to maintaining good water quality as long detention times allow long exposure to solar radiation and enables sediments to settle, improving water clarity and disinfection processes.

In addition to the bulk water supplied by Melbourne Water, GWW's three major storage reservoirs – Rosslynne, Merrimu and Pykes Creek (managed by Southern Rural Water) – also provide drinking water to our customers. We manage 17 smaller storages, most of which are in or near the Macedon Ranges. Except for Pykes Creek, our storages are protected through restricting access.

Water quality is monitored at all reservoirs used for sourcing water for drinking water treatment. Data is regularly reviewed for short and long-term trends so source water selection can be optimised and treatment decisions made.

3.2 Alternative sources of supply

GWW's extensive interconnection to the Melbourne supply system ensures there is capacity in all the region's towns to access alternate water supply sources through the bulk entitlement with Melbourne Water. In the case of any issues for Myrniong's supply, carting water would be required as an alternative supply.

3.3 Bulk water treatment

GWW manages the security and quality of drinking water supply through bulk supply agreements with Melbourne Water for a treated water supply and Southern Rural Water for access to local raw water supplies. The local raw water supply is treated by GWW-operated plants and covered in section 3.4.

Treated water provided by Melbourne Water is stored, monitored and distributed by GWW to our customers. Table 5 summarises the water treatment processes applied by Melbourne Water on the bulk water. Refer to Melbourne Water's annual water quality report for further details.

3.3.1 Fluoridation

Melbourne Water adds fluoride to all GWW's bulk water, in line with the requirements of the *Victorian Health (Fluoridation) Act 1973*. This is in the form of fluorosilicic acid at both the Silvan Reservoir supply and Winneke WTP.

3.3.2 Chemical treatment and disinfection

Melbourne source water comes from highly protected catchments which have a long detention time in storage reservoirs. As a result, disinfection alone is sufficient to ensure the quality of the water. Melbourne Water carries out primary disinfection of the bulk water supply by chlorination. Additional secondary chlorine dosing is undertaken within the GWW service area by:

- Melbourne Water, with four secondary chlorinators servicing the water sampling localities of Werribee, Deer Park, Caroline Springs and Altona
- GWW, with a total of 24 secondary chlorinators:
  - five service the water sampling localities of East Keilor, Little River, Richmond, Werribee and Werribee South
  - five service Sunbury, Bulla, Diggers Rest, Rockbank, Melton South and Eynesbury
  - 14 service the Merrimu and Rosslynne networks.

3.3.3 pH correction

The local water supply at Little River is dosed with gaseous carbon dioxide to help maintain neutral pH levels.

Table 5: Drinking water treatment process - bulk drinking water supply from Melbourne Water

Water sampling locality	Treatment plant	Treatment process[1]	Added substance(s)	Comments
Altona Bulla* Caroline Springs Darley* Diggers Rest* Deer Park East Keilor Eynesbury* Gisborne* Lancefield* Lerderderg* Little River Macedon* Maddingley* Melton South* Merrimu* Mount Macedon* Myrniong* Riddells Creek* Rockbank* Romsey* Strathmore Sunbury* Taylors Lakes Toolern Vale* Tullamarine Werribee Werribee South Woodend*	Greenvale (transfer from treatment plant Silvan to Greenvale Reservoir)	Disinfection • Chlorination	Sodium hypochlorite	No additional fluoridation at Greenvale as it receives fluoridated water from Silvan (refer Section 2.3.1).
Altona Deer Park East Keilor Little River Maribyrnong Moonee Ponds Parkville Richmond Werribee Werribee South Williamstown	Silvan	Disinfection • Chlorination Other • pH correction • Fluoridation	Chlorine gas[2] Calcium Oxide (lime) Fluorosilicic acid	

Water sampling locality	Treatment plant	Treatment process[1]	Added substance(s)	Comments
Altona Caroline Springs Deer Park East Keilor Little River Maribyrnong Moonee Ponds Parkville Richmond Strathmore Taylors Lakes Tullamarine Werribee Werribee South Williamstown	Winneke	Clarification • Coagulation & flocculation • Filtration • Sand filtration Disinfection • Chlorination Other • pH correction • Fluoridation	Polymer Alum Sodium hypochlorite Calcium Oxide (Lime) Fluorosilicic acid	
Altona Caroline Springs Deer Park East Keilor Little River Maribyrnong Moonee Ponds Parkville Richmond Strathmore Taylors Lakes Tullamarine Werribee Werribee South Williamstown	Wonthaggi Desalination Plant via Cardinia and Silvan (including transfer from treatment plant Silvan to Greenvale Reservoir)	Clarification • Coagulation & flocculation Filtration • Drum screens • Dual media pressure filters • Cartridge filters • Reverse osmosis Remineralisation Disinfection • Chlorination Other • pH correction • Fluoridation • Sludge handling	Ferric sulphate/ Sulphuric acid/ Polydadmac Antiscalant, Sodium hydroxide, Sodium bisulfite, Membrane cleaning chemicals (caustic, detergent, acid) Hydrated lime Carbon dioxide Chlorine gas Calcium oxide (lime) Fluorosilicic acid Polymer	Between 1 July 2023 and 30 June 2024, no desalinated water was blended with water supplied to GWW from Melbourne Water

* indicates localities that are connected to at least two drinking water sources – Melbourne water supplies from Greenvale Reservoir and local reservoirs.

1. Chemicals added by Melbourne Water for treatment, chlorination and fluoridation - refer to the Melbourne Water annual drinking water quality report for details
2. Occasional use of sodium hypochlorite when required as additional disinfection residual or when chlorine gas dosing is offline - refer to Melbourne Water's annual drinking water quality report for details

3.4 Local source water treatment

Local sources (untreated water) require treatment to produce safe drinking water. This treatment requires both filtration and disinfection due to agricultural and urban impacts that surround the local reservoirs and dams from which we obtain the water. To ensure provision of safe drinking water at customer taps, after filtration at a water filtration plant, all water is disinfected at the point where it enters the supply system and again at specific points along the delivery system.

3.4.1 Filtration

Filtration is a crucial step in the water treatment process and is essential in the production of safe drinking water, where catchments are impacted by agriculture or urbanisation. Filtration removes particulate matter, pathogens and algae, as well as undesirable chemical and biological contaminants. GWW operates seven water filtration plants, which use a variety of treatment processes including dissolved air flotation filtration (DAFF), sedimentation filtration and microfiltration.

Each treatment process, coupled with disinfection, maintains a healthy drinking water supply with minimal impact on taste and odour. Typically, the filtration treatment provides water quality turbidity values of ≤0.3NTU and true colour of ≤5 Platinum Cobalt Units (PCU), well below the Australian Drinking Water Guideline values.

3.4.2 Chemical treatment and disinfection

Disinfection is another crucial step in the water treatment process and is directly related to the reduction of waterborne diseases caused by pathogenic microorganisms. Chlorination and chloramination are both disinfection processes applied at GWW water filtration plants. The addition of chlorine as the disinfecting agent causes any remaining pathogens to be destroyed, making the drinking water safe for consumption. Drinking water sourced from the Melbourne system and the local system is disinfected by 19 of the 24 GWW secondary chlorinators as it enters the local supply systems.

Other common water treatment chemicals include:

- alum for removal of colour and particulate matter
- calcium oxide (lime), carbon dioxide or sodium carbonate to adjust the pH of the water, which is integral for effective disinfection
- powder activated carbon to combat taste and odours in the treated water, which can occur due to high organic loads in the source water.

3.4.3 Fluoridation

Fluoride is a naturally occurring element that is found in rocks, soils, water and plants. One milligram of fluoride for every litre of water has been shown to provide maximum dental benefits to the community and is the 'optimal' level for temperate climates such as Victoria. GWW supplied fluoridated local water from Merrimu and Rosslynne WFPs (dosed as sodium fluoride or fluorosilicic acid). None of GWW's smaller water filtration plants currently add fluoride to their water supply. Fluoride (dosed as fluorosilicic acid) is added by Melbourne Water before delivery to GWW's supply region in line with the requirements of the *Health (Fluoridation) Act 1973*.

GWW commissioned the upgrade of the fluoride dosing facility at Merrimu WFP during the reporting period. The project constructed a new fluoridation plant building, which now contains modern fluoride dosing systems ensuring the continued management of fluoridation as outlined by the Department of Health and the requirements of the *Health (Fluoridation Act) 1973*.

Table 6 lists the localities that receive a fluoridated supply. Supplies to Lancefield, Myrniong, Romsey and Woodend are only fluoridated when local supplies are supplemented with water from Melbourne, Merrimu or Rosslynne supplies. During the reporting period, some water from Rosslynne and Melbourne supply systems was used to top up local supplies for Woodend, Romsey and Lancefield, resulting in low levels of fluoride in their water supply.

Table 6 Fluoridated and non-fluoridated water supply by water sampling localities

Fluoridated water supply	Non-fluoridated water supply
Altona, Bulla, Caroline Springs, Deer Park, Darley, Diggers Rest, East Keilor, Eynesbury, Gisborne, Lerderderg, Little River, Macedon, Maddingley, Maribyrnong, Melton South, Merrimu, Mount Macedon, Moonee Ponds, Parkville, Richmond, Riddells Creek, Rockbank, Strathmore, Sunbury, Taylors Lakes, Toolern Vale, Tullamarine, Werribee, Werribee South, Williamstown	Lancefield[1] Myrniong, Romsey[1] Woodend[1]

1. Lancefield, Woodend and Romsey received a small proportion of fluoridated water during 2023-24 when Rosslynne Reservoir water was mixed with local water supplies to ensure supply security.

3.4.4 pH correction

Acidity in water is corrected to provide a neutral pH at different stages of the treatment process to ensure added chemicals are effective and there are minimal impacts on pipes and associated fittings within the distribution network. Water's pH level may be corrected by adding calcium oxide (lime) and carbon dioxide or sodium carbonate at the start of the treatment process to assist with coagulation. The pH may be adjusted again at the end of the process to ensure effective disinfection and limit final water corrosiveness. The average pH of water should be maintained within the Australian Drinking Water Guidelines specified range of 6.5-8.5 pH units for aesthetic purposes.

Table 7: Drinking water treatment local water supplies

Water sampling locality	Treatment plant	Treatment process	Added substance(s)	Comments
Lancefield	Lancefield WFP Rosslynne WFP Greenvale WTP	Coagulation pH correction Filtration Dissolved Air Flotation Chlorination Fluoridation by Rosslynne[5] Fluoridation by Melbourne Water[5, 7]	Aluminium chlorohydrate (as required), Polyelectrolyte, Sodium hydroxide (Caustic Soda), Potassium permanganate, Powdered Activated Carbon (PAC), Sodium hypochlorite, Fluorosilicic acid	Drinking water is supplied from Garden Hut Reservoir and local groundwater. The Lancefield system is also connected to Romsey via a source water pipeline which allows transfer of water from Kerrie Reservoir into the Lancefield Basin.

Water sampling locality	Treatment plant	Treatment process	Added substance(s)	Comments
Melton South Lerderderg Maddingley Darley Merrimu Rockbank Toolern Vale Eynesbury	Merrimu WFP Greenvale WTP	Coagulation Clarification/ filtration Fluoridation Chlorination Additional chlorination by secondary chlorinators along reticulation system as required[2] Fluoridation and primary chlorination by Melbourne Water[7] Secondary chlorination at Hillside Pump Station[1] Additional chlorination by secondary chlorinators along reticulation system as required[2]	Aluminium chlorohydrate, Polyelectrolyte, Chlorine gas, Sodium fluoride, Fluorosilicic acid, Sodium hypochlorite	Melton and Melton South have been supplied with Melbourne water since June 2016. Other towns in the Bacchus Marsh area of the Merrimu system have been supplied from Merrimu Reservoir. Booster chlorinators exist in Melton South, Rockbank, Merrimu, Darley, Maddingley and Lerderderg localities.
Myrniong	Myrniong WFP Greenvale WTP Merrimu WFP	Coagulation Oxidation pH correction Dissolved Air Flotation Filtration Chlorination Additional chlorination by secondary chlorinators along reticulation system as required[2, 4] Fluoridation by Melbourne Water[7] or Merrimu WFP[6]	Powdered Activated Carbon (as required), Potassium permanganate, Aluminium sulphate, Polyelectrolyte, Sodium carbonate ('Soda Ash'), Sodium hypochlorite, Sodium hexafluorosilicate, Fluorosilicic acid	Drinking water is supplied from Pykes Creek Reservoir. When necessary, additional water can be carted to Myrniong from Bacchus Marsh (Lerderderg locality).
Romsey	Romsey WFP Greenvale WTP Rosslynne WFP	Microfiltration Chloramination Fluoridation by Melbourne Water[7] Additional chlorination by secondary chlorinators along reticulation system as required[2, 4]	Poly aluminium Chlorohydrate (as required), Sodium hypochlorite, Sodium hydroxide, Aqueous ammonia, Fluorosilicic acid	Drinking water is supplied from Kerrie Reservoir and Wright Reservoir and local groundwater. If required, Romsey's untreated water supply can be sourced from Rosslynne or Melbourne during dry periods.

Water sampling locality	Treatment plant	Treatment process	Added substance(s)	Comments
Gisborne Macedon Mount Macedon Riddells Creek	Rosslynne WFP Greenvale WTP	Oxidation Absorption Coagulation pH correction Dissolved Air Flotation Filtration Fluoridation Chlorination Additional chlorination by secondary chlorinators along reticulation system as required[2, 3]	Aluminium sulphate, Potassium permanganate (as required), Powder Activated Carbon, Polyelectrolyte, Lime, Carbon dioxide, Fluorosilicic acid, Chlorine gas, Sodium hypochlorite, Fluorosilicic acid	During 2023-24 Rosslynne treated water was supplied to Gisborne, Riddells Creek, Macedon and Mt Macedon. Sunbury, Bulla and Diggers Rest remain on Melbourne water supply
Sunbury Bulla Diggers Rest	Rosslynne WFP Greenvale WTP	Fluoridation and primary chlorination by Melbourne Water[7] or at Rosslynne WFP Secondary disinfection (chlorination) at Loemans Rd Pump Station[1] Additional chlorination by secondary chlorinators along reticulation system as required[2]	Aluminium sulphate, Potassium permanganate (as required), Powder Activated Carbon, Polyelectrolyte, Lime, Carbon dioxide, Fluorosilicic acid, Chlorine gas, Sodium hypochlorite, Fluorosilicic acid	
Woodend	Marriages WFP Res C WFP Rosslynne WFP Greenvale WTP	Coagulation pH correction Dissolved Air Flotation Filtration Chlorination Fluoridation by Rosslynne Fluoridation by Melbourne Water[7]	Powdered Activated Carbon (as required at Marriages WFP), Aluminium sulphate, Polyelectrolyte, Sodium carbonate ('Soda Ash'), Sodium hypochlorite, Fluorosilicic acid	Drinking water is supplied from two ends of the system – the Marriages Basin and Reservoir C Contact tank. Supply is fully treated at the Marriages WFP and Reservoir C WFP. If required, Woodend's water supply can be sourced from Rosslynne or Melbourne during dry periods.

1. Chemicals added by GWW for additional disinfection at entry point from Melbourne Water mains via Greenvale
2. Chemicals added by GWW throughout the distribution system to increase chlorine residual levels
3. When receiving water from the Mount Macedon system and that water has been supplemented with Melbourne Water via Greenvale or Rosslynne Reservoir
4. When receiving water from Melbourne Water Greenvale supply or Rosslynne system through transfer to Wright Reservoir
5. When receiving water from the Romsey/Lancefield pipeline and that water has been supplemented with Melbourne Water Greenvale supply or Rosslynne system water supply via Wright Reservoir
6. When receiving water from Melbourne Water through water carting from Bacchus Marsh (Merrimu system, supplied by Merrimu Treatment Plant or supplemented with Melbourne Water Greenvale supply)
7. For further details on the treatment process and chemicals added by Melbourne Water refer to the Melbourne Water's *Water Quality Annual Report 2023-24*

3.5 Operational procedures and process control

GWW has a range of operational procedures in place to manage the consistent delivery of safe drinking water across the region. Standard operating procedures and work instructions are used for maintenance tasks at our filtration plants, pumps stations, secondary chlorination sites and in the management of our drinking water tanks in the network. All procedures and work instructions are kept up to date and controlled through the business-wide document control system. Throughout the reporting period, standard operating procedures were reviewed and updated as per Risk Management Plan requirements.

3.5.1 Operational monitoring and process control

Operational monitoring is conducted across all water filtration plants. This monitoring is a combination of manual sampling and analysis and SCADA online monitoring. Online monitoring is always in place during drinking water production and monitors for parameters that are considered critical to the production of safe drinking water, such as turbidity, chlorine, pH and fluoride. Through the HACCP system, alert and critical limits are monitored and any excursions are reported and investigated. Water filtration plant operation is shut down if critical limits are breached, preventing the production of potentially unsafe drinking water. Section 6 and Appendix A detail the results of treated water quality monitoring in 2023-24.

3.6 Water distribution network

The distribution network is the final step in catchment to tap management of water quality. Consisting of extensive networks of pipes, valves, tanks and storages, it's the largest component of the water supply chain. Managing water quality in the delivery of safe drinking water is as important as managing the source water.

GWW has a dedicated team of network operators maintaining the secondary disinfection systems, inspecting the drinking water tanks and rectifying issues immediately to ensure the safety of the drinking water.

3.6.1 Storage tank cleaning and integrity inspection program

GWW's routine cleaning program for storage tanks in the distribution system uses specialised underwater cleaning equipment to remove sediment accumulated at the bottom of the tanks. All storage tanks are covered and checked regularly to minimise contamination from birds or animals as well as dirt, leaves and other matter.

3.7 Issues

During 2023-24, there were no issues from the process applied by Melbourne Water in the treatment of the bulk water supplied that required a response from GWW and no adverse issues originating from secondary water treatment of bulk water supplied within GWW's service area. GWW works closely with Melbourne Water on any issues related to the treatment of the bulk water supply. For further details about bulk water supply treatment issues during 2023-24, refer to the Melbourne Water *Water Quality Annual Report*[2]. There were no treatment application issues at the GWW-operated local treatment plants during 2023-24. Alternative sources of water supply from the Melbourne system were implemented by GWW to supply customers serviced by the Rosslynne and Merrimu systems toward the end of the reporting period to enable planned maintenance at both water filtration plants. For further information on the Southern Rural Water operated local reservoirs, refer to the Southern Rural Water annual report[3].

2. Melbourne Water's annual water quality report is on their website at https://www.melbournewater.com.au/about/strategies-and-reports/water-quality-annual-report
3. Southern Rural Water's annual report is on their website at https://www.srw.com.au/more/publications

4. Emergency, incident and event management

This section reports on emergencies, incidents and events related to drinking water quality. Water quality information is reported monthly and quarterly to the GWW Board and its sub-committees. This includes events that may have led to known or suspected contamination of the drinking water supply, including those that were reported to the Department of Health in line with s. 22 of the *Safe Drinking Water Act 2003*.

4.1 Known or suspected contamination reported under s. 22 *Safe Drinking Water Act 2003*

One report was made to the Department of Health under s. 22 for this reporting period. The report was related to unusual chlorine residuals in the Altona locality.

On 12 December 2023, as part of the routine sampling program, unusual chlorine levels were detected. Chlorine is an indicator of the disinfection levels in the treated drinking water. In response, additional field testing was undertaken on 13 December 2023, which identified higher than typical results for that area. Although a high result was observed, the level was still well within the chlorine limits in place to meet health guideline levels (max of 5mg/L). The results triggered further investigation and an incident team was stood up to manage potential risks to public health.

Immediate actions included:

- field checks for potential cross connection points between the drinking water and Class A recycled water networks, which confirmed there were none
- isolation and depressurisation of the Class A recycled water network to confirm there was no further supply into the area, while flushing the drinking water system took place.

The possibility of backflow into the drinking water network from residential properties was also investigated and was also ruled out as a cause.

Finally, the instruments in use at the time were assessed for their accuracy and the supplier assisted with those investigations. Once the flushing was completed, the chlorine residuals returned to typical levels for the area, therefore instrument error could not be fully investigated. The instrument supplier has agreed to work with GWW if a similar event recurs.

Further targeted monitoring was undertaken in the following days to ensure no recurrence of the unusual chlorine results. The area continues to be regularly monitored as part of the routine sampling program.

There was no impact to the safety of the drinking water supplied to the Altona locality during this investigation.

4.2 Other drinking water quality events

4.2.1 Rosslynne trihalomethane enhanced monitoring, 2023-24

During the reporting period, disinfection by product development in the network was monitored closely, based on the anticipated impact of organics in Rosslynne Reservoir due to the increased rainfall events of 2022-23. The Rosslynne WFP uses powder activated carbon to remove dissolved organics from the source water, which enables disinfection with chlorine without increasing the production of disinfection by-products such as trihalomethanes. There were no water quality breaches in relation to trihalomethanes in the network for this reporting period; the enhanced monitoring showed an increase in results with the increase in ambient temperatures. A plan was developed to trial granular activated

carbon in the filters at the plant and a project team was formed to work through the process upgrade. Ambient temperatures cooled and trihalomethanes results reduced. The trial of granular activated carbon is currently underway.

4.2.2 Blue green algae

During 2023-24, there were several reservoirs that triggered blue green algae reporting levels to Department of Energy, Environment and Climate Change (DEECA) that directly and indirectly impacted water treatment.

There was one notification to the Department of Health where the indirect supply from Garden Hut Reservoir affected the Lancefield Basin prior to treatment by the Lancefield WFP. The treated water quality was not impacted as the treatment process included powdered activated carbon and filtration. The source water at Romsey was affected by blooms in Kerrie and Glenfern Basin reservoirs which were notified to DEECA. Drinking water remained unaffected due to the water treatment process at Romsey. Woodend source water supply was affected by blooms in Reservoirs B and C, these were notified to DEECA. The Reservoir C WFP successfully removed the algae from the source water and drinking water for Woodend was unaffected. Other reservoirs that were reported for algae blooms included McDonalds Reservoir, Orde Hill Reservoir, Forster Reservoir and Wrights Reservoir; these were isolated from use while the blooms decreased.

Rosslynne Reservoir, Pykes Creek Reservoir and Merrimu Reservoir were impacted by very low levels of algae during the 2023-24 reporting period; however, no bloom notifications were received from Southern Rural Water.

The Melbourne supply from Greenvale Reservoir was impacted with minor levels of algae during 2023-24 reporting period, none of which required further intervention.

5. Drinking water quality monitoring

GWW implements a risk-based water quality sampling program.

A core driver of the sampling program is to ensure compliance with the Safe Drinking Water Regulations 2015 and the Australian Drinking Water Guidelines. These guidelines provide a benchmark for a large range of biological, radiological, physical and chemical parameters. Physical and chemical assessment and monitoring is based on a combination of parameters that indicate physical and aesthetic water characteristics, such as pH, colour and turbidity (water clarity), as well as the chemical quality of the water (levels of chlorine, iron, fluoride, dissolved salts, aluminium and other heavy metals). Water quality monitoring was undertaken under contract by an approved, specialised NATA accredited laboratory. Contact information for obtaining further details of all water quality testing outlined in this report is in section 14 and further monitoring program details are available in sections 6 and 7 and Appendix A.

To assess the quality of our water supplies, a daily routine monitoring program is conducted to confirm compliance with the safe drinking water legislation. Water samples are collected in each of our 34 water sampling localities, at the reservoirs, water filtration plants and various points throughout the supply system, including water storage tanks, pump stations and customer taps. Samples are scheduled to meet the GWW monitoring program and collected by an independent NATA accredited laboratory with results sent directly to GWW data systems for review, investigation, analysis of trends and reporting. If results are outside of defined limits, GWW receives notification in the first instance from the laboratory or by an automatic notification from our data system.

The contracted laboratory is required to immediately notify GWW of any health-related parameter exceedances detected in drinking water samples.

The drinking water parameter limits are based on the Safe Drinking Water Regulations 2015 and Australian Drinking Water Guidelines 2011.

Non-routine water quality testing is carried out in addition to the routine testing program to investigate water quality trends, water source variation issues, customer complaints or to explore suspected contamination issues. Non-routine testing may be done by external NATA accredited laboratories or by operational testing, depending on the nature of the issue and the water quality information required.

A source water sampling program was conducted to monitor the water quality in reservoirs, bores and basins managed by GWW. The program involved monitoring and identifying hazards that could compromise drinking water quality in a catchment to inform and review the performance and effectiveness of the controls in place and maintaining a multiple barrier approach.

In addition, Melbourne Water monitors the quality of bulk water supplies at points upstream of delivery points to GWW. The results of all these tests are reviewed as part of the Bulk Water Supply Agreement between the two water agencies and provided to GWW monthly in the Melbourne Water Customer report.

The chemicals used to treat our drinking water are delivered by approved chemical suppliers. Chemical quality is verified through the quality systems built into the chemical supply contract, which ensures the approved chemicals supplied and used in treatment process meet the required specifications.

6. Drinking water quality compliance

Since 1 July 2004, the management of drinking water in Victoria has been governed by the *Safe Drinking Water Act 2003*. Under this Act, drinking water must comply with quality standards. The Safe Drinking Water Regulations 2015 specify scheduled water quality standards for several water quality parameters.

Table 8: Water quality parameters, standards and frequency of sampling

Water quality parameter	Standard (Safe Drinking Water Regulations 2015)	Relevant sampling frequency for each locality
Escherichia coli (E. coli)	All samples of drinking water collected are found to contain no *E. coli* per 100 millilitres of drinking water, with the exception of any false positive sample	one sample per week
Total Trihalomethanes (Total THMs)	Less than or equal to 0.25 mg/L of drinking water	one sample per month
Turbidity	The 95th percentile of results for samples any 12-month period must be ≤ 5.0 nephelometric turbidity units (NTU)	one sample per week

The tables in sections 6.1 to 6.3 outline the 2023-24 compliance assessment of water quality parameters against the water quality scheduled standards specified in the Safe Drinking Water Regulations 2015.

6.1 *E. coli*

Escherichia coli (E. coli) is abundant in human and animal faeces and is tested as a specific indicator of faecal contamination in the drinking water supply. Detection of *E. coli* can indicate a failure in water treatment or chemical disinfection systems, contamination of a water storage facility or possible infiltration of the enclosed system. Treatment through disinfection removes *E. coli*. GWW applies chemical disinfection by chlorination or chloramination in all its supply systems. A level of disinfection residual is maintained within the distribution system to prevent potential regrowth of microorganisms before reaching customer taps.

E. coli performance in our drinking water has consistently complied with Safe Drinking Water Regulations 2015 in all water sampling localities.

Further details can be found in section 6.6. All other required elements of our sample program were carried out as described in the plan and at the frequency of sampling in the standard. Further water quality results for all localities are available at Appendix A.

Standard: All samples of drinking water collected are found to contain no *E. coli* per 100 millilitres of drinking water, except for any false positive sample.

Table 9: *E. coli* summary results in drinking water samples tested between 1 July 2023 and 30 June 2024

Water sampling locality	Frequency of sampling	Number of samples	Maximum detected (orgs/100mL)	Number of detections & investigations conducted (s. 22*)	Number of samples where standard was not met (s. 18**)
Altona	Weekly	416	0	0	0
Bulla	Weekly	52	0	0	0
Caroline Springs	Weekly	364	0	0	0
Darley	Weekly	364	0	0	0
Deer Park	Weekly	312	0	0	0
Diggers Rest	Weekly	156	0	0	0
East Keilor	Weekly	156	0	0	0
Eynesbury	Weekly	129	0	0	0
Gisborne	Weekly	416	0	0	0
Lancefield	Weekly	156	0	0	0
Lerderderg	Weekly	303	0	0	0
Little River	Weekly	208	0	0	0
Macedon	Weekly	156	0	0	0
Maddingley	Weekly	208	0	0	0
Maribyrnong	Weekly	364	0	0	0
Melton South	Weekly	366	0	0	0
Merrimu	Weekly	310	0	0	0
Moonee Ponds	Weekly	260	0	0	0
Mount Macedon	Weekly	208	0	0	0
Myrniong	Weekly	257	0	0	0
Parkville	Weekly	469	0	0	0
Richmond	Weekly	156	0	0	0
Riddells Creek	Weekly	156	0	0	0
Rockbank	Weekly	249	0	0	0
Romsey	Weekly	446	0	0	0
Strathmore	Weekly	104	0	0	0
Sunbury	Weekly	468	0	0	0
Taylors Lakes	Weekly	315	0	0	0
Toolern Vale	Weekly	106	0	0	0
Tullamarine	Weekly	104	0	0	0
Werribee	Weekly	520	0	0	0
Werribee South	Weekly	183	0	0	0
Williamstown	Weekly	208	0	0	0
Woodend	Weekly	265	0	0	0

* s. 22 *Safe Drinking Water Act 2003.*

** s. 18 *Safe Drinking Water Act 2003.*

6.2 Total trihalomethanes

Trihalomethanes are present in drinking water principally as a by-product of disinfection from chlorination or chloramination, where chlorine reacts with dissolved organic material.

GWW disinfects its drinking water supplies by either chlorination or chloramination. Chlorine-based disinfection by-products measured under the Safe Drinking Water Regulations 2015 include total trihalomethanes. The following section reports the results for the 2023-24 monitoring program.

Standard: Total trihalomethanes less than or equal to 0.25 milligrams per litre of drinking water.

Table 10: Total trihalomethanes summary results in drinking water samples tested between 1 July 2023 and 30 June 2024

Water sampling locality	Frequency of sampling	Number of samples	Drinking water quality standard (mg/L)	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met (s. 18*)
Altona	Monthly	13	0.25	0.05	0.04	0
Bulla	>Monthly	13	0.25	0.05	0.03	0
Caroline Springs	Monthly	13	0.25	0.04	0.03	0
Darley	>Monthly	129	0.25	0.20	0.12	0
Deer Park	Monthly	13	0.25	0.04	0.03	0
Diggers Rest	>Monthly	26	0.25	0.05	0.03	0
East Keilor	Monthly	13	0.25	0.05	0.03	0
Eynesbury	>Monthly	31	0.25	0.05	0.03	0
Gisborne	>Monthly	93	0.25	0.21	0.10	0
Lancefield	>Monthly	39	0.25	0.14	0.09	0
Lerderderg	>Monthly	62	0.25	0.21	0.12	0
Little River	>Monthly	52	0.25	0.07	0.05	0
Macedon	>Monthly	39	0.25	0.23	0.14	0
Maddingley	>Monthly	52	0.25	0.20	0.13	0
Maribyrnong	Monthly	13	0.25	0.06	0.04	0
Melton South	>Monthly	66	0.25	0.05	0.03	0
Merrimu	>Monthly	52	0.25	0.12	0.06	0
Moonee Ponds	Monthly	13	0.25	0.05	0.05	0
Mount Macedon	>Monthly	52	0.25	0.24	0.16	0
Myrniong	>Monthly	65	0.25	0.15	0.09	0
Parkville	Monthly	13	0.25	0.05	0.04	0
Richmond	Monthly	13	0.25	0.08	0.06	0
Riddells Creek	>Monthly	39	0.25	0.22	0.15	0
Rockbank	>Monthly	49	0.25	0.04	0.02	0
Romsey	>Monthly	98	0.25	0.13	0.04	0
Strathmore	Monthly	13	0.25	0.07	0.06	0
Sunbury	>Monthly	91	0.25	0.21	0.06	0
Taylors Lakes	>Monthly	26	0.25	0.09	0.04	0
Toolern Vale	>Monthly	26	0.25	0.11	0.07	0
Tullamarine	Monthly	13	0.25	0.03	0.02	0
Werribee	>Monthly	39	0.25	0.07	0.05	0
Werribee South	>Monthly	46	0.25	0.07	0.04	0
Williamstown	Monthly	13	0.25	0.05	0.04	0
Woodend	>Monthly	54	0.25	0.22	0.08	0

* s. 18 *Safe Drinking Water Act 2003*.

6.3 Turbidity

Turbidity is the measurement of water clarity and the light scattering properties of water. Turbidity is caused by the presence of fine suspended matter in the water supply. When water is clear, it has low turbidity levels.

Based on aesthetic considerations, the turbidity standard is set at five nephelometric turbidity units (NTU), which is the point where water may appear slightly discoloured in a glass.

The following table reflects the reporting period 1 July 2023 to 30 June 2024 and provides a summary of the turbidity results for sampling at customer taps. It includes the statistical measure of the 95th percentile for sampling of turbidity over a 12-month period.

Standard: The 95th percentile of results for samples in any given 12-month period must be less than or equal to 5.0 NTU.

Table 11: Turbidity summary results in drinking water samples tested between 1 July 2023 and 30 June 2024

Water sampling locality	Frequency of sampling	Number of samples	Maximum turbidity in a sample (NTU)	95th percentile of turbidity results in any 12 months (NTU)	Number of 95th percentile results in any 12 months above standard (s. 18*)
Altona	Weekly	416	8.1	0.5	0
Bulla	Weekly	52	1.7	1.4	0
Caroline Springs	Weekly	364	5.8	1.3	0
Darley	Weekly	570	15.0	0.4	0
Deer Park	Weekly	312	1.2	0.6	0
Diggers Rest	Weekly	156	1.5	1.4	0
East Keilor	Weekly	156	1.3	1.2	0
Eynesbury	Weekly	130	2.2	1.4	0
Gisborne	Weekly	416	1.6	0.4	0
Lancefield	Weekly	158	0.3	0.1	0
Lerderderg	Weekly	303	1.6	0.3	0
Little River	Weekly	214	11.0	0.7	0
Macedon	Weekly	156	1.2	0.4	0
Maddingley	Weekly	260	1.4	0.3	0
Maribyrnong	Weekly	364	1.2	0.6	0
Melton South	Weekly	364	16.0	1.4	0
Merrimu	Weekly	310	1.5	1.2	0
Moonee Ponds	Weekly	260	0.9	0.7	0
Mount Macedon	Weekly	208	1.5	0.4	0
Myrniong	Weekly	261	6.2	0.7	0
Parkville	Weekly	469	2.2	0.5	0
Richmond	Weekly	156	0.9	0.8	0
Riddells Creek	Weekly	157	2.9	0.9	0
Rockbank	Weekly	245	7.4	1.6	0
Romsey	Weekly	445	1.0	0.1	0
Strathmore	Weekly	104	0.8	0.7	0
Sunbury	Weekly	468	2.3	1.4	0
Taylors Lakes	Weekly	316	2.7	1.6	0
Toolern Vale	Weekly	104	1.5	1.2	0
Tullamarine	Weekly	104	1.5	1.3	0
Werribee	Weekly	520	1.1	0.4	0
Werribee South	Weekly	183	7.2	0.8	0
Williamstown	Weekly	208	1.8	0.4	0
Woodend	Weekly	260	0.5	0.2	0

* s. 18 *Safe Drinking Water Act 2003.*

6.4 Other water quality standards (algal toxin, pathogen, chemical or substance that may pose a risk to human health)

GWW monitors parameters in the drinking water supply that may affect appearance or taste and odour, as well as those that may interact with pipes and fittings within the distribution system and within hot water services. These results are measured in accordance with the aesthetic measures in the Australian Drinking Water Guidelines or other cited guidelines. Compliance calculations hereafter are based on mean results for samples taken throughout the year, as outlined in Australian Drinking Water Guidelines or other cited guidelines. The following tables reflect the reporting period 1 July 2023 to 30 June 2024 under the Safe Drinking Water Regulations 2015.

In addition to the water quality parameters designated as standards by Safe Drinking Water Regulations 2015, GWW monitored a range of other chemical parameters that provide further information on the overall quality of our drinking water supply. Among such other parameters that were monitored in 2023-24, those for which there is a health-related Australian Drinking Water Guidelines 2011 value are considered as 'other drinking water quality standards' under regulation 12(b) of Safe Drinking Water Regulations 2015. These parameters are listed in Table 14. Furthermore, data on aesthetic and other parameters that provide an additional comprehensive characterisation of the water, as well as assisting the needs of customers, are reported in section 7.3 Appendix A.

Any monitoring for organic chemicals (including pesticides and PFAS) and radioactive substances is undertaken at locations as part of the bulk water supply and local supply sources managed by GWW. Melbourne Water, as our major bulk water supplier, tests for these substances with respect to its major storage reservoirs, such as Silvan and Sugarloaf, where the potential for contamination is greater. Results of this monitoring are provided to GWW by the external laboratory. No significant detections (with respect to Australian Drinking Water Guidelines 2011) in the bulk water supply were reported during 2023-24.

6.5 Fluoride

Fluoride is added to drinking water to improve dental health. In supplies where fluoride is not added, naturally occurring sources, such as soils and rock, may impart fluoride to the water. For further information on water fluoridation, please visit the Victorian Department of Health website.

Both the *Health (Fluoridation) Act 1973* and the Department of Health require that the optimal range of fluoride in drinking water supplied by GWW must be between 0.8 mg/L and 1.0 mg/L. Fluoride levels in any individual sample from drinking water supplied must also not exceed 1.5 mg/L, according to the Australian Drinking Water Guidelines. The following table reflects the reporting period 1 July 2023 to 30 June 2024 under the Safe Drinking Water Regulations 2015.

Table 12: Fluoride summary results in drinking water samples tested between 1 July 2023 and 30 June 2024

Water sampling locality	Frequency of sampling	Number of samples	Drinking water quality standard (mg/L)	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met (s. 18*)
Altona	Monthly	13	1.5	0.94	0.84	0
Bulla	Monthly	13	1.5	0.84	0.79	0
Caroline Springs	Monthly	13	1.5	0.91	0.80	0
Darley	Monthly	141	1.5	0.97	0.57	0
Deer Park	Monthly	13	1.5	0.95	0.85	0
Diggers Rest	Monthly	26	1.5	0.86	0.79	0
East Keilor	Monthly	13	1.5	0.94	0.85	0
Eynesbury	Monthly	32	1.5	0.83	0.79	0
Gisborne	Monthly	91	1.5	0.87	0.76	0
Lancefield	Monthly	39	1.5	0.10	0.07	0

Water sampling locality	Frequency of sampling	Number of samples	Drinking water quality standard (mg/L)	Maximum (mg/L)	Average (mg/L)	Number of samples where standard was not met (s. 18*)
Lerderderg	Monthly	74	1.5	0.92	0.59	0
Little River	Monthly	55	1.5	0.99	0.84	0
Macedon	Monthly	39	1.5	0.87	0.77	0
Maddingley	Monthly	64	1.5	0.88	0.62	0
Maribyrnong	Monthly	13	1.5	0.89	0.82	0
Melton South	Monthly	65	1.5	0.85	0.78	0
Merrimu	Monthly	64	1.5	0.99	0.56	0
Moonee Ponds	Monthly	13	1.5	0.90	0.79	0
Mount Macedon	Monthly	52	1.5	0.90	0.78	0
Myrniong	Monthly	65	1.5	<0.05	<0.05	0
Parkville	Monthly	13	1.5	0.91	0.83	0
Richmond	Monthly	13	1.5	0.85	0.79	0
Riddells Creek	Monthly	39	1.5	0.88	0.78	0
Rockbank	Monthly	49	1.5	0.84	0.78	0
Romsey	Monthly	98	1.5	0.09	0.06	0
Strathmore	Monthly	13	1.5	0.89	0.79	0
Sunbury	Monthly	91	1.5	0.92	0.78	0
Taylors Lakes	Monthly	26	1.5	0.83	0.79	0
Toolern Vale	Monthly	26	1.5	0.86	0.57	0
Tullamarine	Monthly	13	1.5	0.88	0.79	0
Werribee	Monthly	40	1.5	0.93	0.84	0
Werribee South	Monthly	48	1.5	0.93	0.82	0
Williamstown	Monthly	13	1.5	0.98	0.85	0
Woodend	Monthly	53	1.5	0.76	0.09	0

* s. 18 *Safe Drinking Water Act 2003.*

6.6 Drinking water quality compliance

For 2023-24, GWW fully complied with the water quality requirements of the *Safe Drinking Water Act 2003* and the Safe Drinking Water Regulations 2015.

7. Analysis of results and trends

This section examines:

- trends over time (three years) of water quality parameters tested that are designated as standards in the Safe Drinking Water Regulations 2015 (section 7.1)
- trends over time (five years) and between localities of parameters listed in Appendix A tables that are drinking water quality standards under regulation 12 or Australian Drinking Water Guidelines 2011 aesthetic guideline value described further in section 7.2.

Data analysed in this section are based on drinking water samples obtained from reticulation system sampling sites.

7.1 Historical compliance of standard parameters

Trends for the previous two financial years and the current reporting period (and extent of compliance) of water quality parameters that are scheduled standards in the Safe Drinking Water Regulations 2015 are summarised in Table 13. The trend shows consistent 100% compliance with the standards.

Table 13: Schedule 2 Compliance trends over time of the standard parameters from our water sampling localities

Parameter	Safe Drinking Water Regulations (2015)	Localities compliant (customer sample taps) (% of customers supplied with compliant water) 2023-24	2022-23	2021-22
E. coli	All samples of drinking water collected are found to contain no *E. coli* per 100 millilitres of drinking water, with the exception of any false positive sample	34/34 (100%)	34/34 (100%)	34/34 (100%)
Trihalomethanes	≤0.25 mg/L	34/34 (100%)	34/34 (100%)	34/34 (100%)
Turbidity	95th percentile ≤5 NTU	34/34 (100%)	34/34 (100%)	34/34 (100%)

Details of our monitoring data for individual localities, together with monitoring frequencies, Safe Drinking Water Regulations 2015 and Australian Drinking Water Guidelines 2011 for both health-related and aesthetic water quality data, are provided as tables in Appendix A. Contact information for further details of all water quality testing outlined in this report is in section 14.

7.2 Parameter trends over time and between localities

Analysis of parameter trends over five years and between localities is used to better understand and highlight water quality issues that may occur throughout our service area. This section of the report looks at these trends over the past five years with the key parameters listed in Appendix A tables.

Table 14 shows parameters that have changed over the five-year period. Note this table has been updated to reflect the updates to the frequency of sampling program. Notable trends of other parameters that have been monitored during 2023-24 are discussed in section 7.3. Results for all reported parameters are provided in Appendix A.

Table 14: Data trend comparison over five years, by parameter and by sampling locality

Parameter	Total chlorine (mg/L) average	Total THMs (mg/L) average	Turbidity (NTU) 95th percentile	Apparent colour (Pt/Co) average	True colour (Pt/Co) average	Manganese (mg/L) average	Iron (mg/L) average	Copper (mg/L) average	Lead (mg/L) average	Fluoride (mg/L) average	Hardness (mg/L) average
Health guidelines value	5	0.25	NA	NA	NA	0.5	NA	2	0.01	1.5	NA
Aesthetic guideline value	0.6	NA	5	NA	15 HU	0.1	0.3	1	NA	NA	200
Locality											
Altona											
23/24	0.58	0.03	0.5	N/A	<2	0.002	0.02	N/A	N/A	0.84	22
22/23	0.44	0.04	0.5	2	<2	0.003	0.04	N/A[5]	N/A	0.82	22
21/22	0.31	0.05	0.4	<2	N/A	0.001	0.02	0.004	<0.001	0.8	20
20/21	0.26	0.04	0.5	2	N/A	0.002	0.03	0.011	<0.001	0.8	22
19/20	0.24	0.05	0.3	3	N/A	0.001	0.03	0.003	<0.001	0.8	25
Bulla											
23/24	0.95	0.04	1.5	N/A	<2	0.003	0.09	N/A	N/A	0.79	18
22/23	0.71	0.03	0.7	N/A	<2	0.003	0.07	0.044	<0.001	0.72	19
21/22	0.57	0.04	1.1	N/A	2	0.002	0.08	0.012	<0.001	0.8	14
20/21	0.38	0.04	0.8	N/A	3	0.002	0.08	0.001	<0.001	0.8	19
19/20	0.75	0.03	0.7	N/A	3	0.002	0.08	0.001	<0.001	0.7	17
Caroline Springs											
23/24	0.53	0.03	1.3	N/A	<2	0.002	0.06	N/A	N/A	0.8	19
22/23	0.53	0.03	0.7	2	<2	0.002	0.05	N/A	N/A	0.79	20
21/22	0.42	0.03	1.0	3	N/A	0.002	0.06	0.003	<0.001	0.8	16

5. N/A indicates the test is no longer required to be part of the sampling program for this locality

Parameter	Total chlorine (mg/L) average	Total THMs (mg/L) average	Turbidity (NTU) 95th percentile	Apparent colour (Pt/Co) average	True colour (Pt/Co) average	Manganese (mg/L) average	Iron (mg/L) average	Copper (mg/L) average	Lead (mg/L) average	Fluoride (mg/L) average	Hardness (mg/L) average
20/21	0.36	0.03	0.7	3	N/A	0.002	0.05	0.005	<0.001	0.8	15
19/20	0.34	0.03	1.0	4	N/A	0.003	0.05	<0.001	<0.001	0.8	29
Darley											
23/24	1.09	0.12	0.4	N/A	<2	0.001	0.02	N/A	N/A	0.57	95
22/23	1.02	0.10	0.7	N/A	<2	0.002	0.04	0.007	<0.001	0.77	75
21/22	1.02	0.09	0.9	N/A	2	0.002	0.04	0.004	<0.001	0.7	70
20/21	0.96	0.12	0.2	N/A	2	0.001	0.02	0.006	<0.001	0.8	110
19/20	1.03	0.12	0.1	N/A	2	0.001	0.01	0.006	<0.001	0.8	83
Deer Park											
23/24	0.57	0.03	0.6	N/A	<2	0.001	0.03	N/A	N/A	0.85	23
22/23	0.56	0.03	0.5	<2	<2	0.003	0.03	N/A	N/A	0.82	22
21/22	0.48	0.04	0.7	<2	N/A	0.001	0.02	0.010	<0.001	0.8	18
20/21	0.44	0.03	0.5	2	N/A	<0.001	0.02	0.005	<0.001	0.8	20
19/20	0.38	0.04	0.4	2	N/A	<0.001	0.02	<0.001	<0.001	0.8	26
Diggers Rest											
23/24	0.78	0.03	1.4	N/A	<2	0.002	0.09	N/A	N/A	0.79	17
22/23	0.53	0.03	0.8	N/A	<2	0.003	0.06	N/A	N/A	0.74	17
21/22	0.59	0.02	1.1	N/A	2	0.002	0.07	0.020	<0.001	0.8	12
20/21	0.46	0.03	1.2	N/A	3	0.002	0.07	0.004	<0.001	0.8	16
19/20	0.53	0.03	0.7	N/A	3	0.003	0.08	0.003	<0.001	0.7	15
East Keilor											
23/24	1.01	0.03	1.2	N/A	<2	0.001	0.03	N/A	N/A	0.85	24
22/23	0.86	0.03	0.5	<2	<2	0.001	0.03	N/A	N/A	0.8	24
21/22	0.53	0.03	0.6	<2	N/A	0.001	0.02	0.005	<0.001	0.8	18
20/21	0.46	0.03	0.5	2	N/A	<0.001	0.02	0.004	<0.001	0.8	15
19/20	0.43	0.03	0.7	2	N/A	0.001	0.01	0.002	<0.001	0.8	27
Eynesbury											
23/24	1.07	0.03	1.4	N/A	<2	0.003	0.12	N/A	N/A	0.79	17
22/23	0.93	0.04	1.0	N/A	3	0.003	0.07	0.004	<0.001	0.77	17
21/22	0.95	0.04	1.3	N/A	3	0.002	0.10	0.006	<0.001	0.8	13
20/21	0.87	0.04	1.1	N/A	3	0.002	0.09	0.004	<0.001	0.7	14
19/20	0.72	0.04	0.8	N/A	3	0.004	0.14	0.004	<0.001	0.8	13
Gisborne											
23/24	1.27	0.10	0.4	N/A	<2	0.007	0.03	N/A	N/A	0.76	108
22/23	1.14	0.04	0.7	N/A	<2	0.004	0.05	0.001	<0.001	0.78	29
21/22	0.98	0.04	1.1	N/A	2	0.004	0.07	0.002	<0.001	0.8	29

Parameter	Total chlorine (mg/L) average	Total THMs (mg/L) average	Turbidity (NTU) 95th percentile	Apparent colour (Pt/Co) average	True colour (Pt/Co) average	Manganese (mg/L) average	Iron (mg/L) average	Copper (mg/L) average	Lead (mg/L) average	Fluoride (mg/L) average	Hardness (mg/L) average
20/21	1.04	0.05	0.9	N/A	2	0.003	0.04	0.002	<0.001	0.8	63
19/20	1.24	0.04	0.6	N/A	3	0.004	0.05	0.002	<0.001	0.8	54
Lancefield											
23/24	1.15	0.09	0.1	N/A	<2	0.001	0.01	N/A	N/A	0.07	51
22/23	1.29	0.11	0.1	N/A	<2	0.001	0.01	0.009	<0.001	0.09	78
21/22	1.19	0.13	0.1	N/A	2	0.001	0.01	0.003	<0.001	0.1	49
20/21	1.10	0.15	0.1	N/A	3	0.001	0.01	0.003	<0.001	0.1	71
19/20	1.10	0.09	0.1	N/A	2	0.001	0.01	0.004	<0.001	0.1	59
Lerderderg											
23/24	1.12	0.12	0.3	N/A	<2	0.001	0.02	N/A	N/A	0.58	93
212/23	1.11	0.10	0.6	N/A	<2	0.003	0.04	0.066	<0.001	0.76	73
21/22	1.13	0.10	0.9	N/A	2	0.002	0.04	0.005	<0.001	0.8	65
20/21	1.00	0.12	0.3	N/A	2	0.001	0.01	0.005	<0.001	0.8	107
19/20	0.87	0.12	0.1	N/A	2	0.001	0.01	0.007	<0.001	0.7	80
Little River											
23/24	0.75	0.05	0.6	N/A	<2	0.002	0.03	N/A	N/A	0.84	25
22/23	0.82	0.05	0.05	<2	<2	0.002	0.04	N/A	N/A	0.8	25
21/22	0.49	0.05	0.5	<2	N/A	0.002	0.04	0.019	<0.001	0.8	28
20/21	0.37	0.05	0.4	2	N/A	0.001	0.03	0.024	<0.001	0.8	63
19/20	0.37	0.05	0.4	2	N/A	0.001	0.03	0.033	<0.001	0.8	27
Macedon											
23/24	1.20	0.14	0.3	N/A	<2	0.007	0.03	N/A	N/A	0.77	107
22/23	1.1	0.06	0.7	N/A	<2	0.004	0.06	<0.001	<0.001	0.78	22
21/22	1.02	0.05	1.1	N/A	2	0.002	0.09	0.002	<0.001	0.8	17
20/21	0.87	0.07	0.8	N/A	2	0.002	0.06	0.002	<0.001	0.8	86
19/20	0.98	0.07	0.6	N/A	3	0.003	0.07	0.006	<0.001	0.8	40
Maddingley											
23/24	1.20	0.13	0.3	N/A	<2	0.001	0.02	N/A	N/A	0.61	91
22/23	1.16	0.12	0.7	N/A	<2	0.004	0.05	0.007	<0.001	0.77	79
21/22	1.16	0.11	0.8	N/A	2	0.002	0,04	0.012	<0.001	0.8	64
20/21	1.04	0.14	0.3	N/A	2	0.001	0.02	0.011	<0.001	0.8	108
19/20	0.75	0.12	0.1	N/A	2	0.001	0.01	0.010	<0.001	0.7	81
Maribyrnong											
23/24	0.66	0.04	0.6	N/A	<2	0.005	0.04	N/A	N/A	0.82	20
22/23	0.53	0.04	0.7	2	<2	0.003	0.04	N/A	N/A	0.79	22
21/22	0.38	0.04	0.7	2	N/A	0.002	0.03	0.022	<0.001	0.8	19

Parameter	Total chlorine (mg/L) average	Total THMs (mg/L) average	Turbidity (NTU) 95th percentile	Apparent colour (Pt/Co) average	True colour (Pt/Co) average	Manganese (mg/L) average	Iron (mg/L) average	Copper (mg/L) average	Lead (mg/L) average	Fluoride (mg/L) average	Hardness (mg/L) average
20/21	0.31	0.04	0.6	4	N/A	0.002	0.04	0.018	<0.001	0.8	18
19/20	0.33	0.04	0.5	3	N/A	0.002	0.03	0.004	<0.001	0.8	23
Melton South											
23/24	1.17	0.03	1.4	N/A	<2	0.003	0.09	N/A	N/A	0.78	16
22/23	1.11	0.03	0.7	N/A	<2	0.002	0.06	<0.001	<0.001	0.79	17
21/22	0.96	0.03	1.1	N/A	2	0.002	0.07	0.004	0.001	0.8	14
20/21	0.65	0.03	0.7	N/A	3	0.002	0.06	0.002	<0.001	0.7	16
19/20	0.65	0.03	0.7	N/A	3	0.002	0.07	0.004	<0.001	0.7	12
Merrimu											
23/24	1.17	0.06	1.2	N/A	<2	0.003	0.04	N/A	N/A	0.55	62
22/23	1.04	0.07	0.6	N/A	<2	0.003	0.04	<0.001	<0.001	0.72	76
21/22	1.04	0.06	1.0	N/A	2	0.003	0.04	0.003	<0.001	0.7	55
20/21	0.82	0.06	0.6	N/A	2	0.002	0.03	0.002	<0.001	0.7	71
19/20	0.82	0.08	0.2	N/A	3	0.001	0.02	0.005	<0.001	0.8	87
Moonee Ponds											
23/24	0.73	0.05	0.7	N/A	<2	0.005	0.05	N/A	N/A	0.79	19
22/23	0.53	0.04	0.09	4	<2	0.005	0.06	N/A	N/A	0.78	20
21/22	0.34	0.05	0.9	4	3	0.003	0.05	0.007	<0.001	0.8	17
20/21	0.25	0.05	0.8	6	N/A	0.004	0.07	0.012	<0.001	0.8	19
19/20	0.30	0.04	0.6	4	N/A	0.003	0.05	0.010	<0.001	0.8	18
Mount Macedon											
23/24	1.08	0.16	0.4	N/A	<2	0.006	0.03	N/A	N/A	0.78	107
22/23	1.1	0.07	0.7	N/A	<2	0.004	0.07	<0.001	<0.001	0.78	24
21/22	1.00	0.06	1.1	N/A	2	0.003	0.09	0.014	<0.001	0.8	17
20/21	0.89	0.09	0.8	N/A	2	0.003	0.07	0.002	<0.001	0.8	86
19/20	0.91	0.08	0.6	N/A	3	0.005	0.08	0.002	<0.001	0.8	41
Myrniong											
23/24	1.20	0.09	0.7	N/A	<2	0.001	0.04	N/A	N/A	0.03	104
22/23	0.86	0.10	0.3	N/A	<2	0.002	0.03	0.008	<0.001	<0.05	100
21/22	0.86	0.07	0.3	N/A	2	0.001	0.03	0.011	<0.001	0.1	112
20/21	1.03	0.08	0.3	N/A	2	0.001	0.03	0.018	<0.001	0.1	123
19/20	0.72	0.07	0.1	N/A	3	0.002	0.02	0.023	<0.001	0.1	115
Parkville											
23/24	0.73	0.04	0.5	N/A	<2	0.003	0.03	N/A	N/A	0.83	22
22/23	0.58	0.04	0.6	2	<2	0.003	0.04	N/A	N/A	0.80	23
21/22	0.47	0.04	0.6	<2	N/A	0.003	0.02	0.015	<0.001	0.9	19

Parameter	Total chlorine (mg/L) average	Total THMs (mg/L) average	Turbidity (NTU) 95th percentile	Apparent colour (Pt/Co) average	True colour (Pt/Co) average	Manganese (mg/L) average	Iron (mg/L) average	Copper (mg/L) average	Lead (mg/L) average	Fluoride (mg/L) average	Hardness (mg/L) average
20/21	0.38	0.04	0.6	4	N/A	0.002	0.04	0.004	<0.001	0.8	22
19/20	0.34	0.04	0.4	3	N/A	0.002	0.02	0.013	<0.001	0.8	21
Richmond											
23/24	0.80	0.06	0.8	N/A	2	0.004	0.06	N/A	N/A	0.79	16
22/23	0.59	0.06	1.1	4	2	0.004	0.07	N/A	N/A	0.75	17
21/22	0.50	0.06	1.2	6	N/A	0.005	0.10	0.009	<0.001	0.8	17
20/21	0.40	0.07	1.0	7	N/A	0.006	0.09	0.009	<0.001	0.8	13
19/20	0.42	0.06	0.9	6	N/A	0.005	0.07	0.009	<0.001	0.7	16
Riddells Creek											
23/24	0.95	0.15	0.8	N/A	<2	0.005	0.03	N/A	N/A	0.78	108
22/23	1.04	0.05	0.7	N/A	<2	<0	0.06	0.002	<0.001	0.79	
21/22	0.93	0.04	1.1	N/A	2	0.003	0.08	0.003	<0.001	0.8	14
20/21	0.97	0.07	1.0	N/A	2	0.002	0.07	0.001	<0.001	0.8	57
19/20	0.94	0.06	0.6	N/A	3	0.003	0.08	0.001	<0.001	0.8	37
Rockbank											
23/24	1.15	0.02	1.5	N/A	<2	0.004	0.08	N/A	N/A	0.78	15
22/23	1.2	0.02	0.7	N/A	<2	0.002	0.05	0.007	<0.001	0.78	17
21/22	1.08	0.02	1.2	N/A	2	0.002	0.07	0.008	<0.001	0.8	13
20/21	1.00	0.02	0.9	N/A	3	0.002	0.07	0.003	<0.001	0.7	15
19/20	0.99	0.02	0.8	N/A	3	0.002	0.08	0.002	<0.001	0.7	11
Romsey											
23/24	1.00	0.04	0.1	N/A	3	0.003	<0.01	N/A	N/A	0.06	52
22/23	1.01	0.03	0.1	N/A	4	0.003	0.01	<0.001	<0.001	0.07	50
21/22	0.85	0.02	0.1	N/A	4	0.002	0.01	0.004	<0.001	0.1	42
20/21	0.84	0.02	0.1	N/A	4	0.005	0.01	0.005	<0.001	0.2	54
19/20	0.76	0.02	0.1	N/A	3	0.006	0.01	0.008	<0.001	0.2	61
Strathmore											
23/24	0.53	0.06	0.7	N/A	<2	0.004	0.06	N/A	N/A	0.79	18
22/23	0.36	0.06	1.0	4	3	0.004	0.07	N/A	N/A	0.75	17
21/22	0.23	0.06	0.9	4	N/A	0.004	0.06	0.02	<0.001	0.8	19
20/21	0.15	0.06	0.8	7	N/A	0.005	0.07	0.005	<0.001	0.8	16
19/20	0.18	0.05	0.8	4	N/A	0.003	0.05	0.008	<0.001	0.8	17
Sunbury											
23/24	1.02	0.06	1.4	N/A	<2	0.003	0.07	N/A	N/A	0.78	42
22/23	1.04	0.03	0.70	N/A	<2	0.003	0.05	<0.001	<0.001	0.77	18
21/22	0.91	0.03	1.1	N/A	2	0.002	0.07	0.002	<0.001	0.8	14

Parameter	Total chlorine (mg/L) average	Total THMs (mg/L) average	Turbidity (NTU) 95th percentile	Apparent colour (Pt/Co) average	True colour (Pt/Co) average	Manganese (mg/L) average	Iron (mg/L) average	Copper (mg/L) average	Lead (mg/L) average	Fluoride (mg/L) average	Hardness (mg/L) average
20/21	0.84	0.04	1.3	N/A	3	0.002	0.07	0.002	<0.001	0.7	19
19/20	0.86	0.03	0.7	N/A	3	0.002	0.08	0.003	<0.001	0.7	14
Taylors Lakes											
23/24	0.85	0.04	1.6	N/A	3	0.011	0.15	N/A	N/A	0.79	18
22/23	0.77	0.04	1.3	6	3	0.009	0.12	N/A	N/A	0.77	18
21/22	0.69	0.04	1.3	5	N/A	0.008	0.11	0.005	<0.001	0.8	15
20/21	0.53	0.03	0.9	5	N/A	0.004	0.08	0.006	<0.001	0.8	16
19/20	0.50	0.02	1.2	5	N/A	0.005	0.08	0.002	<0.001	0.8	16
Toolern Vale											
23/24	1.10	0.07	1.2	N/A	<2	0.002	0.05	N/A	N/A	0.57	45
22/23	0.98	0.08	0.8	N/A	<2	0.002	0.05	0.005	<0.001	0.75	76
21/22	0.70	0.08	0.9	N/A	2	0.002	0.03	0.005	<0.001	0.7	66
20/21	0.79	0.10	0.2	N/A	2	0.001	0.01	0.003	<0.001	0.8	112
19/20	0.95	0.10	0.1	N/A	2	0.001	0.01	0.005	<0.001	0.7	88
Tullamarine											
23/24	0.77	0.02	1.3	N/A	<2	0.004	0.08	N/A	N/A	0.79	18
22/23	0.76	0.02	1.0	3	N/A	0.003	0.07	N/A	N/A	0.78	20
21/22	0.57	0.03	1.0	2	N/A	0.002	0.05	0.004	<0.001	0.8	16
20/21	0.52	0.03	0.7	3	N/A	0.002	0.04	0.004	<0.001	0.8	18
19/20	0.51	0.03	1.1	4	N/A	0.003	0.06	0.007	<0.001	0.8	26
Werribee											
23/24	0.71	0.05	0.4	N/A	<2	0.002	0.02	N/A	N/A	0.84	23
22/23	0.64	0.05	0.5	<2	<2	0.003	0.03	N/A	N/A	0.81	22
21/22	0.48	0.05	0.6	<2	<2	0.003	0.03	0.001	<0.001	0.8	22
20/21	0.42	0.05	0.3	2	N/A	0.001	0.02	0.009	<0.001	0.8	24
19/20	0.41	0.05	0.5	2	N/A	0.002	0.02	0.001	<0.001	0.8	21
Werribee South											
23.24	0.76	0.04	0.6	N/A	<2	0.002	0.06	N/A	N/A	0.82	26
22/23	0.66	0.05	0.5	<2	<2	0.002	0.03	N/A	N/A	0.81	25
21/22	0.53	0.05	0.6	<2	<2	0.001	0.02	0.002	<0.001	0.8	22
20/21	0.43	0.04	0.4	2	N/A	0.002	0.04	0.011	<0.001	0.8	19
19/20	0.46	0.03	0.5	4	N/A	0.002	0.08	0.001	<0.001	0.8	22
Williamstown											
23/24	0.68	0.04	0.4	N/A	<2	0.003	0.02	N/A	N/A	0.85	22
22/23	0.51	0.044	0.5	2	<2	0.002	0.04	N/A	N/A	0.81	21
21/22	0.35	0.04	0.4	<2	N/A	0.002	0.03	0.004	<0.001	0.9	19

Parameter	Total chlorine (mg/L) average	Total THMs (mg/L) average	Turbidity (NTU) 95th percentile	Apparent colour (Pt/Co) average	True colour (Pt/Co) average	Manganese (mg/L) average	Iron (mg/L) average	Copper (mg/L) average	Lead (mg/L) average	Fluoride (mg/L) average	Hardness (mg/L) average
20/21	0.29	0.04	0.5	3	N/A	0.002	0.03	0.005	<0.001	0.8	19
19/20	0.31	0.04	0.3	3	N/A	0.002	0.02	0.007	<0.001	0.8	23
Woodend											
23/24	1.21	0.07	0.2	N/A	<2	0.002	<0.01	N/A	N/A	0.07	33
22/23	1.09	0.06	0.10	N/A	<2	0.003	0.01	0.004	<0.001	0.04	28
21/22	1.08	0.06	0.5	N/A	2	0.001	0.01	0.003	<0.001	0.1	16
20/21	0.94	0.06	0.1	N/A	2	0.002	0.01	0.002	<0.001	0.1	30
19/20	0.87	0.05	0.1	N/A	2	0.003	0.02	0.002	0.001	0.2	29

N/A Not applicable, parameter not part of the sampling program for this locality

7.3 Parameter trends 2023-24

7.3.1 Aluminium

Aluminium levels in the water supply are low and within the Australian Drinking Water Guidelines value of 0.2 mg/L.

There were no maximum results reported in Appendix A that exceeded the Australian Drinking Water Guideline values.

7.3.2 Chlorine, total

All of our drinking water supply is disinfected with chlorine. A chlorine residual after disinfection is measured to monitor the levels present that mitigate recontamination of the drinking water supply in the network. The secondary chlorinators maintain a chlorine residual throughout much of the network, acting as an additional barrier of protection from microbial risk. Seasonal variation in source water quality, along with demand in the network, can cause the chlorine residual to fluctuate. The average levels amongst individual localities can be markedly different; this is largely due to relative proximity to chlorine dosing points. Year-to-year variations within water sampling localities reflect changes to chlorine dosing rates and bulk water sources. The more active form, free chlorine, is present in all water sampling localities, with levels well within the maximum Australian Drinking Water Guidelines 2011 health guideline of 5 mg/L.

There were no maximum results reported in Appendix A that exceeded the Australian Drinking Water Guideline values.

7.3.3 Monochloramine

Sampling for monochloramine was conducted at Romsey as it is the only locality receiving water supply disinfected by chloramination by GWW. Compliance as measured against the health-related guideline value set out in Australian Drinking Water Guidelines for monochloramine in drinking water should not exceed 3 mg/L.

There were no maximum results reported in Appendix A that exceeded the Australian Drinking Water Guideline values.

7.3.4 Colour, apparent

Apparent colour is colour that is observed in a sample and can be a mixture of water colour and debris in the sample. Compliance is measured against a benchmark guideline of 25 Pt/Co units. Average colour levels are generally consistent within individual sampling localities.

There were no maximum results reported in Appendix A that exceeded the Australian Drinking Water Guideline values.

7.3.5 Colour, true

True colour is the colour of the water when a sample has been filtered and debris has been removed. Compliance as measured against the aesthetic guideline value set out in Australian Drinking Water Guidelines for drinking water and should not exceed 15 Pt/Co.

There were no maximum results reported in Appendix A that exceeded the Australian Drinking Water Guideline values.

7.3.6 Iron

There were single samples that exceeded the aesthetic guideline value of 0.3 mg/L total iron in Eynesbury and Myrniong localities. The Eynesbury exceedance was due to the type of the sample tap installed, which was replaced early in the reporting period.

The Myrniong exceedance was due to sediment stirring up in the main and was resolved by flushing of the network.

7.3.7 pH

Localities that reported above the pH 8.5 aesthetic value included Altona, Bulla, Caroline Springs, Darley, Deer Park, East Keilor, Gisborne, Lancefield, Little River, Macedon, Maribyrnong, Melton South, Merrimu, Mount Macedon, Myrniong, Parkville, Richmond, Riddells Creek, Rockbank, Strathmore, Sunbury, Toolern Vale, Tullamarine, Werribee, Werribee South and Williamstown.

The elevated pH in Sunbury, Riddells Creek, Mount Macedon and Macedon can be attributed to the presence of cement-lined mains and concrete storage tanks.

Another cause for elevated pH is some sampled locations experiencing low demand in the network at times. The reduced turnover can cause the water pH to slightly elevate until the flow increases.

Changes to the sampling program included switching to field-based pH measurement which is then verified by laboratory-based measurement when the pH readings are above 8.5. This has improved the accuracy of pH monitoring across the network.

8. Drinking water aesthetics

In addition to defining health-related guideline values, aesthetic water quality values are also outlined in the Australian Drinking Water Guidelines 2011. These are associated with customers' acceptability of drinking water in terms of appearance, taste and odour.

8.1 Water quality customer complaints

During 2023-24, GWW received a total of 1,786 complaints related to drinking water quality. A range of actions are undertaken for water quality related complaints, including verbal advice, further investigation, on-site inspection, testing and works to improve water supply. If customers are experiencing water quality concerns, they can contact GWW on 134 499 for advice.

Table 15: Water quality related customer complaints received over the last three years

	Number of complaints			Comparison with previous reporting periods	Comments
Type of complaints	2023-24 GWW	2022-23 GWW	2021-22 GWW		
Discoloured water	1,532	1,004	920	Overall increase in trend from previous reporting period.	Responsive water mains flushing of impacted water sampling localities with an increasing trend of discoloured water customer complaints continued throughout the reporting year.
Taste/odour (Chlorine taste/odour)	190	183	187	Slight increase from previous reporting period.	Numbers stayed constant as previous reporting period with slight increase in complaints from Werribee.
Other (alleged illness)	64	55	63	Increase from previous reporting period. Alleged illness cases increased from previous reporting period, but all were linked to internal issue. Total of 19 alleged illness cases were recorded this year.	The alleged illness cases were analysed and investigated. None of the complaints took place on the same day or were in the same suburb.
Total	**1,786**	**1,242**	**1,170**	**Increase of 544 from previous reporting period.**	
No. of properties	631,537	615,619	597,551		
Complaints per 100 properties	0.283	0.201	0.196		

The three localities that had the highest number of discoloured water complaints for the year were Caroline Springs (256), Taylors Lakes (240) and Altona (198).

Table 16: Water quality related complaints received during 2023-24 by water sampling locality

	Number of complaints				
Water sampling locality	**Discoloured water**	**Taste/odour**	**Air in water**	**Other (alleged illness, blocked filter, blue-green water, staining, cloudy water)**	**Total complaints by locality**
Altona	198	15	7	4	224
Bulla	1	0	0	0	1
Caroline Springs	256	9	9	6	280
Deer Park	65	18	4	5	92
Darley	6	1	0	0	7
Diggers Rest	2	5	0	0	7
East Keilor	36	15	9	6	66
Eynesbury	0	0	0	0	0
Gisborne	7	2	1	2	12
Lancefield	0	0	0	0	0
Lerderderg	0	0	0	0	0
Little River	0	0	0	0	0
Macedon	1	1	0	0	2
Maddingley	1	0	0	0	1
Maribyrnong	115	24	6	8	153
Melton South	58	7	1	2	68
Merrimu	49	2	1	2	54
Mount Macedon	3	0	0	0	3
Myrniong	1	0	0	0	1
Moonee Ponds	55	7	5	4	71
Parkville	108	16	3	12	139
Richmond	12	4	2	2	20
Riddells Creek	9	0	0	0	9
Rockbank	37	8	7	0	52
Romsey	2	3	0	0	5
Strathmore	11	1	0	3	15
Sunbury	29	1	0	0	30
Taylors Lakes	240	18	8	3	269
Toolern Vale	0	0	0	0	0
Tullamarine	17	3	0	2	22
Werribee	94	23	6	2	125
Werribee South	5	0	0	0	5
Williamstown	42	3	2	1	48
Woodend	0	4	1	0	5

8.2 Responses to complaints

Responses to complaints for the following complaint categories include:

Discoloured water

Discoloured water is generally caused by the suspension of accumulated natural sediments in water mains or by trapped air in water (white water).

Where discoloured water is brown in appearance, this can be triggered by the opening or closing of valves, use of hydrants by water carters working in housing development areas and reinstatement of mains into service following repairs. Discoloured water can also result from older, rusting internal galvanised iron pipes or ageing hot water services; in these instances, customers are advised to seek further advice from a plumber. Calls from customers are assessed by trained staff and, where the discoloured water is deemed to be originating from the water main, targeted mains flushing is generally undertaken.

White water is water with a cloudy appearance that settles within a few minutes and indicates the presence of tiny, harmless air bubbles. White water tends to be associated with maintenance and repair works, when air can enter the water pipes when the supply mains are recharged.

Blue green water

Blue green water is water that has a cloudy to blue-green appearance, possibly containing blue green particles, and having an unpleasant bitter taste. This is caused by accelerated corrosion of customers' internal copper water pipes and appears to be restricted to cold water pipes. Blue green water must not be consumed (by drinking or in the preparation of food) because it can cause nausea and vomiting. The prolonged consumption of water containing elevated copper levels can have adverse health effects. As blue green water originates from a property's internal copper pipes, customers can manage the problem by flushing their tap with fresh mains water. This means running their tap until the water becomes clear. A permanent solution to such blue green water instances would involve the replacement of the property's internal copper pipes. In certain cases, corrosion of copper pipes can lead to perforation and leakage. Neither the cause(s) of, nor solution to this international and Australia-wide copper corrosion phenomenon are well known (apart from replacement of corroding pipes).

Alleged illness

Complaints of water-related illness are investigated. Customers may be advised to seek medical advice.

Taste or odour

A change in taste or odour of tap water can occur occasionally and is generally apparent as a chlorine-like or earthy, musty taste or odour. Changes in source supply, water demand and flow rates can vary the chlorine levels that are noticeable by customers. Chlorine is used to disinfect our treated water supply to maintain its safety. Other tastes and odours can result as water sources change or water flows are slower and during flow reversals in large pipes. In these cases, once the cause is identified a combination of targeted flushing and changes to flow regimes are implemented.

9. Evaluation and audit

Evaluating and auditing water quality management systems ensures the successful management of water quality risks, data and processes. GWW manages risk to water quality by implementing the 12 elements of the Australian Drinking Water Guidelines framework through our risk management plan and maintaining certification to the international standard for food safety, Codex HACCP code of practice. Codex HACCP principles and supporting programs are recognised in the Australian Drinking Water Guidelines and have been adopted by the water industry to manage risks to drinking water.

9.1 Risk management plan audit and results

The audit of the risk management plan is a requirement of the *Safe Drinking Water Act 2003* (the Act) and Regulations (2015). Under s. 11(1) of the Act, the Secretary to the Department of Health required GWW to have its risk management plan audited by an approved auditor in 2023. GWW complied with this request as required under s. 11(2) of the Act.

The audit covered 25 elements and found 21 compliant findings and four minor non-compliance findings. Eleven opportunities for improvement were identified, with the majority on audit areas that were compliant.

A minor non-compliance is defined as a non-compliance with one or more of the auditable elements, legislative requirements or risk management plan activities, where the potential impact of the non-compliance is not likely to be a serious or imminent risk to public health or compromise public health.

The audit noted that the non-compliances identified were minor and likely a reflection of the audit period including operation during a pandemic, lockdowns and the commencement of a major merger of two separate organisations. Two of the minor non-compliances were most likely exacerbated by these issues, missing monitoring samples and testing of back flow devices.

As a result of the non-compliances identified, the auditor found that GWW has not complied with the obligations imposed by s. 7(1) of the *Safe Drinking Water Act 2003* during the audit period.

There were four minor non-compliances identified as follows:

- Preventive measures in accordance with s. 9(1)(b) of the *Safe Drinking Water Act 2003* were not fully implemented. A number of water agency owned testable backflow prevention devices were not tested in the required timeframe.
- The risk management plan was not implemented in its entirety in accordance with s. 7(1)(a) of the *Safe Drinking Water Act 2003*. The water quality monitoring program was not fully implemented as a number of samples were missed.
- Competency requirements for personnel contracted by GWW were not specified in accordance with regulation 8(1)(f) of the Safe Drinking Water Regulations 2015.
- Actions implemented at the Romsey WFP to address an identified treatment deficit, were found to be non-compliant with the requirements of regulation 8(1)(g) of the Safe Drinking Water Regulations 2015 for the management of short-term water quality risk.

This section provides a progress update on the delivery of the actions to address the findings from the auditing process.

9.1.1 Status on the actions to address the audit minor non-compliance findings

The 2023 audit identified four minor non-compliance findings. Two of the findings were completed and reported in the 2023 report with progress on the remaining two findings provided in this report.

- Training - the requirement for competency and training of personnel who are employed or engaged by the water agency, in relation to the monitoring and management of hazards and risks, has been given a minor non-compliance as a gap was identified in the competency and training processes for contract staff undertaking field services. This was considered to be minor as there are some informal structures in place and contract oversight through audits by GWW.

  Status: Since the audit, the external contractor has improved the accessibility to procedures for crews working on site. GWW will continue to work with the contractor to develop and update water quality training processes to improve awareness and assess competency. Activities to deliver this action progressed during 2024 with further uplift in water quality training planned to be delivered throughout 2025. This action is in progress.

- Infrastructure in place to management risk - this is considered to be a minor non-compliance as there is a potential shortfall in the treatment of virus at the Romsey WFP. Due to the size of the treatment gap identified in GWW's 2020 report, immediate action was required. Action has been taken in the medium term to replace the plant; however, short-term actions were not sufficient to verify or mitigate the risk.

  Status: During 2023-24, the additional disinfection process was installed, commissioned and is now operational. This action is now completed.

9.1.2 Status on the actions to address the audit opportunities for improvement findings

Eleven opportunities for improvement were identified from the audit. In the 2023 report, one action had been completed, eight actions were completed in 2024 and the remaining two actions include a progress update and are due for completion in 2025. The following outlines the opportunities and their status.

- Remove the reference to plant bypass in the Merrimu risk assessment. This has been disconnected and would require a separate risk assessment process to reinstate.

  Status: The documentation has been updated as part of the annual review process. This action is now completed.

- Consider adding an explicit hazardous event in the GWW risk assessment for recycled water cross-connects. The current event that covers this risk is generic.

  Status: Review of the recycled water interaction with drinking water is scheduled as part of the ongoing internal risk management review update to the HACCP manual includes this risk item. This action is now complete.

- Include a revision history in the risk assessment spreadsheets. This should include the date of a review and the changes made.

  Status: Action is complete with recent risk assessment reviews of source water to customer taps.

- Consider aligning the process and structure of water quality risk assessments between City West Water and Western Water. This will improve their usability and integration of the risk management plans.

  Status: Both plans have been reviewed by an external consultant and the process to combine and update the assessment process will be delivered as part of the drinking water improvement roadmap actions. This action progressed during 2024 and is now completed.

- Include a requirement to undertake a review of the drinking water supply system as part of the risk assessment methodology. This should include descriptive statistics and trending of water quality, a review of complaints, the performance of critical control points (CCPs) and details of recent incidents.

  Status: This action has been completed with data presented at the annual HACCP audit on the performance of critical control points and at the operational HACCP meetings.

- Repair the damaged fence around Kerrie Reservoir.

  Status: The fence repairs have been completed. This action was completed in 2023.

- It would be beneficial to use operator checklists at WFPs for daily, weekly and monthly routine tasks. This will aid operators and provide auditable evidence. A hardcopy or electronic copy could be used.

  Status: This action has been completed with a core checklist now implemented across the water treatment plants.

- It is recommended that incident and emergency details are only in the City West Water risk management plan, as they should be consistent across all sites. A thorough review of incident and emergency documentation use in relation to water quality is required to ensure currency.

  Status: This action has been completed as part of the ongoing work to update the GWW Emergency management framework.

- The risk management plan must include the details for competency and training of employees and those engaged by GWW, including under service contracts. Training and competency requirements for contractors must be reviewed and documented and appropriate measures put in place to ensure competency.

  Status: This action has been completed and information is included in the current risk management plan.

- A short-term risk management strategy must be put in place for the Romsey WFP. It currently has an estimated four log treatment shortfall for virus and although there is a process in place to upgrade the plant there must be action taken to verify the risk and short-term action before the new plant is built.

  Status: This is a multi-step action. The first part included setting up an interim sampling program to monitor the performance of the plant in the removal of viruses if they were detected in the source water. The program began in May 2023 and will be reviewed when the chlorine contact pipework has been installed. Implementation and performance of the Romsey WFP HACCP barriers is also a core item on our HACCP meetings until the interim chlorine dosing and contact pipe work is installed and the ultraviolet (UV) unit installation is completed. This work has been completed with additional short-term monitoring program in place for source water being treated at the Romsey WFP. Increased oversight of the performance of the HACCP preventative measure barriers by the plant operators also forms part of the short-term measure as well as the implementation of chlorine disinfection until the UV treatment unit is installed. The action to address the short term was completed in mid-2024 with commissioning and operation of the chlorination step at the Romsey WFP. The UV unit installation project is on track to be delivered in 2025.

- As part of the integration of the HACCP plans, ensure that CCPs are assessed consistently across City West Water and Western Water service areas. Currently tanks have been assessed differently between the two areas.

  Status: This will be delivered as part of the ongoing drinking water improvement roadmap actions and the consolidation of risk management stage 1 was delivered in 2023-24 as part of the HACCP operational meetings and providing a combined reporting process. Stage 2 will be completed as part of the 2024-25 drinking water improvement actions.

9.1.3 Status of previous audit actions

During the 2023 audit, the auditor noted the close out of the previously open actions from the 2020 and 2018 audits completed as City West Water and Western Water.

As reported in the 2023 Drinking water quality report, City West Water has closed out all previously open audit actions. There remains one open audit action from Western Water from the 2018 audit; progress on the status of this action is below.

Progress on 2018 audit outcomes and actions

As reported in the 2023 Drinking water quality report, the status of the remaining open action during 2024 is provided below. For the most important critical limits (such as individual filter effluent turbidity, a point representative of primary chlorination after adequate CT has been achieved for free chlorine and pH, and a point representative of fluoridation for fluoride), some identification of top priority would be of value. For those top priority critical limits, some additional effort could be made to better assure total consistency and compliance between all references to those values, including their names and identities, the limiting values, the times to alarm and the corrections taken in the event of exceedance.

- **Action update**: A significant program of work to upgrade programmable logic controller (PLC) at all plants was required to deliver this action. The schedule of works was staggered to meet operational and delivery constraints and was impacted by COVID-19 restrictions. The final upgrades were completed in 2022. During 2023-24, the final stage of work was scoped, which is the full rollout of HACCP SCADA pages and will be implemented across all sites. Updates to the pages include automated contact time calculations, alarming and notifications for changes to HACCP alarm settings, inclusion of operator set point alarms, alert and critical levels, and ability to trend key parameters. This action is in progress during 2024 with a focus to have this operational early 2025. Transitioning legacy systems to the updated HACCP SCADA page will be undertaken through a commissioning plan and finalised with a post-implementation review to ensure the action is implemented and understood correctly.

9.2 HACCP audit outcomes

GWW retained certification to Codex HACCP in 2023. During 2023-24, single certification of Codex HACCP across the whole GWW was successfully obtained. Copies of the audit certificates are available upon request.

Retaining and maintaining HACCP certification demonstrates GWW's commitment to apply best practice approaches to identify and manage risk to water quality in areas of water treatment operations and networks that can impact water quality. Maintenance of HACCP certification requires continual vigilance and improvements to our water quality management practices.

The drinking water risk management plan is based on our existing HACCP plans which are audited as part of the GWW internal audit program and annually by an external, independent auditor. The internal and external audits review work processes, including records of staff training, instrument maintenance and calibrations, and procedures and monitoring programs to ensure compliance with the HACCP principles and the Australian Drinking Water Guidelines. Outcomes from the audit programs are reviewed as part of the annual management review by senior managers and reports are provided regularly to the Drinking Water Executive Committee, senior management and the GWW board.

10. Undertakings under s. 30 of the *Safe Drinking Water Act 2003*

During 2023-24, GWW did not enter into any undertakings with the Department of Health, pursuant to s. 30 of the *Safe Drinking Water Act 2003*.

11. Exemptions from water quality standards under s. 20 and conditions imposed under s. 21 of the *Safe Drinking Water Act 2003*

During 2023-24, GWW did not have any s. 20 exemptions or s. 21 exemptions-imposed conditions in place.

12. Variation to aesthetic standards under s. 19 of the Act under conditions imposed under s. 21 of the *Safe Drinking Water Act 2003*

During 2023-24, GWW did not have any s. 19 variations.

13. Regulated water

'Regulated water' is water that is the subject of a declaration made by the Minister for Health concerning water that is not intended for drinking but could reasonably be mistaken as drinking water. We do not manage any water supplies that have been declared as regulated water.

13.1 Non-potable supply

GWW had 20 non-potable water by agreement residential customers located across our system. Typically, they are customers who have made special arrangements for connection to GWW's system between the untreated source water and the treatment plant. GWW advises those customers, that this (non-potable) water is not suitable for drinking or food preparation. This advice is given in the individual contracts and as ongoing notification on all applicable customer bills.

Non-potable water is water that has not been treated to the standards considered acceptable for drinking water under the *Safe Drinking Water Act 2003*. It can include source (untreated) water direct from reservoirs as well as partially treated water. There are no regulated water declarations regarding the non-potable water supply to customers of GWW.

13.2 Water by agreement

In certain cases, we supply water from our water distribution mains to customers with privately owned offtakes. Such supplies were provided under a private agreement between GWW and the customer. The agreement does not guarantee the pressure or quality of the supply downstream of the offtake point. However, we endeavour to maintain pressure and quality for these customers. GWW has embarked on a program to reduce the number of such private supplies.

14. Further information

For further information on this report please email: contact@gww.com.au. Previous annual reports are available on the GWW website.

For water quality issues please contact 13 44 99. Written enquiries can be addressed to: Greater Western Water, Locked Bag 350, Sunshine Vic 3020.

This report is available on Greater Western Water's website gww.com.au

Appendix A Water quality results and performance by locality

Reference locality sampling map, results from the sampling program are presented in the following tables

All localities

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples) Min	Average	Max	Frequency of sampling[3]	No of samples Total[2]	Passing	Performance against standard/ guideline
Alkalinity, Total as CaCO3	mg/L	NA	1	26	65	>Monthly	941	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.00	0.03	0.12	>Monthly	935	935	100.0%
Aluminium, Total as Al	mg/L	NA	0.01	0.05	0.24	>Monthly	936	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.96	2.6	>Weekly	9,153	9,153	100.0%
Chlorine, Total	mg/L	5	<0.05	0.93	2.8	>Weekly	9,153	9,153	100.0%
Coliforms, Total	orgs/100mL	NA	1	<1	100	>Weekly	9157	NA	NA
Colour, True	Pt/Co units	15	<2	<2	12	>Fortnightly	2,759	2759	100.0%
E. coli	orgs/100mL	0	0	0	0	>Weekly	9157	9157	100.0%
Electrical Conductivity (25°C)	µS/m	~900	60	249	510	>Fortnightly	2,762	2762	100.0%
Fluoride, as F	mg/L	1.5	0.03	0.61	0.99	>Monthly	1,432	1432	100.0%
Hardness, as CaCO3	mg/L	200	9	58	140	>Monthly	1,381	1381	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	2,000	>Weekly	9154	9154	100.0%
Iron, Total as Fe	mg/L	0.3	<0.01	0.04	0.40	>Monthly	1,384	1381	99.8%
Manganese, Total as Mn	mg/L	0.5	0.001	0.003	0.038	>Monthly	1,384	1384	100.0%
Monochloramine	mg/L	3	0.03	0.64	1.60	>Weekly	382	382	100.0%
Nitrate (as NO3)	mg/L	50	0.00	0.11	0.25	>weekly	380	380	100.0%
pH	units	6.5-8.5	6.2	7.6	10.9	>Weekly	9,157	8978	98.0%
Sodium, as Na	mg/L	180	3.1	20.6	62.0	>Monthly	1,381	1381	100.0%
Trihalomethanes, Total	mg/L	0.25	0.002	0.075	0.240	>Weekly	1,381	1381	100.0%
Turbidity	NTU	5[1]	0.1	2.4[1]	16.0	>Weekly	9,154	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps, tanks, pump stations for the specific water sampling localities
3. No. of samples collected is more than the frequency due to multiple sites sampled in the localities

NA - Not Applicable

Altona

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples)			Frequency of sampling[3]	No of samples		Performance against standard/ guideline
			Min	Average	Max		Total[2]	Passing	
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	13	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.45	0.95	>Weekly	416	416	100.0%
Chlorine, Total	mg/L	5	0.05	0.58	1.20	>Weekly	416	416	100.0%
Chloroform	mg/L	NA	0.02	0.02	0.03	>Monthly	13	NA	NA
Coliforms, Total	orgs/100mL	NA	3	<1	11	>Weekly	416	NA	NA
Colour, True	Pt/Co units	15	<2	<2	2	Fortnightly	26	26	100.0%
Dibromochloromethane	mg/L	NA	0.001	0.006	0.008	>Monthly	13	13	100.0%
E. coli	orgs/100mL	Zero(0)	0	0	0	>Weekly	416	416	100.0%
Electrical Conductivity (25°C)	µS/m	~900	77	102	120	Fortnightly	26	26	100.0%
Fluoride	mg/L	1.5	0.71	0.84	0.94	>Monthly	13	13	100.0%
Hardness, Total (as $CaCO_3$)	mg/L	200	16	22	29	>Monthly	13	13	100.0%
Heterotrophic Plate Count (36°C)	cfu/mL	NA	1	<1	7	Weekly	416	NA	NA
Iron	mg/L	0.3	<0.01	0.02	0.08	>Monthly	13	13	100.0%
Manganese	mg/L	0.5	0.001	0.002	0.004	>Monthly	13	13	100.0%
pH	units	6.5-8.5	6.8	7.4	9.4	>Weekly	416	411	98.8%
Sodium	mg/L	180	5.2	7.6	9.6	>Monthly	13	13	100.0%
Trihalomethanes, Total	mg/L	0.25	0.033	0.041	0.052	>Monthly	13	13	100.0%
Turbidity	NTU	5[1]	0.1	0.5[1]	8.1	>Weekly	416	NA	within standard

1. Based on 95th percentile result.
2. No. of samples includes routine program at network taps for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Bulla

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples) Min	Mean	Max	Frequency of sampling[3]	No of samples Total[2]	Passing	Performance against standard/ guideline
Bromoform	mg/L	NA	0	0	0	>Monthly	13	NA	NA
Chlorine, Free	mg/L	5	0.32	0.79	1.1	Weekly	52	52	100.00%
Chlorine, Total	mg/L	5	0.4	0.95	1.3	Weekly	52	52	100.00%
Chloroform	mg/L	NA	0.02	0.03	0.04	>Monthly	13	NA	NA
Coliforms, Total	orgs/100mL	NA	6	<1	6	Weekly	52	NA	NA
Colour, True	Pt/Co units	15	<2	<2	2	Fortnightly	26	26	100.00%
Dibromochloromethane	mg/L	NA	0.001	0.002	0.002	>Monthly	13	NA	NA
E. coli	orgs/100mL	Zero(0)	0	0	0	Weekly	52	52	100.00%
Electrical Conductivity (25°C)	µS/m	~900	72	76	82	Fortnightly	26	26	100.00%
Fluoride	mg/L	1.5	0.73	0.79	0.84	>Monthly	13	13	100.00%
Hardness, Total (as $CaCO_3$)	mg/L	200	13	18	24	>Monthly	13	13	100.00%
Heterotrophic Plate Count (36°C)	cfu/mL	NA	1	<1	1	Weekly	52	NA	NA
Iron	mg/L	0.3	0.05	0.09	0.13	>Monthly	13	13	100.00%
Manganese	mg/L	0.1	0.002	0.003	0.006	>Monthly	13	13	100.00%
pH	units	6.5-8.5	7.1	7.8	8.7	Weekly	52	51	98.10%
Sodium	mg/L	NA	4.6	5.8	7.4	>Monthly	13	13	100.00%
Temperature	°C	NA	11.5	17	22.5	Weekly	52	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.024	0.035	0.049	>Monthly	13	13	100.00%
Turbidity	NTU	5[1]	0.5	1.45[1]	1.7	Weekly	52	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps, tanks, pump stations for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Caroline Springs

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples)			Frequency of sampling[3]	No of samples		Performance against standard/ guideline
			Min	Average	Max		Total[2]	Passing	
Bromoform	mg/L	NA	0	0	0	>Monthly	13	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.39	0.94	>Weekly	364	364	100.0%
Chlorine, Total	mg/L	5	<0.05	0.53	1.1	>Weekly	364	364	100.0%
Chloroform ug/L	Mg/L	NA	0.01	0.02	0.03	>Monthly	13	NA	NA
Coliforms, Total	MPN/100mL	NA	4	<1	4	>Weekly	364	NA	NA
Colour, True	PCU	15	<2	<2	6	Fortnightly	26	26	100.00%
Dibromochloromethane	mg/L	NA	0.001	0.003	0.008	>Monthly	13	13	100.00%
E. coli	MPN/100mL	Zero(0)	0	0	0	>Weekly	364	364	100.00%
Electrical Conductivity (25°C)	µS/m	~900	67	90	120	Fortnightly	26	26	100.00%
Fluoride, as F	mg/L	1.5	0.73	0.8	0.91	>Monthly	13	13	100.00%
Hardness, as CaCO3	mg/L	200	13	19	29	>Monthly	13	13	100.00%
Heterotrophic Plate Count (36°C)	cfu/mL	NA	1	<1	57	>Weekly	364	NA	NA
Iron, Total as Fe	mg/L	0.3	<0.01	0.06	0.12	>Monthly	13	13	100.00%
Manganese, Total as Mn	mg/L	0.5	0.001	0.002	0.006	>Monthly	13	13	100.00%
pH	units	6.5-8.5	6.7	7.5	9.2	>Weekly	365	354	97.00%
Sodium, as Na	mg/L	180	4.5	6.5	9.2	Monthly	13	13	100.00%
Temperature	°C	NA	11.9	17.6	25.6	>Weekly	364	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.017	0.027	0.038	>Monthly	13	13	100.00%
Turbidity	NTU	5[1]	0.1	1.3[1]	5.8	>Weekly	364	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Darley

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples)			Frequency of sampling[3]	No of samples		Performance against standard/ guideline
			Min	Average	Max		Total[2]	Passing	
Alkalinity, Total as CaCO3	mg/L	NA	32	36	42	>Monthly	116	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.02	0.03	0.05	>Monthly	116	116	100.00%
Aluminium, Total as Al	mg/L	NA	0.02	0.03	0.05	>Monthly	116	NA	NA
Bromoform	mg/L	NA	0	0	0	>Monthly	129	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.81	1.8	>Weekly	572	572	100.00%
Chlorine, Total	mg/L	5	<0.05	1.09	2.1	>Weekly	572	572	100.00%
Chloroform	mg/L	NA	0.02	0.05	0.11	>Monthly	129	NA	NA
Coliforms, Total	orgs/100mL	NA	16	<1	16	>Weekly	572	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	>Fortnightly	259	259	100.00%
Dibromochloromethane	mg/L	NA	0.007	0.023	0.034	>Monthly	129	NA	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	572	572	100.00%
Electrical Conductivity (25°C)	µS/m	~900	360	389	420	>Fortnightly	259	259	100.00%
Fluoride, as F	mg/L	1.5	0.03	0.57	0.97	>Monthly	141	141	100.00%
Hardness, as CaCO3	mg/L	200	63	95	140	>Monthly	129	129	100.00%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	120	>Weekly	571	NA	NA
Iron, Total as Fe	mg/L	0.3	0.01	0.02	0.08	>Monthly	129	129	100.00%
Manganese, Total as Mn	mg/L	0.5	0.001	0.001	0.004	>Monthly	129	129	100.00%
pH	units	6.5-8.5	7.2	7.7	8.7	>Weekly	572	570	99.60%
Sodium, as Na	mg/L	180	21	32.2	43	>Monthly	129	129	100.00%
Temperature	°C	NA	9.1	17.2	25.4	>Weekly	572	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.071	0.117	0.2	>Weekly	129	129	100.00%
Turbidity	NTU	5[1]	0.1	0.35[1]	15	>Weekly	572	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Deer Park

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples)			Frequency of sampling[3]	No of samples		Performance against standard/ guideline
			Min	Average	Max		Total[2]	Passing	
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	13	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.43	1.30	>Weekly	312	312	100.0%
Chlorine, Total	mg/L	5	0.06	0.57	1.50	>Weekly	312	312	100.0%
Chloroform	mg/L	NA	0.01	0.01	0.02	>Monthly	13	NA	NA
Coliforms, Total	orgs/100mL	NA	<1	<1	<1	>Weekly	312	NA	NA
Colour, True	Pt/Co units	15	<2	<2	2	Fortnightly	26	26	100.0%
Dibromochloromethane	mg/L	NA	0.001	0.006	0.009	>Monthly	13	NA	NA
E. coli	orgs/100mL	Zero(0)	0	0	0	>Weekly	312	312	100.0%
Electrical Conductivity (25°C)	µS/m	~900	93	110	130	Fortnightly	26	26	100.0%
Fluoride	mg/L	1.5	0.70	0.85	0.95	>Monthly	13	13	100.0%
Hardness, Total (as $CaCO_3$)	mg/L	200	16	23	34	>Monthly	13	13	100.0%
Heterotrophic Plate Count (36°C)	cfu/mL	NA	1	<1	2,000	>Weekly	312	312	100.0%
Iron	mg/L	0.3	<0.01	0.03	0.12	>Monthly	13	13	100.0%
Manganese	mg/L	0.5	0.001	0.001	0.005	>Monthly	13	13	100.0%
pH	units	6.5-8.5	6.9	7.5	9.7	>Weekly	312	302	96.8%
Sodium	mg/L	180	5.1	8.2	11.0	Monthly	13	13	100.0%
Temperature	°C	NA	10.5	17.9	25.0	>Weekly	312	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.016	0.030	0.039	Monthly	13	13	100.0%
Turbidity	NTU	5[1]	0.1	0.6[1]	1.2	>Weekly	312	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Diggers Rest

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples) Min	Average	Max	Frequency of sampling[3]	No of samples Total[2]	Passing	Performance against standard/ guideline
Alkalinity, Total as CaCO3	mg/L	NA	12	13	14	>Monthly	13	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.01	0.02	0.02	>Monthly	13	13	100.00%
Aluminium, Total as Al	mg/L	NA	0.07	0.11	0.17	>Monthly	13	NA	NA
Bromoform	mg/L	NA	0	0	0	>Monthly	26	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.66	1.2	>Weekly	156	156	100.00%
Chlorine, Total	mg/L	5	<0.05	0.78	1.4	>Weekly	156	156	100.00%
Chloroform	mg/L	NA	0.01	0.03	0.05	>Monthly	26	NA	NA
Coliforms, Total	orgs/100mL	NA	<1	<1	<1	>Weekly	156	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	>Fortnightly	52	52	100.00%
Dibromochloromethane	mg/L	NA	0.001	0.002	0.002	>Monthly	26	NA	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	156	156	100.00%
Electrical Conductivity (25°C)	µS/m	~900	67	73	77	>Fortnightly	52	52	100.00%
Fluoride, as F	mg/L	1.5	0.72	0.79	0.86	>Monthly	26	26	100.00%
Hardness, as CaCO3	mg/L	200	12	17	23	>Monthly	26	26	100.00%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	2,000	>Weekly	156	NA	NA
Iron, Total as Fe	mg/L	0.3	0.06	0.09	0.12	>Monthly	26	26	100.00%
Manganese, Total as Mn	mg/L	0.5	0.002	0.003	0.006	>Monthly	26	26	100.00%
pH	units	6.5-8.5	7	7.5	8.4	>Weekly	156	156	100.00%
Sodium, as Na	mg/L	NA	4.5	5.8	7.4	>Monthly	26	26	100.00%
Temperature	°C	NA	10.5	17.7	27	>Weekly	156	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.02	0.034	0.054	>Monthly	26	26	100.00%
Turbidity	NTU	5[1]	0.6	1.4[1]	2.4	>Weekly	156	NA	within standards

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

East Keilor

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples)			Frequency of sampling[3]	No of samples		Performance against standard/ guideline
			Min	Average	Max		Total[2]	Passing	
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	13	NA	NA
Chlorine, Free	mg/L	5	0.15	0.86	1.30	>Weekly	156	156	100.0%
Chlorine, Total	mg/L	5	0.25	1.01	1.50	>Weekly	156	156	100.0%
Chloroform	mg/L	NA	0.01	0.01	0.03	>Monthly	13	NA	NA
Coliforms, Total	orgs/100mL	NA	9	<1	100	>Weekly	156	NA	NA
Colour, True	Pt/Co units	15	<2	<2	2	>Fortnightly	26	26	100.0%
Dibromochloromethane	mg/L	NA	0.001	0.005	0.010	>Monthly	13	NA	NA
E. coli	orgs/100mL	Zero(0)	0	0	0	>Weekly	156	156	100.0%
Electrical Conductivity (25°C)	µS/m	~900	72	107	120	Fortnightly	26	26	100.0%
Fluoride	mg/L	1.5	0.78	0.85	0.94	>Monthly	13	13	100.0%
Hardness, Total (as $CaCO_3$)	mg/L	200	14	24	30	>Monthly	13	13	100.0%
Heterotrophic Plate Count (36°C)	cfu/mL	NA	1	<1	120	>Weekly	156	156	100.0%
Iron	mg/L	0.3	<0.01	0.03	0.11	Monthly	13	13	100.0%
Manganese	mg/L	0.5	0.001	0.001	0.004	Monthly	13	13	100.0%
pH	units	6.5-8.5	7.0	7.6	10.0	>Weekly	156	147	94.2%
Sodium	mg/L	180	5.6	8.5	9.9	Monthly	13	13	100.0%
Temperature	°C	NA	11.5	17.7	25.1	>Weekly	156	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.012	0.027	0.054	Monthly	13	13	100.0%
Turbidity	NTU	5[1]	0.1	1.2[1]	1.3	>Weekly	156	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Eynesbury

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples) Min	Average	Max	Frequency of sampling[3]	No of samples Total[2]	Passing	Performance against standard/ guideline
Alkalinity, Total as CaCO3	mg/L	NA	12	13	15	>Monthly	19	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.01	0.02	0.02	>Monthly	19	19	100.0%
Aluminium, Total as Al	mg/L	NA	0.06	0.11	0.15	>Monthly	19	NA	NA
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	32	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.90	1.30	>Weekly	130	130	100.0%
Chlorine, Total	mg/L	5	0.07	1.07	1.50	>Weekly	130	130	100.0%
Chloroform	mg/L	NA	0.02	0.03	0.04	>Monthly	32	NA	NA
Coliforms, Total	orgs/100mL	NA	6	<1	6	>Weekly	130	NA	NA
Colour, True	Pt/Co units	15	<2	<2	8	>Fortnightly	66	66	100.0%
Dibromochloromethane	mg/L	NA	0.001	0.002	0.003	>Monthly	32	NA	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	130	130	100.0%
Electrical Conductivity (25°C)	µS/m	~900	70	76	84	>Fortnightly	66	66	100.0%
Fluoride, as F	mg/L	1.5	0.75	0.79	0.83	>Monthly	32	32	100.0%
Hardness, as CaCO3	mg/L	200	12	17	21	>Monthly	32	32	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	2,000	>Weekly	130	130	100.0%
Iron, Total as Fe	mg/L	0.3	0.04	0.12	0.40	>Monthly	32	30	93.8%
Manganese, Total as Mn	mg/L	0.5	0.001	0.003	0.006	>Monthly	32	32	100.0%
pH	units	6.5-8.5	7.1	7.5	8.4	>Weekly	130	130	100.0%
Sodium, as Na	mg/L	180	4.8	6.2	7.5	>Monthly	32	32	100.0%
Temperature	°C	NA	10.5	16.7	23.1	>Weekly	130	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.023	0.034	0.054	>Weekly	32	32	100.0%
Turbidity	NTU	5[1]	0.2	1.4[1]	2.2	>Weekly	130	N	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps and tanks for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Gisborne

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples)			Frequency of sampling[3]	No of samples		Performance against standard/ guideline
			Min	Average	Max		Total	Passing	
Alkalinity, Total as CaCO3	mg/L	NA	1	34	41	>Monthly	78	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.02	0.06	0.096	>Monthly	77	77	100%
Aluminium, Total as Al	mg/L	NA	0.02	0.06	0.1	>Monthly	78	NA	NA
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	93	NA	NA
Chlorine, Free	mg/L	5	<0.05	1.02	2.3	>Weekly	420	420	100.0%
Chlorine, Total	mg/L	5	<0.05	1.27	2.6	>Weekly	420	420	100.0%
Chloroform	mg/L	NA	0.01	0.04	0.12	>Monthly	93	NA	NA
Coliforms, Total	orgs/100mL	NA	1	<1	9	>Weekly	416	NA	NA
Colour, True	Pt/Co units	15	<2	<2	6	>Fortnightly	182	182	100.0%
Dibromochloromethane	mg/L	NA	0.013	0.022	0.042	>Monthly	93	NA	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	416	416	100.0%
Electrical Conductivity (25°C)	µS/m	~900	90	400	440	>Fortnightly	182	182	100.0%
Fluoride, as F	mg/L	1.5	0.61	0.76	0.87	>Monthly	91	91	100.0%
Hardness, as CaCO3	mg/L	200	70	108	120	>Monthly	91	91	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	300	>Weekly	416	NA	NA
Iron, Total as Fe	mg/L	0.3	0.01	0.03	0.15	>Monthly	91	91	100.0%
Manganese, Total as Mn	mg/L	0.5	0.001	0.007	0.034	>Monthly	91	91	100.0%
pH	units	6.5-8.5	7.2	7.7	8.9	>Weekly	420	415	98.8%
Sodium, as Na	mg/L	180	17.0	26.9	32.0	>Monthly	91	91	100.0%
Temperature	°C	NA	5.5	15.3	23.0	>Weekly	420	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.040	0.102	0.210	>Weekly	93	93	100.0%
Turbidity	NTU	5[1]	0.1	0.4[1]	1.6	>Weekly	416	NA	within standard

1. Based on 95th percentile result
2. No of samples includes routine program at network taps, tanks, pump stations for the specific water sampling locality
3. No of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Lancefield

Parameter	Unit	Guideline Value (ADWG 2011)	Concentration or value (all samples) Min	Average	Max	Frequency of Sampling[3]	No of samples Total[2]	Passing	Performance against standard/ guideline
Alkalinity, Total as CaCO3	mg/L	NA	29	34	65	>Monthly	26	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.00	0.01	0.02	>Monthly	26	26	100.0%
Aluminium, Total as Al	mg/L	NA	0.01	0.01	0.02	>Monthly	26	NA	NA
Bromoform	mg/L	NA	0.00	0.01	0.01	>Monthly	39	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.92	1.80	>Weekly	156	156	100.0%
Chlorine, Total	mg/L	5	0.21	1.15	2.00	>Weekly	156	156	100.0%
Chloroform	mg/L	NA	0.01	0.03	0.04	>Monthly	39	NA	NA
Coliforms, Total	orgs/100mL	NA	<1	<1	<1	>Weekly	156	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	>Fortnightly	78	78	100.0%
Dibromochloromethane	mg/L	NA	0.020	0.031	0.046	>Monthly	39	NA	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	156	156	100.0%
Electrical Conductivity (25°C)	µS/m	~900	220	321	430	>Fortnightly	78	78	100.0%
Fluoride, as F	mg/L	1.5	0.05	0.07	0.10	>Monthly	39	39	100.0%
Hardness, as CaCO3	mg/L	200	28	51	110	>Monthly	39	39	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	10	>Weekly	156	156	100.0%
Iron, Total as Fe	mg/L	0.3	<0.01	0.01	0.03	>Monthly	39	39	100.0%
Manganese, Total as Mn	mg/L	0.5	0.001	0.001	0.003	>Monthly	39	39	100.0%
pH	units	6.5-8.5	7.3	7.7	8.8	>Weekly	156	155	99.4%
Sodium, as Na	mg/L	180	22.0	36.6	51.0	>Monthly	39	39	100.0%
Temperature	°C	NA	8.5	15.8	23.0	>Weekly	156	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.066	0.094	0.140	>Weekly	39	39	100.0%
Turbidity	NTU	5[1]	0.1	0.1[1]	0.3	>Weekly	156	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps and tanks for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Lerderderg

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples) Min	Average	Max	Frequency of sampling[3]	No of samples Total[2]	Passing	Performance against standard/ guideline
Alkalinity, Total as CaCO3	mg/L	NA	30	35	37	>Monthly	49	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.03	0.04	0.05	>Monthly	49	49	100.0%
Aluminium, Total as Al	mg/L	NA	0.03	0.04	0.06	>Monthly	49	NA	NA
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	62	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.84	1.50	>Weekly	303	303	100.0%
Chlorine, Total	mg/L	5	0.14	1.12	1.80	>Weekly	303	303	100.0%
Chloroform	mg/L	NA	0.02	0.05	0.12	>Monthly	62	NA	NA
Coliforms, Total	orgs/100mL	NA	91	<1	100	>Weekly	303	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	>Fortnightly	127	127	100.0%
Dibromochloromethane	mg/L	NA	0.017	0.023	0.031	>Monthly	62	62	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	303	303	100.0%
Electrical Conductivity (25°C)	µS/m	~900	360	392	450	>Fortnightly	127	127	100.0%
Fluoride, as F	mg/L	1.5	0.03	0.58	0.92	>Monthly	74	74	100.0%
Hardness, as CaCO3	mg/L	200	59	93	120	>Monthly	62	62	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	80	>Weekly	303	NA	NA
Iron, Total as Fe	mg/L	0.3	0.01	0.02	0.07	>Monthly	62	62	100.0%
Manganese, Total as Mn	mg/L	0.5	0.001	0.001	0.003	>Monthly	62	62	100.0%
pH	units	6.5-8.5	7.1	7.6	8.4	>Weekly	303	303	100.0%
Sodium, as Na	mg/L	180	21.0	33.6	51.0	>Monthly	62	62	100.0%
Temperature	°C	NA	9.6	17.3	26.3	>Weekly	303	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.063	0.118	0.210	>Weekly	62	62	100.0%
Turbidity	NTU	5[1]	0.1	0.3[1]	1.6	>Weekly	303	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps and tanks for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA - Not Applicable

Little River

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples)			Frequency of sampling[3]	No of samples		Performance against standard/ guideline
			Min	Average	Max		Total[2]	Passing	
Alkalinity, Total as CaCO3	mg/L	NA	9	12	16	>Monthly	42	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.01	0.02	0.03	>Monthly	39	39	100.0%
Aluminium, Total as Al	mg/L	NA	0.01	0.03	0.24	>Monthly	39	NA	NA
Bromoform	mg/L	NA	0.001	0.001	0.001	>Monthly	52	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.61	1.50	>Weekly	208	208	100.0%
Chlorine, Total	mg/L	5	0.11	0.75	1.70	>Weekly	208	208	100.0%
Chloroform	mg/L	NA	0.02	0.03	0.04	>Monthly	52	NA	NA
Coliforms, Total	orgs/100mL	NA	<1	<1	<1	>Weekly	208	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	>Fortnightly	104	104	100.0%
Dibromochloromethane	mg/L	NA	0.004	0.007	0.010	>Monthly	52	NA	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	208	208	100.0%
Electrical Conductivity (25°C)	µS/m	~900	75	113	140	>Fortnightly	104	104	100.0%
Fluoride, as F	mg/L	1.5	0.68	0.84	0.99	>Monthly	55	55	100.0%
Hardness, as CaCO3	mg/L	200	15	25	41	>Monthly	52	52	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	20	>Weekly	208	NA	NA
Iron, Total as Fe	mg/L	0.3	0.01	0.03	0.06	>Monthly	52	52	100.0%
Manganese, Total as Mn	mg/L	0.5	0.001	0.002	0.007	>Monthly	52	52	100.0%
pH	units	6.5-8.5	6.9	7.5	10.0	>Weekly	208	204	98.1%
Sodium, as Na	mg/L	180	5.3	8.5	11.0	>Monthly	52	52	100.0%
Temperature	°C	NA	10.1	16.7	25.0	>Weekly	208	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.032	0.048	0.068	>Weekly	52	52	100.0%
Turbidity	NTU	5[1]	0.1	0.6[1]	11.0	>Weekly	208	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps and tanks for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Macedon

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples) Min	Average	Max	Frequency of sampling[3]	No of samples Total[2]	Passing	Performance against standard/ guideline
Alkalinity, Total as CaCO3	mg/L	NA	30	35	39	>Monthly	26	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.01	0.05	0.07	>Monthly	26	26	100.0%
Aluminium, Total as Al	mg/L	NA	0.03	0.05	0.07	>Monthly	26	NA	NA
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	42	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.91	1.70	>Weekly	156	156	100.0%
Chlorine, Total	mg/L	5	<0.05	1.20	2.10	>Weekly	156	156	100.0%
Chloroform	mg/L	NA	0.03	0.07	0.12	>Monthly	42	NA	NA
Coliforms, Total	orgs/100mL	NA	<1	<1	<1	>Weekly	156	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	>Fortnightly	78	78	100.0%
Dibromochloromethane	mg/L	NA	0.012	0.026	0.036	>Monthly	42	NA	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	156	156	100.0%
Electrical Conductivity (25°C)	µS/m	~900	200	403	440	>Fortnightly	78	78	100.0%
Fluoride, as F	mg/L	1.5	0.68	0.77	0.87	>Monthly	39	39	100.0%
Hardness, as CaCO3	mg/L	200	78	107	120	>Monthly	39	39	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	400	>Weekly	156	156	100.0%
Iron, Total as Fe	mg/L	0.3	0.02	0.03	0.09	>Monthly	39	39	100.0%
Manganese, Total as Mn	mg/L	0.5	0.002	0.007	0.028	>Monthly	39	39	100.0%
pH	units	6.5-8.5	7.4	7.9	8.7	>Weekly	156	153	98.1%
Sodium, as Na	mg/L	180	18.0	27.5	31.0	>Monthly	39	39	100.0%
Temperature	°C	NA	9.0	15.1	21.6	>Weekly	156	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.087	0.141	0.230	>Weekly	39	39	100.0%
Turbidity	NTU	5[1]	0.1	0.33[1]	1.2	>Weekly	156	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps, tanks, pump stations for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Maddingley

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples) Min	Average	Max	Frequency of sampling[3]	No of samples Total[2]	Passing	Performance against standard/ guideline
Alkalinity, Total as CaCO3	mg/L	NA	31	35	38	>Monthly	39	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.03	0.04	0.05	>Monthly	39	39	100.0%
Aluminium, Total as Al	mg/L	NA	0.02	0.04	0.05	>Monthly	39	NA	NA
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	52	NA	NA
Chlorine, Free	mg/L	5	0.14	0.93	1.50	>Weekly	260	260	100.0%
Chlorine, Total	mg/L	5	0.30	1.20	1.80	>Weekly	260	260	100.0%
Chloroform	mg/L	NA	0.02	0.06	0.12	>Monthly	52	NA	NA
Coliforms, Total	orgs/100mL	NA	2	<1	2	>Weekly	260	NA	NA
Colour, True	Pt/Co units	15	<2	<2	2	>Fortnightly	104	104	100.0%
Dibromochloromethane	mg/L	NA	0.018	0.024	0.031	>Monthly	52	NA	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	260	260	100.0%
Electrical Conductivity (25°C)	µS/m	~900	360	392	420	>Fortnightly	104	104	100.0%
Fluoride, as F	mg/L	1.5	0.03	0.61	0.88	>Monthly	64	64	100.0%
Hardness, as CaCO3	mg/L	200	65	91	120	>Monthly	52	52	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	39	>Weekly	260	260	100.0%
Iron, Total as Fe	mg/L	0.3	0.01	0.02	0.04	>Monthly	52	52	100.0%
Manganese, Total as Mn	mg/L	0.5	0.001	0.001	0.004	>Monthly	52	52	100.0%
pH	units	6.5-8.5	7.2	7.6	8.0	>Weekly	260	260	100.0%
Sodium, as Na	mg/L	NA	21.0	32.8	43.0	>Monthly	52	52	100.0%
Temperature	°C	NA	10.3	17.7	26.2	>Weekly	259	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.063	0.129	0.200	>Weekly	52	52	100.0%
Turbidity	NTU	5[1]	0.1	0.3[1]	1.4	>Weekly	260	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps and tanks for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Maribyrnong

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples)			Frequency of sampling[3]	No of samples		Performance against standard/ guideline
			Min	Average	Max		Total[2]	Passing	
Bromoform	mg/L	NA	0.00	0.00	0.00	Monthly	13	NA	NA
Chlorine, Free	mg/L	5	0.10	0.53	1.10	>Weekly	364	364	100.0%
Chlorine, Total	mg/L	5	0.20	0.66	1.30	>Weekly	364	364	100.0%
Chloroform	mg/L	NA	0.01	0.03	0.04	>Monthly	13	NA	NA
Coliforms, Total	orgs/100mL	NA	2	<1	2	>Weekly	364	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	>Fortnightly	26	26	100.0%
Dibromochloromethane	mg/L	NA	0.001	0.004	0.006	>Monthly	13	NA	NA
E. coli	orgs/100mL	Zero(0)	0	0	0	>Weekly	364	364	100.0%
Electrical Conductivity (25°C)	µS/m	~900	75	95	120	>Fortnightly	26	26	100.0%
Fluoride	mg/L	1.5	0.62	0.82	0.89	>Monthly	13	13	100.0%
Hardness, Total (as $CaCO_3$)	mg/L	200	15	20	26	>Monthly	13	13	100.0%
Heterotrophic Plate Count (36°C)	cfu/mL	NA	1	<1	3	>Weekly	364	364	100.0%
Iron	mg/L	0.3	0.01	0.04	0.12	>Monthly	13	13	100.0%
Manganese	mg/L	0.5	0.001	0.005	0.035	>Monthly	13	13	100.0%
pH	units	6.5-8.5	6.9	7.3	8.8	>Weekly	364	360	98.9%
Sodium	mg/L	180	4.3	6.7	9.1	>Monthly	13	13	100.0%
Temperature	°C	NA	10.0	17.5	26.5	>Weekly	364	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.029	0.042	0.056	>Monthly	13	13	100.0%
Turbidity	NTU	5[1]	0.1	0.6[1]	1.2	>Weekly	364	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Melton South

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples)			Frequency of sampling[3]	No of samples		Performance against standard/ guideline
			Min	Average	Max		Total[2]	Passing	
Alkalinity, Total as CaCO3	mg/L	NA	11	13	15	>Monthly	52	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.00	0.02	0.04	>Monthly	52	52	100.0%
Aluminium, Total as Al	mg/L	NA	0.05	0.11	0.19	>Monthly	52	NA	NA
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	65	NA	NA
Chlorine, Free	mg/L	5	0.33	0.99	1.70	>Weekly	362	362	100.0%
Chlorine, Total	mg/L	5	0.52	1.17	1.9	>Weekly	362	362	100.0%
Chloroform	mg/L	NA	0.01	0.02	0.04	>Monthly	65	NA	NA
Coliforms, Total	orgs/100mL	NA	8	<1	17	>Weekly	363	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	>Fortnightly	130	130	100.0%
Dibromochloromethane	mg/L	NA	<0.001	0.001	0.003	>Monthly	65	NA	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	363	363	100.0%
Electrical Conductivity (25°C)	µS/m	~900	66	74	100	>Fortnightly	130	130	100.0%
Fluoride, as F	mg/L	1.5	0.72	0.78	0.85	>Monthly	65	65	100.0%
Hardness, as CaCO3	mg/L	200	9	16	22	>Monthly	65	65	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	2,000	>Weekly	363	NA	NA
Iron, Total as Fe	mg/L	0.3	0.05	0.09	0.14	>Monthly	65	65	100.0%
Manganese, Total as Mn	mg/L	0.5	0.001	0.003	0.006	>Monthly	65	65	100.0%
pH	units	6.5-8.5	6.9	7.5	8.6	>Weekly	363	362	99.7%
Sodium, as Na	mg/L	180	3.7	5.6	7.2	>Monthly	65	65	100.0%
Temperature	°C	NA	10.5	16.5	24.0	>Weekly	363	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.010	0.028	0.054	>Weekly	65	65	100.0%
Turbidity	NTU	5[1]	0.5	1.4[1]	16.0	>Weekly	362	NA	Within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps and tanks for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Merrimu

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples)			Frequency of sampling[3]	No of samples		Performance against standard/ guideline
			Min	Average	Max		Total[2]	Passing	
Alkalinity, Total as CaCO3	mg/L	NA	16	31	41	>Monthly	39	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.02	0.05	0.07	>Monthly	39	39	100%
Aluminium, Total as Al	mg/L	NA	0.02	0.06	0.18	>Monthly	39	NA	NA
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	52	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.96	2.6	>Weekly	309	309	100%
Chlorine, Total	mg/L	5	0.12	1.17	2.8	>Weekly	309	309	100%
Chloroform	mg/L	NA	0.01	0.03	0.07	>Monthly	52	NA	NA
Coliforms, Total	orgs/100mL	NA	1	<1	1	>Weekly	310	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	>Fortnightly	104	104	100%
Dibromochloromethane	mg/L	NA	0.001	0.012	0.028	>Monthly	52	NA	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	310	310	100.0%
Electrical Conductivity (25°C)	µS/m	~900	70	266	400	>Fortnightly	104	104	100.0%
Fluoride, as F	mg/L	1.5	0.03	0.55	0.99	>Monthly	64	64	100.0%
Hardness, as CaCO3	mg/L	200	11	62	110	>Monthly	52	52	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	2	>Weekly	310	310	100.0%
Iron, Total as Fe	mg/L	0.3	0.01	0.04	0.13	>Monthly	52	52	100.0%
Manganese, Total as Mn	mg/L	0.5	0.001	0.003	0.012	>Monthly	52	52	100.0%
pH	units	6.5-8.5	6.8	7.6	9.2	>Weekly	310	297	95.8%
Sodium, as Na	mg/L	180	4.3	21.2	35.0	>Monthly	52	52	100.0%
Temperature	°C	NA	10.9	17.4	25.7	>Weekly	310	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.020	0.061	0.120	>Weekly	52	52	100.0%
Turbidity	NTU	5[1]	0.1	1.2[1]	1.5	>Weekly	310	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps and tanks for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Moonee Ponds

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples) Min	Average	Max	Frequency of sampling[3]	No of samples Total[2]	Passing	Performance against standard/ guideline
Bromoform	mg/L	NA	0.00	0.00	0.00	Monthly	13	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.59	1.20	>Weekly	260	260	100.0%
Chlorine, Total	mg/L	5	<0.05	0.73	1.50	>Weekly	260	260	100.0%
Chloroform	mg/L	NA	0.02	0.03	0.04	>Monthly	13	NA	NA
Coliforms, Total	orgs/100mL	NA	22	<1	22	>Weekly	260	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	Fortnightly	26	26	100.0%
Dibromochloromethane	mg/L	NA	<0.001	0.003	0.005	Monthly	13	NA	NA
E. coli	orgs/100mL	Zero(0)	0	0	0	>Weekly	260	260	100.0%
Electrical Conductivity (25°C)	µS/m	~900	69	90	120	>Fortnightly	26	26	100.0%
Fluoride	mg/L	1.5	0.62	0.79	0.90	>Monthly	13	13	100.0%
Hardness, Total (as CaCO3)	mg/L	200	14	19	27	>Monthly	13	13	100.0%
Heterotrophic Plate Count (36°C)	cfu/mL	NA	1	<1	2,000	>Weekly	260	NA	NA
Iron	mg/L	0.3	0.03	0.05	0.08	>Monthly	13	13	100.0%
Manganese	mg/L	0.5	0.002	0.005	0.010	>Monthly	13	13	100.0%
pH	units	6.5-8.5	6.5	7.4	10.9	>Weekly	260	256	98.5%
Sodium	mg/L	180	4.0	6.1	8.0	Monthly	13	13	100.0%
Temperature	°C	NA	11.7	17.7	27.1	>Weekly	260	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.031	0.045	0.054	>Monthly	13	13	100.0%
Turbidity	NTU	5[1]	0.1	0.7[1]	0.9	>Weekly	260	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Mt Macedon

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples) Min	Average	Max	Frequency of sampling[3]	No of samples Total[2]	Passing	Performance against standard/ guideline
Alkalinity, Total as CaCO3	mg/L	NA	26	36	41	>Monthly	39	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.02	0.05	0.07	>Monthly	39	39	100.0%
Aluminium, Total as Al	mg/L	NA	0.03	0.05	0.08	>Monthly	39	NA	NA
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	52	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.85	1.70	>Weekly	208	208	100.0%
Chlorine, Total	mg/L	5	0.29	1.08	2.10	>Weekly	208	208	100.0%
Chloroform	mg/L	NA	0.05	0.09	0.13	>Monthly	52	NA	NA
Coliforms, Total	orgs/100mL	NA	<1	<1	<1	>Weekly	208	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	>Fortnightly	104	104	100.0%
Dibromochloromethane	mg/L	NA	0.007	0.025	0.036	>Monthly	52	NA	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	208	208	100.0%
Electrical Conductivity (25°C)	µS/m	~900	130	407	440	>Fortnightly	104	104	100.0%
Fluoride, as F	mg/L	1.5	0.69	0.78	0.90	>Monthly	52	52	100.0%
Hardness, as CaCO3	mg/L	200	44	107	130	>Monthly	52	52	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	140	>Weekly	208	NA	NA
Iron, Total as Fe	mg/L	0.3	0.02	0.03	0.07	>Monthly	52	52	100.0%
Manganese, Total as Mn	mg/L	0.5	0.002	0.006	0.023	>Monthly	52	52	100.0%
pH	units	6.5-8.5	7.8	8.1	8.9	>Weekly	208	201	96.6%
Sodium, as Na	mg/L	180	12.0	27.2	34.0	>Monthly	52	52	100.0%
Temperature	°C	NA	7.2	14.3	22.1	>Weekly	208	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.099	0.162	0.240	>Weekly	52	52	100.0%
Turbidity	NTU	5[1]	0.1	0.4[1]	1.5	>Weekly	208	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps, tanks, pump stations for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Myrniong

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples) Min	Average	Max	Frequency of sampling[3]	No of samples Total[2]	Passing	Performance against standard/ guideline
Alkalinity, Total as CaCO3	mg/L	NA	37	46	59	>Monthly	52	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.00	0.02	0.12	>Monthly	52	52	100.0%
Aluminium, Total as Al	mg/L	NA	0.01	0.02	0.12	>Monthly	52	NA	NA
Bromoform	mg/L	NA	0.00	0.00	0.01	>Monthly	65	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.96	2.4	>Weekly	256	256	100.0%
Chlorine, Total	mg/L	5	<0.05	1.2	2.6	>Weekly	256	256	100.0%
Chloroform	mg/L	NA	0.01	0.03	0.06	>Monthly	65	NA	NA
Coliforms, Total	orgs/100mL	NA	<1	<1	<1	>Weekly	257	NA	NA
Colour, True	Pt/Co units	15	<2	<2	2	>Fortnightly	128	128	100.0%
Dibromochloromethane	mg/L	NA	<0.001	0.023	0.040	>Monthly	65	NA	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	257	257	100.0%
Electrical Conductivity (25°C)	µS/m	~900	430	472	510	>Fortnightly	128	128	100.0%
Fluoride, as F	mg/L	1.5	0.03	0.03	0.05	>Monthly	65	65	100.0%
Hardness, as CaCO3	mg/L	200	67	104	140	>Monthly	65	65	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	120	>Weekly	257	NA	NA
Iron, Total as Fe	mg/L	0.3	<0.01	0.04	0.34	>Monthly	65	64	98.5%
Manganese, Total as Mn	mg/L	0.5	0.001	0.001	0.005	>Monthly	65	65	100.0%
pH	units	6.5-8.5	7.0	7.6	9.3	>Weekly	257	243	94.6%
Sodium, as Na	mg/L	180	36.0	42.7	50.0	>Monthly	65	65	100.0%
Temperature	°C	NA	8.0	15.7	24.6	>Weekly	257	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.022	0.087	0.150	>Weekly	65	65	100.0%
Turbidity	NTU	5[1]	0.1	0.7[1]	6.2	>Weekly	257	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps and tanks for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Parkville

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples)			Frequency of sampling[3]	No of samples		Performance against standard/ guideline
			Min	Average	Max		Total[2]	Passing	
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	13	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.59	1.50	>Weekly	469	469	100.0%
Chlorine, Total	mg/L	5	0.09	0.73	1.70	>Weekly	469	469	100.0%
Chloroform	mg/L	NA	0.01	0.02	0.04	>Monthly	13	NA	NA
Coliforms, Total	orgs/100mL	NA	1	<1	46	>Weekly	469	NA	NA
Colour, True	Pt/Co units	15	<2	<2	2	>Fortnightly	26	26	100.0%
Dibromochloromethane	mg/L	NA	0.001	0.005	0.007	>Monthly	13	13	100.0%
E. coli	orgs/100mL	Zero(0)	0	0	0	>Weekly	469	469	100.0%
Electrical Conductivity (25°C)	µS/m	~900	68	97	110	Fortnightly	26	26	100.0%
Fluoride	mg/L	1.5	0.69	0.83	0.91	>Monthly	13	13	100.0%
Hardness, Total (as $CaCO_3$)	mg/L	200	13	22	25	>Monthly	13	13	100.0%
Heterotrophic Plate Count (36°C)	cfu/mL	NA	1	<1	2,000	>Weekly	469	469	100.0%
Iron	mg/L	0.3	<0.01	0.03	0.09	>Monthly	13	13	100.0%
Manganese	mg/L	0.1	0.001	0.003	0.008	>Monthly	13	13	100.0%
pH	units	6.5-8.5	6.4	7.3	9.2	>Weekly	469	464	98.9%
Sodium	mg/L	180	4.5	7.7	9.1	>Monthly	13	13	100.0%
Temperature	°C	NA	11.3	17.7	26.8	>Weekly	469	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.026	0.036	0.048	Monthly	13	13	100.0%
Turbidity	NTU	5[1]	0.1	0.5[1]	2.2	>Weekly	469	469	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Richmond

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples) Min	Average	Max	Frequency of sampling[3]	No of samples Total[2]	Passing	Performance against standard/ guideline
Bromoform	mg/L	NA	0.00	0.00	0.00	Monthly	13	NA	NA
Chlorine, Free	mg/L	5	0.06	0.65	1.00	>Weekly	156	156	100.0%
Chlorine, Total	mg/L	5	0.23	0.80	1.20	>Weekly	156	156	100.0%
Chloroform	mg/L	NA	0.02	0.05	0.07	Monthly	13	NA	NA
Coliforms, Total	orgs/100mL	NA	1	<1	2	>Weekly	156	NA	NA
Colour, True	Pt/Co units	15	<2	2	6	Fortnightly	26	26	100.0%
Dibromochloromethane	mg/L	NA	<0.001	0.001	0.005	>Monthly	13	13	100.0%
E. coli	orgs/100mL	Zero(0)	0	0	0	>Weekly	156	156	100.0%
Electrical Conductivity (25°C)	µS/m	~900	60	65	78	Fortnightly	26	26	100.0%
Fluoride	mg/L	1.5	0.73	0.79	0.85	>Monthly	13	13	100.0%
Hardness, Total (as $CaCO_3$)	mg/L	200	9	16	23	>Monthly	13	13	100.0%
Heterotrophic Plate Count (36°C)	cfu/mL	NA	1	<1	1	>Weekly	156	156	100.0%
Iron	mg/L	0.3	0.02	0.06	0.07	>Monthly	13	13	100.0%
Manganese	mg/L	0.1	0.003	0.004	0.005	>Monthly	13	13	100.0%
pH	units	6.5-8.5	6.9	7.4	9.0	>Weekly	156	155	99.4%
Sodium	mg/L	180	3.1	4.9	8.5	Monthly	13	13	100.0%
Temperature	°C	NA	10.9	17.7	26.1	>Weekly	156	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.032	0.063	0.076	Monthly	13	13	100.0%
Turbidity	NTU	5[1]	0.2	0.8[1]	0.9	>Weekly	156	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Riddells Creek

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples)			Frequency of sampling[3]	No of samples		Performance against standard/ guideline
			Min	Average	Max		Total[2]	Passing	
Alkalinity, Total as CaCO3	mg/L	NA	30	36	41	>Monthly	26	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.02	0.04	0.05	>Monthly	26	26	100.0%
Aluminium, Total as Al	mg/L	NA	0.02	0.04	0.06	>Monthly	26	NA	NA
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	39	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.74	1.40	>Weekly	156	156	100.0%
Chlorine, Total	mg/L	5	0.07	0.95	1.80	>Weekly	156	156	100.0%
Chloroform	mg/L	0.25	0.04	0.08	0.12	>Monthly	39	39	100.0%
Coliforms, Total	orgs/100mL	NA	<1	<1	<1	>Weekly	156	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	>Fortnightly	78	78	100.0%
Dibromochloromethane	mg/L	NA	0.014	0.027	0.036	>Monthly	39	NA	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	156	156	100.0%
Electrical Conductivity (25°C)	µS/m	~900	100	378	440	>Fortnightly	78	78	100.0%
Fluoride, as F	mg/L	1.5	0.66	0.78	0.88	>Monthly	39	39	100.0%
Hardness, as CaCO3	mg/L	200	79	108	140	>Monthly	39	39	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	10	>Weekly	156	156	100.0%
Iron, Total as Fe	mg/L	0.3	0.01	0.03	0.10	>Monthly	39	39	100.0%
Manganese, Total as Mn	mg/L	0.5	0.001	0.005	0.019	>Monthly	39	39	100.0%
pH	units	6.5-8.5	7.5	8.0	9.0	>Weekly	156	143	91.7%
Sodium, as Na	mg/L	180	20.0	27.4	38.0	>Monthly	39	39	100.0%
Temperature	°C	NA	1.0	15.7	22.5	>Weekly	156	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.100	0.151	0.220	>Weekly	39	39	100.0%
Turbidity	NTU	5[1]	0.1	0.8[1]	2.9	>Weekly	156	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps, tanks, pump stations for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Rockbank

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples) Min	Average	Max	Frequency of sampling[3]	No of samples Total[2]	Passing	Performance against standard/ guideline
Alkalinity, Total as CaCO3	mg/L	NA	11	12	19	>Monthly	36	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.01	0.02	0.05	>Monthly	36	36	100.0%
Aluminium, Total as Al	mg/L	NA	0.05	0.11	0.20	>Monthly	36	NA	NA
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	49	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.98	1.80	>Weekly	245	245	100.0%
Chlorine, Total	mg/L	5	0.20	1.15	2.00	>Weekly	245	245	100.0%
Chloroform	mg/L	0.25	0.01	0.01	0.03	>Monthly	49	NA	NA
Coliforms, Total	orgs/100mL	NA	3	<1	100	>Weekly	245	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	>Fortnightly	97	97	100.0%
Dibromochloromethane	mg/L	NA	<0.001	<0.001	0.002	>Monthly	49	NA	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	245	245	100.0%
Electrical Conductivity (25°C)	µS/m	~900	64	71	76	>Fortnightly	97	97	100.0%
Fluoride, as F	mg/L	1.5	0.72	0.78	0.84	>Monthly	49	49	100.0%
Hardness, as CaCO3	mg/L	200	10	15	26	>Monthly	49	49	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	140	>Weekly	245	NA	NA
Iron, Total as Fe	mg/L	0.3	0.05	0.08	0.16	>Monthly	49	49	100.0%
Manganese, Total as Mn	mg/L	0.5	0.001	0.004	0.038	>Monthly	49	49	100.0%
pH	units	6.5-8.5	6.9	7.4	8.8	>Weekly	245	243	99.2%
Sodium, as Na	mg/L	180	3.5	5.3	7.9	>Monthly	49	49	100.0%
Temperature	°C	NA	0.7	15.7	22.2	>Weekly	245	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.009	0.018	0.039	>Weekly	49	49	100.0%
Turbidity	NTU	5[1]	0.5	1.5[1]	7.4	>Weekly	245	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps, tanks, pump stations for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Romsey

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples)			Frequency of sampling[3]	No of samples		Performance against standard/ guideline
			Min	Average	Max		Total[2]	Passing	
Alkalinity, Total as CaCO3	mg/L	NA	32	37	41	>Monthly	85	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.00	0.01	0.02	>Monthly	85	85	100.0%
Aluminium, Total as Al	mg/L	NA	0.01	0.01	0.01	>Monthly	85	NA	NA
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	98	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.32	1.90	>Weekly	444	444	100.0%
Chlorine, Total	mg/L	5	0.07	1.00	2.40	>Weekly	444	444	100.0%
Chloroform	mg/L	NA	0.00	0.02	0.06	>Monthly	98	NA	NA
Coliforms, Total	orgs/100mL	NA	1	<1	9	>Weekly	444	NA	NA
Colour, True	Pt/Co units	15	<2	3	8	>Fortnightly	196	196	100.0%
Dibromochloromethane	mg/L	NA	<0.001	0.008	0.028	>Monthly	98	NA	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	444	444	100.0%
Electrical Conductivity (25°C)	µS/m	~900	220	257	310	>Fortnightly	196	196	100.0%
Fluoride, as F	mg/L	1.5	0.05	0.06	0.09	>Monthly	98	98	100.0%
Hardness, as CaCO3	mg/L	200	29	52	72	>Monthly	98	98	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	2,000	>Weekly	444	NA	NA
Iron, Total as Fe	mg/L	0.3	<0.01	<0.01	0.09	>Monthly	98	98	100.0%
Manganese, Total as Mn	mg/L	0.5	0.001	0.003	0.024	>Monthly	98	98	100.0%
Monochloramine	mg/L	3	0.03	0.64	1.60	>Weekly	382	382	100.0%
Nitrate (as NO3)	mg/L	50	0.00	0.11	0.25	>weekly	380	380	100.0%
pH	units	6.5-8.5	6.9	7.5	8.4	>Weekly	444	444	100.0%
Sodium, as Na	mg/L	180	14.0	24.3	36.0	>Monthly	98	98	100.0%
Temperature	°C	NA	7.0	15.3	23.4	>Weekly	444	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.002	0.039	0.130	>Weekly	98	98	100.0%
Turbidity	NTU	5[1]	0.1	0.1[1]	1.0	>Weekly	444	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps and tanks for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Strathmore

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples) Min	Average	Max	Frequency of sampling[3]	No of samples Total[2]	Passing	Performance against standard/ guideline
Bromoform	mg/L	NA	0.00	0.00	0.00	Monthly	13	NA	NA
Chlorine, Free	mg/L	5	0.05	0.41	0.77	>Weekly	104	104	100.0%
Chlorine, Total	mg/L	5	0.16	0.53	0.96	>Weekly	104	104	100.0%
Chloroform	mg/L	NA	0.04	0.05	0.06	>Monthly	13	NA	NA
Coliforms, Total	orgs/100mL	NA	9	<1	15	>Weekly	104	NA	NA
Colour, True	Pt/Co units	15	<2	<2	6	>Fortnightly	26	26	100.0%
Dibromochloromethane	mg/L	NA	<0.001	0.002	0.004	>Monthly	13	NA	NA
E. coli	orgs/100mL	Zero(0)	0	0	0	>Weekly	104	104	100.0%
Electrical Conductivity (25°C)	µS/m	~900	60	73	91	Fortnightly	26	26	100.0%
Fluoride	mg/L	1.5	0.60	0.79	0.89	>Monthly	13	13	100.0%
Hardness, Total (as $CaCO_3$)	mg/L	200	14	18	22	>Monthly	13	13	100.0%
Heterotrophic Plate Count (36°C)	cfu/mL	NA	1	<1	2	>Weekly	104	NA	NA
Iron	mg/L	0.3	0.04	0.06	0.08	>Monthly	13	13	100.0%
Manganese	mg/L	0.5	0.002	0.004	0.008	>Monthly	13	13	100.0%
pH	units	6.5-8.5	6.8	7.4	9.0	>Weekly	104	102	98.1%
Sodium	mg/L	180	4.2	4.8	6.3	Monthly	13	13	100.0%
Temperature	°C	NA	11.0	17.4	26.0	>Weekly	104	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.045	0.057	0.070	>Monthly	13	13	100.0%
Turbidity	NTU	5[1]	0.3	0.71	0.8	>Weekly	104	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Sunbury

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples)			Frequency of sampling[3]	No of samples		Performance against standard/ guideline
			Min	Average	Max		Total[2]	Passing	
Alkalinity, Total as CaCO3	mg/L	NA	11	21	41	>Monthly	78	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.01	0.03	0.11	>Monthly	78	78	100.0%
Aluminium, Total as Al	mg/L	NA	0.02	0.09	0.20	>Monthly	78	NA	NA
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	91	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.86	1.70	>Weekly	468	468	100.0%
Chlorine, Total	mg/L	5	<0.05	1.02	2.00	>Weekly	468	468	100.0%
Chloroform	mg/L	NA	0.01	0.03	0.09	>Monthly	91	NA	NA
Coliforms, Total	orgs/100mL	NA	16	<1	100	>Weekly	468	NA	NA
Colour, True	Pt/Co units	15	<2	<2	6	>Fortnightly	182	182	100.0%
Dibromochloromethane	mg/L	NA	<0.001	0.009	0.040	>Monthly	91	91	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	468	468	100.0%
Electrical Conductivity (25°C)	µS/m	~900	64	168	440	>Fortnightly	182	182	100.0%
Fluoride, as F	mg/L	1.5	0.64	0.78	0.92	>Monthly	91	91	100.0%
Hardness, as CaCO3	mg/L	200	11	42	120	>Monthly	91	91	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	260	>Weekly	468	NA	NA
Iron, Total as Fe	mg/L	0.3	0.01	0.07	0.16	>Monthly	91	91	100.0%
Manganese, Total as Mn	mg/L	0.5	0.001	0.003	0.035	>Monthly	91	91	100.0%
pH	units	6.5-8.5	7.0	7.7	9.5	>Weekly	468	439	93.8%
Sodium, as Na	mg/L	180	4.2	12.2	35.0	>Monthly	91	91	100.0%
Temperature	°C	NA	9.5	16.2	23.0	>Weekly	468	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.009	0.061	0.210	>Weekly	91	91	100.0%
Turbidity	NTU	5[1]	0.1	1.4[1]	2.4	>Weekly	468	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps, tanks, pump stations for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Taylors Lakes

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples) Min	Average	Max	Frequency of sampling[3]	No of samples Total[2]	Passing	Performance against standard/ guideline
Alkalinity, Total as CaCO3	mg/L	NA	13	14	15	>Monthly	13	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.02	0.03	0.04	>Monthly	13	13	100.00%
Aluminium, Total as Al	mg/L	NA	0.1	0.16	0.21	>Monthly	13	NA	NA
Bromoform	mg/L	NA	0	0	0	>Monthly	26	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.69	1.5	>weekly	312	312	100.00%
Chlorine, Total	mg/L	5	0.1	0.85	1.8	>weekly	312	312	100.00%
Chloroform ug/L	mg/L	NA	0.01	0.03	0.08	>Monthly	26	NA	NA
Coliforms, Total	MPN/100mL	NA	2	<1	100	>weekly	315	NA	NA
Colour, True	PCU	15	<2	3	12	>Fortnightly	52	52	100.00%
Dibromochloromethane	mg/L	NA	<0.001	0.002	0.002	>Monthly	26	26	NA
E. coli	MPN/100mL	0	0	0	0	>weekly	315	315	100.00%
Electrical Conductivity (25°C)	µS/m	900	64	78	100	>Fortnightly	55	55	100.00%
Fluoride, as F	mg/L	1.5	0.71	0.79	0.83	>Monthly	26	26	100.00%
Hardness, as CaCO3	mg/L	200	13	18	26	>Monthly	29	29	100.00%
Heterotrophic Plate Count (36°C)		NA	1	<1	520	>Monthly	315	NA	NA
Iron, Total as Fe	mg/L	0.3	0.05	0.15	0.28	>Monthly	32	32	100.00%
Manganese, Total as Mn	mg/L	0.5	0.002	0.011	0.037	>Monthly	32	32	100.00%
pH	units	6.5-8.5	6.8	7.5	8.3	>weekly	312	312	100.00%
Sodium, as Na	mg/L	180	4.7	6.4	9.3	>Monthly	29	29	100.00%
Temperature	°C	NA	9.5	17	25.1	>weekly	312	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.013	0.041	0.091	>weekly	26	26	100.00%
Turbidity	NTU	5[1]	0.1	1.6[1]	2.7	>weekly	315	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps and tanks for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Toolern Vale

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples)			Frequency of sampling[3]	No of samples		Performance against standard/ guideline
			Min	Average	Max		Total[2]	Passing	
Alkalinity, Total as CaCO3	mg/L	NA	13	22	35	>Monthly	13	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.02	0.03	0.05	>Monthly	13	13	100.0%
Aluminium, Total as Al	mg/L	NA	0.03	0.08	0.17	>Monthly	13	NA	NA
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	26	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.92	1.50	>Weekly	104	104	100.0%
Chlorine, Total	mg/L	5	0.08	1.10	1.80	>Weekly	104	104	100.0%
Chloroform	mg/L	NA	0.02	0.04	0.06	>Monthly	26	NA	NA
Coliforms, Total	orgs/100mL	NA	<1	<1	<1	>Weekly	104	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	>Fortnightly	52	52	100.0%
Dibromochloromethane	mg/L	NA	0.001	0.010	0.026	>Monthly	26	NA	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	104	104	100.0%
Electrical Conductivity (25°C)	µS/m	~900	71	207	390	>Fortnightly	52	52	100.0%
Fluoride, as F	mg/L	1.5	0.03	0.57	0.86	>Monthly	26	26	100.0%
Hardness, as CaCO3	mg/L	200	15	45	100	>Monthly	26	26	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	2	>Weekly	104	104	NA
Iron, Total as Fe	mg/L	0.3	<0.01	0.05	0.11	>Monthly	26	26	100.0%
Manganese, Total as Mn	mg/L	0.5	0.001	0.002	0.005	>Monthly	26	26	100.0%
pH	units	6.5-8.5	7.1	7.6	9.1	>Weekly	104	99	95.2%
Sodium, as Na	mg/L	180	5.0	14.8	36.0	>Monthly	26	26	100.0%
Temperature	°C	NA	10.2	16.7	24.1	>Weekly	104	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.040	0.067	0.110	>Weekly	26	26	100.0%
Turbidity	NTU	5[1]	0.1	1.2[1]	1.5	>Weekly	104	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps and tanks for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Tullamarine

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples) Min	Average	Max	Frequency of sampling[3]	No of samples Total[2]	Passing	Performance against standard/ guideline
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	13	NA	NA
Chlorine, Free	mg/L	5	0.05	0.63	1.30	>Weekly	104	104	100.0%
Chlorine, Total	mg/L	5	0.10	0.77	1.50	>Weekly	104	104	100.0%
Chloroform	mg/L	NA	0.01	0.02	0.02	>Monthly	13	NA	NA
Coliforms, Total	orgs/100mL	NA	<1	<1	<1	>Weekly	104	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	Fortnightly	26	26	100.0%
Dibromochloromethane	mg/L	NA	0.001	0.002	0.006	>Monthly	13	NA	NA
E. coli	orgs/100mL	Zero(0)	0	0	0	>Weekly	104	104	100.0%
Electrical Conductivity (25°C)	µS/m	~900	67	76	110	Fortnightly	26	26	100.0%
Fluoride	mg/L	1.5	0.72	0.79	0.88	>Monthly	13	13	100.0%
Hardness, Total (as $CaCO_3$)	mg/L	200	15	18	25	>Monthly	13	13	100.0%
Heterotrophic Plate Count (36°C)	cfu/mL	NA	1	<1	21	>Weekly	104	104	100.0%
Iron	mg/L	0.3	<0.01	0.08	0.16	>Monthly	13	13	100.0%
Manganese	mg/L	0.5	0.002	0.004	0.006	>Monthly	13	13	100.0%
pH	units	6.5-8.5	7.1	7.6	9.1	>Weekly	104	101	97.1%
Sodium	mg/L	180	5.4	6.0	9.0	Monthly	13	13	100.0%
Temperature	°C	NA	8.0	17.5	25.0	>Weekly	104	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.013	0.022	0.031	Monthly	13	13	100.0%
Turbidity	NTU	5[1]	0.1	1.3[1]	1.5	>Weekly	104	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Werribee

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples)			Frequency of sampling[3]	No of samples		Performance against standard/ guideline
			Min	Average	Max		Total	Passing	
Alkalinity, Total as CaCO3	mg/L	NA	8	10	12	>Monthly	26	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.01	0.02	0.02	>Monthly	26	26	100.0%
Aluminium, Total as Al	mg/L	NA	0.02	0.03	0.09	>Monthly	26	NA	NA
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	39	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.57	1.50	>Weekly	520	520	100.0%
Chlorine, Total	mg/L	5	0.09	0.71	1.70	>Weekly	520	520	100.0%
Chloroform	mg/L	NA	0.02	0.03	0.05	>Monthly	39	NA	NA
Coliforms, Total	orgs/100mL	NA	1	<1	2	>Weekly	520	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	>Fortnightly	78	78	100.0%
Dibromochloromethane	mg/L	NA	0.002	0.006	0.009	>Monthly	39	39	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	520	520	100.0%
Electrical Conductivity (25°C)	µS/m	~900	71	107	120	>Fortnightly	78	78	100.0%
Fluoride, as F	mg/L	1.5	0.73	0.84	0.93	>Monthly	39	39	100.0%
Hardness, as CaCO3	mg/L	200	14	23	29	>Monthly	39	39	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	11	>Weekly	520	NA	NA
Iron, Total as Fe	mg/L	0.3	<0.01	0.02	0.10	>Monthly	39	39	100.0%
Manganese, Total as Mn	mg/L	0.5	0.001	0.002	0.005	>Monthly	39	39	100.0%
pH	units	6.5-8.5	6.5	7.5	10.3	>Weekly	520	504	96.9%
Sodium, as Na	mg/L	180	5.1	8.5	11.0	>Monthly	39	39	100.0%
Temperature	°C	NA	11.3	17.6	25.5	>Weekly	520	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.031	0.047	0.072	>Weekly	39	39	100.0%
Turbidity	NTU	5[1]	0.1	0.4[1]	1.1	>Weekly	520	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps and tanks for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Werribee South

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples) Min	Average	Max	Frequency of sampling[3]	No of samples Total[2]	Passing	Performance against standard/ guideline
Alkalinity, Total as CaCO3	mg/L	NA	9	13	17	>Monthly	35	NA	100.0%
Aluminium, Acid Soluble	mg/L	0.2	0.01	0.02	0.03	>Monthly	33	33	100.0%
Aluminium, Total as Al	mg/L	NA	0.02	0.03	0.07	>Monthly	33	NA	NA
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	46	NA	NA
Chlorine, Free	mg/L	5	0.05	0.62	1.30	>Weekly	183	183	100.0%
Chlorine, Total	mg/L	5	0.13	0.76	1.40	>Weekly	183	183	100.0%
Chloroform	mg/L	NA	0.01	0.02	0.04	>Monthly	46	NA	NA
Coliforms, Total	orgs/100mL	NA	9	<1	9	>Weekly	183	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	>Fortnightly	92	92	100.0%
Dibromochloromethane	mg/L	NA	<0.001	0.004	0.008	>Monthly	46	NA	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	183	183	100.0%
Electrical Conductivity (25°C)	µS/m	~900	73	115	130	>Fortnightly	92	92	100.0%
Fluoride, as F	mg/L	1.5	0.67	0.82	0.93	>Monthly	48	48	100.0%
Hardness, as CaCO3	mg/L	200	14	26	33	>Monthly	46	46	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	21	>Weekly	183	183	100.0%
Iron, Total as Fe	mg/L	0.3	<0.01	0.06	0.14	>Monthly	46	46	100.0%
Manganese, Total as Mn	mg/L	0.5	0.001	0.002	0.009	>Monthly	46	46	100.0%
pH	units	6.5-8.5	7.0	7.6	10.0	>Weekly	183	176	96.2%
Sodium, as Na	mg/L	180	5.0	8.7	11.0	>Monthly	46	46	100.0%
Temperature	°C	NA	8.1	16.7	23.5	>Weekly	183	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.015	0.035	0.065	>Weekly	46	46	100.0%
Turbidity	NTU	5[1]	0.1	0.6[1]	7.2	>Weekly	183	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps and tanks for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Williamstown

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples)			Frequency of sampling[3]	No of samples		Performance against standard/ guideline
			Min	Average	Max		Total[2]	Passing	
Bromoform	mg/L	NA	0.00	0.00	0.00	Monthly	13	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.55	0.90	>Weekly	208	208	100.0%
Chlorine, Total	mg/L	5	0.11	0.68	1.40	>Weekly	208	208	100.0%
Chloroform	mg/L	NA	0.01	0.02	0.04	Monthly	13	NA	NA
Coliforms, Total	orgs/100mL	NA	3	<1	68	>Weekly	208	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	Fortnightly	26	26	100.0%
Dibromochloromethane	mg/L	NA	0.002	0.005	0.007	Monthly	13	13	NA
E. coli	orgs/100mL	Zero(0)	0	0	0	>Weekly	208	208	100.0%
Electrical Conductivity (25°C)	µS/m	~900	82	102	120	>Fortnightly	26	26	100.0%
Fluoride	mg/L	1.5	0.75	0.85	0.98	Monthly	13	13	100.0%
Hardness, Total (as $CaCO_3$)	mg/L	200	15	22	31	Monthly	13	13	100.0%
Heterotrophic Plate Count (36°C)	cfu/mL	NA	1	<1	65	>Weekly	208	208	100.0%
Iron	mg/L	0.3	0.01	0.02	0.07	Monthly	13	13	100.0%
Manganese	mg/L	0.5	0.001	0.003	0.007	Monthly	13	13	100.0%
pH	units	6.5-8.5	6.2	7.4	8.6	>Weekly	208	206	99.0%
Sodium	mg/L	180	4.9	7.5	10.0	Monthly	13	13	100.0%
Temperature	°C	NA	10.8	17.6	24.0	>Weekly	208	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.028	0.038	0.047	Monthly	13	13	100.0%
Turbidity	NTU	5[1]	0.1	0.4[1]	1.8	>Weekly	208	NA	within standards

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Woodend

Parameter	Unit	Guideline value (ADWG 2011)	Concentration or value (all samples) Min	Average	Max	Frequency of sampling[3]	No of samples Total[2]	Passing	Performance against standard/ guideline
Alkalinity, Total as CaCO3	mg/L	NA	17	34	54	>Monthly	39	NA	NA
Aluminium, Acid Soluble	mg/L	0.2	0.01	0.03	0.12	>Monthly	39	39	100.0%
Aluminium, Total as Al	mg/L	NA	0.01	0.04	0.12	>Monthly	39	NA	NA
Bromoform	mg/L	NA	0.00	0.00	0.00	>Monthly	56	NA	NA
Chlorine, Free	mg/L	5	<0.05	0.98	1.70	>Weekly	260	260	100.0%
Chlorine, Total	mg/L	5	<0.05	1.21	2.10	>Weekly	260	260	100.0%
Chloroform	mg/L	NA	0.01	0.04	0.17	>Monthly	56	NA	NA
Coliforms, Total	orgs/100mL	NA	<1	<1	<1	>Weekly	262	NA	NA
Colour, True	Pt/Co units	15	<2	<2	4	>Fortnightly	104	104	100.0%
Dibromochloromethane	mg/L	NA	0.005	0.011	0.030	>Monthly	56	NA	NA
E. coli	orgs/100mL	0	0	0	0	>Weekly	262	262	100.0%
Electrical Conductivity (25°C)	µS/m	~900	77	268	440	>Fortnightly	104	104	100.0%
Fluoride, as F	mg/L	1.5	0.03	0.07	0.76	>Monthly	53	53	100.0%
Hardness, as CaCO3	mg/L	200	14	33	120	>Monthly	52	52	100.0%
Heterotrophic Plate Count (36°C)	orgs/100mL	NA	1	<1	48	>Weekly	260	NA	NA
Iron, Total as Fe	mg/L	0.3	<0.01	<0.01	0.02	>Monthly	52	52	100.0%
Manganese, Total as Mn	mg/L	0.5	0.001	0.002	0.011	>Monthly	52	52	100.0%
pH	units	6.5-8.5	6.9	7.6	8.1	>Weekly	260	260	100.0%
Sodium, as Na	mg/L	180	18.0	36.9	62.0	>Monthly	52	52	100.0%
Temperature	°C	NA	6.7	14.6	22.9	>Weekly	260	NA	NA
Trihalomethanes, Total	mg/L	0.25	0.016	0.074	0.220	>Weekly	53	53	100.0%
Turbidity	NTU	5[1]	0.1	0.2[1]	0.5	>Weekly	260	NA	within standard

1. Based on 95th percentile result
2. No. of samples includes routine program at network taps and tanks for the specific water sampling locality
3. No. of samples collected is more than the frequency due to multiple sites sampled in the locality

NA – Not Applicable

Appendix B Risk Management Plan Audit Certificates

Risk Management Plan Audit Certificate
Safe Drinking Water Regulations 2015

Certificate Number: 183
Audit period: 1 January 2021 – 31 December 2022

To:
Maree Lang
Managing Director
Greater Western Water
36 Macedon Street
SUNBURY VIC 3429

Australian Business Number (ABN): 70 066 902 467

I, James Howey, after conducting a risk management plan audit of the water supplied by Greater Western Water, am of the opinion that Greater Western Water *has not* complied with the obligations imposed by section 7(1) of the *Safe Drinking Water Act 2003* during the audit period.

There were four minor non-compliances identified as follows:

- Preventive measures in accordance with Section 9(1)(b) of the *Safe Drinking Water Act 2003* were not fully implemented. A number of water agency owned testable backflow prevention devices were not tested in the required timeframe.
- The risk management plan was not implemented in its entirety in accordance with Section 7(1)(a) of the *Safe Drinking Water Act 2003.* The water quality monitoring program was not fully implemented as a number of samples were missed.
- Competency requirements for personnel contracted by Greater Western Water were not specified in accordance with Regulation 8(1)(f) of the *Safe Drinking Water Regulations 2015*.
- Actions implemented at the Romsey Water Filtration Plant, to address an identified treatment deficit, were found to be non-compliant with the requirements of Regulation 8(1)(g) of the *Safe Drinking Water Regulations 2015* for the management of short-term water quality risk.

James Howey

28/4/2023

Appendix C List of parameters

The limits for parameters tested by GWW at various locations and as identified in the risk management plan - as specified by various guides such as the Australian Drinking Water Guidelines - are outlined below. In some cases, a parameter does not have a limit specified but has been identified through risk assessments as a parameter of interest in case a limit is determined in the future.

Parameter	Sampling Frequency	Water Quality Standard
Alkalinity, Total as CaCO3	Monthly	aesthetic limit is 200mg/L
Aluminium, filtered	Monthly	currently no recommended health guideline value set
Aluminium, Total as Al	Monthly	currently no recommended health guideline value set
Ammonia	Weekly*	aesthetic limit is 0.5mg/L
Bicarbonate Alkalinity as CaCO3	Monthly	aesthetic limit is 200mg/L
Bromodichlormethane	Monthly	should not exceed 0.25mg/L
Bromoform	Monthly	should not exceed 0.25mg/L
Cadmium	Quarterly	should not exceed 0.002mg/L
Calcium	Monthly	currently no recommended health guideline value set
Carbonate Alkalinity as CaCO3	Monthly	aesthetic limit is 200mg/L
Chlorine, Total	Weekly	should not exceed 5mg/L
Chlorine, Free	Weekly	Limit based on Chlorine, Total
Chloroacetic acid	Quarterly	should not exceed 0.15mg/L
Chloroform	Monthly	should not exceed 0.25mg/L
Chromium	Quarterly	should not exceed 0.05mg/L
Coliforms, Total	Weekly	currently no recommended health guideline value set
Colour, True	Fortnightly	should not exceed 15HU
Copper	Quarterly	should not exceed 1mg/L
Dibromochloromethane	Monthly	should not exceed 0.25mg/L
Dichloroacetic acid	Quarterly	should not exceed 0.1mg/L
Dissolved Organic Carbon	Monthly	currently no recommended health guideline value set
Dissolved Oxygen (Field)	Weekly	currently no recommended health guideline value set
E. coli	Weekly	0 detections in an 100ml sample of drinking water
Electrical Conductivity @ 25C	Fortnightly	aesthetic limit is 940µS/cm
Enterococci	Weekly	should not exceed 0orgs/100mL
Hardness, as CaCO3	Monthly	aesthetic limit is 200mg/L

Parameter	Sampling Frequency	Water Quality Standard
Heterotrophic Plate Count, 37C	Weekly	currently no recommended health guideline value set
Hydroxide Alkalinity as CaCO3	Monthly	aesthetic limit is 200mg/L
Iron, Filtered	Weekly	Limit based on Iron, Total
Iron, total as Fe	Weekly	aesthetic limit is 0.3mg/L
Lead	Quarterly	should not exceed 0.01mg/L
Magnesium, as Mg	Monthly	currently no recommended health guideline value set
Manganese,Filtered (Soluble)	Weekly	Limit based on Manganese, Total
Manganese, total as Mn	Weekly	Aesthetic limit should not exceed 0.1mg/L, should not exceed 0.5mg/L
Mercury, as Hg	Quarterly	should not exceed 0.001mg/L
Monochloramine	Monthly**	should not exceed 3mg/L
NDMA	Monthly**	should not exceed 0.0001mg/L
Nickel	Quarterly	should not exceed 0.02mg/L
Nitrate	Monthly**	should not exceed 50mg/L
Nitrite	Monthly**	should not exceed 3mg/L
pH	Weekly	aesthetic limits are no less than 6.5 and no greater than 8.5
Phosphorus, Reactive as P	Quarterly	should not exceed 1mg/L
Silica, Non Reactive	Quarterly	currently no recommended health guideline value set
Silica, Reactive	Quarterly	currently no recommended health guideline value set
Sodium	Monthly	aesthetic limit should not exceed 180mg/L
Sulfate	Annually	aesthetic limit should not exceed 250mg/L
Trihalomethanes	Monthly	must not exceed 0.25mg/L (reference Safe Drinking Water Regulations 2015)
Turbidity	Weekly	95th percentile limit of drinking water samples collected in the preceding 12months must be less than or equal to 5NTU (reference Safe Drinking Water Regulations 2015)
UV Transmission as 254nm	Quarterly	currently no recommended health guideline value set
Zinc	Quarterly	should not exceed 3mg/L

* Weekly at Romsey only

** Monthly at Romsey only

Glossary

Algae	Simple types of plant with no root, stems or leaves. They occur mostly in freshwater and marine environments.
Algal bloom	A rapid growth of algae in aquatic environments often triggered by an input of high levels of nutrients and an increase in temperature. Blue-green algae (or cyanobacteria) are of most concern.
Alum	An aluminium sulphate-based chemical used as a coagulant in the water treatment process.
Aluminium (Al)	A naturally occurring element in soils which can enter water from catchments.
Ammonia (NH3)	A highly soluble compound resulting from the decomposition of organic matter containing nitrogen. Usually only found in small concentrations in surface waters.
Apparent Colour	The measurement of colour without turbidity removal, that is the colour of the whole water sample due to both dissolved and suspended components.
Aquifer	A layer or section of earth or rock that contains freshwater (known as groundwater), any water that is stored naturally underground or that flows through rock or soil, supplying springs and wells.
Australian Drinking Water Guidelines (ADWG)	National Health and Medical Research Council's Australian Drinking Water Guidelines 2011.
Blue green algae (cyanobacteria) (BGA)	Single celled, filamentous or colony-forming organisms which are widely distributed in the freshwater and marine environments. Under favourable conditions of light, temperature and nutrient supply, extensive growth of blue green algae may occur, leading to blooms. These can result in environmental problems and can create challenges for water treatment.
Bulk entitlement or Bulk Water Agreement	An agreement that outlines the conditions for supply of bulk drinking water from reservoirs managed by Southern Rural Water and drinking water supplied by the Melbourne Water Corporation to Greater Western Water.
Calcium (Ca)	A naturally occurring element which can enter water from catchments. It may also be added to water in the treatment process to reduce the acidity levels or increase the capacity of water to buffer pH changes.
Catchment	An area of land surrounding a water storage. The runoff water from rain falling over the catchment drains into the storage and may collect nutrients, minerals and other contaminants including microorganisms from the surface of the land.
Chlorination	The disinfection of water, wastewater, and industrial waste through the application of chlorine (Cl) as part of the water treatment process. Chlorination kills microorganisms and oxidises undesirable compounds.
Chloramination	The application of the chlorine followed by ammonia to create monochloramine (NH2Cl), a stable disinfectant that is added to drinking water to kill bacteria or to oxidise undesirable compounds. Chloramines persist for a longer time than chlorine and as a result are used in longer water distribution systems.

Coliforms	Coliform bacteria are used as one of the indicators of the quality of drinking water and the possible presence of disease-causing microorganisms. These bacteria are killed by chlorine.
Cryptosporidium	A parasitic protozoan (microorganism) which causes gastroenteritis in humans. These organisms occur in the gut of infected warm-blooded animals and can be introduced into source water through faecal contamination.
Disinfection	Inactivation (killing) of pathogens or organisms capable of causing infectious disease by chemical or physical processes, including chlorination.
Drinking Water Sample	A water sample collected after drinking water treatment is complete.
Escherichia coli (E. coli)	The most common heat tolerant coliform present in faeces, which is regarded as the most specific indicator of recent faecal contamination. *E. coli* can be killed by standard disinfection practices.
False Positive sample *E. coli* result	*E. coli* detection in a routine water quality sample considered non-representative of the water supplied to customers, following an investigation conducted in accordance with the guidelines issued by the Department of Health. A 'false positive sample' result is considered to have met the *E. coli* drinking water quality standards in Schedule 2 of the Safe Drinking Water Regulations 2015.
Filtration	A process for removing particles from water by passing through a porous barrier, such as a screen, membrane, sand or gravel. Often used in conjunction with a coagulant to settle contaminants.
Flagellates	Any group of protozoans that possess a hair-like structure that is capable of a whip-like motion for movement.
Fluoride (F)	Fluoride is regarded as a useful constituent of drinking water, particularly for the prevention of tooth decay. Fluoride is added to the water supply at Merrimu WFP, Rosslynne WFP and all water supplied from the Melbourne system.
Groundwater	Water beneath the earth's surface (often between saturated soil and rock) that supplies bores, wells and springs.
Hazard Analysis and Critical Control Point (HACCP)	A system that identifies, evaluates and controls hazards that are significant for food safety (Codex 2020).
Incident	Any event or circumstance that causes or is likely to cause: a) threat to community health or safety; or b) creation of the need for urgent action under statute or legislation.
Inflows	Water flowing from the catchment to the reservoirs through streams, rivers and creeks.
Iron (Fe)	An element which when found in water leads to brownish discolouration. Limits on the amount of iron in water are usually due to taste and appearance factors rather than any detrimental health effects.
kL	kilolitres (thousand litres)
Manganese (Mn)	Manganese in a water supply may affect taste, cause staining of clothes, produce deposits in pipes and contribute to turbidity.
mg/L	milligrams per litre
ML	megalitres (million litres)
µg/L	micrograms per litre
National Association of Testing Authorities (NATA)	Australia's national laboratory accreditation authority. NATA accreditation recognises and promotes facilities competent in specific types of testing, measurement, inspection and calibration.
National Health and Medical Research Council (NHMRC)	Australia's peak body for supporting health and medical research for developing health advice for the Australian community, health professionals and governments.
Nitrogen (N)	An essential nutrient for plant growth. It is used in fertilisers and is present in sewage effluent. High levels of nutrients can lead to excessive algal growth.
Nitrate (N03-)	The most stable form of combined nitrogen in water. Present in surface waters in small amounts, the major sources are from human and animal wastes.

Nephelometric turbidity unit (NTU)	A measure of the turbidity in water.
Nutrients	Compounds required for growth by plants and other organisms. Major nutrients for plant growth are phosphorous and nitrogen.
Pathogens	Disease-causing organisms such as bacteria and viruses.
pH	The pH value indicates if a substance is acidic, neutral or alkaline. It is calculated from the number of hydrogen ions present and is measured on a scale of 0 to 14. A pH greater than 7 is alkaline, less than 7 is acidic and 7 is neutral.
Phosphorous (P)	An essential nutrient for plant growth. High levels of phosphorous can lead to excessive algal growth and can be due to inputs from human activity such as fertiliser run-off and land clearing.
Potable water (drinking water)	Water that is intended for human consumption or for purposes connected with human consumption (e.g., food preparation, making of ice, preservation of unpackaged food).
Reservoir	A natural lake or artificial body of water used as storage for water supply.
Risk assessment	A scientifically based process consisting of the following steps: i) hazard identification; ii) hazard characterisation; iii) exposure assessment; and, iv) risk characterisation.
Risk management	The process of weighing policy alternatives in the light of the results of risk assessment and, if required, selecting and implementing an appropriate control option, including regulatory measures.
Risk management plan	As set out in Section 9 of the *Safe Drinking Water Act 2003*.
SCADA	Supervisory Control and Data Acquisition system.
Source water	Water that has not been treated in any way.
SRW	Southern Rural Water, bulk water supplier responsible for Merrimu, Rosslynne and Pykes Creek Reservoirs.
Total dissolved solids	A measure of organic salts and small amounts of organic matter that are dissolved in water.
Total hardness	The sum of the concentrations of calcium and magnesium ions expressed as calcium carbonate equivalent. Waters with a total hardness in excess of 200mg/L are considered hard.
Treatment (water)	The filtration and disinfection processes employed to produce drinking water.
Trihalomethanes	Compounds that may occur in a chlorinated water supply as a by-product of organic materials present in the water reacting with chlorine.
True colour	The colour of water after particles of organic matter have been removed through filtration and is the measurement of the extent to which light is absorbed by the water. Measured in Hazen Units (HU).
Turbidity	The presence of suspended solids in water causing a muddy or discoloured appearance. Turbidity is measured in Nephelometric Turbidity Units (NTUs).
Water filtration plant (WFP)	Drinking water treatment plant.
Water quality standard	A quality standard specified for drinking water by regulations made for the purposes of Section 17 of the *Safe Drinking Water Act 2003*.
Water supply system	The complete system that provides a water supply to customers. It includes all infrastructure from the water source to the customer including the catchment, water storage, treatment and delivery systems and networks.

Greater Western Water

36 Macedon Street
Sunbury, Vic 3429
ABN 70 066 902 467
gww.com.au

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