Melbourne Water

Water Quality Annual Report

2023-24

VICTORIA State Government

Melbourne Water is owned by the Victorian Government. We manage Melbourne's water supply catchments, remove and treat most of Melbourne's sewage, and manage rivers and creeks and major drainage systems throughout the Port Phillip and Westernport region.

Melbourne Water
Enhancing Life and Liveability

About Melbourne Water

This report is provided to the Secretary of the Department of Health in accordance with Section 26 of the *Safe Drinking Water Act 2003* (Vic) for the 2023-24 financial year.

Melbourne Water (MW) makes a vital contribution to the renowned Melbourne lifestyle by underpinning human health, enhancing community well-being, supporting economic growth, and balancing the natural and human-made environment.

The organisation is responsible for the supply of affordable, high-quality water, reliable sewerage, healthy waterways, integrated drainage and flood management services and cooler greener spaces, helping make greater Melbourne a fantastic place to live.

Today, the organisation employs a passionate, truly diverse, future-focused team of experts, who collaborate with a wide range of partners to skilfully balance the social, economic and liveability needs of the community with the long-term benefit of the environment.

MW has a solid history of foresight, ingenuity, and best practice. Today, with a strong commitment to understanding and delivering to the needs of customers and the community, we are a leader in the delivery of an outstanding integrated system that is secure, efficient, affordable, and sustainable.

Our key stakeholders are government, regulators, and our customers including other water businesses, land developers, the community, and suppliers. These stakeholders and our other strategic partners, including our construction and maintenance partners and research organisations, help us achieve our objectives. We consider social, environmental, and financial effects and short-term and long-term implications in all our business decisions.

We are owned by the Victorian Government, with an independent Board of Directors responsible for governance. The responsible Minister is the Minister for Water. The Environment Protection Authority Victoria and the Department of Health Victoria (DH) regulate the environmental and public health aspects of our business. The Essential Services Commission (ESC) regulates prices and monitors service performance. We work across several arms of the Victorian Government, including the Department of Energy, Environment and Climate Action (DEECA) and the Department of Treasury and Finance.

Our customers include Melbourne's retail water companies (Greater Western Water, GWW; South East Water, SEW; and Yarra Valley Water, YVW), regional water authorities (South Gippsland Water, SGW; Gippsland Water, GW; Westernport Water, WPW and Barwon Water, BW), local councils, land developers, and businesses that divert river water.

MW and the retail water companies have developed risk management systems for drinking water quality using the principles of Hazard Analysis Critical Control Points (HACCP) and the quality management system standard ISO 9001. The HACCP process systematically analyses hazards and establishes measures for their control to ensure product quality and safety. Our commitment to delivering safe and secure high quality drinking water that meets or exceeds regulatory and customer service standards is set out in our board approved Public Health Policy.

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1. Water Supply System

We manage the harvesting of water from catchments, storage of harvest, bulk water transfer, the treatment of water, and the delivery of treated water to numerous interface points with water companies such as GWW, SEW, YVW, BW, SGW and WPW (SGW and WPW receive water via the Victorian Desalination Pipeline). GW receives untreated water. In total, we supplied approximately 471 billion litres of water in 2023-24, which is 4% more than last year. This volume included a small volume of untreated water directly from our aqueducts to connected customers supplied by Melbourne's retail water companies.

2. Source Water

The drinking water we supply is sourced from a combination of protected surface water catchments, open surface water catchments, and seawater. Each of these source waters requires a different type of treatment to ensure that the treated water is appropriate for human consumption.

Approximately 75% of Melbourne's water is sourced from forested, protected catchments. The catchment system consists of 11 water supply catchments and five water holding storages. The catchments located within National Parks are co-managed with Parks Victoria, with management arrangements outlined in a National Parks Agreement. The catchments located within State Forest are co-managed with DEECA, a Memorandum of Understanding details the arrangements to effectively manage human activity and land use for the purposes of protecting water resources in State Forest.

The five water holding storages are solely managed by MW. Most of Melbourne's water is supplied via Silvan Reservoir which receives inflows from Thomson Reservoir, Upper Yarra Reservoir, O'Shannassy Reservoir, and other small tributaries to the Yarra River. Cardinia is supplied both by the Silvan system and when in operation the Victorian Desalination Project (VDP), some of this water can then be used to supplement Silvan demand when required. Greenvale Reservoir continues to be supplied by the Silvan system. These sources are supplied to Melbourne's retail water companies unfiltered because of the high quality of water drawn from the protected catchments and large storages. As is reflected in our board approved Public Health Policy MW is committed to "protect Melbourne's existing drinking water sources through sustainable catchment management practices".

Approximately 25% of Melbourne's drinking water has been sourced from open catchments that have mixed land uses including farming, rural properties and state forests that are open to activities such as camping and four-wheel driving. Water sourced from these catchments undergoes additional treatment to that sourced from protected catchments to ensure the safety of the drinking water supply.

The Yan Yean water treatment plant was upgraded with commissioning and proof of performance underway during 2024. The upgraded treatment plant sources water from the Wallaby Creek, Toorourrong and Yan Yean catchments via the Yan Yean Reservoir. Yan Yean Reservoir can also receive treated water from the Silvan Reservoir.

The Tarago water supply catchment contains land that is privately owned, with a variety of agricultural uses. We have an interest in the protection and improvement of water quality on this private land and have worked with stakeholders, including the Baw Baw Shire Council and the Neerim District Landcare Group, to develop a Tarago Catchment Management Plan.

The open mid-Yarra River catchment feeds into Sugarloaf Reservoir, where it mixes with water from the protected Maroondah catchment before being treated at the Winneke Treatment Plant. The Yarra Glen supply is also fed from the Maroondah catchment; however, the transfer aqueduct is not protected, meaning that a greater degree of treatment is required prior to supply.

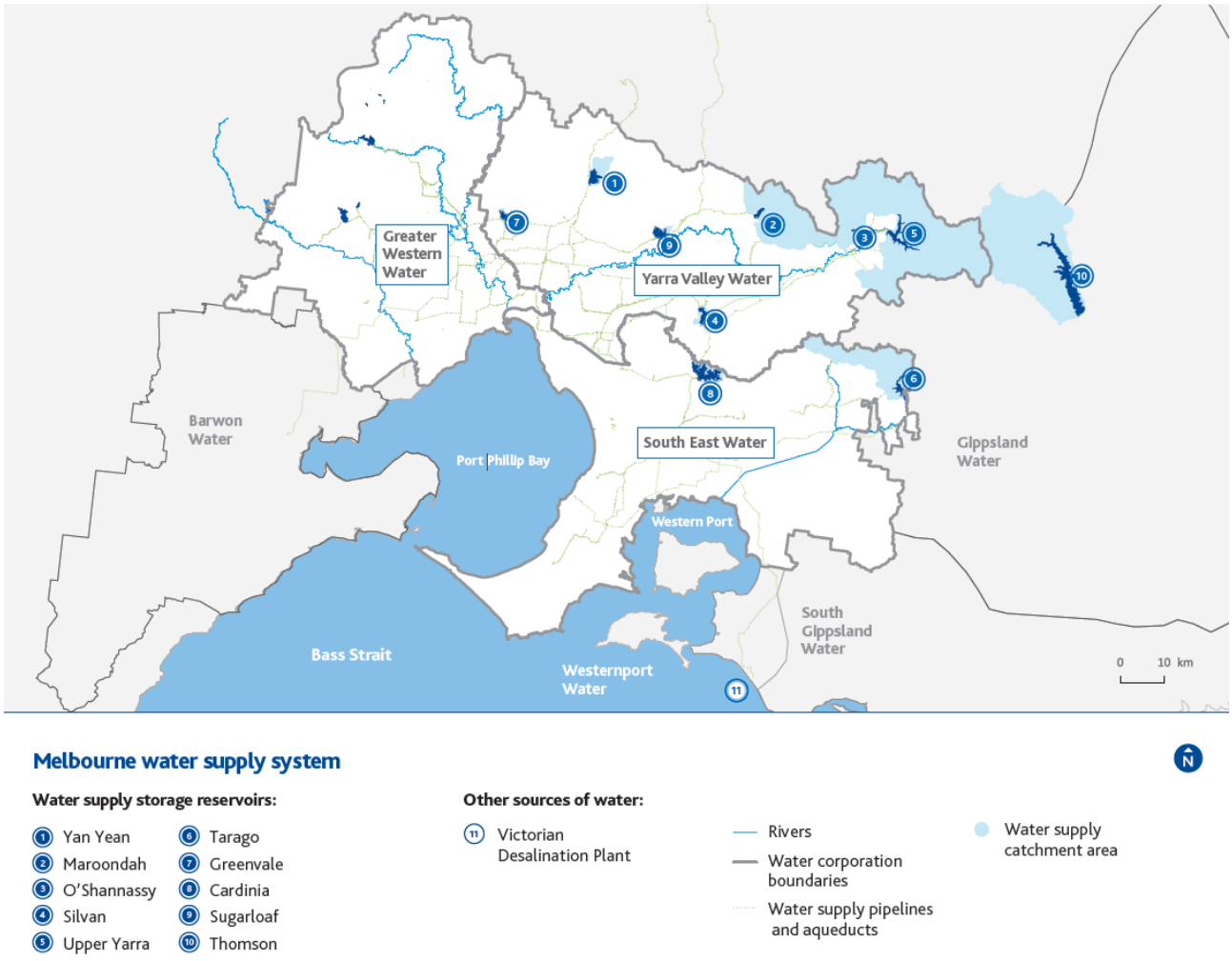
The Healesville supplies are sourced directly from nominally protected catchments without a storage reservoir to buffer water quality problems that arise from time to time. To mitigate these water quality risks these sites also have additional treatment barriers, which remove colour and turbidity as well as potential pathogens.

Depending on the volume of water stored in Melbourne's reservoirs, Cardinia Reservoir can also receive desalinated water. The VDP comprises a 150 gigalitre per year reverse osmosis plant at Wonthaggi, an 84-kilometre underground, two-way transfer pipeline to Berwick and an 87 kilometre underground dedicated power supply from Cranbourne. The plant extracts seawater from Bass Strait near Wonthaggi. Water is fully treated via a series of processes (refer to Table 1 and Table 2 on pages 10-13 for further details). Water enters an underground transfer pipeline which connects the plant to our existing water supply network, enabling supply to Cardinia Reservoir, directly into the water network at Berwick and to offtakes along the pipeline. The pipeline is two-way, so when the plant is not in use, the pipeline can transfer water from our distribution network to connected regional water businesses, thereby ensuring security of supply.

In the 2023-24 financial year, no water was supplied by the Victorian Desalination Plant. There were no major changes in the arrangements for water supply compared to the previous financial year and the relative contribution from each source was similar to the previous year. A notable minor change was the introduction of water from Yan Yean reservoir back into supply, though this only contributed a relatively small amount of water as the treatment plant commenced commissioning and undergoes proof of performance. We continued to optimise which sources we harvested from throughout the year to meet forecast demand and climate variability, as per regularly updated plans.

Figure 1 shows our supply area, supply systems and treatment processes are described in Table 1 and 2.

Figure 1 - Melbourne's water supply system



We manage the catchments and source water storages used for the supply of drinking water to the Melbourne metropolitan area. Untreated (supply by agreement) and treated drinking water is supplied to consumers by Melbourne's retail water companies. The water is monitored from catchments, through major storages and treatment plants to the interface points with the retail water companies to ensure that it meets the requirements of relevant drinking water quality guidelines and agreements with these companies.

We prioritise our actions to protect source water from contamination using our drinking water quality risk assessment. The risk assessment covers catchments, storage and service reservoirs, treatment, and bulk water transfer to the interface with the retail water companies. Operational monitoring is used to provide early warning of issues which could affect drinking water quality before critical limits are reached. Examples of this monitoring include catchment inspections, manual water quality sampling and online monitoring.

We routinely monitor the water quality within the catchments and distribution system through regular sampling and analysis according to a risk-based water sampling program consistent with the requirements of regulation 8(1)(d) of the Safe Drinking Water Regulations 2015. The sampling and analysis are contracted out to external National Association of Testing Authorities (NATA) accredited laboratories. The level of monitoring is designed to complement risk management and Hazard Analysis Critical Control Points (HACCP) systems, meet the

requirements of the Bulk Water Supply Agreements (BWSA), monitor treatment processes, and assist Melbourne's retail water companies and regional water authorities' needs in meeting the Safe Drinking Water Regulations 2015.

We maintain a certified management system, HACCP, for operation of the water treatment plants and supply system to ensure the delivery of safe drinking water. This risk-based management system verifies that treatment processes are operating in accordance with design intent and are achieving the required level of pathogen reduction.

The supply areas of Melbourne's retail water companies are divided into water sampling localities and these localities can have one or more water sources during the day or year due to the demand, seasonal variation, and complexity of our water supply system. The retail water companies must comply with the Safe Drinking Water Regulations in these localities as part of their licence agreement with the Essential Services Commission (ESC).

Recreation in our catchments

MW continues to support exploring a balanced approach to recreation in selected catchments and reservoir parks to allow more people to enjoy Victoria's vast natural spaces, balanced with protecting our precious drinking water for the safety of our community.

At Yan Yean Reservoir we have been working with the Wurundjeri Woi-wurrung Aboriginal Cultural Heritage Corporation, Parks Victoria, and the City of Whittlesea to explore opportunities to enhance community open space and recreation. As partners we aim to celebrate, protect, and connect community with the unique landscape, cultural, environmental, heritage and water supply values of Yan Yean. We are committed to working with the Wurundjeri Woi-wurrung to protect and celebrate their cultural heritage and have partnered with them to undertake a Cultural Values Assessment for Yan Yean Reservoir. Additionally, we are working together on eDNA surveys to better understand the aquatic fauna present in the reservoir. This will provide an important foundation for future planning for the site.

As part of the 2023-24 State Budget, the Victorian Government committed more the $12m towards the development of recreational facilities and required water treatment upgrades at existing water treatment plants to facilitate on water boating and fishing at Tarago Reservoir.

As the authority responsible for managing Tarago Reservoir, MW has been working with DEECA's Water and Catchments – Recreational Values team, the Victorian Fisheries Authority (VFA), Better Boating Victoria (BBV), Gippsland Water, the Department of Health (DH), the Department of Premier and Cabinet (DPC) and Baw Baw Shire Council as part of an interagency steering committee to deliver early aspects of this project.

MW has secured funding to proceed with upgraded UV drinking water treatment capacity at the Tarago Water Treatment Plant, which will enable limited on-water activities and protect public health by maintaining a high-quality supply of drinking water from Tarago Reservoir. We are also leading a detailed risk assessment, working with independent expert consultants to better understand the risk of allowing petrol-powered boating on-water; this activity was discussed at and endorsed by the project steering committee. This also includes engaging our key water supply customer, South East Water, proving them with information about the risk assessment and working directly with Gippsland Water as a partner who supply their local customers directly from Tarago Reservoir.

3. Drinking Water Treatment Processes

The water we supply to retail water companies is potable water, with the exception of:

- Gippsland Water (GW) - Untreated water from our Tarago Reservoir is fed into GW's treatment plants and then into supply for consumption by the customers.
- South Gippsland Water (SGW) – Water from the VDP is supplied to SGW via the Victorian Desalination Pipeline. This water is retreated in SGW's treatment plants prior to being supplied to customers to ensure it meets water quality standards.
- Supply by Agreement Customers – some customers directly connect to our untreated water assets. The retail water companies have processes to ensure these customers are informed that their water is not suitable for drinking.

Water treatment plants are located where water from open storages first enters the distribution system. Whilst long retention times in storage reservoirs and primary disinfection plants help inactivate microorganisms such as pathogenic bacteria, protozoa and viruses in the untreated water, additional treatment barriers are required in some cases depending on the risk level of the water.

Chlorination and ultraviolet (UV) irradiation are the methods we use to disinfect the water. Chlorination is the most common form of disinfection used to treat Melbourne's water supply, it is effective against viruses and bacteria and provides a residual to help control biofilm growth and maintain water quality in the distribution network. We operate primary chlorination disinfection plants only at Silvan, Monbulk, Kallista, Cardinia, and Greenvale. We operate five primary UV disinfection plants, which provide effective initial disinfection alongside secondary chlorination (sodium hypochlorite) plants to maintain downstream chlorine residual. At Warburton (Martyr Road), Woori Yallock and Launching Place (Lusatia Park), East Warburton (Brahams Road and Lyrebird Avenue) and Yarra Junction.

Water from open catchments is treated by filtration in addition to chlorine and UV disinfection, to ensure adequate pathogen removal. We operate three large filtration plants – Winneke, Tarago and Yan Yean. Winneke is a sand filtration plant that treats water at the outlet of Sugarloaf Reservoir. It incorporates processes including coagulation, clarification, filtration, UV disinfection along with chemical addition for fluoridation, chlorination, and pH correction. The Tarago Water Treatment Plant at Drouin West is gravity fed and incorporates processes including permanganate pre-dosing, coagulation, Dissolved Air Flotation and Filtration, UV and chemical addition for pH correction, fluoridation, and chlorination. The Yan Yean Water Treatment Plant upgrade has been completed and is currently operating in Proof of Performance mode. The treatment plant is gravity fed and has a treatment train that consists of Direct Filtration, Biological Activated Carbon / Granular Activated Carbon (BAC/GAC), UV and Chlorine Disinfection, Fluoridation, and pH correction.

There are three membrane filtration plants; two that supply Healesville (Frogley and Cresswell Water Treatment Plants) and one that supplies Yarra Glen. These plants remove particles in the untreated water from their respective aqueduct sources to ensure that parameters such as turbidity and colour are reduced to acceptable levels, particularly during storm events. In addition, pathogens attached to the filtered particles are removed. Reducing the turbidity also ensures more effective chlorine disinfection of the filtered water.

Water from the Victorian Desalination Plant is treated via a series of processes which include filtration, reverse osmosis, disinfection, and fluoridation.

Eleven fluoridation plants are operated at the direction of DH to promote improved dental health outcomes in the community. The operation of the fluoridation plants is a statutory requirement under the *Health (Fluoridation) Act 1973* (Vic). These 11 plants are:

- Eight fluorosilicic acid plants operating at: Silvan (three plants), Cardinia (two plants), Winneke (one plant), Tarago (one plant) and Yan Yean (one plant).
- Two sodium fluoride solution plants operating at Monbulk and Kallista.
- The Victorian Desalination Plant which uses fluorosilicic acid. AquaSure operates the Victorian Desalination Plant under a public private partnership project managed by DEECA.

Secondary disinfection chlorination plants are also located at a number of points within the treated water network. Secondary disinfection supports achieving a chlorine residual throughout the transfer and distribution systems helping to protect against minor ingress into the distribution network, prevent taste and odour problems and minimise biofilm growth within the closed distribution system where the water has already been treated by primary disinfection.

Tables 1 – 2 describe the water treatment sources, treatment processes and substances added at each treatment plant.

Table 1: Summary of water supply systems and areas serviced

Water Supply System	Source Water / Catchment	Storage	Treatment Plant	Treatment Storages	Area Supplied *(Retail water company supplied)*
Cardinia	Transfer from Silvan Reservoir without being treated at Silvan water treatment plant Treated water from Desalination plant	Cardinia Reservoir	Cardinia	N/A	Mornington Peninsula and south eastern suburbs. Note: pump station at Cardinia can also pump water back to Silvan Reservoir *(South East Water, Yarra Valley Water, South Gippsland Water and Westernport Water)*
Victorian Desalination Plant	Desalination plant offtake from Bass Strait	Direct to supply or Cardinia Reservoir	Wonthaggi Desalination Plant	Cardinia Reservoir / direct supply to townships	Capable of supplying primarily Mornington Peninsula, south eastern suburbs and South Gippsland area through direct delivery points and contributing to water businesses connected to the Melbourne Water supply through Cardinia Reservoir which is blended with catchment supplies. (*South East Water, Yarra Valley Water, South Gippsland Water and Westernport Water)*
Greenvale	Transfer from Silvan Reservoir (after treated at Silvan), or from Winneke water treatment plant. See Silvan and Winneke water supply systems	Greenvale Reservoir	Greenvale St Albans	N/A	Western suburbs and Sunbury/Melton *(Greater Western Water, Yarra Valley Water, Barwon Water)*
			Greenvale-Yuroke	N/A	
Lower Yarra Valley Townships	Maroondah Catchment	Maroondah Reservoir	Yarra Glen	Yarra Glen Service Reservoir	Yarra Glen *(Yarra Valley Water)*

Water Supply System	Source Water / Catchment	Storage	Treatment Plant	Treatment Storages	Area Supplied *(Retail water company supplied)*
Lower Yarra Valley Townships	Coranderrk and Graceburn Catchments	N/A	Cresswell	Cresswell Service Reservoir	Healesville *(Yarra Valley Water)*
			Frogley	Frogley Service Reservoir	
Silvan	Thomson Catchment Upper Yarra Catchment O'Shannassy Catchment Armstrong Catchment McMahons Catchment Starvation Catchment Coranderrk Catchment Treated water from Desalination plant via Cardinia	Silvan Reservoir	Silvan-Olinda Silvan-Preston Silvan-Waverley	N/A	Eastern, central, northern & western suburbs, including Seville and Wandin *(Greater Western Water, South East Water, Yarra Valley Water)*
			Monbulk	Monbulk Service Reservoir 1 & 2	Monbulk, Silvan, Sherbrooke, Sassafras, Ferny Creek, Olinda, Mount Dandenong *(Yarra Valley Water)*
			Kallista	Johns Hill Service Reservoir	Emerald, Kallista, Menzies Creek, Cockatoo *(Yarra Valley Water)*
Tarago	Tarago Catchment	Tarago Reservoir	Tarago	Tarago Clearwater Reservoir	Neerim South, Drouin/Warragul *(Gippsland Water)* Mornington Peninsula, West Gippsland townships, southern suburbs *(South East Water)*
Upper Yarra Valley Townships	Thomson Catchment Upper Yarra Catchment	Thomson Reservoir Upper Yarra Reservoir	Brahams Rd Lusatia Park Lyrebird Martyr Rd Yarra Junction	N/A	Woori Yallock, Launching Place, Yarra Junction, Warburton, East Warburton *(Yarra Valley Water)*
Winneke	Transfer from Maroondah Reservoir, Yarra River, Goulburn River[1]	Sugarloaf Reservoir	Winneke	Winneke Clearwater Reservoir	Northern, eastern, central & western suburbs *(Greater Western Water, South East Water, Yarra Valley Water)*

Water Supply System	Source Water / Catchment	Storage	Treatment Plant	Treatment Storages	Area Supplied *(Retail water company supplied)*
Yan Yean	Wallaby Creek Catchment Toorourrong Catchment Yan Yean Catchment Transfer from Silvan Reservoir Transfer from Winneke Treatment plant.	Yan Yean Reservoir	Yan Yean	Yan Yean Service Reservoir	Northern suburbs, Whittlesea *(Yarra Valley Water)*

Table 2: Water treatment processes and added substances at each drinking water treatment plant

Water Supply System	Treatment Plant	Treatment Process	Added Substances	Role of Each Process
Cardinia	Cardinia 1400 Cardinia 1700	Chlorination	Chlorine gas / Sodium hypochlorite[1]	Disinfection
		Fluoridation	Fluorosilicic acid	Provide dental health benefit
		pH Correction	Hydrated Lime	pH correction
Victorian Desalination Plant	Wonthaggi Desalination Plant	Coagulation /Flocculation	Ferric sulphate / Sulphuric acid / Polydadmac	Improve performance of filtration
		Filtration (Drum screens, dual media pressure filters, cartridge filters	-	Protect RO membranes
		Reverse Osmosis	Antiscalant / Sodium hydroxide/ Sodium bisulphite	Removal of salts from the water
		Reverse Osmosis Cleaning	Membrane cleaning chemicals (caustic, detergent, acid)	Maximise performance of RO
		Chlorination	Chlorine gas	Disinfection
		Fluoridation	Fluorosilicic acid	Provide dental health benefit
		Remineralisation	Hydrated lime / Carbon dioxide	Stabilise water and pH correction
		Membrane preservation	Sodium bisulphite	Protect membranes when not in use

[1] Occasional use of Sodium hypochlorite when required as additional residual or when Chlorine gas dosing is offline.

		Sludge thickening/dewatering	Polymer	Washwater recovery
Greenvale	Greenvale St Albans Greenvale Yuroke	Chlorination	Sodium hypochlorite	Disinfection
Lower Yarra Valley Townships	Cresswell Frogley Yarra Glen	Coagulation / flocculation	Aluminium chlorohydrate	Colour & organics removal
		Membrane ultrafiltration	-	Remove pathogens/turbidity
		Membrane cleaning	Citric acid / Sodium hypochlorite	Optimise membrane performance
		Chlorination	Sodium hypochlorite	Disinfection
		pH correction	Sodium carbonate	pH correction
Silvan	Silvan-Olinda Silvan-Preston Silvan-Waverley	Chlorination	Chlorine gas / Sodium hypochlorite[4]	Disinfection
		Fluoridation	Fluorosilicic acid	Provide dental health benefit
		pH correction	Hydrated Lime	pH correction
	Monbulk Kallista	Chlorination	Sodium hypochlorite	Disinfection
		Fluoridation	Sodium fluoride	Provide dental health benefit
Tarago	Tarago	Pre-treatment chemical dosing	Powdered activated carbon / hydrated lime / carbon dioxide	Optimise treatment plant performance
		Coagulation/flocculation	Aluminium chlorohydrate / PolyDADMAC / Polyacrylamide	Improve filter performance
		Dissolved air flotation filtration (DAFF)	-	Removal of pathogens/turbidity
		Chlorination	Chlorine gas	Disinfection
		Ultraviolet (UV) irradiation	-	Disinfection
		Fluoridation	Fluorosilicic acid	Provide dental health benefit
		pH correction	Hydrated Lime / Carbon dioxide	pH correction
		Sludge thickening / dewatering	Polyacrylamide	Washwater recovery
		Iron / manganese removal	Potassium permanganate	Removal of iron and manganese
Upper Yarra Valley Townships	Brahams Rd Lusatia Park	Ultraviolet (UV) irradiation	-	Disinfection

	Lyrebird Ave Martyr Rd Yarra Junction	Chlorination	Sodium hypochlorite	Secondary disinfection to provide a chlorine residual to customer tap
Winneke	Winneke Treatment Plant	Coagulation / flocculation	Aluminium sulphate / Polymer	Colour & organics removal
		Clarification	-	Remove pathogens / turbidity
		Rapid media filtration	-	Remove pathogens / turbidity
		Chlorination	Sodium Hypochlorite	Disinfection
		Ultraviolet (UV) irradiation	-	Disinfection
		Fluoridation	Fluorosilicic acid	Provide dental health benefit
		pH correction	Hydrated Lime	Optimise disinfection, and pH correction
		Sludge thickening / dewatering	Polyacrylamide	Washwater recovery
Yan Yean	Yan Yean Treatment Plant	Coagulation/flocculation	Aluminium sulphate / PolyDADMAC / Polyacrylamide	Colour & organics removal / Filtration aid
		Rapid media filtration	-	Remove pathogens / turbidity
		BAC/GAC	-	Remove taste and odour compounds
		Chlorination	Sodium hypochlorite	Disinfection
		Ultraviolet (UV) irradiation	-	Disinfection
		Fluoridation	Fluorosilicic acid	Provide dental health benefit
		pH correction	Lime	pH correction
Distribution network	Various secondary treatment plants	Secondary disinfection	Sodium hypochlorite	Secondary disinfection
		Alkalinity adjustment	Hydrated lime/Carbon Dioxide	Optimise alkalinity, pH correction

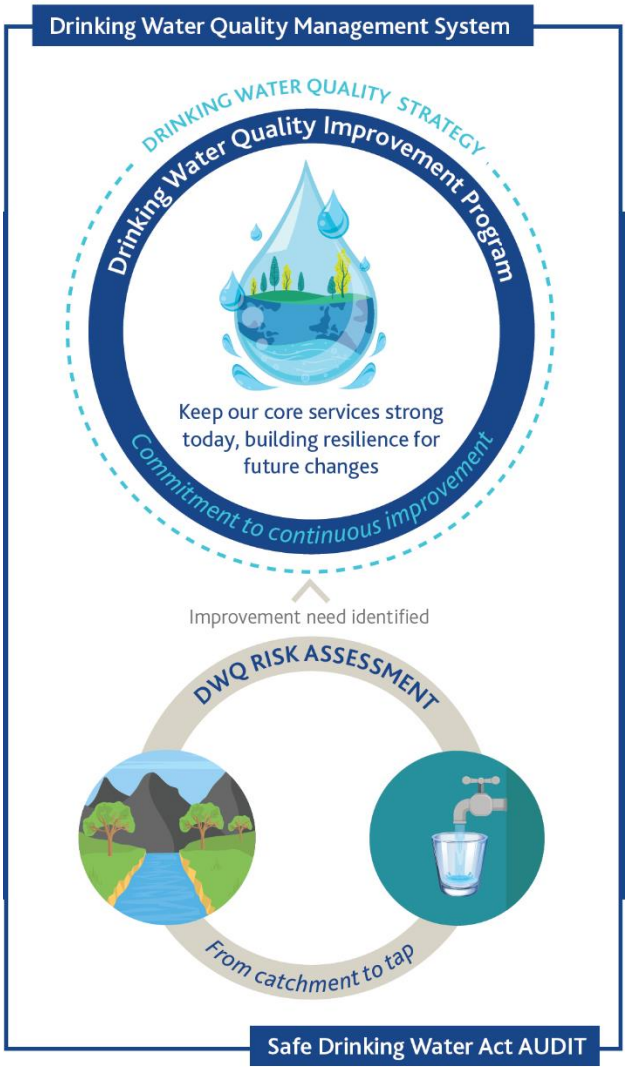
4. Improvement Initiatives

MW aims to continually improve our management of drinking water quality risks to maintain safe supply, adapt to change and continue to enhance resilience. Improvement initiatives are underpinned and guided by MW's *Drinking Water Quality Strategy*.

4.1 Implementing Upgrades and Renewals

MW's Drinking Water Quality Improvement Program (DWQIP) tracks, prioritises, and facilitates delivery of drinking water quality improvement actions. As shown in Figure 2, the program sits within MW's Drinking Water Quality Management System where it is directed by our catchment to tap risk assessment and guided by our Drinking Water Quality Strategy. The DWQIP is a core piece of MW's commitment to continuous improvement supporting achievement of our objective to keep our core services strong today while building resilience for future changes.

Figure 2 – Drinking Water Quality Improvement Program



DWQIP is an ongoing program and since its launch in 2021-22 financial year it has grown to include the actions advocated by MW's *Drinking Water Quality Strategy,* actions identified by the Melbourne Metropolitan water companies Joint Action Plan, as well as opportunities for

improvement identified during drinking water quality risk register reviews, water safety assessment and the 2023 Safe Drinking Water Act audit. Incorporating these improvement opportunities into a unified and cohesive action plan ensures improvement recommendations are prioritised, transparent, and systematically implemented under appropriate and consistent governance arrangements.

4.1.1 Key initiatives being delivered via DWQIP:

- Drinking Water Quality Risk Register Review - At the core of our Drinking Water Quality Management System is our drinking water quality risk register. The purpose of this risk register is to assess, document, track and communicate all existing and emerging, operational, and strategic risks to drinking water quality and the controls that Melbourne Water uses to manage them. Opportunities to improve MW's risk register beyond compliance, to 'industry leading', were identified in by an external review of our Drinking Water Quality Management System across the 12 elements of the Australian Drinking Water Guidelines.

  In response, MW initiated a project to re-structure the risk register to enhance alignment between our risk register and those of our customers, which will support an increasingly coordinated and systematic catchment to tap approach to managing drinking water quality risks. This project continued to progress in 2023-24 with review of 50% of the existing risk register now completed.

- Silvan Pathogen Monitoring Program Review – This significant program of work has engaged an expert team from Monash University to improve MW's source water monitoring program with improved analytical method sensitivity and specificity on closed catchment water source pathogens, to inform improved risk mitigation, public health assessment and economic benefit.

  Stage 1 of the program review was completed in June 2024 and has enabled improved pathogen monitoring sensitivity and operational response to pathogen monitoring data in both routine monitoring and specific event sampling. For example, microbial sequencing has been used to identify pathogen species, which in turn has provided more confidence in methods used to quantify microbial risk. Learnings have been extrapolated across the protected source waters. Importantly, this is a stepped process of validating and adapting methodologies to ensure targeted measures are implemented. Stage 2 of this work (scheduled for FY24-25) will include monitoring to better understand survival, transport, and removal mechanisms for pathogens from catchment animals.

4.1.2 Capital projects supporting the DWQIP and improved water quality outcomes:

- Disinfection resilience and reliability projects including:
  - Resilience upgrades to the Cardinia Water Treatment plant. These upgrades successfully operated to prevent a disinfection failure during a significant storm event in March 2024. High winds lead to fallen trees and power supply interruptions to the treatment plant which required the recently installed emergency hypochlorite dosing unit to operate to provide uninterrupted disinfection and no disruption to supply.
  - Work on the Mt Evelyn Water Treatment Plant, which will provide additional disinfection resilience to the Silvan supply, continues to progress following some

initial delays through the statutory planning process. Construction of this plant is scheduled to begin in late 2024 with provisional commissioning in 2027. In the meantime, while this project progresses the reliability of the Silvan emergency chlorine dosing units have been further enhanced.

  - Improvements to plant resilience for the 5 small UV 'Yarra Valley plants' have continued into the 2023-24 financial year. Upgrades to improve capacity of UV disinfection successfully operated during 23-24 to cope with flow spikes that would have caused a similar disinfection failure to that reported in MWs 2022-23 Drinking Water Quality Annual Report.

- A number of treatment upgrades have been completed or are underway at the Winneke treatment plant including:
  - An ultraviolet disinfection upgrade which completed commissioning and entered the Proof of Performance phase at the end of the 2023-24 financial year.
  - Partial media replacement and underdrain improvements to improve the condition of the Winneke Filters was completed in the 2023-24 financial year.
  - A longer-term filter upgrade project is in development. This has an approved business case and construction is scheduled to commence in 2026.
- Finally, construction of an upgrade to Yan Yean Treatment Plant designed to manage historic taste and odour problems completed commissioning and entered the Proof of Performance phase at the end of the 2023-24 financial year.

5. Issues

5.1 Widespread Customer Complaints

MW made no reports of events causing or with the potential to cause widespread customer complaint reportable under section 22 of the Safe Drinking Water Act 2003. YVW reported two events causing or with the potential to cause widespread customer complaint which were linked to activities in the MW network.

23 October 2023 event

On 23 October 2023, MW initiated a shutdown of a large water transfer main to repair a leak. The resulting change in network conditions caused a sudden reversal of flow within parts of YVW's Northcote water sampling locality. This event caused resuspension of naturally occurring sediments within YVWs network lasting approximately 24 hours and led to YVW receiving several customer complaints related to discoloured water.

YVW verbally informed the Department of Health of the water quality complaints on 23 October 2023 followed by a written Section 22 report submitted on the same day. The primary concern was re-suspended naturally occurring sediments causing discoloured water. To mitigate these risks YVW allowed time for sediments to settle and conducted water sampling to confirm water quality had returned to normal.

Melbourne Water's Operational Change Control Procedure has been reviewed and updated for this location to prevent a recurrence.

26 and 27 October 2023 event

On 26 and 27 October 2023, YVW received customer complaints in the Mitcham water sampling locality related to re-suspended naturally occurring sediments causing discoloured water lasting approximately 27 hours. YVW verbally informed the Department of Health of the water quality complaints on 27 October 2023 followed by a written Section 22 report submitted on the same day.

Several events occurred in the lead up to this that may have contributed to the discoloured water including reinstatement of a large MW water transfer main on 25 October, a burst in the YVW network on 26 October and, opening an offtake on the same MW transfer main also on 26 October.

To mitigate these risks YVW conducted flushing to remove the affected water and conducted water sampling to confirm water quality had returned to normal.

Preventative actions from this event included:

- MW adding a note to the relevant plan to warn that the offtake in question is problematic with commentary on this incident provided.
- Melbourne Water's Operational Change Control Procedure was reviewed and updated for this location to prevent a recurrence.

Additional details for both events are contained in YVW's drinking water quality report 2023-24.

5.2. Fluoride Notifications

MW made 5 notifications to DH and the retail water companies during the reporting period as required by the *Code of Practice for Fluoridation of Drinking Water Supplies* (Vic).

- On 21 July 2023 DH were notified of a critical high fluoride spike at the inlet to Winneke Clear Water Reservoir following a sudden drop in flow through the plant that occurred on the same day. The plant controls operated as designed and the fluoride concentration in the supplied water was not impacted.
- On 13 May 2024 DH were notified of a fluoride plant outage of greater than 72 hours at Winneke following cut-in of the newly constructed UV plant that occurred on 4 May 2024. This outage was unavoidable to deliver the UV cut-in, works were scheduled to minimise the outage as best as practicable.
- On 13 June 2024 DH were notified of the fluoride concentration 12 month rolling average falling below 0.8mg/L at Monbulk treatment plant following a series of incorrectly triggered discrepancy alarms on 4 June 2024. The source of the alarms (a faulty flowmeter) was identified repaired to prevent recurrence.
- On 21 June 2024 DH were notified of a critical high fluoride spike at the inlet to the treated water storage at Yan Yean following commissioning activities that occurred on 20 June 2024. The fluoride concentration in the water supplied from the treated water storage remained within limits. The cause of the fluoride spike was identified and corrected to prevent recurrence.
- On 24 June 2024 DH were notified of a fluoride plant outage of greater than 72 hours at Yan Yean treatment plant during investigations into the spike experienced in the point above.

6. Emergency, Incident and Event Management

6.1 Issues with Known or Suspected Water Contamination

There were no instances of known or suspected contamination reportable by Melbourne Water under section 22 of the *Safe Drinking Water Act 2003* in 2023-24.

On 3 April 2024 Melbourne Water supported YVW and Parks Victoria to clarify responsibility for and manage risks associated with potential contamination of water supplied to Yan Yean Reservoir Park due to poor condition of a water storage tank in the reticulation system. Ultimately YVW made a section 22 notification to DH for this event, additional details are contained in YVW's drinking water quality report 2023-24.

7. Risk Management Plan Audit Results

In 2023 MW's drinking water risk management plan was audited against the requirements of the *Safe Drinking Water Act 2003* (the Act) and Safe Drinking Water Regulations 2015 (the Regulations) for the period 1 January 2021 to 31 December 2022. The audit found Melbourne Water to be fully compliant with the requirements of the Act and the Regulations and noted four Opportunities For Improvement (OFI). A copy of the audit certificate is provided in the appendix to this document.

MW has committed to corrective actions to address each of the four Opportunities For Improvement (OFIs) identified during the previous audit, the OFIs are summarised in Table 3 along with an update on the status of the associated corrective actions.

MW was also recertified for HACCP by BSI during 2023, no OFIs or non-conformances were identified.

Table 3: 2023 RMP (Risk Management Plan) Audit Opportunities for Improvement

Opportunity for Improvement	Corrective Action	Current Status
Review and improve MW's spares identification processes.	Review and improve spares identification and management-related procedural documents to ensure critical spares for maintaining supply of safe drinking water are appropriately identified during routine Maintenance Strategy Determination Reviews (including identification of re-order points) and for all new assets.	Completed during 2023-2024
Review with suppliers, supply chain resilience and criticality	Set up a Third-Party Risk Management Framework, which would include how we manage MW's Supply Chain Risks (SCRM) related to water quality. Update the Procurement Framework in line with the Third-party Risk management framework and establishment of category management practices at Melbourne Water. Establishment of a Category management practice and category manager for "Directs" category at Melbourne Water.	Completed during 2023-24
Review bushfire controls for the Silvan treatment plant and similar treatment plants, including deluge system and tree proximity.	Review bushfire controls for Silvan treatment plants and associated emergency assets that are vulnerable to bushfire and identify any upgrades required. Review bushfire controls for all other treatment plants and emergency assets that are vulnerable to bushfire and identify any upgrades required.	On track. Due for completion during 2024-25
Ensure adequate internet coverage and adequate computer screens.	Identify and implement required updates to the IT facilities at remote treatment plants.	A feasibility study and PC upgrade was completed during 2023-24. Delivery of the final internet connection upgrade has been delayed due to unavailability of hardware components; this will now be delivered in 2024-25

8. Exemptions under Section 8 of the Act

No exemptions were in place during the year.

9. Undertakings under Section 30 of the Act

No undertakings were entered into or completed during the year and there were none in place from previous years.

10. Further information

This report and further information regarding drinking water quality is available on our website at www.melbournewater.com.au or by contacting the customer service team:

Telephone:	131 722
Translation Service:	131 450
Speak and Listen:	1300 555 727
Fax:	03) 9600 1192
Email:	enquiry@melbournewater.com.au
Mail:	Melbourne Water PO Box 4342 Melbourne, Victoria 3001

Appendix

ABN 46 122 146 767

Regulation 10

Schedule 1 - Risk Management Plan Audit Certificate

Safe Drinking Water Regulations 2015

Certificate Number: 193

Audit Period: 1st January 2021 to 31st December 2022

To: Matthew Higginbotham
Drinking Water Quality Management Systems Lead
Melbourne Water
990 La Trobe Street
Docklands
Melbourne 3008

Australian Business Number (ABN): 81 945 386 953

I, Thomas Teunissen, after conducting a risk management plan audit of the water supplied by Melbourne Water, am of the opinion that:

Melbourne Water has complied with the obligations imposed by Section 8(1) of the ***Safe Drinking Water Act 2003*** during the audit period.

Date: 19th April 2023

Signature of approved auditor:

Thomas Teunissen