Melbourne Water

Water Quality Annual Report

2024-25

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 2024-25 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 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, the community, and suppliers. These stakeholders and our other strategic partners, including our construction and maintenance partners, research organisations and traditional owner groups, 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 (EPA), WorkSafe Victoria and the Department of Health Victoria (DH) regulate the environmental, safety 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), Department of Transport and Planning (DTP) and, the Department of Treasury and Finance (DTF).

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 including Melbourne's retail water companies (Greater Western Water, South East Water and Yarra Valley Water) and, regional water authorities (South Gippsland Water, Gippsland Water, Westernport Water and, Barwon Water).

Note that South Gippsland Water and Westernport Water receive either treated water or a mix of treated and untreated water via the Victorian Desalination Pipeline depending on the operating configuration and Gippsland Water receives untreated water from the Tarago Reservoir.

In total, we supplied approximately 509 billion litres of water in 2024-25, which is 8% more than last year. This volume includes 11.3 billion litres supplied to Barwon Water (a 345% increase on the year prior) and 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.

The majority 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 Plant (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 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 treatment plant sources water from the Tarago reservoir and it's catchment. The 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. 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 10-14 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.

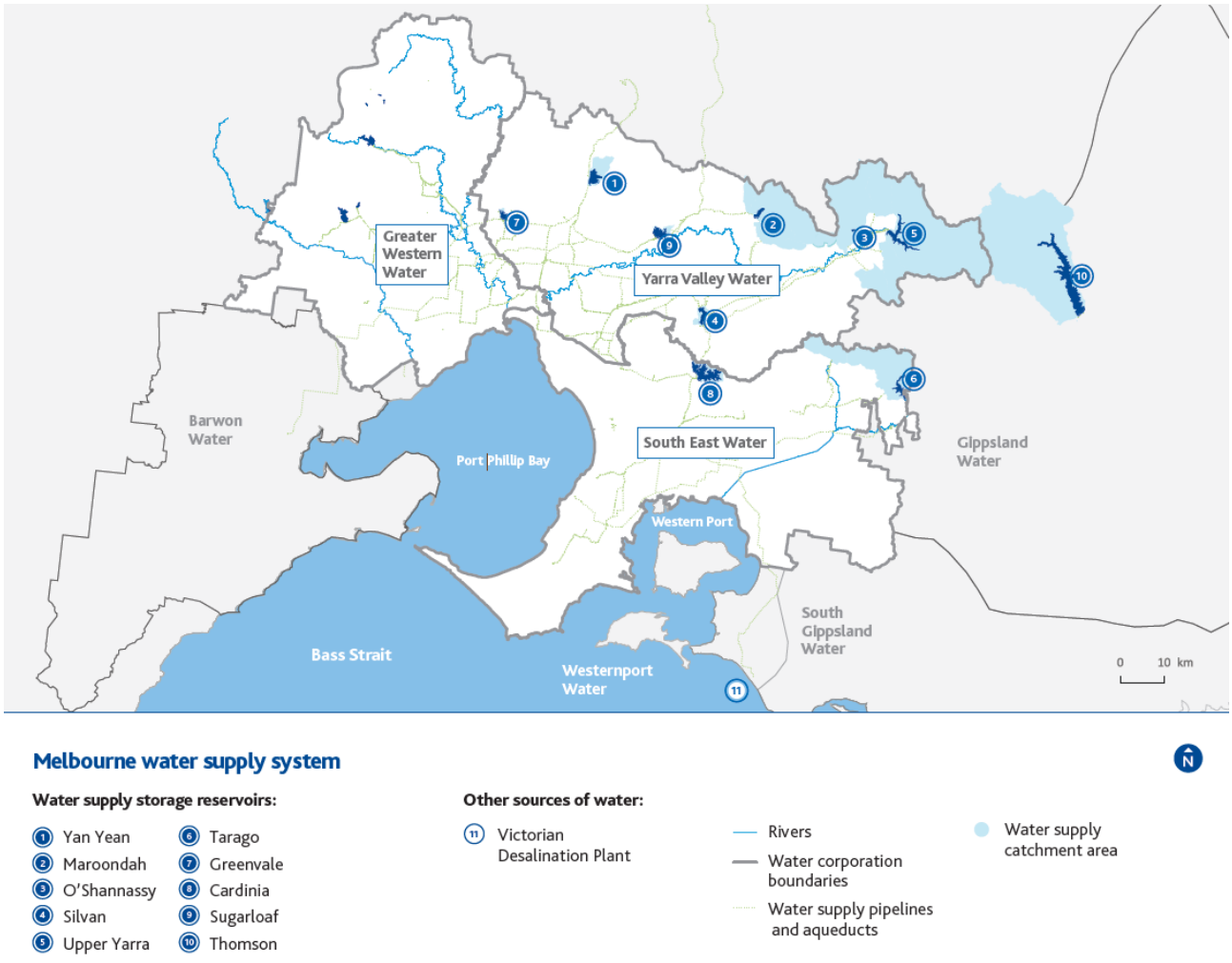
Since 2017, 455 billion litres of water have been supplied from the VDP, which is a rainfall-independent source of water for Greater Melbourne. Desalinated water is part of our strategy to ensure the water supply system is more resilient to climate change and increased demand, as indicated in Central and Gippsland Regional Sustainable Water Strategy. The VDP also provides a critical element of operational flexibility during significant events, such as storms or bushfires, when parts of the system may be taken offline to manage water quality and protect the delivery of essential services.

No water was supplied by the VDP in the 2024-25 financial year however an order for 50 GL has been placed to be delivered in the 2025-26 financial year.

In the 2024-25 financial year 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. 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 hazard 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 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 the 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 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. This upgrade is well advanced with commissioning to begin later in 2025.

We have completed a detailed risk assessment, working with expert consultants to better understand the risks of allowing different recreational activities on the reservoir. This also includes engaging our key water supply customer, South East Water, providing 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 - Untreated water from our Tarago Reservoir is fed into GW's treatment plants and then into supply for consumption by their customers.
- South Gippsland Water (SGW) and Westernport Water (WPW) – Water from the VDP is supplied to SGW and WPW via the Victorian Desalination Pipeline. This water is retreated in their 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. These are located 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 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.

Melbourne Water has invested significant time and effort over the past several years to upgrade secondary chlorinators or install emergency disinfection units to reliably provide primary chlorination in the event of an outage. We now have back up chlorination available at Silvan, Cardinia, Greenvale St Albans, Lusatia Park and Yarra Junction, which provide a significant increase in our resilience to events that can cause a disinfection failure.

Additionally, we are investing in further improvements including a disinfection resilience plant at Mt Evelyn and Greenvale Yuroke along with an uplift to the existing secondary disinfection at Lyrebird, Brahams Rd and Martyr Rd.

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	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[1]	Cardinia 1400 Cardinia 1700	Chlorination	Chlorine gas / Sodium hypochlorite[2]	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

[1] When the Desalination Plant is used to fill Cardinia those treatment processes and substances also apply.
[2] Occasional use of Sodium hypochlorite when required as additional residual or when Chlorine gas dosing is offline.

Water Supply System	Treatment Plant	Treatment Process	Added Substances	Role of Each Process
		Membrane preservation	Sodium bisulphite	Protect membranes when not in use
		Sludge thickening/dewatering	Polymer	Washwater recovery
Greenvale[3]	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

[3] Greenvale may be filled with treated water from Silvan and Winneke so those treatment processes and substances also apply.

Water Supply System	Treatment Plant	Treatment Process	Added Substances	Role of Each Process
		Sludge thickening / dewatering	Polyacrylamide	Washwater recovery
		Iron / manganese removal	Potassium permanganate	Removal of iron and manganese
Upper Yarra Valley Townships	Brahams Rd Lusatia Park Lyrebird Ave Martyr Rd Yarra Junction	Ultraviolet (UV) irradiation	-	Disinfection
		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/Carbon Dioxide	pH correction
Distribution network	Various secondary treatment plants	Secondary disinfection	Sodium hypochlorite	Secondary disinfection
		Alkalinity adjustment	Hydrated lime/Carbon Dioxide	Optimise alkalinity, pH correction

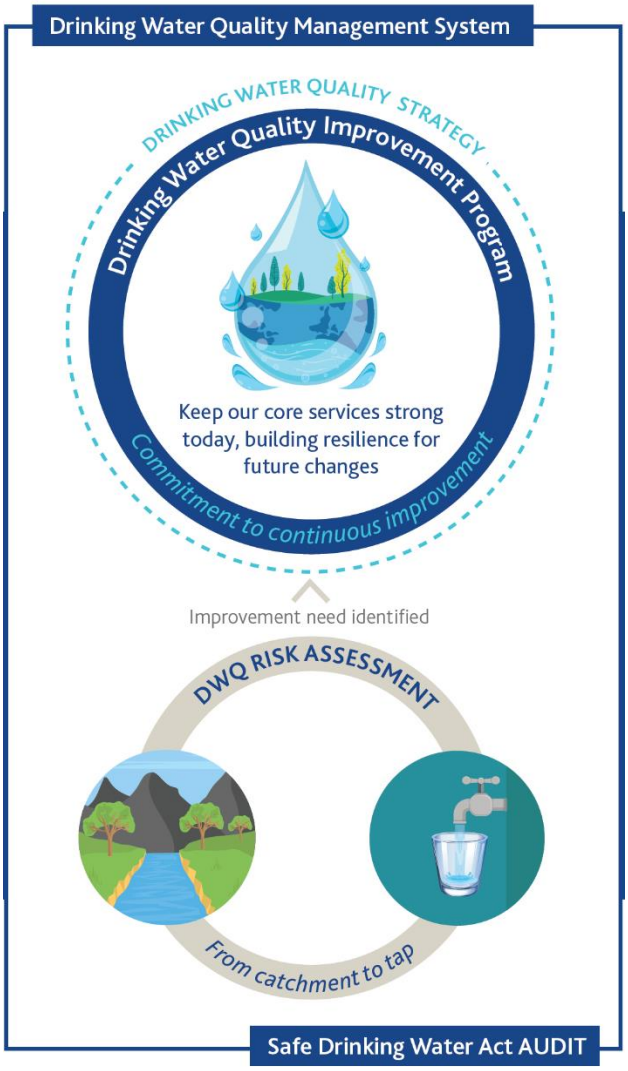
4. Improvement Initiatives

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 element 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 assessments and Safe Drinking Water Act audits. 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 delivered by DWQIP:

- Protected source water 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 continued in 2024-25.

  Stages 1 and 2 of the program included enhanced characterisation of microbial risk and investigation of the transport and fate of pathogens in the catchment, the findings of which have been incorporated into our routine monitoring program and risk management plan. Stage 3 is planned to begin in the 2025-26 financial year and is designed to support capital delivery for UV projects, understanding when investment in filtration may be required and, continued validation of implementation and application of the quantitative microbial risk assessment in both normal operations and contingency scenarios. It also involves developing a pathogen balance for both Campylobacter and Protozoan hazards to enable evidence-based risk assessment for each pathogen type.
- Development of a bird management program for our protected catchment offline storages. The pathogen monitoring program better quantified the risk posed by birds to our raw water quality which has been addressed by the development of a bird control program during 2024-25. The bird management program aims to deter birds from occupying key areas in our raw water storage reservoirs to minimise potential pathogen loads entering treatment plants.
- Revalidation of our critical limits for Category 1 protected water sources was completed for chlorination in 2024-25. This project used native pathogens and sediments to validate that our existing chlorine treatment continued to be effective under both normal operation and contingency scenarios. This supports the critical limits set in our risk management plan for normal operation and contingency response to events in our catchments and treatment plant. The project will continue next financial year with a focus on UV validation using native sediments and pathogens.
- Drinking Water Quality Risk Register Review - This project has been discussed in previous reports and continued to progress in 2024-25 with review of 90% of the existing risk register now completed.

4.1.2 Capital projects supporting the DWQIP and improved water quality:

Disinfection resilience and reliability projects including:

- 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 began in FY 24-25 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 2024-25 financial year. This suite of improvements includes upgrades to infrastructure

to improve its reliability and capacity, improvements to water quality monitoring and, enhancements of secondary chlorination to provide backup disinfection in the case that UV treatment is compromised. The rewards from these improvements are already being felt by successfully operating during 24-25 to cope with flow spikes that would previously have caused a disinfection failure.
- Establishment of a temporary dosing unit for Greenvale St Albans gravity supply to provide backup disinfection should the primary disinfection plant fail.
- Reliability upgrades to emergency generators at Silvan, Monbulk and Kallista to improve resilience to power failures
- Upgrades to the reliability of a significant number of analysers and, the addition of new analysers in both the raw and treated water supply network to provide greater network visibility and improve response to changes in water quality.

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 service in August 2024.
- Partial media replacement and underdrain improvements to improve the condition of the Winneke Filters was completed in the 2024-25 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.

5. Issues

5.1 Widespread Customer Complaints

MW made no reports of events causing, or with the potential to cause, widespread customer complaints reportable under section 22 of the Safe Drinking Water Act 2003.

In May 2025, South East Water (SEW) made a section 22 report for widespread customer complaints. These complaints were linked with seasonal changes to the water chemistry in Cardinia reservoir which lead to higher than usual amounts of soluble manganese entering the SEW reticulation network. Despite manganese levels from Cardinia Reservoir meeting the Australian Drinking Water Guidelines (ADWG) aesthetic limit throughout the event, some SEW customers experienced discoloured water coming from their taps. Though MW did not issue a section 22 report, we have been working closely with SEW to investigate and address this issue, so have included the event in our report for completeness.

Prior to the complaints occurring, routine monitoring detected elevated manganese and low dissolved oxygen levels in the raw water sources from Cardinia reservoir prompting the reservoir offtake level to be changed as per MW standard procedures. This change successfully reduced manganese levels to normal ranges however, in the days and weeks following the change, elevated dirty water complaints were received by SEW and targeted sampling identified high manganese levels in parts of the network corresponding with elevated complaints.

Investigation suggested that the soluble manganese was oxidised by chlorination in the network, forming black, sticky deposits that adhered to pipe walls—particularly in PVC and PE pipes— in turn, causing water discolouration.

MW have been working closely with SEW to understand the contributing factors and future improvements that can be made to prevent a recurrence, including improved trigger thresholds for considering offtake gate changes and enhanced understanding of the water chemistry influences. We will continue to work with SEW to ensure the water we provide is safe and aesthetically pleasing.

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).

- DH were notified of a critical high fluoride spike at the inlet to the Kallista treated water storage in which the fluoride concentration peaked at 2.1 mg/L on 28 April 2025. Calculations determined the theoretical outlet fluoride concentration to be around 0.98 mg/L using worst case assumptions, dilution with tank storage volume at the time and poor tank baffling, and therefore posed no risk to public health. The cause of the fluoride spike was identified to be a carrier water flow rate deviation and subsequent duty change flushing a slug of high fluoride content water into the main. Corrective actions including installation of a pressure transmitter on the service water line and overhaul of the fluoride carrier water diaphragm valve have been completed to prevent recurrence.
- DH were notified of two instances of Yan Yean fluoridation plant being offline for a period of greater than 72 hours:
    - The first, on 7 January 2025, was due to maintenance of both fluoride dosing pumps. Under the terms of the Yan Yean approval to fluoridate, the pump supplier is required to make adjustment to the calibration of the pump. The outage was partly due to unavailability of the pump supplier during the holiday period which caused a delay in returning the plant to service; it is unlikely that this event will re-occur.
    - The second, on 13 March 2025, was due to a service water flowmeter fault. Investigation found that crystallisation of fluoride in the flowmeter flow tube was causing a blockage. Modifications to the flowmeter including installation of a non-return valve to prevent a recurrence of this fault are in planning for delivery in 2025-26.
- DH were notified of a critical high fluoride spike on the Silvan-Waverley treatment plant on 14 February 2025, however it was later verified that this incident was not genuine and was due to an analyser fault. To prevent a recurrence of this event, the analyser has been overhauled and a calculation tool has been developed that will allow prompt verification of the analyser result.
- Following the above event, DH were notified of Silvan-Waverley fluoridation plant being offline for greater than 72 hours on 25 February 2025, while the analyser issue was investigated and rectified.

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 2024-25.

7. Risk Management Plan Audit Results

The last audit of MW's drinking water risk management plan against the requirements of the *Safe Drinking Water Act 2003* (the Act) and Safe Drinking Water Regulations 2015 (the Regulations) was completed in 2023 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 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, all related corrective actions have now been completed. 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 2023-24
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.	Completed during 2024-25
Ensure adequate internet coverage and adequate computer screens.	Identify and implement required updates to the IT facilities at remote treatment plants.	Completed during 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