Melbourne Water 101

Who we are, what we do and who we work with

VICTORIA State Government

Melbourne Water
Enhancing Life and Liveability

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Updated March 2020

Water is essential to Melbourne's vibrant, liveable and sustainable lifestyle – now and into the future. It underpins the health of people and the environment, enhances community wellbeing and supports productivity and jobs.

Who we are

As a statutory authority owned by the Victorian Government, Melbourne Water works on behalf of the community to deliver a range of valuable services across the Greater Melbourne region.

To help make Melbourne a fantastic place to live, we supply affordable, high-quality water, provide reliable sewerage treatment and resource recovery, manage healthy waterways, provide integrated drainage management and flood resiliency, and maintain outstanding natural community spaces.

Every day we:

- manage water supply catchments
- treat and supply both drinking and recycled water products
- transfer, treat and recover resources from most of Melbourne's sewage
- manage waterways and major drainage systems in the Port Phillip and Westernport region.

Melbourne Water's operating area

Our vision and strategic direction

Melbourne Water's vision is to enhance life and liveability across Greater Melbourne and the surrounding region. We know that water is central to life. It sustains the natural environment we live in, the communities we value, and the economy we depend on.

We deliver on our vision through our three core pillars:

Healthy people – Providing safe, affordable, world-class drinking water and sewage treatment and supporting Melburnians to live healthy lifestyles.

Healthy places – Managing the impacts of climate change, building resilience to flooding across the Greater Melbourne region and partnering to deliver sustainable land and water management.

Healthy environment – Being innovative with resource recovery, reducing our emissions, improving the quality of waterways and engaging with the community on biodiversity and how to protect our natural assets.

Our values of care, integrity and courage are integral to the way we do business and treat one another. They are intrinsically linked to our vision of enhancing life and liveability and guide all that we do.

Our customers and the community

Melbourne Water is proud to play its part in making Melbourne a great place to live. All Melburnians benefit from our work every day, both directly and through our services.

The community benefits from a range of services we deliver in partnership with our stakeholders to enhance Melbourne's liveability, including:

- Retail water companies, who partner with us to deliver water and collect sewage from individual households and businesses across the Greater Melbourne region. Each year we deliver about 450 billion litres of water and receive almost 320 billion litres of sewage from Melburnians through retailers.
- Local councils, who help us manage stormwater and build flood resiliency across the region. Our drainage system connects all 38 councils and reduces flood risk across 13,000 square kilometres in the Port Philip and Westernport catchments.
- Developers, who work with us to build stormwater, flood and waterway infrastructure in the growing urban landscape and help expand water and sewerage services to new suburbs. Our work with the development industry supports delivery of around 20,000 new homes each year in growth areas.
- In addition, the broader community directly benefits from our management of environmental assets including over 24,000 kilometres of wetlands, rivers and creeks, where we often work in partnership with community groups, councils and government agencies.

Water

The majority of Melbourne's water is supplied from protected mountain catchments adjacent to the city. This is why Melbourne enjoys some of the most affordable and highest quality water in the world.

Melbourne Water supplies, treats and transfers drinking water to Melbourne's three retail water companies and other non-metropolitan water businesses. Our wholesale water customers are:

- City West Water
- South East Water
- Yarra Valley Water
- Western Water
- Barwon Water
- Gippsland Water
- South Gippsland Water
- Southern Rural Water
- Westernport Water
- Victorian Environmental Water Holder

We also supply recycled water to wholesale customers who on-sell it to their customers for a range of fit-for-purpose uses like the irrigation of gardens and agriculture. Our recycled water customers are:

- City West Water
- South East Water
- Southern Rural Water
- Eastern Irrigation District

Sewerage

Melbourne Water transports, treats and disposes 90 per cent of the sewage generated by Melbourne and the wider metropolitan area. Our wholesale sewerage customers are:

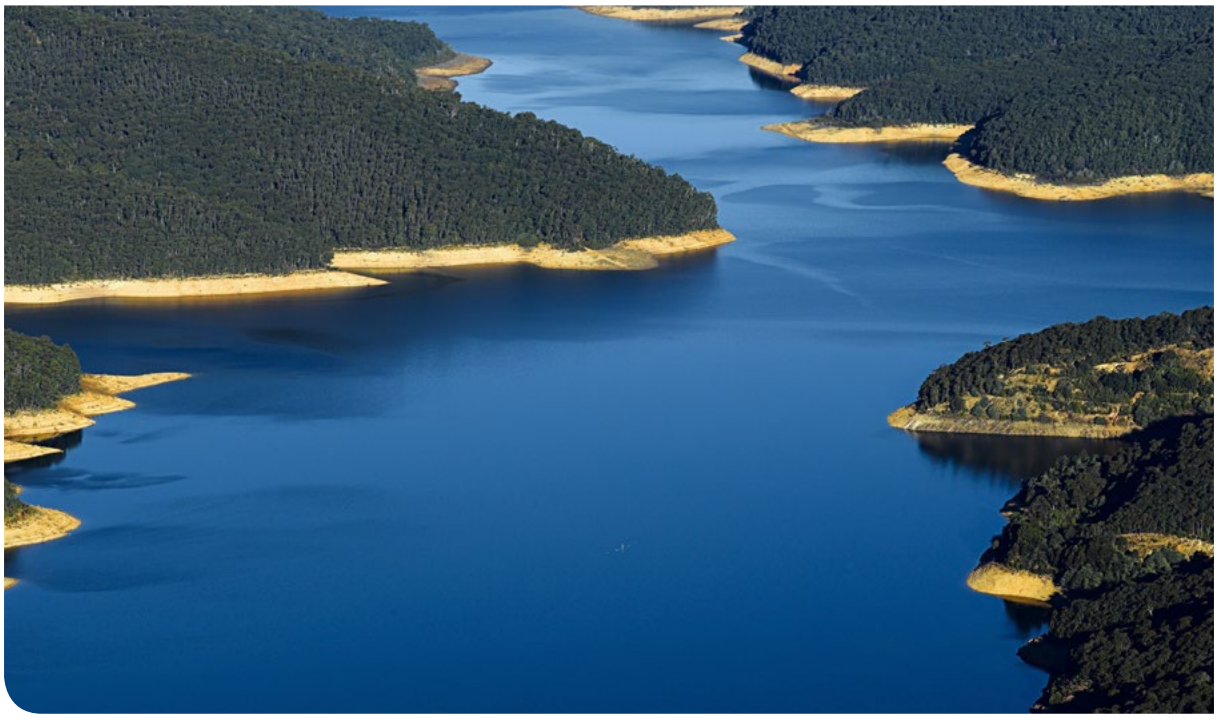
- City West Water
- South East Water
- Southern Rural Water

Drainage

Melbourne Water and councils both play a role in managing most of Melbourne's drainage system.

Our drainage customers are:

- Local government
- Direct service customers
- Developers



Waterways

Melbourne Water works to protect and improve the quality of our waterways, establish healthy ecosystems and enhance biodiversity in an increasingly urbanised region.

Melbourne Water is responsible for ensuring that we continue to care for the health and vitality of the region's waterways as well as contributing to the health and wellbeing of Port Phillip Bay and Western Port Bay, now and into the future. We also contribute to the *Victorian Waterway Management Strategy* and the *Regional Waterway Strategy* (known as the *Healthy Waterways Strategy*).

Our waterways customer segments are:

- Local government
- Direct service customers
- Engaged community groups
- The community

Melbourne Water is committed to delivering affordable services that are valued by our customers and the community, and which contribute to Melbourne's liveability. We consistently look for opportunities to improve our services and deliver them in a sustainable way.

Industry memberships

Melbourne Water maintains several industry memberships and associations, particularly those associated with the Australian water industry and provision of infrastructure.

We often serve on committees from both a governance perspective and on issue specific initiatives. We engage frequently with the following organisations:

- Water Services Association of Australia
- VicWater
- Stormwater Victoria
- Water Research Australia
- Australian Water Association
- Climate Research Centre for Water Sensitive Cities
- Institute of Water Administration
- Committee for Melbourne
- Global Compact Network
- CEDA – Committee for the Economic Development of Australia
- Urban Development Institute of Australia (EnviroDevelopment)
- Association of Land Development Engineers Australia
- Engineers Australia
- Water Stewardship Australia
- Werribee Riverkeeper Association
- Yarra Riverkeeper Association

Water supply

Water supply

To ensure Melbourne's water supply remains secure, we manage our water storages to meet the needs of a growing city and are prepared for drought, flood, bushfires and other events.

156,700 HECTARES OF CATCHMENTS

10 STORAGE RESERVOIRS

TOTAL CAPACITY

1812 BILLION LITRES

428 BILLION LITRES

HIGH QUALITY DRINKING WATER DELIVERED TO CUSTOMERS AND THE COMMUNITY

14 WATER TREATMENT *PLANTS*

37 SERVICE RESERVOIRS

221KM *AQUEDUCTS*

1067 KM WATER MAINS

Most of Melbourne's drinking water comes from protected water catchments in the Yarra Ranges and forested areas located in national parks and state forests. Melbourne is one of only a few cities in the world with protected water catchments. A small proportion of our drinking water is sourced from open catchments. Open catchments incorporate mixed land uses like farming instead of being used exclusively to harvest water.

Protected catchments

In protected catchments, native forests filter rainwater as it flows across land into creeks, rivers and our reservoir storages. The Thomson Reservoir catchment isn't closed but is located in a remote and uninhabited area.

The water sourced from protected catchments is disinfected with chlorine. This process ensures that any bacterial contamination from animals within the catchment is treated, and prevents any potential recontamination within the distribution network. Most water from protected catchments is also dosed with fluoride, to help prevent tooth decay. This is a legal requirement under the Fluoridation Act. In addition, some water is treated by ultraviolet (UV) light to provide immediate treatment for sites where customers live close by.

We maintain Melbourne's safe and reliable water resources that come from forests high up in the Yarra Ranges, and manage long-term projects to address the challenges of climate change, increased climate variability and population growth.

Open catchments

About 30 per cent of Melbourne's water comes from open catchments. This water undergoes additional treatment processes to ensure it meets the same requirements as water from closed catchments.

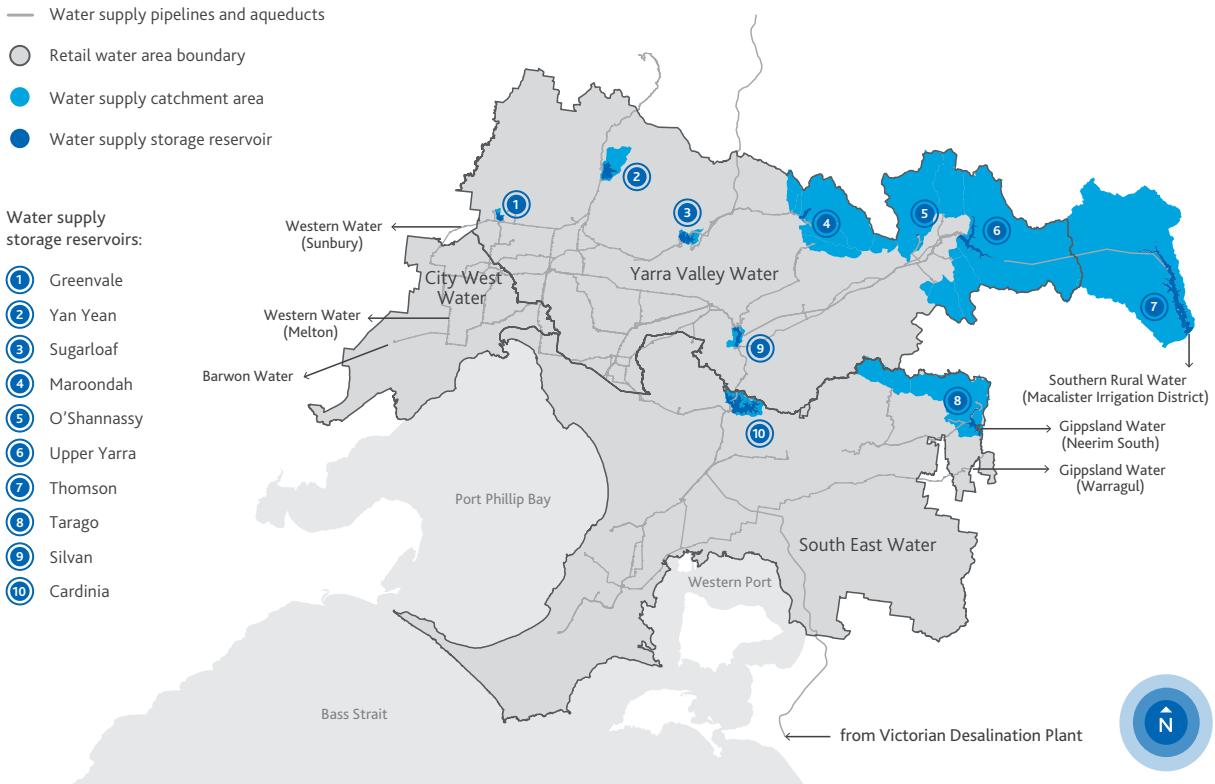
Our water treatment plants include:

- Winneke Water Treatment Plant: treats water from Sugarloaf Reservoir that is fed by water from the Yarra River, Maroondah Aqueduct and Sugarloaf Pipeline.
- Tarago Water Treatment Plant: complemented by an extensive catchment management plan. Around 25 per cent of water from the Tarago catchment comes from areas that include farmed land, dairies and homes with septic tanks and therefore, must be treated.

Full treatment includes:

- coagulation: helps bacteria and small solid particles stick together
- clarification: separates solid particles and removes odour
- filtration: removes most of the remaining suspended particles, and any microorganisms attached to the particles
- disinfection: chlorine and/or ultraviolet light are used to destroy or inactivate remaining microorganisms in the water
- fluoridation: helps prevent tooth decay and is a legal requirement under the Health (Fluoridation) Act 1973
- pH correction: lime or caustic soda is added to neutralise the pH of the water as chlorine and fluoride are slightly acidic.

Melbourne's water supply system



Water quality

We use extensive online monitoring on our treatment processes to make sure Melbourne's drinking water consistently meets the Department of Health and Human Services requirements for safe drinking water.

We test for a wide range of physical, biological and chemical parameters in both raw and treated water, to ensure that the water provided to our customers meets the requirements specified in the Australian Drinking Water Guidelines, and is safe to drink.

Reservoirs

From the major reservoir storages, water flows through large pipes (distribution mains) to service reservoirs.

The 38 service reservoirs throughout the metropolitan area provide short-term storage of one to two days to ensure a constant water supply during peak demand periods.

Thousands of kilometers of underground pipes carry the water in a web-like network to the metropolitan retail water businesses, supplying the water to homes, schools and businesses.

Water pressure is carefully managed to ensure it is adequate but not so high that it causes damage to water mains or household plumbing appliances.

Mini hydro-electricity plants

Hydro-electric power stations operate throughout Melbourne Water's supply network. These power stations generate renewable energy from the flow and pressure of moving water and feed it back into the electricity grid.

In addition to the nine existing power stations, five mini-hydro plants were commissioned over the last few years and we are investigating options for further plants. The new plants are located at service reservoirs in Wantirna, Boronia, Dandenong, Mount Waverley and Cardinia Creek.

Victorian Desalination Plant

Desalination helps to build a buffer in our water storages by providing a secure, rainfall-independent source of water for Melbourne. The Victorian Desalination Plant is capable of supplying up to 150 billion litres of high quality drinking water each year, equal to around one third of Melbourne's annual demand. The plant removes salts and minerals from seawater by passing it through reverse osmosis membranes.

Each year, we collaborate with Melbourne's water retail companies to provide advice on ordering desalinated water to the Department of Environment, Land, Water and Planning. The Minister for Water makes the final decision on the desalination order to be delivered the following year.

For the 2019-20 financial year, the Minister for Water ordered 125 billion litres (GL) of water from the desalination plant. This is the largest order that has been made to date. The order will help secure our water supply by boosting water storage levels, following five years of decline and a summer of particularly low rainfall. The next order will be made by April 1 2020.

Regular orders from the desalination plant will build a buffer in our storages for a growing population and take the pressure off our reservoirs during drier periods and droughts.

Protecting our catchments

Bushfires

Bushfires threaten the quality and quantity of our drinking water supply. Rain washes ash and sediment into reservoirs, and forests recovering from bushfire use large amounts of water, reducing the amount entering reservoirs.

Melbourne Water uses fire towers, lightening trackers and a 'spotter chopper' to detect fires early. Our ongoing maintenance of grass cutting, fire breaks, access roads and planned burns also helps to reduce the risk of fires starting.

We employ approximately 40 fire fighters who are based near water catchments all year round and are responsible for 'first-attack' response to fires in the catchments. During the fire season, this number increases to more than 60 trained fire fighters on standby. We also have a fire-bombing helicopter, 25 fire trucks, five bulldozers and 40 mobile water tanks capable of holding 22,000 litres of water each to help fight fires.

Illegal entry

Public entry to closed water supply catchments has been prohibited for over 100 years.

Melbourne Water patrols the catchments and can issue on-the-spot fines to anyone caught trespassing or causing damage to fences or signs.

Key projects

Securing Melbourne's water supply

Our water supply challenges

Melbourne and cities all over the world are being challenged to ensure the ongoing supply of safe and reliable water in the face of population growth and a changing climate.

Melbourne's water storage levels have steadily decreased from year to year, even with the assistance of Victoria's desalination plant. On average over the last five years, our storages have lost 68 billion litres per year. Without desalinated water, our storages would be around 10% lower.

Building more dams is not a practical solution, as our filling season is becoming shorter; while rainfall less reliable. Instead, securing our future water supply requires an innovative and collaborative approach from the water sector and the community.

How we are taking action

We are working in collaboration with government and water retailers to manage our water supply now and into the future. In order to diversify our water supply we are investing in innovative initiatives including combining desalinated water with water-efficiency measures, producing recycled water and harvesting stormwater.

In the *Melbourne Water System Strategy* we present a system-level view of water resource management over the next 50 years. The collaborative industry publication, *Water for a Future Thriving Melbourne* provides an overview of how we are working with the metropolitan water retailers to meet the challenges of our growing city.

We also collaboratively prepare the annual Water Outlook, which provides a summary of the state of Melbourne's water supply and demand and sets out actions to maintain safe and reliable supplies.

Encouraging behaviour change

In 2019, we launched a water security public awareness campaign in collaboration with the three Melbourne retail water companies – City West Water, Yarra Valley Water and South East Water. It is the first major campaign to be undertaken since the Millennium Drought.

The campaign highlights a renewed focus on the importance of working collaboratively to deliver increased value to the community, and to better manage our precious water resources for future generations. Leveraging the State Government's Target 155 brand (T155), the campaign seeks to inform and instil confidence. By working together, Melbourne's water sector organisations are effectively managing long-term water supplies, as part of the overall water supply system. The campaign also encourages Melburnians to consider their own water use and suggests simple behaviours to help make every drop count.

Target 155 and permanent water saving rules

In 2018-19, the average Melburnian used around 162 litres of water per day. The Victorian Government initiative, Target 155, encourages us to make the best use of our precious water supply by limiting consumption to 155 litres per person, per day.

Melburnians have shown an encouraging shift to water wise behaviours and are generally using less water than prior to the Millennium Drought. This is important given the expected continued growth of our population.

To meet Target 155, we need everyone to use just seven litres less each day, which is about three-quarters of a bucket of water.

In addition, permanent water use rules have been in place since water restrictions were lifted after the Millennium Drought at the end of 2012. These rules propose practical ways to reduce water use including:

- Only use hand-held hoses fitted with a leak-free trigger nozzle
- Only water your garden or lawn with:
  - A hand-held hose, bucket or watering can (at any time)
  - A watering system (between 6 pm and 10am any day).
- Only water public gardens, lawns and playing surfaces with:
  - A hand-held hose, bucket or watering can (at any time)
  - A watering system fitted with a rain or soil moisture sensor (between 6pm and 10am any day); or
  - In line with an approved Water Use Plan
- Only use fountains or water features that recirculate the water
- Only clean hard surfaces using a high-pressure water cleaning device (or hand-held hose with trigger nozzle or bucket if not available).

Maintaining our world-class infrastructure

In 2018-19, Melbourne Water invested $103.9 million in critical upgrades to our world-class water supply network, ensuring security for future generations.

This included $29.9 million to complete the replacement of the M41 water main renewal project. This 4.7 kilometre pipe running through the narrow, inner streets of Fitzroy and East Melbourne supplies drinking water to over 350,000 residents and businesses. After almost 100 years of service, the M41 needed to be replaced.

In 2019, Melbourne Water initiated upgrade works on two critical reservoirs within Melbourne's water supply network. Melbourne Water is making significant investments at O'Shannassy Reservoir and Upper Yarra Dam to ensure these older assets keep pace with current best-practice dam safety standards, securing Melbourne's world-class drinking water.

Supporting growth and reducing risk

The population of Melbourne is projected to increase from 4.6 million in 2016 to 6 million in 2031 and ultimately to 8 million people in 2051. Around 60% of this growth is expected to occur in the northern and western suburbs. As part of our commitment to meet the growing demand for water in these areas, we are planning to build a new 20 kilometre pipeline from the Yan Yean Water Treatment Plant to a future reservoir in Bald Hill. Construction is scheduled to begin in 2021.

In October 2019 we completed the renewal of the 80 year old M102 water main in Yarraville to secure a reliable water supply for the growing western Melbourne suburbs of Footscray, Altona and Werribee.

Sewerage and recycled water

Sewerage and recycled water

Melbourne's sewage treatment system consists of two main treatment plants; the Western Treatment Plant at Werribee and the Eastern Treatment Plant at Bangholme.

400 KM OF SEWERS

8 SEWAGE PUMPING *STATIONS*

12 AIR TREATMENT *FACILITIES*

60% WESTERN TREATMENT PLANT WERRIBEE

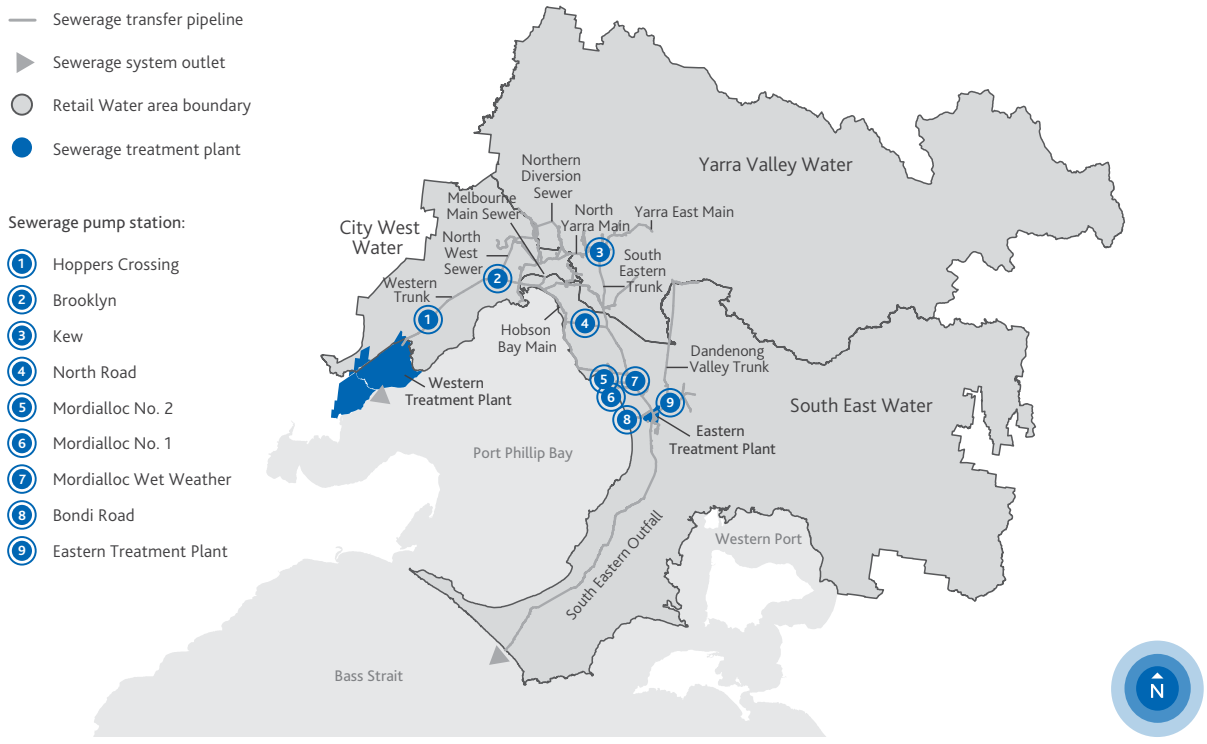
SEWAGE TREATMENT

40% EASTERN TREATMENT PLANT BANGHOLME

90% OF MELBOURNE'S SEWAGE IS TREATED BY MELBOURNE WATER

More than 400 kilometres of pipes and pumps transfer waste from the networks of Melbourne's retail water companies to our treatment facilities. The rest is treated at smaller plants by Melbourne's three retail water companies.

Melbourne Water's sewerage system



Pump stations

Although our sewers slope downwards to allow sewage to flow along by gravity, sewage must be brought back to the surface by pumping stations for treatment.

The three largest pumping stations are at Hoppers Crossing, Brooklyn and Kew.

Sewage as a resource

Sewage is not just a waste product. In the face of climate change and new technology, we are turning sewage into valuable resources such as recycled water and biogas (renewable energy).

Recycled water

Both sewage treatment plants produce Class A and Class C recycled water for use on site and to supply to customers offsite. Class A is the highest class of recycled water and can be used for a range of non-drinking purposes. The Western Treatment Plant was the first plant in Victoria to produce Class A recycled water.

Both plants continue to meet customer and regulatory standards. In 2018-2019 the plants treated a total of 305.5 billion litres of recycled water. The Western Treatment Plant produced nearly 32 billion litres of recycled water, with almost 25,000 million litres used on site and more than 6,880 million litres delivered to our customers.

Nearly 17 billion litres of recycled water was reused from the Eastern Treatment Plant; with 9 billion litres used on site, 6 billion supplied to the Trility Eastern Irrigation Scheme and the remainder delivered to South East Water's customers.

Energy generation

Both plants produce biogas (methane) during the treatment of sewage, which is used to generate electricity and significantly reduce the running costs of the treatment plants. Around 45 million cubic metres of biogas was captured over the last twelve months to cover 40 per cent of treatment process electricity requirements.

The Western Treatment Plant uses biogas to meet nearly all of its electricity needs. The plant has 9.9 megawatts of installed generation capacity, with an additional 6 megawatts coming online in 2020. Sometimes the plant produces more energy than it uses, so this excess electricity is exported to the electricity grid to offset usage at our other sites.

The Eastern Treatment Plant hosts 9.3 megawatts of biogas generation, which can be supplemented with natural gas as required. These generators substantially reduce the need for imported power while also supporting the plant's heating and cooling requirements. A project to install a 16.7 megawatt solar field by 2021 is currently underway, which will significantly increase the sites use of self-generated renewable power.

Biosolids

Biosolids are the residual solid organic material from sewage treatment. The treatment process involves:

1. Separating solids from wastewater in large setting tanks, where they sink to the bottom.
2. Using bacteria to break down organic material in settled solids and to reduce pathogens and odours.
3. Naturally air-drying the solids in drying pans.
4. Storing them on site for at least three years to further reduce pathogens in accordance with Environment Protection Authority (EPA) guidelines.
5. Re-using them in strict accordance with EPA guidelines.

These treated biosolids look and smell like soil and contain beneficial nutrients like nitrogen, carbon and phosphorus.

Across Australia and around the world, biosolids have been used for many years on farmland to improve soil condition and improve water retention, as well as in compost and fertiliser.

Each year we produce approximately 41,000 dry tonnes of biosolids at the Western Treatment Plant (WTP). We supply them for re-use in agricultural purposes, providing them to local farms to spread on existing cropland.

Over the year 2018-2019, we re-used more than 112,000 dry tonnes of stockpiled clay-rich biosolids to help rehabilitate a landfill site in outer Melbourne, and 120,000 dry tonnes as part of the groundworks for the solar energy project at the Eastern Treatment Plant (ETP).

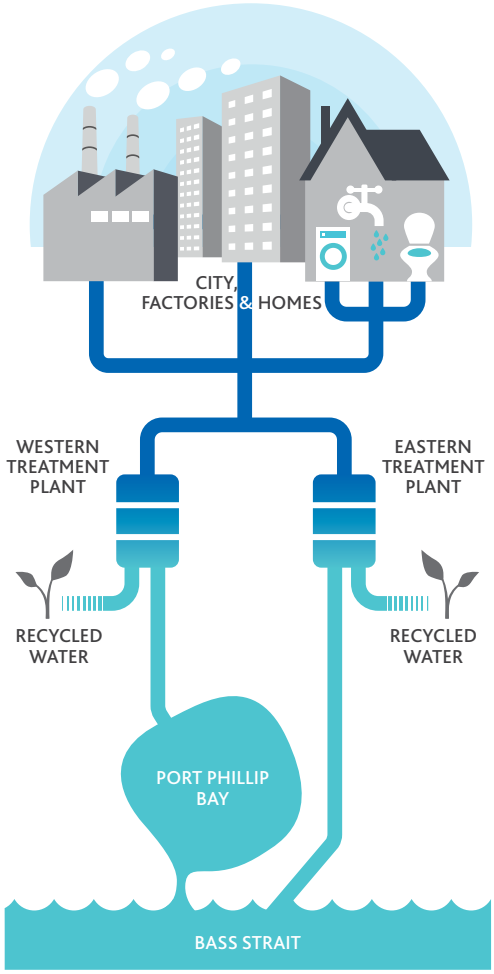
In the same year we supplied 4100 dry tonnes of biosolids for crop farming in the nearby Balliang area.

Mitigating sewage spill risk

In extreme rainfall events there is the risk of sewage backing up and spilling into households, especially in showers as they are the lowest point in most homes.

To take pressure off the system, a number of measures and infrastructure are in place. These include:

- extra capacity in our sewers to cope with higher flows from rainfall events
- emergency outlets across the network to control overflow of highly diluted sewage into local creeks and waterways to protect people's homes
- infrastructure upgrades, such as the Northern Sewerage Project, to increase the sewerage capacity.



Key projects

Western Treatment Plant upgrades

The Western Treatment Plant provides safe, effective treatment for more than half of Melbourne's sewage including significant removal of nitrogen before discharge of the final treated water to Port Phillip Bay.

We are undertaking a three-stage $320 million program of works to increase the capacity of the Western Treatment Plant to help meet the needs of Melbourne's growing population.

These works ensure nitrogen loads to Port Phillip Bay are managed and that the assets continue to be safe and efficient to operate and maintain. The works will also provide enhanced biodiversity outcomes.

In 2018-2019, construction was completed on an innovative nutrient removal plant in the second stage of works. The new Nutrient Removal Plant treats 140 megalitres of wastewater per day, which is equivalent to 56 Olympic-sized swimming pools. Functional design for the third stage of this program of work began in early 2019.

Securing recycled water supply

Melbourne Water has bulk water agreements with Southern Rural Water and City West Water. They provide certainty of water supply by guaranteeing recycled water from the Western Treatment Plant to pass on to irrigators. Irrigators can be confident of a reliable supply into the future, regardless of uncertain climate conditions.

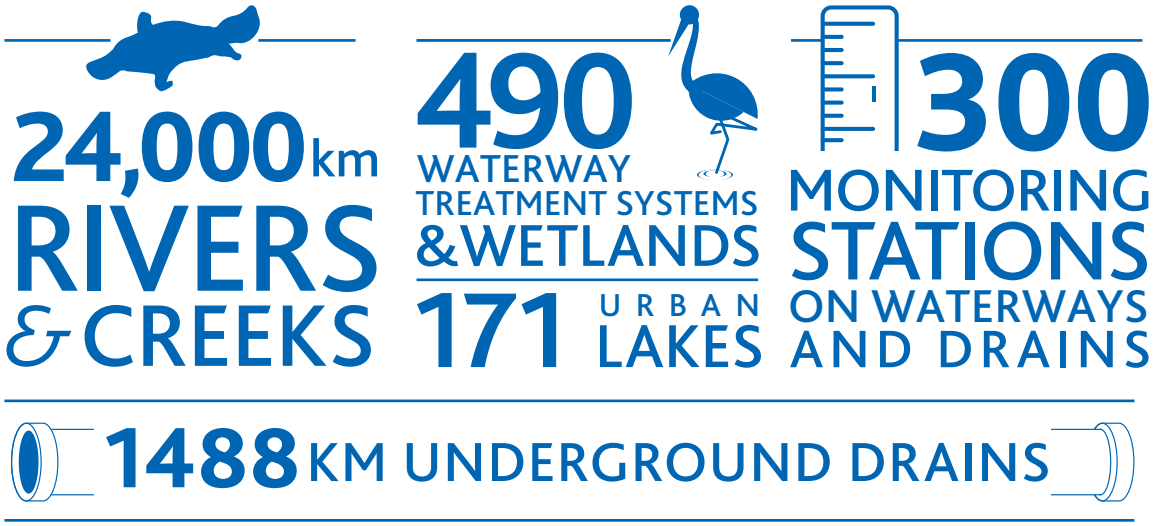
Capital works

In 2018-19 we delivered $73.6 million of capital works to rehabilitate our sewer transfer assets while continuing to service our customers. Major capital works included the rehabilitation of the upper end of the Hobsons Bay Main Sewer under Beach Road in Brighton, the Maribyrnong Main Sewer in Avondale Heights and lower end of the Williamstown Main in Spotswood. A further $56.4 million of sewer rehabilitation projects have been developed and prioritised for delivery in 2019-20.

Waterways

Waterways

Melbourne Water manages the health of Melbourne's rivers and creeks.



Healthy Waterways Strategy

The *Healthy Waterways Strategy* is a celebration of the catchments and community of the Port Phillip and Westernport regions, and provides a single framework for the management of their rivers, wetlands and estuaries.

The Strategy brings together world-leading science, community knowledge and management experience to set clear targets and performance objectives for protecting our waterways and enhancing the long-term health, amenity and lifestyle of Greater Melbourne. More than 630 individuals representing over 220 organisations partnered to shape the Strategy.

We are now working together with partners across the region to implement the Strategy. A key element of Strategy implementation is the *Monitoring, Evaluation, Reporting and Improvement (MERI) Framework* – the first of its kind in Australia – which enables us to track how we are progressing against strategy objectives and adapt our approach to drive the best possible outcomes for our waterways.

Yarra River

The Yarra River and its environs underpin the liveability and economic prosperity of Melbourne. The river and its catchment provide 70 per cent of Melbourne's drinking water, and is home to one-third of Victoria's animal species. The river is of great spiritual and cultural significance for Aboriginal communities.

Melbourne Water conducts water quality monitoring at seven sites along the Yarra to assess broad-scale, long-term trends in water quality. Sites are sampled monthly and tested for various water quality indicators including oxygen levels, salinity and nutrients.

The Yarra Strategic Plan

Protecting the Yarra River and its parklands is critical to the future prosperity of our whole region.

In 2017, the Victorian Government nominated Melbourne Water as the lead agency for the development of the Yarra Strategic Plan and the *Yarra River 50 Year Community Vision* to ensure the ongoing management and protection of the Yarra River corridor.

The *draft Yarra Strategic Plan* was released for public consultation in January 2020 and is scheduled for delivery in late 2020, early 2021.

Once finalised, the Yarra Strategic Plan will be the first integrated corridor strategy developed in collaboration with Traditional Owners and all 15 state and local agencies responsible for managing the river corridor.

More information on the Yarra River 50 Year Community Vision and the Yarra Strategic Plan can be found at imaginetheyarra.com.au/

Animals

More than a third of Victoria's plant and animal species are found in the Yarra catchment, including platypus, a range of fish (and the endangered Yarra Pygmy Perch), frogs, waterbugs and bird species.

Melbourne Water surveys urban waterways twice a year to understand the health and movements of platypus. We undertake a number of research projects to understand the migration and importance of fish in our rivers and creeks.

In particular, the Frog Census is a community-based monitoring program managed by Melbourne Water. Participants simply download the free Frog Census mobile app and record frog calls at any river, creek, wetland or other waterway.

Our Frog Census App continues to engage citizen scientists with more than 5594 frog reports submitted by over 1800 volunteers since its launch in 2016.

Environmental flows

To enhance the natural environment, Melbourne Water works in conjunction with the Victorian Environmental Water Holder to release water that improves seasonal flow within key river systems across the Port Phillip and Westernport regions.

These releases, also known as environmental flows, help improve the environmental quality of rivers as they:

- flush sediment from rivers
- improve the quality of habitat for platypus, macroinvertebrates, fish and frogs
- encourage vegetation growth
- aid fish spawning and migration.

In 2018-19 Melbourne Water released a total of more than 18.5 billion litres of water to the Yarra River, Tarago and Bunyip Rivers, Werribee River and Maribyrnong River.

Incentives program

Melbourne Water provides funding to community, landholders, local government, and other organisations to improve waterway health through a number of programs that will help us deliver on the objectives in the Healthy Waterways Strategy.

Over the last 12 months, Melbourne Water provided $8.4 million in funding to projects that will enhance or protect waterway health though stormwater management, revegetation, weed control and fencing.

Education and Waterwatch

We continue to support a community that values water and the environment through our engagement and education programs, with learning for the water curriculum and opportunities for citizen scientists to contribute to scientific research by monitoring our waterways.

We have built capacity at an industry level through the Clearwater program to increase integrated water management knowledge and understanding. Clearwater works with the Victorian water industry to address complex challenges associated with climate change, population growth and urbanisation. The program supports professionals, organisations and the sector to take a holistic approach to water management by strengthening their skills, knowledge and networks across Victoria.

Each year, Melbourne Water invests in protecting our waterways from a variety of threats, including those posed by climate change and population growth.

Over the past twelve months, 6562 people participated in Waterwatch activities to help protect the health of our local rivers and creeks, including the Frog Census, Platypus Census, Waterbug Census and water quality testing. We supported water quality volunteers to monitor critical drought refuges for threatened fish, supported the National Waterbug Blitz, and prototyped immersive digital waterway experiences with Swinburne University.

Volunteer-collected data helped support environmental watering of billabongs, protect habitat for the vulnerable Southern Toadlet, and inform actions to assist the recovery of wildlife following a major pollution incident on Stony Creek, in Melbourne's inner west.

Development services

With Melbourne's population forecast to increase to more than 8 million people by 2051, facilitating the provision of housing for our growing city is of great importance to our community.

Melbourne Water provides services to industry and private landowners to support the planning and building of resilient, sustainable and liveable communities.

This includes creation and management of catchment-scale drainage Strategies (stormwater infrastructure plans), stipulation of development requirements and conditions, overseeing stormwater management asset construction sequencing and timing, performing asset construction surveillance to ensure functionality and quality, and creation and management of Development Services Schemes (funding mechanism to provide equity within that catchment).

It also includes responding to council-referred planning applications (provide development requirements and conditions), providing planning guidelines and statutory requirements, providing pre-development advice, and supporting council Special Building Overlay (SBO) and Land Subject to Inundation Overlay (LSIO) planning scheme amendments.

Managing the floodplain

Managing the Floodplain

Melbourne Water is the floodplain manager for the Port Phillip and Westernport region. We work closely with a wide range of organisations involved in flood management including 38 councils, the Department of Environment, Land, Water and Planning (DELWP), the State Emergency Service (SES) and Emergency Management Victoria (EMV).

We've developed flood management plans in partnership with councils which articulate a collaborative approach to managing flood risk, tailored to the specific needs of the local area. We also have a partnership with SES which involves the delivery of targeted flood awareness education to hotspot areas and the development of Flood Emergency Plans with councils.

We collect and develop flood information to support appropriate decision making for the prevention, response and recovery phases of flood management. Our sources of flood information include flood models, rainfall data, topographic data and drainage system configuration.

We provide flood advice on new developments and lead projects to address existing and future flood risks across Melbourne.

We help reduce the risk of floods by:

- maintaining 1594 kilometres of stormwater drains and 238 retarding basins
- building new flood protection assets including new pipes, retarding basins, flood gates and levee banks
- managing waterways to help reduce the impacts of flooding
- raising awareness of risks and responses
- providing data for warning systems
- implementing planning controls to ensure appropriate development in flood prone areas.

Rising sea levels

Melbourne Water is working with the Victorian Government and councils to address rising sea levels through initiatives and research projects that include:

- sea level rise assessments in developments along coast lines
- the application of the Australian Rainfall and Runoff Review
- flood modelling around climate change scenarios
- a business-wide Climate Change Adaptation Strategy.

Key projects

A shared Flood Strategy

Melbourne Water has started work on the refresh of the *Flood Management Strategy* which sets the direction for flood management in the Port Phillip and Westernport region. As the regional floodplain manager, Melbourne Water's role is to coordinate development and delivery of the strategy, as required by the Victorian Government's Floodplain Management Strategy.

The strategy refresh will be completed by late 2020 to align with the Melbourne Water 2021-26 pricing period, and come into effect in mid-2021, after the current strategy expires.

Who is developing the Flood Strategy?

In recognition of the number of stakeholders involved in the delivery of Melbourne's flood and drainage services, the refresh will continue to be a regional, multi-agency strategy. The audience for the strategy is agencies with flood management responsibilities who co-deliver and represent their community.

We are working collaboratively with:

- local and state government agencies
- emergency services
- insurance and private sector with flood management responsibilities
- organisations that represent their community.

Drainage infrastructure

During 2018-19 $24.4 million was allocated to the construction of flood mitigation projects, including $21.3 million for a major upgrade of the Murrumbeena Main Drain (the total project cost $40 million). This major capital project will reduce flood risk in two of Melbourne's eastern suburbs and is nearing completion.

The project duplicates 2km of drain stretching from Railway Parade in Murrumbeena to Gardiners Creek in Malvern East. It has also improved connectivity by opening up neighbourhoods to more green spaces, increasing access to bike routes for commuters and leisure riders.

A capital project in the City of Darebin on the Merrilands Main Drainage network, aims to maximise the capture of overland flows into existing pits and pipes through inlet pits during lower rainfall events.

We are also working closely with Banyule City Council and residents to investigate and design flood mitigation works for the St Helena East Main Drain in Eltham. The planned works include additional pipes to carry the flood waters and an expanded retarding basin to slow the passage of water. Works are scheduled to commence in 2020.

Flood Integrated Decision Support System

The Flood Integrated Decision Support System (FIDSS) is used for monitoring and reporting on minor to major flood events along our main rivers. It has been recognised as the Flood Risk Management Project of the Year (2017) by Floodplain Management Australia.

FIDSS provides real time, high quality information before, during and after flood events. It is an essential tool for sharing flood-related information with our emergency partners and for keeping flood-prone communities up-to-date. FIDSS has been designed to integrate Melbourne Water's telemetry systems, URBS hydrologic software, HYDSTRA data management and GIS flood maps. It directly connects with the latest Radar, Nowcast and Access Products from the Bureau of Meteorology.

Flood alert mobile app

Partnerships play an integral role in progressing the delivery of flood prevention, response and recovery initiatives. Warning services can help communities take action to reduce the effects of floods. Due to the rapid onset of flash floods, automated messaging is considered the most efficient means of informing the community of flood risk, particularly in the urban areas.

We are working with Emergency Victoria, the SES, DELWP and the Bureau of Meteorology following the successful trial of a pilot flood alert mobile phone app developed by Melbourne Water. These partners are working towards collectively sending flash flood alerts and information to the community through the Emergency Victoria mobile phone app.

This service will be complemented with flood education and awareness provided through our partnership with the SES. It is expected that a trial of this new service will be completed by June 2025.

Flood modelling

We have undertaken a review of Melbourne Water's *Technical Specifications for Flood Modelling*, bringing the specifications in line with the new *Australian Rainfall and Runoff 2019 Guidelines*. This marks a significant update of the specifications to account for an additional 30 years of climate data and the inclusion of climate change scenarios. The specifications are also currently being broadened to include the requirements for flood mitigation projects and development schemes which will be completed by May 2020. This will ensure that mapping undertaken by any Melbourne Water team is completed to an appropriate standard for use and sharing.

Marine and coastal planning

On 1 August 2018 the Marine and Coastal Act 2018 came into effect to protect Victoria's marine and coastal environment now and into the future.

Melbourne Water is collaborating with DELWP to help implement a number of actions outlined in the *Marine and Coastal Act 2018* Transition Plan. These include:

- Engaging a project officer to scope the role to provide coastal erosion advice as provided for in the Act.
- Completion of a coastal hazard assessment for Port Phillip Bay.
- Supporting strategic planning to assist coastal councils plan for sea level rise in partnership with the Municipal Association of Victoria and the Association of Bayside Municipalities.
- Reviewing flood controls and policy in Victoria Planning Provisions to clarify applicability to sea level rise.

Technology

The adoption of new technology is helping to drive new opportunities for risk reduction and flood mitigation.

An exciting development is the introduction of the Flood Management Portal, completed in 2018-19. The portal will support effective collaboration across the flood management sector. It is an interface to capture and manage actions and commitments agreed to by councils, the SES and other flood management stakeholders. This simple and easy-to-use portal currently contains actions identified in seven flood management plans. Further actions will be updated and included in the portal. The portal enables reporting to governance groups so they can have oversight and visibility of actions and commitments in the flood management plans.

Alternative water sources and integrated water management

Alternative water sources and integrated water management

Melbourne Water takes an integrated approach that brings together all facets of the water cycle – water supply, sewerage management, treatment and stormwater – to achieve sustainable triple bottom line benefits for the community.

Integrated water management is an approach that supports:

- collaboration with customers and stakeholders to promote new and diverse water resources
- the incorporation of integrated water and urban development planning
- finding ways to obtain multiple benefits from our natural and built assets
- managing the water supply system to meet urban, environmental and agricultural needs
- undertaking long-term planning to address the needs of a growing population, climate change and variability.

Taking a holistic, integrated approach to Melbourne's water cycle helps in a number of ways:

- Socially, by providing public health, safety, open spaces and sports fields, reduced urban heat-island effect and improvements in the resilience of the water supply system to climate change.
- Economically, by providing affordable services and seeking opportunities for growth, especially in industry and agriculture.
- Environmentally, by increasing the amount of water available for environmental flows and reducing impacts to the environment from such things as pollution, stormwater and treated wastewater.

Stormwater management

Stormwater is rainwater that has fallen onto roads and hard surfaces, which can contain chemicals or pollutants. Water Sensitive Urban Design (WSUD) is an approach to planning and designing urban areas that makes use of this valuable resource and reduces the harm it causes to rivers and creeks.

Melbourne Water is responsible for the licensing of surface water from some catchments and its own works, which includes licencing stormwater to assist in integrated water management.

Key projects

Sunbury Integrated Water Management Plan

The population in the Sunbury region is expected to double in the next 20 years. We are developing the Sunbury Integrated Water Management Plan with Western Water, Hume City Council and the Department of Environment, Land, Water and Planning to identify a sustainable and integrated approach to water management.

Through community engagement the plan considers the growth of Sunbury and the challenges and opportunities to protect local waterways. It will explore how to maximise alternative water sources generated from stormwater and recycled water within the expanding urban areas.

Arden Macaulay

Arden Macaulay is a city-shaping project on the northern edge of Melbourne's CBD that will transform the area into one of the best examples of urban regeneration in the world.

By 2051, it is projected that Arden Macaulay will be home to 27,000 residents, supporting nearly 45,000 jobs and featuring a wide variety of well-designed open spaces.

Melbourne Water is working closely with the Victorian Planning Authority and the City of Melbourne to develop and implement a water sensitive strategy for the precinct, which includes flood mitigation.

Enhancing our Dandenong Creek

Over the past five years, we have been working with the community to deliver measurable, on-ground benefits to Dandenong Creek's environment. The Enhancing Our Dandenong Creek program is an innovative, collaborative and alternative approach to sewerage management that focuses on protecting public health, improving stormwater quality and bringing the creek back to life for the flora, fauna and community that live there.

The project has seen the transformation of the creek corridor, including reintroducing threatened native fish and returning a piped section into an open, flowing waterway once again. Due to the success of the collaborative, phase one pilot, Enhancing Our Dandenong Creek is now transitioning into the next five-year program.

Liveability

Community benefits

For over a century our organisation has serviced the community with safe and secure drinking water, reliable sanitation and effective flood management. These are fundamental elements to a liveable city.

In addition to these services, Melbourne Water works to add multiple community benefits to everything we do in creative and collaborative ways. As we go about our work, we look to include actions that can further enhance life and liveability in Melbourne such as:

- providing cooler, greener, more amenable spaces
- enhancing community connection and access to nature
- creating opportunities for community recreation and enjoyment.

We manage more than 33,000 hectares of land and 24,000 kilometres of waterways, and hold valuable partnerships with state and local government, industry and community groups that extend beyond our estate.

We have a significant opportunity to further enhance the liveability of Melbourne.

With a growing population across the world's most liveable city, we know it is increasingly important to provide our community with healthy green spaces and amenity.

Key projects

Greening the Pipeline

The Greening the Pipeline initiative aims to transform the 27-kilometre heritage listed Main Outfall Sewer pipeline into parkland. The pipeline was built in the 1890s in Melbourne's west as a vital piece of infrastructure to remove and transport Melbourne's sewage for treatment. It was decommissioned and replaced after protecting the health of Melbourne for more than 100 years.

We are currently working with Wyndham City Council, City West Water and VicRoads, with support from Greening the West, to deliver on the next stage of the initiative that will consist of an integrated stormwater system to keep the parkland green all year around.

Western Treatment Plant Future Land Use Plan

As the premier bird watching site in Victoria, the Western Treatment Plant (WTP) is an example of waste management in harmony with nature. It is visited by thousands of people each year through Melbourne Water guided tours and self-guided access to bird watching areas. The WTP Future Land Use Plan identified visitation and community education as key components of a future that maximises the social, environmental and economic value of WTP for the community.

A range of projects have been delivered to provide an enhanced experience for visitors to the site including toilet facilities, interpretive, directional and wayfinding signage, and safety improvements to birdwatching routes. Landscaping is underway for the new administration and education centre in the historic Cocoroc precinct. This will enable educational tours to interpret the history of the old township and unlock new opportunities to acknowledge the site's rich history.

Community-led liveability projects

Working with our community helped deliver a range of projects over the past year. These include:

- developing the Yarra River Paddling Investigation that identified opportunities to improve recreational boating access throughout the Yarra River, with enhanced public safety and promoting waterway values
- the AMES Australia and Conservation Volunteers Australia partnership to build a sense of community and improve waterway awareness for new migrants through a revegetation program along Kororoit Creek in Sunshine
- the *Our Space, Your Place* program which enables the community to utilise Melbourne Water's owned land. For instance a not-for-profit organisation called TEAM has utilised a pipetrack to run a sustainability education hub for people with disabilities
- creating a sustainable tourism action plan for Werribee Gorge
- a student led growling grass frog mural at Williams Landing as part of Greening the Pipeline.

Environmental stewardship

Environmental stewardship

We work to minimise environmental impacts and meet environmental obligations.

We do this by:

- enhancing and promoting the value of natural and cultural assets in the services we provide
- responding to climate change and variability through mitigation measures
- using natural resources efficiently
- minimising waste through recycling and reuse initiatives
- preserving and promoting cultural heritage
- encouraging our suppliers and partners to apply sustainable business practices.

Research is a critical part of our response to climate change. We have formed close partnerships with the CSIRO, Bureau of Meteorology and various universities.

Melbourne Water has developed projects to harness waste and to re-use it either to generate energy for our operations or for the benefit of communities. We are also looking at new ways to ensure our natural assets are used to their maximum potential and have established healthy ecosystems by managing waterways from catchment to coast.

United Nations Global Compact

We are committed to the United Nations Global Compact, the world's largest corporate sustainability initiative. This is both a practical framework for action and a platform for demonstrating corporate commitment and leadership to the UN Sustainable Development Goals (SDG). These goals aim to put the world on a sustainable path and mobilise efforts to end all forms of poverty, fight inequalities and tackle climate change, while ensuring that no one is left behind.

The vital role of water and related resources in creating and delivering sustainable communities puts Melbourne Water in a key position to contribute to this global effort. We will enhance our contribution across all goals, while demonstrating leadership on the goals of Clean Water and Sanitation, Sustainable Cities and Communities and Life on Land.

Climate resilience

Disruptions in global climate systems are challenging the resilience of Melbourne's water supply, drainage networks and treatment systems. Extreme weather events, rising sea levels, reduced rainfall and increasing temperatures are already impacting essential infrastructure and water supplies. Our climate will continue to change and challenge us now and into the future.

Melbourne is already experiencing and can continue to expect:

- Long-term decline in rainfall over our catchments, leading to less water in our reservoirs and reduced natural flows in our waterways.
- Longer and more severe fire seasons that threaten the quality and quantity of water in our reservoirs.
- Prolonged periods of drought that reduce our water supply.
- Hotter, longer and more frequent heatwaves increasing the risk of algal blooms in reservoirs.
- Heavier and more frequent downpours and rising sea levels resulting in increased flooding events and coastal erosion.

Melbourne Water's land management, water supply, wastewater and urban development activities provide unique opportunities to prepare for climate change, support the natural environment and community wellbeing.

Climate challenges and our response are set out in core service strategies, and we have a Climate Change and Resilience Plan for our business to ensure we are prepared and capable to address future challenges. The plan responds to four key areas:

- greenhouse gas emissions
- environmental resilience
- community resilience
- adapting to climate change.

Net zero carbon emissions

The Victorian water sector constitutes the single largest proportion of total State Government carbon emissions. Melbourne Water accounts for approximately 50% of the Victorian water sector's emissions. This is largely due to the fact that Melbourne Water receives and treats about 90% of Melbourne's sewage at its Eastern and Western Treatment Plants.

Melbourne Water has pledged to reduce its net carbon emissions to zero by 2050 and is examining a path to net zero by 2030. This commitment reflects the direction set out in Water for Victoria that *"Our water sector will be a leader in the state's climate change mitigation and adaptation actions"*.

Already we have:

- Harnessed renewable energy that would otherwise have been wasted by building a number of hydroelectric plants into our water supply network which capitalise on gravity-fed water flows. This is currently generating 55.1 GWh per annum.
- Made significant investments in methods to capture and use the biogas from sewage treatment to generate over 100 GWh of electricity per annum and reduce greenhouse gas emissions and their harm on the environment.

We are:

- Continuing to work with experts across the world to come up with new ways of reducing our emissions even further, and sharing our knowledge to help tackle what is a global challenge for all water businesses.
- Offsetting the electricity we draw from the grid by capturing renewable energy from sources within our system, increasing the overall amount of renewable energy generated within Victoria and reducing costs to our customers and the community at large.

We will:

- Establish new onsite solar farms to help power Eastern Treatment Plant and Winneke Treatment Plant. Together they will generate 42 GWh per year of electricity, further reducing our greenhouse gas emissions.
- Further reduce our organisational carbon footprint over the 2021-22 period through our refreshed *Environmental Stewardship Strategy*.
- Increase the Western Treatment Plant's renewable energy production by 46.5GWh per year to be an exporter of energy with construction of an additional biogas power plant.

Aboriginal engagement

Aboriginal communities have a spiritual and customary living relationship with water in all its forms through creation stories, use of water as a resource and knowledge about sharing and conserving water. Establishing and fostering partnerships with Aboriginal communities throughout the Port Phillip and Westernport region continues to be an important part of Melbourne Water's water resource planning and management processes.

Over the coming year, Melbourne Water will enhance this approach to include recognition and, where appropriate, support for improved integration of Aboriginal cultural, spiritual and economic values to land, water and resources planning, as part of delivering the Water for Victoria plan. Key initiatives supporting this effort include the Heritage Improvement Program and the Reconciliation Action Plan.

Enhancing biodiversity

Melbourne Water manages significant landholdings that support diverse and thriving communities of native plants and animals. We develop and implement strategies that protect native biodiversity in compliance with Victorian and Commonwealth biodiversity obligations, and our activities for the year align with the Victorian Biodiversity Plan 2037.

We are updating our Biodiversity Conservation Plan and Environmental Stewardship Strategy to enhance the value of our natural and cultural assets by ensuring resources are available and service provisions are made for future generations.

Water prices and charges

Water prices and charges

We plan and cost projects, and prepare budgets to help determine the prices we need to charge customers.

This forms part of our pricing submissions to the Essential Services Commission, which reviews and approves changes to water prices, usually every five years as part of the Price Review.

The Melbourne Water 2021 Price Submission will succeed the 2016 Water Plan Price Submission, setting out the water, sewerage, waterways and drainage projects along with their associated expenditures for 2021-2026.

The Price Submission engagement program is about working closely with our customers and the community to ensure we continue to deliver valued services, while addressing the global challenges of population growth and a changing climate.

Waterways and Drainage Charge

The Waterways and Drainage Charge funds a range of programs to protect and improve the health of our rivers and creeks, and provide regional drainage services, flood protection and flood warning systems throughout the Port Phillip and Westernport region.

Melbourne Water plans water, sewerage, drainage and river health projects needed to support Melbourne's growing population and maintain essential services.

There are three main categories of charges:

- Residential: applies to residential property owners located within the Urban Growth Boundary
- Non-residential: properties located within the Urban Growth Boundary and major airports that are not classified as residential
- Rural: applies to customers located outside the Urban Growth Boundary

The Waterways and Drainage Charge is billed to customers quarterly by Melbourne's retail water companies and annually by regional water companies on behalf of Melbourne Water.

Financial Performance

$1.94bn
REVENUE

$595.2m
OPERATING EXPENSES

$408.1m
DEPRECIATION &AMORTISATION EXPENSES

$618.2m
FINANCE EXPENSES

$317.3m
EARNINGS BEFORE TAX

$201m
NET PROFIT AFTER TAX

$15.3bn
TOTAL ASSETS

$9.5bn
TOTAL LIABILITIES

51.2%
GEARING RATIO
DEBT/DEBT + EQUITY

2.1 TIMES
Interest cover (cash) times (operating cash flows before interest and tax/interest payments)

As per the 2018-2019 Annual Report

Melbourne Water

990 La Trobe Street
Docklands, Victoria 3008

PO Box 4342
Melbourne, Victoria 3001

Telephone 131 722
Fax 03 9679 7499

melbournewater.com.au