

Striking a new balance

Land-use strategy for the Western Treatment Plant



Melbourne Water is owned by the Victorian Government and manages Melbourne’s water supply catchments, removes and treats most of Melbourne’s sewage and manages rivers and creeks and major drainage systems in the Port Phillip and Westernport region.

We are committed to managing these assets in a way that protects and improves their environmental, social and financial values. Our policy document, *Sustainable Water – A Strategic Framework*, outlines our sustainability principles and provides the context for everything we do.

The 11,000-hectare Western Treatment Plant is one of our best known and loved sites, visited by thousands of people each year. It continues to provide an essential public health service, treating 52 per cent (about 485 million litres a day) of Melbourne’s domestic sewage and industrial waste.

Cover

Pied cormorants are among thousands of water birds found on the wetlands; maize, part of a new mix of agriculture; aerators in modern sewage treatment lagoons

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Foreword



The Western Treatment Plant at Werribee is a remarkable community asset that has underpinned the development of Melbourne by protecting public health.

It is a world leader in environmentally sensitive sewage treatment, a centre for education and research, an internationally recognised haven for birdlife and home to many other species of native wildlife and vegetation.

Sewage treatment is the site's main purpose and activity, complemented by conservation and agriculture.

A major upgrade of the treatment plant has opened up new opportunities by consolidating treatment processes in a defined area, and eliminating sewage treatment on the land.

Melbourne Water has developed this land-use strategy with the Western Treatment Plant's Community Liaison Committee and Biodiversity Conservation Advisory Committee.

The strategy divides the site into land-use zones, and proposes activities for each, recognising the importance of balancing sewage treatment, conservation management and agriculture.

The long-term aim is for the Western Treatment to host a diversified agribusiness that protects and improves renowned biodiversity and conservation values, delivers commercial returns, and helps to realise the Victorian Government's vision for sustainable development of the plains west of Melbourne.

Rob Skinner
Managing Director
Melbourne Water

A healthier city

The origins of the Western Treatment Plant can be traced to the findings of an 1888 Royal Commission into Melbourne's public health.

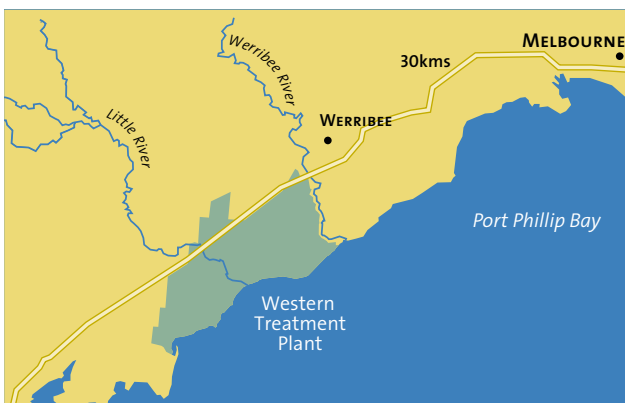
The origins of the Western Treatment Plant can be traced to the findings of an 1888 Royal Commission into Melbourne's public health.

Sewage had been collected in open channels running into the Yarra River and Hobsons Bay, and cholera and typhoid were rife. The Commission's findings led to an ambitious plan for an effective land treatment system – a sewage farm.

In 1892, the newly established Melbourne Metropolitan Board of Works began buying land at Werribee, chosen for its low rainfall and suitable soils. The first Melbourne homes were connected to the sewerage system in 1897.

The site has a rich heritage – Indigenous and European. The grasslands, alluvial flats and wetlands attracted indigenous people over thousands of years. The traditional landowners, the Wathaurong, were consulted in the development of this strategy.

The site once had its own township, Cocoroc, with homes for employees, schools, sporting ovals, a football team, swimming pool and tennis courts.



A rich history



- 1888** Royal Commission into Public Health following Cholera outbreak in Melbourne
- 1890** Melbourne Metropolitan Board of Works is established
- 1897** Western Treatment Plant begins operations
- 1921** Parts of Port Phillip Bay and Bellarine Peninsula including the Western Treatment Plant are declared a sanctuary for native animals
- 1982** Western Treatment Plant is declared a Ramsar site, internationally recognised for its wetland habitat especially for waterfowl
- 1996** Port Phillip Bay Environmental Study by CSIRO recommends reduction in the nitrogen load to the bay
- 2004** Plant upgrade to reduce nitrogen load to bay is complete. Recycled water irrigation replaces sewage irrigation across the site
- 2006** Land-use Strategy: Striking a New Balance

Melbourne's first water tank, moved to the Western Treatment Plant in 1894

Protecting the bay

In 2004, Melbourne Water completed a \$160 million upgrade of the plant. This work stemmed from a CSIRO study which found that Port Phillip Bay could be damaged if nitrogen loads entering its waters continued to increase.

Now all sewage is treated in modern lagoons, replacing old ponds and traditional land and grass filtration. The new methods remove large amounts of nitrogen, which would otherwise enter the bay, and generate high quality recycled water, which is a valuable resource for onsite and offsite use.

An added benefit is that greenhouse gas emissions and odour have been reduced by trapping methane under lagoon covers. The methane is being used to generate electricity, which will meet up to 80 per cent of the site's energy needs and save the organisation significant energy costs.



Time for change

The upgrade means that about 6,000 hectares of mainly ryegrass pasture is no longer needed for sewage treatment. Irrigation on these paddocks, which fatten cattle and sheep as a complementary business, has switched from using sewage to recycled water, bringing new opportunities.

While stock grazing has been found to be compatible with birds and vegetation in the wetlands, and until recently an integral and cost-effective part of the sewage treatment process, it also accumulates nutrients that could flow to Port Phillip Bay and contributes to the generation of greenhouse gas emissions.



Future directions

This strategy outlines the future direction for land use across most of the agricultural areas that will deliver the best financial, environmental and social results for Melbourne Water.

What has already begun

The move toward future uses for some sections of the site has begun, and these changes are compatible with this strategy.

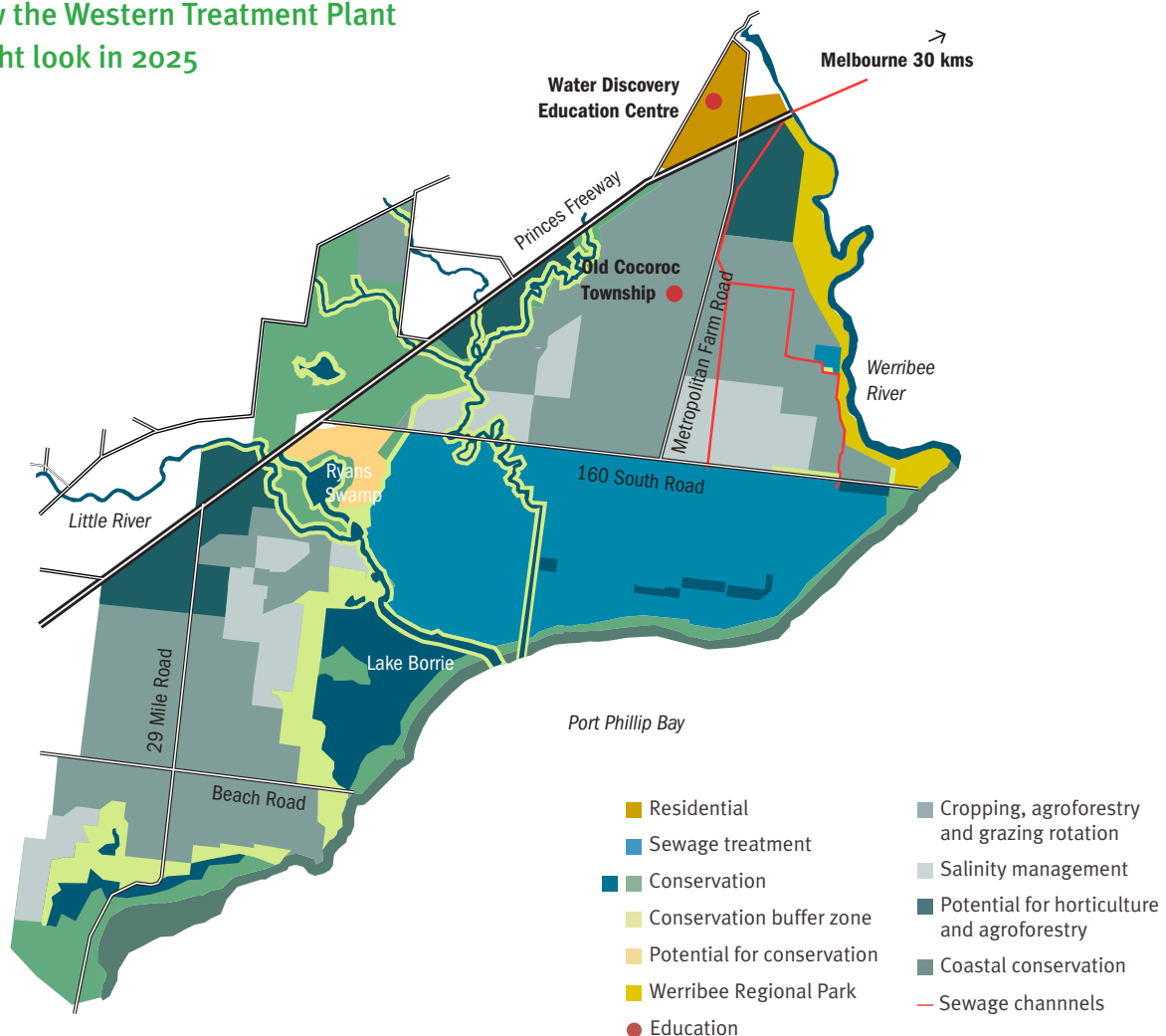
A 270-hectare strip along the Werribee River on the eastern fringe has been transferred to Parks Victoria for the new Werribee Regional Park and expansion of the Werribee Zoo.

A residential area of 200 hectares known as Werribee Field in the north-east has been set aside for future development in conjunction with VicUrban, along with key conservation wetlands and land to meet demands for expanded sewage treatment as Melbourne grows.

Assessments and trials

Extensive assessments, trials and consultations began several years ago. Salinity mapping, risk and financial assessments, Victorian Government policy, consultation with the community and other stakeholders and previous studies helped shape a new direction for the site

How the Western Treatment Plant might look in 2025



How the strategy was developed

The impact of grazing

Sheep and cattle grazing has been part of the landscape of the Western Treatment Plant since 1899.

It has been carried out to manage the lush pasture produced by sewage irrigation, and is run by the Werribee Agriculture Team, a separate business unit of Melbourne Water.

The farm is one of the largest grazing properties in Victoria, supporting around 15,000 cattle and 40,000 sheep. However, there is evidence that it results in nutrient build-up and greenhouse gas emissions.

Because sewage treatment now occurs in lagoons rather than on the land, some high quality recycled water is available onsite for conservation and irrigation, and this has opened up opportunities for a more sustainable mix of activities.

The options

A range of possibilities – from farming fish, abalone, seaweed, flowers or mushrooms to energy generation and conservation parks – was considered, and put through a ‘sustainability screen’.

This screening process determined the best seven integrated land-use systems, which were assessed according to environmental, social and financial factors.

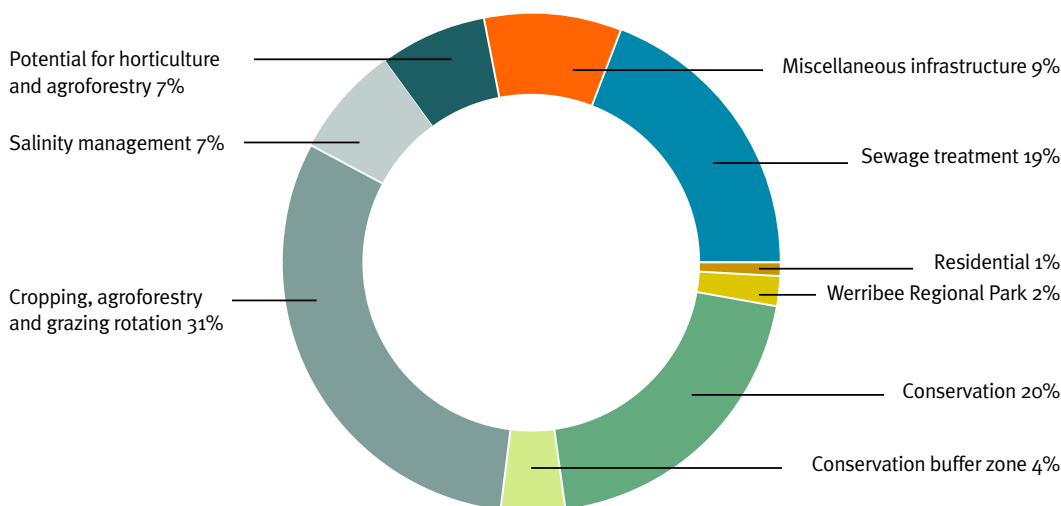
These systems were investigated to see which provided the best balance and flexibility for the mixed capabilities of the site.

Agriculture is not considered to be the core function of Melbourne Water, but it has always complemented sewage treatment, conservation and land management aims at the site.

Until field trials and monitoring have been completed, there will be uncertainty about the best ways of managing the soils to produce new crops and the commercial returns from new enterprises..

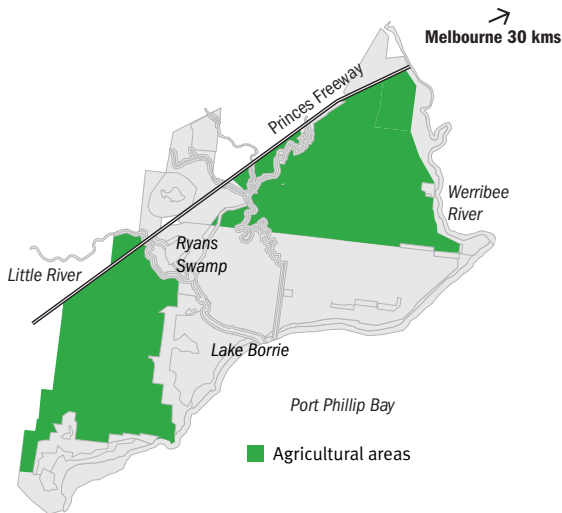
Melbourne Water will seek private sector involvement to innovatively develop the integrated agricultural land-use system. In the long term the site will remain in Melbourne Water’s ownership, but it is envisaged that a private sector operator would continue to advance the agricultural operations.

How the land may be used



The strategy's vision of land uses (by area) at the Western Treatment Plant in 2025

New enterprises and land management



Range of activities

A mix of crops, pastures, horticulture and forestry will provide food, animal fodder, fibre, 'carbon sinks' and fuel, and will be the basis of future agriculture at the site. Limited grazing will continue as part of crop rotations to provide integrated pest management, control grass in conservation buffer zones and provide forage areas for ibis and ducks.

About 500 hectares in the north-east of the site, with the highest quality soils, will be developed for horticulture – possibly nuts or prunes.

Activities will be mixed, with the distribution of crops and trees depending on the results of field trials and specific business cases.

Stems and stalks left after harvesting may provide additional biomass fuel to produce green energy.

Higher value uses

The ongoing drought has intensified the demand for recycled water and reduced the amount of recycled water available. Projections of sewage inflows to the Western Treatment Plant and recycled water available from the plant have been undertaken, incorporating the effects of climate change, reduced rainfall, water restrictions and conservation strategies.

These projections have identified a significant reduction in reliable volumes of additional water available for recycling from the plant.

The demand for recycled water from the plant exceeds supply at certain times of the year, so the planning and management of demand for recycled water are critical.

To address the competing demands for recycled water, the following allocation hierarchy has been proposed, which prioritises higher value uses of recycled water from the plant:

- Onsite conservation for biodiversity and habitat and onsite irrigation for salinity management
- Offsite committed contracts (potable and river water substitution)
- New potable substitution uses (offsite and onsite)
- Onsite irrigation for agriculture
- Offsite "new uses" (no potable/river water substitution)

This hierarchy will aim to prioritise the allocation of reliable recycled water supplies on a yearly basis, and ensure that seasonal water demands are met.

Consistent with this hierarchy, more intense horticultural operations offer better value for money for the recycled water available onsite.

Improving soil quality

Areas of land where soils have been damaged by salinity or rising water tables will be managed by the application of recycled water. Other options, to reduce the dependency on recycled water for salinity management, will be investigated including fencing out the land, planting salt-tolerant species or implementing drainage upgrades to improve irrigation efficiency and optimise the use of water for agricultural productivity and prevent further degradation.

Bioremediation techniques, which use bacteria, fungi and plants to remove contaminants such as cadmium from soil caused by decades of sewage treatment activities, are being trialled.

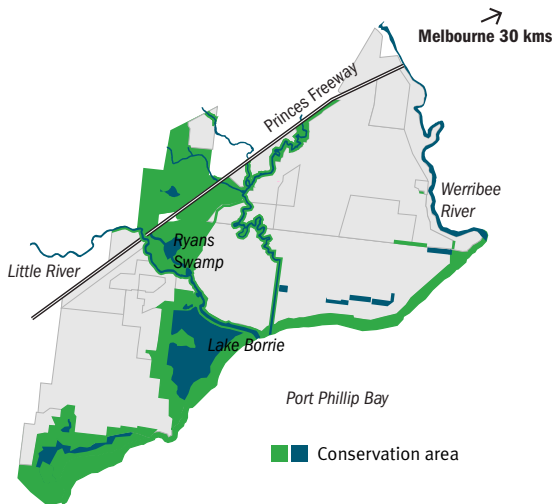
Pace of change

A 20-year timeframe has been envisaged to implement the strategy in a step-wise fashion, starting in the north-east and finishing in the south-west.

The pace of change may be faster, but will be governed by the results of field trials with pastures, crops and trees, careful monitoring of biodiversity values and the availability of recycled water. Flexibility is a key, and new enterprises can be reversed or adjusted if trial results do not meet expectations, if recycled water is not available or if climate change means they are no longer viable.

Progress will be overseen by a management committee, which will include external expertise, with an overall strategic review after five years or sooner if required.

An environmental haven



Dazzling array of birds

The Western Treatment Plant has 20 kilometres of frontage to Port Phillip Bay. This shoreline, linked with a network of constructed lagoons, natural wetlands, ponds, and irrigated paddocks, provides habitat for a dazzling variety and number of birds, particularly waterfowl and migratory shorebirds.

Years of high nutrient discharge to the intertidal mudflats has created one of the richest feeding grounds for shorebirds ever documented. Each spring, 16,000 migratory shorebirds arrive from Siberia.

The largest breeding colony of pied cormorants in Victoria roost in flooded trees and up to 10,000 ibis forage on grazed, irrigated pastures. The Western Treatment Plant provides critical wetlands habitat for up to 20,000 waterfowl, particularly during times of drought.

Birds are excellent indicators of environmental health, and more than 270 species have been recorded at the site, all of which is covered by the Ramsar Convention on wetlands of international importance.

Further international wildlife treaties, federal and state environment laws, licences, management plans and agreements are in place to protect conservation and biodiversity values.



Lagoons sit in harmony with world renowned wetlands

Realising a sustainable vision

Conserving biodiversity

More than a century of sewage filtration, grazing, clearing and changed water regimes have damaged some habitats and improved others.

The strategy continues to protect habitat for birds, particularly waterfowl and migratory shorebirds, but recognises that old treatment ponds, channels, drains, vegetated corridors and open grasslands and woodlands also support important populations of native animals and vegetation. Some, like the growling grass frog, are nationally threatened species.

Measures to protect these values include maintaining strips of pasture 350 metres wide next to the wetlands to serve as protective barriers against noise, human and farm machinery and other disturbances to birds. The strips will be grazed to keep the grass down, discouraging predators such as foxes and cats, and to control weeds.

Agricultural chemicals and pesticide sprays will be strictly controlled to protect conservation areas and Port Phillip Bay. Habitat in and around irrigation drains and channels, which often harbour frogs, skinks, ground parrots and native vegetation, will be improved.

The entire Western Treatment Plant already has a detailed conservation plan that seeks to maintain biodiversity values and monitor progress.

It may take years, for example, to see whether fewer nutrients on the mudflats and Lake Borrie will affect the numbers of birds. Before new crops or tree plantings are introduced, field trials will provide a better understanding of the impacts on adjoining and downstream areas.

Protecting grasslands

A new conservation area of up to 700 hectares of native grass and grassy woodlands around Ryans Swamp and north of the Princes Freeway will be set aside. Management of these areas will include integrated grazing and fire management regimes.

The Western Treatment Plant western basalt plains grasslands are still home to significant species of native plants and animals, including the spiny rice-flower, native herbs and grasses as well as the fat-tailed dunnart, and this new area presents one of the few remaining opportunities to protect a sizeable portion of this highly threatened habitat.



Growling grass frog, grasses of the western basalt plains, fat-tailed dunnart

Summary

The Western Treatment Plant is entering a new phase, helping to realise the Victorian Government's vision for sustainable development on the western plains.

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- A move away from the use of land for sewage treatment is driving this land-use strategy for the site.
- Melbourne Water will work with an innovative private sector partner to deliver this strategy. It is envisaged that this private sector involvement will continue into the future.
- Extensive evaluation – as well as continuing crop trials and monitoring – will establish the most sustainable land uses for the mixed capabilities of the site.
- Water recycling, including onsite use at the Western Treatment Plant, is helping the Victorian Government and Melbourne Water meet a target to recycle 20 per cent of Melbourne's treated effluent by 2010, and achieve dramatic reductions in nitrogen entering Port Phillip Bay.
- Reducing cattle and sheep numbers will reduce greenhouse gas emissions. Also, the proposal to use crops and crop residuals as biofuel and biomass for renewable energy generation, and trees as a carbon sink, will further reduce greenhouse emissions.
- Salinity in soils, rising water tables and contaminated areas will be managed.
- Trials, environmental and agricultural monitoring and the application of bioremediation methods developed at the site will provide new opportunities for education and research.
- Conservation and biodiversity values will be preserved and enhanced.
- Access to this valuable community asset will remain unchanged, with thousands of ornithologists and birdwatchers, researchers, students and others visiting each year.
- Aboriginal heritage sites will be confirmed and protected before any disturbance takes place.

Other useful resources

Melbourne Water's website, melbournewater.com.au, contains:

- Werribee Farm: A History, by Helen Penrose
- Port Phillip Bay Environmental Study (CSIRO 1996)
- Sustainability Report 2006/07
- Western Treatment Plant Explorer

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