

Resource 1 – Melbourne Water and the Eastern Treatment Plant

In this activity you will learn about how the Eastern Treatment Plant functions and about what the future holds for treating sewage.

What you will need

- One of the videos: *Big City small land* or *Making it fresh*. (The videos can be viewed by clicking the two movie icons in the bottom navigation bar of the Eastern Treatment Plant Explorer.)

Background

The role Melbourne Water plays in providing high-quality drinking water and managing waste is fundamental to the progress of Melbourne.

As the city grows, so do the needs of the community for high-quality fresh water. In turn, Melbourne has a growing need to increase and improve the capacity for treating sewage.

Melbourne Water is owned by the Victorian Government and, in partnership with private industry, is committed to upgrading and rebuilding the infrastructure required to meet growing domestic and industrial demand.

What is in sewage?

Sewage is the wastes from human settlement. If not handled properly, sewage can spread disease throughout a community. Even if networks of drains and pipes are established to remove sewage from urban areas, there can be major health and environmental problems associated with its disposal.

However, sewage is also an untapped resource: It might carry bacteria and diseases but it also contains a range of valuable materials that can be separated and reused. The Eastern Treatment Plant provides an interesting account of how engineers used basic scientific principles, not only to solve the problems associated with sewage, but also to use the resources in the sewage itself. This is a how a problem turned into a solution.

The Eastern Treatment Plant

The Eastern Treatment Plant at Bangholme, south-east of Melbourne, was opened in 1975 to serve Melbourne's growing population. It treats approximately 42 per cent of

Melbourne's sewage, or about 370 million litres a day. Some of the treated effluent from the plant is recycled at vineyards, sports grounds and nurseries.

The 1,000-hectare plant uses a treatment method known as the activated sludge process. Sewage is treated to a secondary standard and the effluent is chlorinated. It is then discharged into Bass Strait at Boags Rocks on the Mornington Peninsula, under an EPA Victoria licence.



Aerial view of the Eastern Treatment Plant.

A major two-year CSIRO study, recently commissioned by Melbourne Water, studied the effect of effluent on the marine environment, and found that ammonia was affecting the marine ecology. The study concluded that treatment improvements to reduce ammonia would result in a reduction of far-field impacts and may allow some recovery at the rocky platforms south-east of Boags Rocks, where effluent is discharged.

A successful six-month pilot project in one of the Eastern Treatment Plant's six aeration tanks to reduce ammonia has led to a multi-million dollar upgrade of the plant.

The pilot project involved incorporation of a treatment process called nitrification-denitrification into the existing system. The trial tank was fitted with barriers and upgraded aeration to create alternating aerobic and anoxic (low oxygen) zones. The additional aeration improves conditions for the aerobic bacteria, and ensures greater mixing of the waste, leading to more thorough treatment. In the aerobic zones, bacteria are encouraged to convert ammonia to nitrate, and in the anoxic zones the nitrate is reduced to nitrogen gas, which makes up about 80 per cent of air.

The upgrade, which will take about four years to complete, is a major step in improving the marine environment at Boags Rocks.

What to do

1. Watch one of the videos on the Eastern Treatment Plant.
2. Draw up a concept map showing how sewage is treated at the Eastern Treatment Plant.
3. Draw up another concept map showing who is involved in the treatment of sewage in Melbourne. (hint: read the Appendix: The Melbourne Water Charter)

Further research

To find out more about the Eastern Treatment Plant, visit the Melbourne Water website at www.melbournewater.com.au

Appendix: The Melbourne Water Charter

Melbourne Water is owned by the [Victorian Government](#). Our operating area extends from Melbourne's water supply catchments high up in the Yarra Ranges, to the Mornington Peninsula and Western Port, north to Yan Yean and west to Werribee.

We are a significant business, managing \$7.1 billion of natural and built assets. Our annual operating revenue of more than \$510 million is earned from water supply, sewage treatment and drainage rates. This is used to fund dividends and equivalent taxes to the Government, our operations, capital program and pay off debt.

We invest about \$145 million a year on our infrastructure including reservoirs, sewage treatment plants, pumping stations, sewers and drains to help ensure we meet our objectives. We are committed to decision-making based on economic, social and environmental considerations.

An independent Board of Directors is responsible for the governance of Melbourne Water. The responsible Minister is the Minister for Environment and Water.

Our people have diverse skills and expertise, and range from environmental scientists to engineers and research and technology specialists, and we place a high priority on building strong partnerships and relationships in the government, industry and community sectors.