

Northern Water Plant

Barwon Water
Collaborative partnerships

Key insights

The Northern Water Plant (NWP) was developed to help Barwon Water and the Viva Energy Geelong Refinery meet strategic objectives for sustainable water treatment and water reuse.

The NWP combines domestic and industrial wastewater treatment and reuse into the one facility. Reuse of the treated wastewater in the adjacent refinery has reduced Geelong's drinking water use by around 2,000 million litres a year (5% of Geelong's average annual demand).

It has also resulted in 10% less treated water being discharged to the ocean at the Black Rock Water Reclamation Plant.

The project was a collaboration between the water corporation, business and Government demonstrates the potential for win-win outcomes from IWM.



The Northern Water Plant (bottom right hand corner) and Viva Energy Geelong Refinery from the air.

Project overview

In the mid-1990s, Barwon Water began developing a long term sewerage strategy to manage future growth in Geelong. Around the same time, Shell Geelong Refinery (now Viva Energy) was considering ways to improve the quality of its wastewater and reduce use of drinking water.

An opportunity was identified for a joint project to develop a purpose built waste water treatment near the refinery which could then utilise the recycled water. The 'Northern Water Plant,' as it has become known, has provided a win-win solution for both Barwon Water and the refinery. After several years in planning, construction commenced in April 2011 and the project was officially opened in April 2013.

Organisations

This project was a partnership between Federal and State Governments, Barwon Water and Geelong Refinery. The overall cost of the project was \$94 million.

- The refinery contributed \$47.5 million
- The Federal Government \$20 million
- BarwonWater \$17.5 million
- The Victorian Government \$9.2 million

The plant is owned and operated by Barwon Water.

Project design

Due to close proximity (300 metres) to residential communities, major design issues included odour, noise and aesthetic disturbance. The EPA Works Approval process incorporated an extended community consultation period to ensure all these issues were addressed. Plume dispersion modelling was undertaken to ensure the proposed plant would comply with Victorian regulations.

Achieving these requirements was challenging due to the variable mix of industrial and residential wastewater inflows, posing treatment process risks. Of particular importance was nutrient removal and degradation of long chain and aromatic hydrocarbons. Coming from the refinery stream. A pilot plant was built and operated for six months to simulate the feedwater conditions, assess the concept design and inform the operational cost plan.

A community engagement plan was implemented during the project to:

- Increase levels of community awareness of the project
- Promote the benefits of recycled water for industrial and community use
- Ensure residents in the adjacent suburbs of Corio and Norlane were consulted during the design, construction and commissioning phases.

Outcomes

- Removal of the refinery's trade waste and associated hazards from Barwon Water's sewer network (up to 2 million litres per day).
- Relief to downstream sewer bottlenecks via treatment and temporary storage of wet weather flows of up to 21 million litres per day.
- Production of 5 million litres per day of Class A recycled water for wash down and boiler feed purposes at the refinery.
- Class A recycled water available to nearby businesses and community facilities.
- Substituting potable water with recycled water secured Geelong's water supply for an additional 3 years.
- Reducing effluent discharge from the Black Rock Water Reclamation Plant avoided the need for significant capacity upgrades to the Geelong sewerage system.
- Augmenting Geelong's water supply with wastewater improves the system's resilience to climate change impacts
- Engagement activities increased public awareness of the project and its benefits.

Lessons learnt

The pilot plant successfully demonstrated the feasibility treatment technologies. The observed rates of membrane fouling were found to be manageable via conventional maintenance regimes. The success of the pilot plant also addressed a number of unknowns and process risks, allowing the project to proceed. Delivering a joint project between a public authority and a private party took considerable effort and time. Extensive joint risk analysis assisted with the development of commercial agreements between the partners to most appropriately and equitably manage the risks.

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Use of recycled water at the NWP has reduced the volume of treated water being discharged via the ocean outfall at the Black Rock Water Reclamation Plant.



Class A recycled water from the plant has reduced demand on drinking water supplies and its reuse supports the State Government's reform for integrated water management.

Acknowledgements