

BUILDING A SUSTAINABLE CITY

INTEGRATING STORMWATER HARVESTING TO PROVIDE FLOOD PROTECTION AND WATER FOR MULTIPLE STAKEHOLDERS

During droughts alternative water sources are frequently discussed. Following significant rainfall, flood management becomes front of mind. All of us involved in the water industry must find ways to change this discussion and provide holistic solutions for all climates. We face multiple challenges, especially given changing future climates, rapidly growing population and urbanisation. How best to meet these challenges requires innovation and thought leaders in all aspects of water management.

Introduction

Warrnambool City Council was faced with a significant issue. A failing Simpson Street Tunnel presented a significant liability risk and a flood risk to the surrounding community.

Although complex, these risks presented an opportunity for an integrated solution to provide a community water source whilst minimising the flood risk

Turning a Challenge into an Opportunity

Catchment wide flood modelling identified a significant flood issue within the Warrnambool Racecourse catchment, with a number of properties being flooded during frequent rainfall events. This was caused by flat drainage within low lying areas and the capacity of the downstream Simpson Street tunnel.

A review of the Simpson Street tunnel showed that it presented a significant risk of structural failure. The tunnel, primarily a semi lined sandstone tunnel, had a capacity of less than $1.8\text{m}^3/\text{s}$, but conveyed runoff from a large inland catchment ($>100\text{ha}$) to the Hopkins River.

Council has relined the tunnel to resolve part of the structural issue, however a long term flood protection option was required to protect surrounding properties and infrastructure where capacity was exceeded. The only feasible option for alleviation was to divert water from the tunnel to an adjacent catchment, before discharging into an already flood prone Russell's Creek.

This project was proposed as early as 2003, however Council required agreement from a number of stakeholders to implement it. Many concepts and iterations of the project were developed, however none of these progressed due to disagreements across stakeholders.

Recognising that Warrnambool Racecourse was one of Warrnambool's biggest water users, a stormwater harvesting component was added to the proposed flood management project, which provided the key to unlocking this project.

Diversion was provided through a large underground reverse graded drainage pipeline and conveyed the water to a retarding basin within the Racecourse. This removed the stormwater from the Simpson Street Tunnel catchment up to the 10% AEP, whilst limiting the remaining 1 EY flows to $1.1\text{m}^3/\text{s}$ in Simpson Street Tunnel.

The additional flow from the diverted Simpson Street catchment would have a significant flood impact on the Russell's Creek catchment, which was already flood prone, with large floodwalls constructed immediately downstream of the Racecourse. As a result, a key objective was that the discharged water could not impact the creeks peak flood levels. Modelling of the designed retarding basin and outlet, indicated that the retarded flow from Simpsons Street catchment, would occur prior to the peak flood from the remainder of the catchment.

Natural treatment was proposed to remove sediment before entering into the retarding basin, to ensure it was fit for purpose, with a sump and pump system used to divert water to a storage within the Racecourse.



Highlights

- Failing tunnel with limited capacity impacting on a large number of residences causing frequent flooding.
- Development of a flood mitigation option to divert over 100ha catchment away from the tunnel.
- Integration of stormwater harvesting to provide a water source for Warrnambool Racecourse.
- Outlet larger flows into a flood affected catchment, ensure early release to not alter peak flood heights in the receiving creek.
- Provide holistic and integrated solutions incorporating multiple stakeholders.



Outcomes

Warrnambool City Council demonstrated that integrating stormwater harvesting and flood management can provide multiple outcomes to the community. Overall, the upgrade and development will mitigate further flooding in the area, providing protection to residents affected by previous flooding.

The investment in the upgrade of new infrastructure will ensure the longevity of the Warrnambool Racecourse and surrounding drainage infrastructure. The system was shown to have the potential to provide 220ML/year, over 80 per cent of the demand for the site.

Conclusion

The Simpson Street project by Warrnambool City Council, provides an example of a holistic approach to water management within a catchment. Until recently, stormwater harvesting was primarily considered as an option to reduce potable water consumption. Its impact on flood management was quite often a secondary consideration.

By providing a stormwater harvesting option in a flood management project, Council demonstrated that providing holistic options can be key to unlocking complex projects across various stakeholders.

