Sewer alternative put to the test in innovative Park Orchards trial

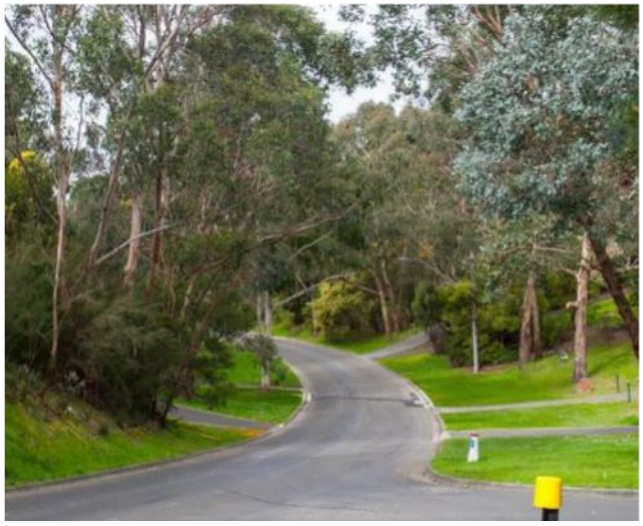
In a bid to find efficiencies within Yarra Valley Water's community sewerage program and address community concerns about reticulated sewerage, an alternative servicing approach was trialled in Park Orchards in Melbourne's north east.
The trial – the first of its kind – tested the effectiveness of a range of modern onsite treatment and reuse technologies, and included comprehensive monitoring of environmental impacts. It provided a range of lessons that can be applied locally and across Victoria.

The problem

For many years, more than 1,200 onsite systems have posed a problem for the suburb of Park Orchards in Melbourne's north east. Many of the systems in the area were outdated designs that discharged septic effluent or untreated greywater into the stormwater drains. This waste flowed into local waterways where it has a negative impact on the environment and increased risks to public health.

In 2005, Park Orchards and Ringwood North were identified as priority areas in Yarra Valley Water's community sewerage program, which includes 10,000 unsewered properties. The area was identified by Manningham Council as requiring a sewerage solution following poor water quality results in local creeks and streams, system inspections and importantly due to the number of systems discharging treated effluent and/or untreated greywater off-site.

Yarra Valley Water began to plan for a new reticulated sewerage service for Park Orchards in 2010. However, the plan was strongly opposed by a group of local residents in 2011-12 who believed a reticulated sewerage service was not necessary due to low density housing in the area.



Maintaining the green and leafy surroundings of the Park Orchards area is important to the local community.

A key concern for the high proportion of owner-occupiers was that a reticulated sewer system would enable development and impact the area's green and leafy character. This feedback contrasted with the results from a Council survey in 2011-12 which indicated support for reticulated sewers.

An independent survey found almost half of the residents were against sewer construction and preferred to upgrade their existing onsite systems, while 40% were in favour of sewer and 10% had no preference.

As a result, Yarra Valley Water decided to trial an alternative solution that could potentially achieve the same outcomes as a sewer system, protect the amenity of the area and alleviate development concerns.

To outline the principles, objectives and roles and responsibilities for the trial, a Memorandum of Understanding (MoU) was developed between Yarra Valley Water, Manningham Council, the Department of Environment, Land, Water and Planning (DELWP) and the Environment Protection Authority (EPA).

To help inform any future review of regulatory issues and the implementation of any proven alternative systems, the trial was also highlighted in the 2018 Victorian Auditor-General's Office (VAGO) audit *Managing the Environmental Impacts of Domestic Wastewater.*

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An example of an onsite treatment system from the trial.

The steps taken to address the problem

After seven years of community engagement and research, Yarra Valley Water developed a unique three-year trial of alternative onsite service solutions for part of the Park Orchards area which kicked off in 2017.

Yarra Valley Water investigated 100 properties in Park Orchards and found that 90% could fully contain domestic wastewater onsite in accordance with the EPA Code of Practice. Following consultation with customers, 61 of the 100 properties agreed to participate in the trial. This included residents who were both for and against a sewerage system. The remaining properties would be connected to sewer.

For properties that could contain wastewater onsite, Yarra Valley Water either upgraded the onsite systems with modern secondary treatment and drip irrigation systems, or refurbished the existing system to test their effectiveness from an economic, environmental and customer perspective. Designs for each property were signed off by the owners, and a permit was obtained through Manningham Council before installation. Yarra Valley Water agreed to monitor and maintain these systems for the duration of the trial, to verify the properties could treat domestic wastewater onsite without posing a risk to the environment and public health.

A sewer extension was also constructed as part of the trial to service properties that were unable to contain their wastewater onsite, which included a primary school and a small shopping strip.

Extensive environmental monitoring was conducted for a 12-month period before and after the trial to better understand the problems and impacts. The plan was to then hand the onsite systems back to customers for ongoing maintenance following the verification monitoring, with ongoing regulatory oversight by Council.

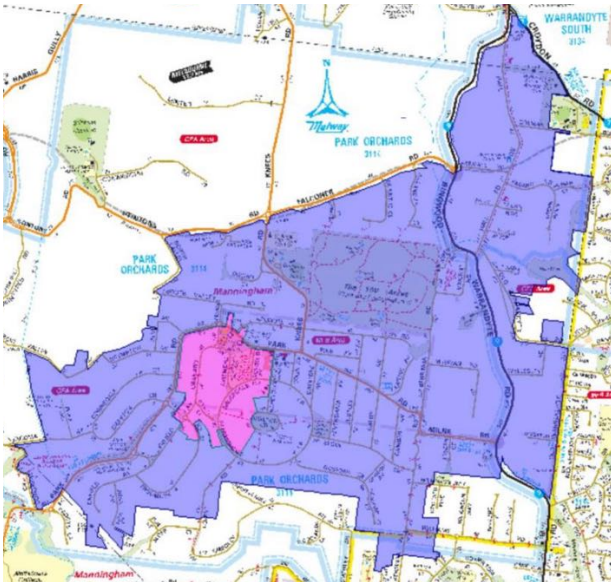
The results

Following the Park Orchards trial:

- 45 of the 61 properties in the trial area were fully containing wastewater onsite
- Seven properties were containing wastewater onsite but may not continue to if water use increased
- Eight properties were not able to contain wastewater onsite even after the upgrade of the onsite systems
- One property was removed from the trial.

Another sewer extension will be added to service the properties from the trial that couldn't contain wastewater onsite. This will effectively provide sewer access to all but 14 properties in the trial area. Residents will have the opportunity to connect to the sewer system or continue with their onsite system if it is effectively maintained and meets EPA regulatory requirements.

While capital expenditure for this alternative servicing approach was lower than that for a sewer connection, the operating expenditure was higher due to increased maintenance of the onsite systems.



The Park Orchards and Ringwood North community sewerage area (purple) and trial area (pink).

The challenges and how they were met

Ongoing construction issues

Yarra Valley Water understood that increased oversight of installation was necessary in this trial, including

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providing detailed designs to a contractor and using a specialist to check any last-minute changes.

However, as the rollout of the trial progressed, Yarra Valley Water faced a range of challenges, including fixtures not diverted to sewer, irrigation pipes laid downhill, inadequate trenching and machinery being used in wet soil. Last minute design changes made on the ground were not reviewed before installation and these challenges were compounded by time pressures to complete the trial.

This experience highlighted the management and oversight expertise required for large scale installation of onsite wastewater treatment upgrades which was lacking.

Increased maintenance of onsite systems

Yarra Valley Water initially planned for a three-year maintenance period to be managed by the contractor following the trial rollout. The contractor was the key point of contact for customer maintenance requests, which ranged from boggy lawns to stormwater drainage and irrigation issues. However, use of a contractor resulted in a lack of visibility of maintenance issues for Yarra Valley Water, particularly given that many residents lacked confidence in managing their new systems.

Regular servicing of the onsite systems was required following the trial, with many maintenance visits identifying follow up work to be addressed. The pump out frequency of the trial systems was also much higher than expected.

Yarra Valley Water extended the maintenance period in response to the COVID-19 pandemic and to allow for construction of the additional sewer extension. Improvements were made to tracking and reporting of maintenance, working with the contractor and utilising the existing asset management system. At the end of the maintenance period, ongoing management will be handed back to residents and Manningham Council.

Focus on effluent dispersal

During the rectification works, irrigation was the primary source of maintenance issues and customer complaints. This was linked to a physical area constraint for effluent dispersal as well as unapproved design changes, poor construction and system installation, leakage management and zoning, and unsuitable soils and slopes.

While the initial focus of the trial revolved around treatment system technologies, the prominence of irrigation and dispersal concerns during the rollout meant Yarra Valley Water had to adapt its trial objectives to ensure this was adequately addressed as the project progressed.

Lessons learnt

1. Existing treatment systems on the market are viable but not optimal

Yarra Valley Water installed five models of treatment systems during the trial and all types required more maintenance than anticipated to meet the required treatment performance levels. Biological process issues and component failures were both factors that resulted in variable performance of systems during the trial. Supplier support was also limited for some system types.

Yarra Valley Water has used lessons from the trial to develop and certify its own onsite treatment system to address and more effectively overcome issues in other localities. While this solution may involve higher upfront costs for installation compared with existing treatment systems, it is expected to result in lower operating costs through reduced ongoing maintenance.

2. A considered large-scale trial can save time and money in rectification works and maintenance

Time pressures to implement the Park Orchards trial meant Yarra Valley Water underestimated the time to complete the installation work to a high standard by a single contractor.

When developing large-scale trials, it is important to initiate a considered rollout using a smaller trial area so the approach can be tested and any insights incorporated into the remainder of the rollout. This would provide better outcomes and limit the high costs associated with ongoing maintenance.

Increased customer communication about maintenance issues, particularly regarding responsibilities for sewer pipe and stormwater maintenance, is also important.

3. Include community groups when engaging with customers

One of the key lessons for Yarra Valley Water was to engage community groups on proposed projects, as well as provide information to individual customers. Given the divided community response to sewer in the Park Orchards area, Yarra Valley Water created a community engagement panel of approximately 10 people which included those both for and against sewer.

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The panel acted as a conduit between Yarra Valley Water and the Park Orchards community. It also contributed to a Steering Committee with the water corporation, Manningham Council and EPA, which provided a forum to discuss issues and keep communication open between the relevant authorities.

4. Comprehensive monitoring can provide data to demonstrate environmental outcomes and inform decisions

Yarra Valley Water invested in baseline environmental monitoring before and after the trial, with a focus on the stormwater discharge point, weather and waterways. This was followed up with verification monitoring to confirm the impact of onsite systems, as well as a combination of onsite systems and sewer. Results have shown significant reductions in dry weather flows, nitrogen and virus loads to waterways.

The inclusion of baseline and verification monitoring provides robust, localised evidence to support decision making about areas to service in the future and the expected environmental outcomes from these initiatives. Future follow up monitoring should also occur to check the onsite systems are continuing to effectively manage risk.

Baseline and verification monitoring was conducted to measure the environmental impacts of onsite systems and sewer.

Beyond the results

The outcomes from the Park Orchards trial will be used to inform the servicing strategy of the greater Park Orchards and Ringwood North community sewerage area and future management of onsite systems. A key component of this servicing strategy will be a formal handover of the systems to customers for ongoing maintenance. As the onsite system regulator, Manningham Council will also be engaged as part of this handover process, which includes a full system audit.

Some properties in Park Orchards and Ringwood North are unable to use an onsite system and will need to be connected to a reticulated sewer. This was known when the trial started. Many of the sites in Park Orchards that can theoretically use an onsite system are highly constrained. Generally, they have limited space available for an onsite dispersal field, which can be up to 500m^2 or larger. The clay soil in the Park Orchards area can also make onsite containment difficult.

Yarra Valley Water's understanding of what is required to service high risk properties has evolved over the project, and while onsite systems have been successfully upgraded on most of the high-risk properties, design, construction and maintenance processes are still being refined. Yarra Valley Water is investigating the potential for this refined approach to be applied to other properties within its service area.

While onsite systems are not feasible for the whole of the Park Orchards area, the results from environmental monitoring show that the alternative approach trialled at Park Orchards can provide equivalent levels of public health and environmental benefits as a reticulated sewerage system, provided the onsite systems are functioning to the required standard. These benefits include local water recycling and reduced pathogen risks and nutrient loads.

An unintended long-term benefit of the trial was that Yarra Valley Water has developed a useful community engagement model. Feedback from the community panel highlighted that by demonstrating through the trial that some onsite systems are unsuitable for certain properties, the community was educated about onsite systems and comfortable with the outcome. Some residents who were originally against the sewer service are now more likely to connect if their onsite systems cannot be effectively maintained.

The Park Orchards trial has also supported broader integrated water management (IWM) outcomes in the *Yarra IWM Strategic Directions Statement* (DELWP, 2019) and *Water for Victoria – Water Plan* (DELWP, 2016), particularly in regard to effective and affordable wastewater systems, and fit for purpose sewerage systems servicing community's expectations.

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Conclusion

While the Park Orchards trial did not meet all its intended objectives, it demonstrated the significant time and effort required to effectively install and manage onsite systems.

The lessons learnt from the rollout has helped establish an effective proof of concept that can be applied to other high risk onsite system areas, both locally and across Victoria. It also formed a pathway to inform the community about domestic wastewater management options.

Further reading

- *Park Orchards Sewerage Project*
- *Yarra IWM Strategic Directions Statement (DELWP, 2019)*
- *Water for Victoria – Water Plan (DELWP, 2016)*
- *Managing the Environmental Impacts of Domestic Wastewater (VAGO, 2018)*
- *Guide to the proposed final Environment Protection Regulations (EPA, 2020)*

Yarra Valley Water

Key messages

- The Park Orchards trial demonstrated that onsite systems can and do work effectively when they are designed, installed and managed appropriately. Both the treatment system and irrigation reuse area need to be an adequate size and standard to address the local risks
- Providing customers and community groups with greater involvement in decisions regarding onsite wastewater management can lead to a more informed community
- Robust environmental monitoring data can improve understanding and awareness of the environmental and public health impacts from onsite systems and reticulated sewerage.

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