



CRC for  
Water Sensitive Cities

# Currumbin Ecovillage Wastewater Management

Location:  
Currumbin  
Valley,  
QLD



Case Study — Prepared by Cooperative Research  
Centre for Water Sensitive Cities, September 2018



**Business**  
Cooperative Research  
Centres Programme

## Insight

*Decentralised residential wastewater management*

## Project description

The Currumbin Ecovillage is a 147 lot development over 270 acres of land in the Gold Coast Hinterland. The development contains community title blocks which range from 400 to 1400m<sup>2</sup>. A sewerage treatment plant located within the development accepts and treats all wastewater which is then provided back to the houses in a purple pipe for non-potable uses.



## The drivers

*Commitment to urban residential development sustainability supported by demonstration of decentralised wastewater treatment and reuse*

- **Sustainability commitment** – To ensure compliance with a stated commitment to sustainability for the entire development, all house designs must include recycled water pipework as part of their design and be approved by the body corporate prior to commencement of construction.
- **Disconnected from mains sewer network** – The Ecovillage is not connected to the main sewer network and therefore all wastewater treatment and reuse needs to be provided on site.



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### What does this case study demonstrate?

Each case study has been selected to demonstrate specific solutions, benefits or enabling structures that support the creation of water sensitive cities. This case study focuses on:

Wastewater management and recycling

Water sensitive precincts

Alternative water supplies

Water literacy and behaviour change

## The innovations




*First Australian demonstration that urban residential developments can be 'off-the-grid' for water, including the local collection, treatment and reuse of wastewater*

- **Communal sewage treatment plant** – The Ecovillage has its own sewage treatment/water reclamation plant, which uses membrane filtration and ultraviolet (UV) disinfection to treat the wastewater from the development.
- **Suitable water quality** – The sewage treatment plant treatment processes are able to provide Class A +recycled water back to the houses in a purple pipe network, which is suitable for toilet flushing and external amenity use. Excess water is used to irrigate the common property in the development. 1 ML of buffering capacity and three 75 kL recycled water storage tanks are incorporated into the treatment facility to ensure continuity of supply and a safety factor in the event of a treatment system failure.
- **Sustainable wastewater infrastructure design** – Wastewater from the development is collected in a low infiltration sewer reticulation network that is largely gravity driven. The treatment processes are regarded as low energy, utilising septic tanks for primary treatment, oxidation by attached growth textile filter, and membrane filtration and UV sterilisation for final polishing. The sewerage reticulation network feeding this facility is largely gravity driven, further reducing energy requirements of the system.



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## The outcomes

 <b>Cities providing ecosystem services</b>	 <b>Cities as water supply catchments</b>	 <b>Cities comprising water sensitive communities</b>
<ul style="list-style-type: none"> <li>• <b>Reduced wastewater entering waterways</b> – The local treatment and reuse of wastewater significantly reduces the volume of effluent entering the waterways.</li> <li>• <b>Cooler and greener open spaces</b> – The use of recycled water for local irrigation supports a cool and green urban development.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Local recycled water providing an alternative supply</b> – The availability of recycled water for non-potable uses ensures that residents are able to reduce their potable demand and thereby save their rainwater for those uses that require it.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Committed and informed residents</b> – The upfront design requirements and ongoing household monitoring of water use has created a water sensitive community that is committed to sustainable water management.</li> </ul>



## The lessons

- **Upfront vs ongoing costs** – While the upfront costs to the water infrastructure at the Ecovillage are generally greater than for more traditional subdivision, the ongoing costs to the residents are less due to the off-grid solutions. There are also a range of other benefits from the off-grid solution, including reliable use of recycled water for irrigating food and open spaces in all climate conditions, improved aesthetics and reduced pollutants entering the waterways.
- **Trying something different requires a strong vision and process but also allows for flexibility** – A strong vision and supporting process is essential to maintain the direction and integrity of an ecovillage development, in particular when complex inter-related issues arise. However, the construction of the elements needs to be flexible and supported by collaborative working relationships between the contractor and developer to respond to challenges as they arise.
- **Off-grid water servicing is possible in urban developments** – Using an integrated water management system, it is possible to develop a community that has a very low impact on the environment, on local and regional sources of water, and on local waterways. To achieve this, designers must be systems thinkers and capable of detailed design using complex analysis.

## Business case

Costs	Benefits
<ul style="list-style-type: none"> <li>• The upfront cost of the decentralised wastewater treatment plant is greater than that typically required for a traditional subdivision that is connected to the main sewer network.</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental and social benefits of the local treatment and reuse of wastewater include reduced pollutants entering the waterways and beneficial use of recycled water for irrigation and greening of the local open spaces and backyards.</li> </ul>



## Transferability

While at the moment it is unlikely that the fully decentralised Currumbin Ecovillage solutions can be taken directly into mainstream urban development, the demonstrated use of a decentralised wastewater treatment plant to treat and supply recycled water back to households can be replicated. This will be especially true in areas where connection to the mains sewer network is difficult or costly.

## Project collaborators

- Land Matters
- Bligh Tanner
- City of Gold Coast

## Awards

The Ecovillage has won over 33 awards including:

- World's Best Environmental Development (FIABCI Prix D'Excellence Award)
- Most Sustainable Development 2006 (Queensland Environmental Protection Agency Award)
- Best Sustainable Development and Best Small Subdivision in 2006 (Urban Development Institute of Australia, Qld)

## Additional information

More information on the Currumbin Ecovillage project can be found at:

- [The Ecovillage at Currumbin website](#)
- [A case study for the Ecovillage at Currumbin - Integrated water management planning, design and construction \(Tanner, 2007\)](#)
- [CRCWSC Curumbin Ecovillage Case Study: Looking at rainwater harvesting](#)

