CRC for
Water Sensitive Cities

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Subiaco Case Study

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IRP2 Work Package 5 – Economic Evaluation Case Studies

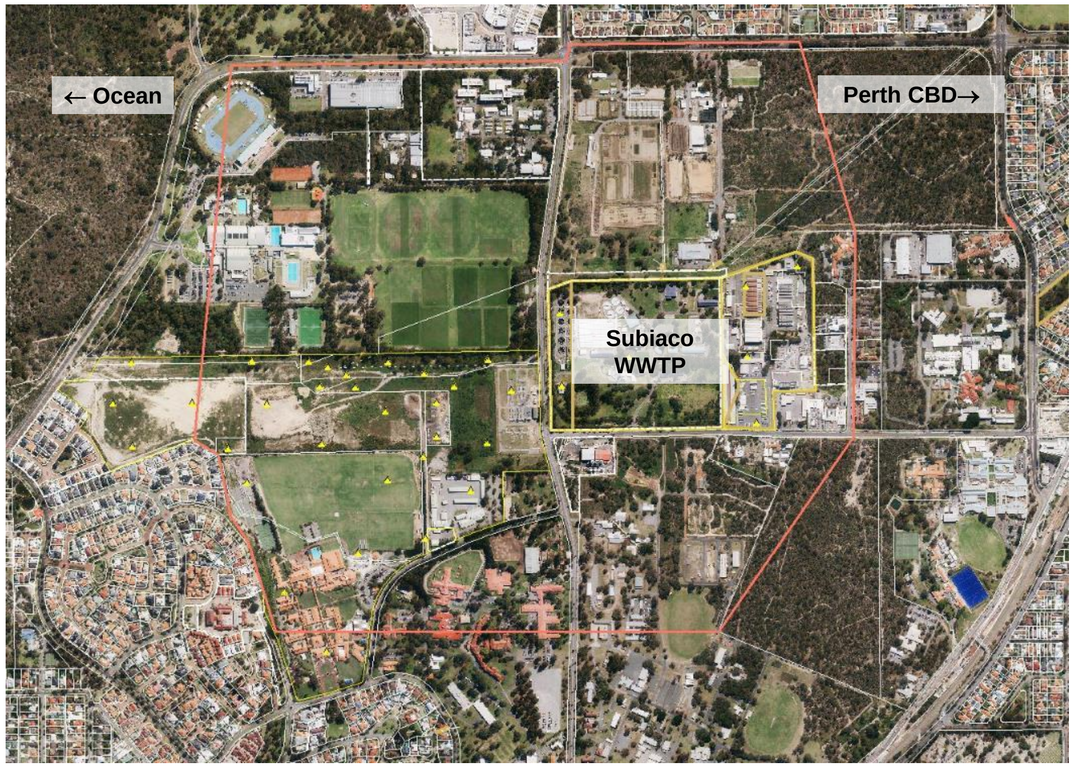
WP5.1 Greening the Pipeline (Melbourne) Case Study

WP5.2 Economic evaluation of land use scenarios and funding options for Strategic Water Resource Precincts (Subiaco) Case Study

WP5.3 Residential development with Water Sensitive Urban Design (Bellevue) Case Study

WP5.4 Urban Redevelopment (Arden Macaulay) Case Study

WP5.5 Urban Rejuvenation (Salisbury East precinct) Case Study



Work Package 5.2 – Subiaco Case Study

Previous IRP2 research:

Understanding social preferences for land use in wastewater treatment plant buffer zones

Landscape and Urban Planning journal paper (Iftekhar et al 2018)

Stakeholder Workshop:

Strategic Resource Precinct and “buffertopia”

Wastewater treatment plants generate resources, not waste (e.g. recycled water)

Ideas for Subiaco – Discussion Paper (CRCWSC 2017)

Current Study:

Who are the possible **users** of recycled water?

To what extent does **market demand** exist for recycled water?

Background

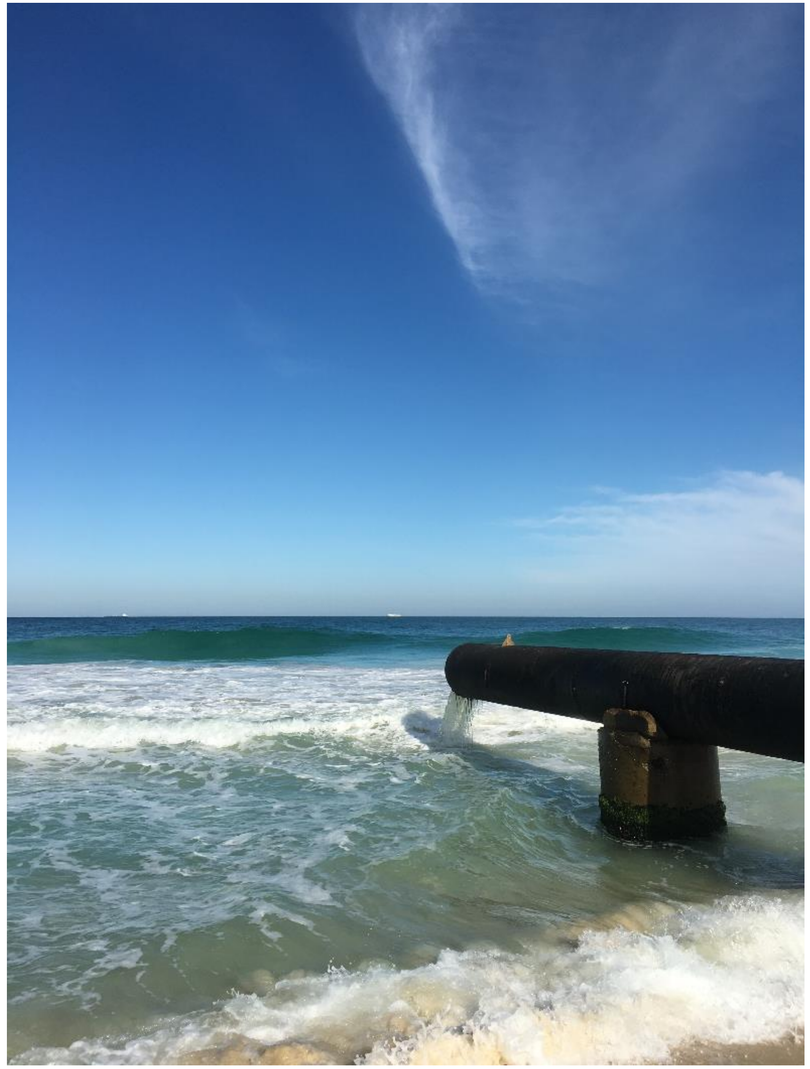
Perth’s water supply is under pressure due to:

- Climate change
- Population growth
- Over-use of groundwater

Current water supply relies on unsustainable groundwater use

To supply water sustainably, groundwater use must decrease/groundwater recharge must be enhanced, or some combination thereof

- Desalination
- **Recycled wastewater?**
- **Recycled stormwater?**



Subiaco Wastewater Treatment Plant

Services a catchment of around 240 000 people, and includes the Perth CBD (pictured)

Less than 10% of the 21.9 million kL of **wastewater** the plant treats annually is currently recycled

None of the 1.5-3 million kL of **stormwater** that runs underneath the plant each year is currently recycled

Together, these sources could supply an additional 4-5 million kL annually, or very roughly 13-16% of annual water consumption of the catchment

Motivation and Questions

The motivation of the study is to explore current and future **non-residential** demand for recycled water from the Subiaco WWTP, via the following key questions:

Question 1: How much are non-residential users **willing to pay** for recycled water?

Question 2: What are the **key factors** that drive willingness to pay for recycled water?

Main land/water uses?

Perception of water security?

Water type (wastewater versus stormwater)?

Others?

Existing Literature

Limited number of published survey-based NMV studies estimating willingness to pay for recycled water

- The contingent valuation method is the most commonly used method
- Focus on Agricultural uses with associated low WTP
- Australian examples focus on urban residents. Context is water restrictions

We found **no studies** estimating monetary willingness to pay values for:

- **Urban non-residential** users of recycled water or Stormwater

Our Population

Non-residential (potential) users of recycled water in the vicinity of the WWTP:

- Schools and universities
- Golf courses
- Sporting facilities (indoor and outdoor)
- Playing fields
- Council bodies
- Research organisations
- Government departments
- Hospitals
- Cemeteries
- Industrial and commercial

Approach

Non-market valuation survey to estimate non-residential willingness to pay for recycled water from the Subiaco WWTP

- Face-to-face interviews (survey emailed to respondents in advance)
- Contingent valuation/contingent behaviour methodology
- Payment card value elicitation format
- Separate valuation task for wastewater and stormwater

Contingent Valuation

On the payment cards below, we have listed different amounts of money ranging from $0 to $2 per kL. Starting on the left-hand side ($0) and moving across to the right-hand side ($2), please ask yourself:

*"Is my organisation **currently** willing to pay this amount for recycled wastewater? Or would the organisation rather not pay this amount, and not have the water?"*

*When you reach the **maximum** amount that your organisation would **currently** be willing to pay for recycled wastewater, please place a tick (✓) in the space below it.*

Price	$0	$0.05	$0.10	$0.20	$0.50	$1.00	$1.50	$2.00
WTP								

Contingent Behaviour

*Assume the government announces a **10%** reduction in your groundwater license allocation. That would imply a reduction of 13,500kL in your groundwater license allocation. If recycled water was available at the edge of your property, in response to the cut, how much recycled water would you purchase at the following per kL prices?*

Price	$0	$0.05	$0.10	$0.20	$0.50	$1.00	$1.50	$2.00
Quantity								

Stage 1: The pilot study

Five completed surveys

- A golf course
- A cemetery
- A school
- Two local councils

Preliminary results

Useful feedback on the survey design

Survey is currently being modified based on the pilot results

Indicative results from the pilot (1)

Question 1: How much are non-residential users **currently willing to pay** for recycled water?

For most respondents, **nothing ($0)**

The primary use respondents would consider using recycled water for is landscape irrigation

Landscape irrigation is currently supplied primarily by groundwater sources

Groundwater is currently **free of charge** (other than pumping and bore maintenance/servicing costs)

Variation in extent to which current allocation is used

Variation in terms of scope to make water use efficiency adjustments rather than purchase additional water

Indicative results from the pilot (2)

Question 2: What are the **key factors** that drive willingness to pay for recycled water?

Main land/water uses?

Landscape irrigation, especially sports fields and golf courses

Perception of water security?

Lack of security regarding ongoing adequacy of groundwater allocation

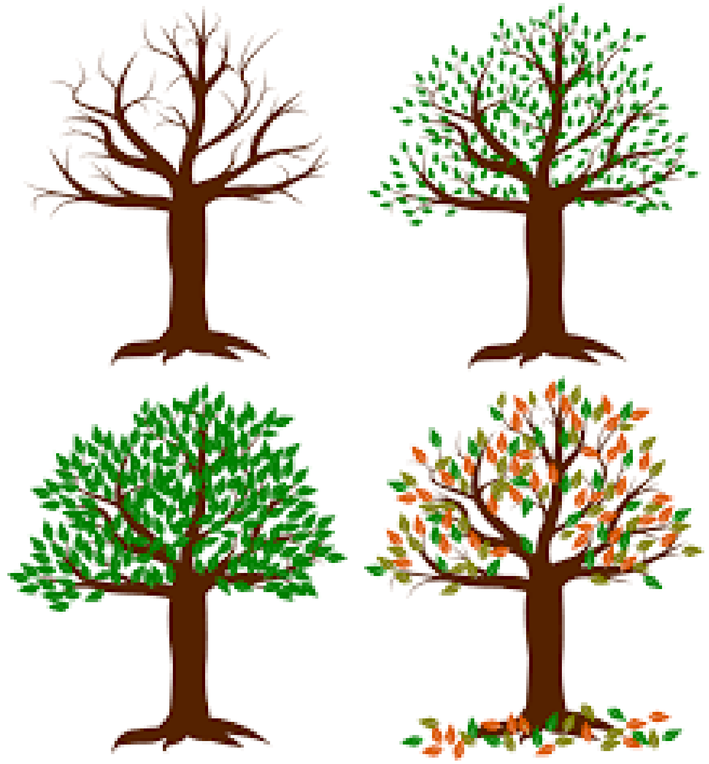
Water type (wastewater versus stormwater)

No difference

Others?

Scope to make water efficiency adjustments rather than purchase more water

Indicative results from the pilot (3)



The users who are ready to use recycled water immediately (if it were free, for example) would typically use it for landscape irrigation

Usage varies with season, lower in winter

The question is, what to do with recycled water over winter when it is least needed?

This seasonality of demand issue will need to be resolved

Next Steps

Main data collection block (March-May)

- Planned sample of up to 40 respondents
- Some additional interaction with the pilot organisations

Analysis (April-June)

- Estimate of current willingness to pay for recycled water (could be $0?)
- Construction of demand curves for water under different groundwater allocation cut assumptions

Report Writing (May-June)

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