Strategic Prioritisation of WSUD Opportunities

Simon Roberts, Dale Browne
The City of Hume is one of Australia’s fastest growing and culturally diverse communities and is home to more than 180,000 residents. It extends through upper catchment areas including the township of Sunbury, agricultural land and the fringes of outer suburbs.

The City of Brimbank is a dynamic and rapidly growing municipality of 192,000 residents extending through the mid-catchment areas. It supports both existing residential suburbs and major industrial areas.

The City of Hobsons Bay is home to more than 90,000 residents and significant industrial facilities. It extends along the lower catchment areas and coastline of Port Phillip Bay.
Objectives

**Blue objectives**
- Improve stormwater quality
- Control runoff through retention, retardation and use
- Diversify water supply and maximise use of alternative supplies for resilience

**Green objectives**
- Increase native vegetation cover for biodiversity and environmental outcomes
- Increase tree canopy cover and soil moisture for human comfort and health
- Improve the quality of recreation spaces

**Pink objectives**
- Improve amenity and liveability value
But how?
Process

Step 1
- Catchment prioritisation
Process

Step 1
• Catchment prioritisation

Step 2
• WSUD opportunity identification and assessment
Process

Step 1
- Catchment prioritisation

Step 2
- WSUD opportunity identification and assessment

Step 3
- WSUD concept designs and catchment masterplans
Step 1
Catchment prioritisation
Within the study area:

- **Upper Maribyrnong**: Emu Creek, Blind Creek, Jacksons Creek and Deep Creek
- **Lower Maribyrnong**: Jacksons Creek, Taylors Creek, Arundel Creek and the Maribyrnong River
- **Kororoit Creek**: Mid to lower reaches (exc. Sunbury)
- **Skeleton Creek**
- **Laverton Creek + Cherry Creek**
- **Stony Creek**
Catchment prioritisation

Waterway value

Habitat  Water Quality  Flows  Connectivity  Physical Form

Catchment risk
Catchment prioritisation

- Assess waterway value
  - Management end point

Emu Creek at Gellies Road
Catchment prioritisation

\ Assess waterway value
  – Management end point
  – RAMSAR sites and key public destinations

Cheetham wetlands

Jawbone Marine Sanctuary

Altona Beach
Assess waterway value
– RAMSAR sites and key public destinations
– DCI threshold catchments
– Extent of waterway modification (e.g. channelized or underground)

Asses catchment risk
– Level of urban development
– Extent of road surfaces
– Industrial land use zones
– Flooded properties (1% AEP)

Catchment prioritisation
Results
Catchment management priorities vary based on the *type of values* being protected and the *nature of risks* encountered.

<table>
<thead>
<tr>
<th>Key characteristic</th>
<th>Management response</th>
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<tbody>
<tr>
<td>Farm land and green wedge</td>
<td>CMA</td>
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<tr>
<td>Growth zones</td>
<td>Apply BPEM and manage for future development through PSPs etc.</td>
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<tr>
<td><strong>Urban areas (standard)</strong></td>
<td><strong>Large scale WSUD retrofit and non-structural solutions</strong></td>
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<tr>
<td>Urban areas (unique e.g. land ownership, land use, existing WSUD)</td>
<td>Small scale WSUD retrofit and non-structural solutions</td>
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</table>
Results

Farm land, growth zones, greenfield development

Urban (standard) priority for WSUD retrofit

Urban (unique)
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<tr>
<th>Council</th>
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Step 2
WSUD opportunity identification and assessment
WSUD opportunities

• Step 1: Initial opportunity identification
Prioritisation process

- **Step 1:** Initial opportunity identification
- **Step 2:** Detailed opportunity identification
Prioritisation process

- Step 1: Initial opportunity identification
- Step 2: Detailed opportunity identification
- Step 3: Opportunity refinement
Prioritisation process

- Step 1: Initial opportunity identification
- Step 2: Detailed opportunity identification
- Step 3: Opportunity refinement
- **Stage 4: Opportunity assessment**

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- Increase native vegetation cover for biodiversity and environmental outcomes
- Increase tree canopy cover and soil moisture for human comfort and health
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**Pink objectives**
- Improve amenity and liveability value
Opportunity assessment

Blue

Improve stormwater quality
Opportunity assessment

Increase native vegetation cover for biodiversity and environmental outcomes
Opportunity assessment

Improve amenity and liveability value

Pink
Opportunity assessment

Upfront and ongoing costs
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Step 2
WSUD concept designs and catchment masterplans
Abatement cost per kg of N

kg of N

Melbourne Water - Nitrogen offset (incl. opex and renewal)
Taylors Creek (lower)

Catchment Overview
This catchment is heavily urbanised, consisting of large areas of residential development. The areas waterways have been piped, with two large Melbourne Water drains (the Wanaka Drive Drain and Keelba Park Drain) discharging into Taylors Creek on the eastern edge of the catchment. Flooding along the two Melbourne Water drains occurs during large rainfall events. Open space is limited to several unnamed and typically unirrigated pocket parks, however, a major network of open space and sporting grounds is located at Green Gully Reserve along Taylors Creek.

Green Gully Reserve contains a significant Stormwater Harvesting Scheme. The scheme collects water from two drains (including the Keelba Park Drain) before being stored in a holding pond, with a total capacity of 5 million litres (City West Water, 2013). Depending on demand, water is then treated and drawn out for irrigation of the reserves soccer pitches and cricket ovals as needed. The project was officially opened in 2013 and was delivered by City West Water working with Brimbank City Council.

"With seven hectares of public open space under irrigation, the project is expected to result in approximately 41 million litres of water saved each year – the equivalent of 16 Olympic sized swimming pools – and will provide almost three quarters of the reserve's irrigation needs." (City West Water, 2013)

Potable water is still used at Green Gully Reserve and there are plans to increase the number of sporting grounds at the site. As such, there is potential to improve the performance and capacity of the existing stormwater harvesting scheme or augment it with an alternative supply.

Despite Green Gully being one of the largest stormwater harvesting schemes for sports fields, it still only treats a fraction of the catchments runoff and there is potential for further opportunities to be realised upstream.

Catchment Scorecard

Waterway Value
Category | Indicator | Catchment R 23 | Average
--- | --- | --- | ---
1.1 | Management of inlet | 2.0 | 2.0
1.2 | Inlet site - key public destination | 1.0 | 1.1
1.3 | Ditch threshold | 10 | 1.7
1.4 | Wastewater modification | 10 | 2.6
Category score | 4.2 | 4.9

Catchment Risk
2.1 | Erosion of urban development | 2.2 | 1.7
2.2 | Inundation | 1.8 | 1.6
2.3 | Industrial land use | 10 | 1.3
2.4 | Fossil fuel development | 10 | 1.1
2.5 | Flood affected properties | 12 | 1.1
Category score | 3.5 | 2.6

WSUD Opportunities
Priority Scores
- 0 - 2: Natural waterway
- 2 - 4: Waterway channel
- 4 - 6: Waterway underground
- Industrial and Special Purpose
- Urban Growth Zone
- Existing WSUD Asset
- Existing WSUD Catchments
- Opportunity WSUD Catchments

Pipes >= 400mm
WSUD Opportunities