

# Urban Wetlands

## Wharf Street Wetland and Civic Centre Parklands, Cannington

| Land use / development type | Scale    |
|-----------------------------|----------|
| Public realm                | Precinct |

| Stormwater controls      | Scale |
|--------------------------|-------|
| Surface flow wetlands    |       |
| Subsurface flow wetlands |       |
| Rock cascades            |       |

| Efficient use of water  | Scale    |
|-------------------------|----------|
| Waterwise native plants | Precinct |

| Water reuse | Scale |
|-------------|-------|
| N/A         |       |

| Site conditions |                                      |
|-----------------|--------------------------------------|
| Soils           | Clayey, sandy silt                   |
| Groundwater     | 1mbgl to 17mbgl                      |
| Slope           | <10%, gradual slope to Canning River |

| Local government | Location               |
|------------------|------------------------|
| City of Canning  | Civic Centre Parklands |

This project was a partnership between the Department of Parks and Wildlife and the City of Canning with support from the South East Regional Centre for Urban Landcare (SERCUL). The Wharf Street Wetland and Civic Centre Parklands intercept and treat stormwater (and groundwater) from the Wharf Street main drain, located in the greater Canning Plain Catchment - a priority catchment with high nutrient loads. The wetland was designed by Syrinx to remove nutrients and other pollutants from stormwater before it flows into the Canning River. High flows bypass the wetland and continue down the main drain so that scouring of the wetland during storm events does not occur. Discharge from the main drain and wetland enters the Canning River through rock cascades to encourage aeration and sediment removal.

Construction of the wetland involved the removal of a road and infrastructure that separated the City of Canning council offices from the Canning River Regional Park, restoration of 365 linear m of degraded foreshore and the establishment of a river access/viewing node to control foreshore access. Seasonally saturated grassed areas were replaced with a functional wetland and useable grassed parkland (some of which is located on top of a subsurface flow wetland). A path network, shelter, BBQ, bins and seating were also installed to improve the active and passive recreational value of the site.

Revegetation of the site with 100,000 locally native plants of 37 different species has significantly improved the habitat value of the area, particularly for waterbirds and reptiles.

The wetland has been rigorously monitored using best practice methodologies to determine its performance and further understand how constructed wetlands perform on the Swan Coastal Plain. The wetland provides an excellent demonstration site for practitioners to witness first-hand a functional constructed wetland which improves habitat, amenity and importantly, water quality.

The one hectare wetland consists of surface and subsurface flow wetland components. The surface flow wetland components have been 'online' since late 2008, however, the subsurface flow components remained isolated due to the recycled concrete material (RCM) used in their construction. RCM was trialled in the wetland as it was an inexpensive, available, recycled material that was intended to

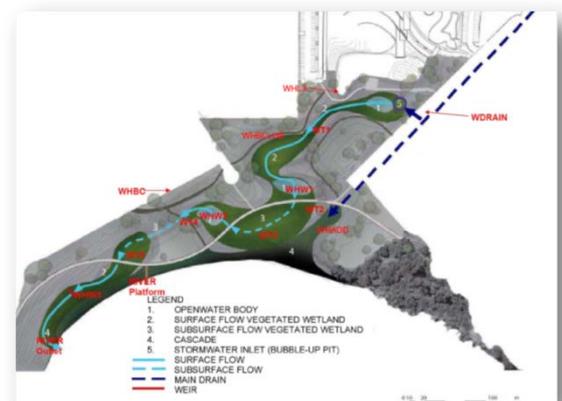
provide an alkalinity boost to the system to encourage nutrient processing.

During installation the RCM was heavily abraded and also degraded over the ensuing years, resulting in an elevated alkalinity in the subsurface flow wetlands. Despite efforts to remediate, elevated levels of alkalinity persisted.

In June 2012, approximately 1500m<sup>3</sup> of RCM was removed and replaced with a coarse laterite aggregate, with some of the material left in situ, realising the intended alkalinity benefits of the RCM. The laterite material has provided the added benefit of enhanced phosphorus removal in the subsurface flow wetlands.

### Key Project Objectives

- Improve the water quality entering the Canning River during low flow periods when the risk of algal blooms is high.
- Provide information on wetland maintenance requirements and costs.
- Fill knowledge gaps in the performance of wetlands in improving water quality.
- Provide a passive recreation and education asset and link between the Canning River Regional Park and the Civic Centre Parklands.
- Enhance the habitat of the area by returning endemic species and habitat types.



## Development Costs<sup>1</sup>

|                                                                                                                                     |                   |
|-------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Total project costs: Site investigations, designs, approvals, construction, restoration activities and public infrastructure of 4ha | \$2,546,000 + GST |
| Wetland component                                                                                                                   | \$1,674,000 + GST |
| Parkland component                                                                                                                  | \$872,000 + GST   |

## Maintenance Costs<sup>1</sup>

|                   |                    |
|-------------------|--------------------|
| 2009/10 – 2012/13 | \$40,000 per annum |
| 2012/13 – 2015/16 | \$8,000 per annum  |

<sup>1</sup>All costs are site specific and are an approximation given for guidance purposes only

## Issues

Prior to construction of the wetland, the Wharf Street main drain discharged untreated stormwater into the Canning River. The 2015 CRC WSC performance assessment showed that since commissioning, the wetland has removed 129kg of 286kg (or 45%) of phosphorus and 1,658kg of 2,526kg (or 65%) of nitrogen, which has flowed through it, with phosphorus removal being enhanced after the subsurface flow wetlands were brought online.

## Outcomes

In addition to the water quality improvements of the works, there have been other significant outcomes from the project.

### Stormwater reuse

The wetland treats and reuses stormwater to support the ecology of the artificial system. Once water has passed through the system, its quality is improved thereby lessening impacts on the receiving environment. In summer the wetland recirculates captured stormwater to sustain ecological function of the system and to improve amenity at the site.

### Ecosystem Health

Over 100,000 local native plants of 37 different species have enhanced ecosystem health and helped integrate the wetland into the Canning River Regional Park. This has increased the width and condition of the riparian zone and regional park corridor in this location and has

provided additional habitat for water birds and fauna.

### Flooding and drainage control

The wetland was designed to not interfere with the flow capacity of the Wharf Street main drain. It has been shown to treat ~94% of the main drain flow through the wetland treatment system. Additionally the grassed subsurface flow wetland provides a usable area of public open space year round, as it is free draining.

### Placemaking/amenity

Prior to construction of the wetland and Civic Centre parklands, the City of Canning council offices were visually and physically separated from the Canning River by a road, power lines and an expanse of poorly maintained, seasonally waterlogged grass. Post-construction, linkage to the Canning River Regional Park has been significantly improved through removal of the road and associated



infrastructure. The provision of a meandering wetland system, path network and facilities have improved site amenity and encouraged usage by the community. It also protects and enhances the ecological value of the area. The use of grass over one of the subsurface flow wetlands allows for improved amenity while still providing an area for stormwater treatment.

### Adaptation to climate change

The wetland and Civic Centre Parklands significantly enhance the area of green and blue space close to local residents. Recent research from the CRC WSC has shown that removal of hard infrastructure and the provision of water and plants in the landscape can significantly reduce ambient temperatures, improving liveability and reducing mortality (Coutts et al, 2014).

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