

Case Study 5



Doughty Street Retention Ponds

WATER SENSITIVE URBAN DESIGN SYSTEM

- Retention ponds

LOCATION

- Doughty Street, City of Mount Gambier

AVERAGE ANNUAL RAINFALL

- 700 mm

YEAR ESTABLISHED

- 2008

RESPONSIBLE AUTHORITY

- City of Mount Gambier

Prepared by the City of Mount Gambier, Engineering Services Department, March 2010



Source: Department of Planning and Local Government

Background

This is one of several case studies providing examples of bioretention and swale systems that have been incorporated into landscaping in public spaces.

Project objectives

The project aims to:

- provide a retention basin that reduces flooding, and make better use of available space in a restricted site area
- act as a demonstration project showing the implementation of water sensitive urban design (WSUD) principles and the development of native landscaping requiring minimal water and on-going maintenance
- demonstrate how native plantings can screen and aesthetically enhance an engineered drainage solution.

Project description

The stormwater catchment areas that encompass Francis Street and parts of Doughty Street, Shepherd Street, Gray Street and Jubilee Highway West rely for the most part on stormwater discharge to drainage bores that have a limited discharge rate (that is, a rate which is below discharge rates that provide acceptable protection from flooding).

The modelling of the drainage problem determined that the most beneficial and cost-effective solution would be a retention basin to cut off upstream flows and increase the time to peak discharge rate.

The construction of the retention basin system (in the grassed reserve opposite Jubilee Highway West/ Doughty Street) incorporates WSUD principles and provides a vegetated reserve that is both functional and complementary to the surrounding area.

Lessons learned

Timing—Indigenous, non-irrigated plants require winter planting to increase the chances of healthy establishment in the first year. Timelines for planting in potentially saturated areas such as ponds and spillways are also critical to ensure adequate protection of newly planted specimens.



Source: City of Mount Gambier

Observations as of March 2010: sun-bleached jute liner; *Isolepis nodosa* successful in saturated area; second zone of *Gahnia clarkeii* showing minimal growth and some failures; top zone showing many *Poa* grasses removed/vandalised



Source: City of Mount Gambier

Observations as of March 2010: the jute liner disintegrating and detaching from the ground surface



Source: Department of Planning and Local Government



Source: Department of Planning and Local Government

The condition of the retention pond when dry and during a heavy rainfall

Aesthetics—New indigenous plants are usually supplied in the form of tube stock or small cells that take some time to establish. Native gardens and landscapes are slowly becoming more prevalent in cities across Australia; however, some people perceive native gardens as ‘messy’ and unattractive.

Jute liners—While these liners are probably the best on the market, they are not overly attractive soil stabilisers; we have yet to find an alternative that weathers in a way that is not visually obtrusive! The liners tend to bleach to a grey colour in the sun and either disintegrates too quickly (as has happened in this project) or stay intact for too long and become an eyesore. In time, however, most of the material will be covered by plants and stained by dirt or silt.

Vandalism—Due to the public nature of this site there has been some vandalism involving destruction and removal of plants; these should be replaced during the next planting season to ensure proper functioning of the system.

Soil specifications

The existing soil on the site consisted of native organic material that was suitable for direct planting following excavation of the drainage ponds. Basalt swales connecting the drainage ponds dissipates overflow stormwater energy from the pipe inlets and ensures minimal scouring of the ponds.

Maintenance suggestions

Maintenance involves predominantly weed management, re-pegging of the jute mat and replacement of any failed or vandalised plant specimens.

Litter can be a problem due to the proximity of the site to a busy highway and a fast food outlet.

A new footpath alongside the site could reduce pedestrian traffic through the pond area and protect the plants.

Maintenance specific to individual plant species includes: general pruning of *Poa* grasses to about 50 per cent of plant size once or twice a year to promote new healthy growth; and yearly pruning of *Isolepis* in late spring (although we have had success thus far without pruning).

Species used in retention ponds

Scientific name	Common name	Observations as of 19 March 2010
<i>Poa poiformus</i>	Poa Grass	Planted winter 2008 <ul style="list-style-type: none"> Growing well on the top perimeter of the ponds; some have been vandalised Success rate approximately 70 per cent
<i>Gahnia clarkeii</i>	Common Sedge	Planted winter 2008 <ul style="list-style-type: none"> Growing poorly in the middle zone between the top of the pond and the base, Many have been destroyed or have died, some are growing slowly and about 5 per cent have successfully grown to maturity Success rate approximately 30 per cent
<i>Isolepis nodosa</i>	Knobby Club-rush	Planted winter 2008 <ul style="list-style-type: none"> Growing well on the bottom of the ponds Success rate approximately 85 per cent



Plants used from left to right: *Isolepis nodosa*, *Gahnia clarkeii*, *Poa poiformus*



Source: Department of Planning and Local Government

Observations as of December 2009: Isolepis nodosa growing well on the bottom of the ponds



Source: Department of Planning and Local Government

Retention pond in December 2009 during heavy rainfall.



Status of retention pond in January 2010 showing the overall site and well established plant species



Status of retention pond in March 2010 showing lower plant growth rates on higher non-saturated areas; pedestrian traffic through the site also may have contributed to planting failure



Source: Department of Planning and Local Government

The retention pond in December 2009 showing well established plants as well as vandalism of some vegetation and damage to the jute liner

The project described in this case study was funded by:



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