

Chapter 14 Other measures

14.1 Introduction

There are a range of ‘other’ **stormwater** management and treatment measures that can be considered as part of the available toolkit for the WSUD practitioner. These ‘other’ measures are either proprietary devices or may have a differing scope of application to the more mainstream techniques discussed earlier in this Manual and, as such, no detailed design procedures have been prepared for them. The following sections of this chapter provide general guidance on the characteristics of these additional techniques for review and further consideration by interested designers of a WSUD-oriented project.

The techniques that are discussed include the following:

- subsurface **wetlands**
- proprietary products
- porous pavements
- use of natural areas including reforestation and revegetation.

14.2 Subsurface wetlands

Figure 14.1 provides an example of indicative cross-sections of both free surface and subsurface wetlands (source Queensland Department of Natural Resources and Mines (DNRM) 2000). The ‘free surface’ wetland illustrated in Figure 9.1 is addressed in Chapter 9 of this Manual. The discussion here relates to the subsurface flow wetland in which the flow to be treated passes through a porous media such as sand or gravel which underlies the wetland.

Subsurface wetlands are typically applied in a wastewater treatment system where there is a relatively consistent influent flow rate. To date in Australia, there have been few, if any, applications of these techniques in the stormwater field, though there are obvious overlaps between a porous media, a planted bioretention system and a vertical subsurface flow wetland.

One of the major issues associated with the use of subsurface flow wetlands in a stormwater treatment context relates to the highly episodic nature of stormwater events. A subsurface wetland would require considerable volumes of balancing/detention storage above it to attenuate stormwater inflows. There may also be problems with the subsurface wetlands excessively drying under prolonged low rainfall conditions with associated losses of algal and microbial slime layers.

The following general guidance on subsurface flow wetlands has been broadly sourced from DNRM (2000).

- Subsurface wetlands, commonly referred to as reed beds, consist of channels or basins that contain gravel or sand media which support emergent type vegetation. The purpose of the vegetation is to provide some oxygen to the root zone.
- The environment with a subsurface wetland is mostly anoxic or anaerobic. Some oxygen is supplied to the roots, which is likely to be used up in the biomass growing there rather than penetrate too far into the water column and, for this reason, subsurface wetlands are effective in denitrification.