

# The Hills Development Control Plan (DCP) 2012

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Sydney's Garden Shire  
**THE HILLS**



## **Appendix B** Water Sensitive Urban Design



## **WATER SENSITIVE URBAN DESIGN - MEASURES**

The Development Controls in the Stormwater Management Section of this DCP require that two of the following Water Sensitive Urban Design Measures (WSUD Measures) be implemented in light industry development.

**M1** - Low Impact Building Design

**M2** - Low Impact Landscape Design

**M3** - Porous Paving

**M4** - Rainwater Utilisation – toilet, hot water

**M5** - On-Site Infiltration System

**M6** - Stormwater Treatment System

**M7** - Infiltration or Retention Basin

**M8** - Stormwater Utilisation – irrigation

When integrating the selected measures into the design of your development proposal you must ensure the following requirements are satisfied:

### **M1 LOW-IMPACT BUILDING DESIGN**

The design and-construction of the building satisfies each of the following criteria:

- The building is designed to retain the existing landform, minimise disruption to soil drainage patterns and soil organisms and eliminate the need for periodic application of toxic termite treatments
- The natural or pre-existing land surface is retained beneath and immediately surrounding the building (that is, there is no cut or fill, other than excavation required for the installation of footings or underground services)
- The building is suspended above the ground by means of piers, posts, walls or other similar means
- The building incorporates a recognised physical (non-chemical) termite barrier system, such as metal capping or granite gravel barriers
- The design and layout of the building takes into account the space and locational requirements of other water-smart measures, such as rainwater utilisation and infiltration trenches.

### **M2 LOW-IMPACT LANDSCAPE DESIGN**

The design and construction of landscaping satisfies each of the following criteria:

- landscaping is designed to retain or restore the natural landscape, provide habitat for indigenous species and minimise inputs of water, energy, fertilisers and herbicides
- natural landforms, watercourses and other water features are retained, restored or emphasised
- existing native vegetation (including understory) is retained or restored, beyond three metres of the constructed hardstand surface areas.
- vegetated links are provided with native vegetation on adjoining or nearby land
- planting is substantially composed of locally indigenous species
- provision is made for fauna habitat measures such as ponds, wetlands, native shrubs, nest boxes or roost boxes
- control structures are installed to divert stormwater runoff from native vegetation so as to maintain suitable soil moisture and nutrient conditions
- grassed areas are planted with native grasses to eliminate fertilising, mowing and watering
- landscaping is designed to promote the capture and infiltration of runoff through the use of depressions, grassed channels, infiltration swales, rock channels, sedges, reed beds or similar
- where practical, low-lying areas are utilised for treatment ponds or wetlands
- areas likely to be subject to high water demand are fitted with a water-efficient irrigation system that incorporates an electronic controller and rain switch.

### M3 POROUS PAVING

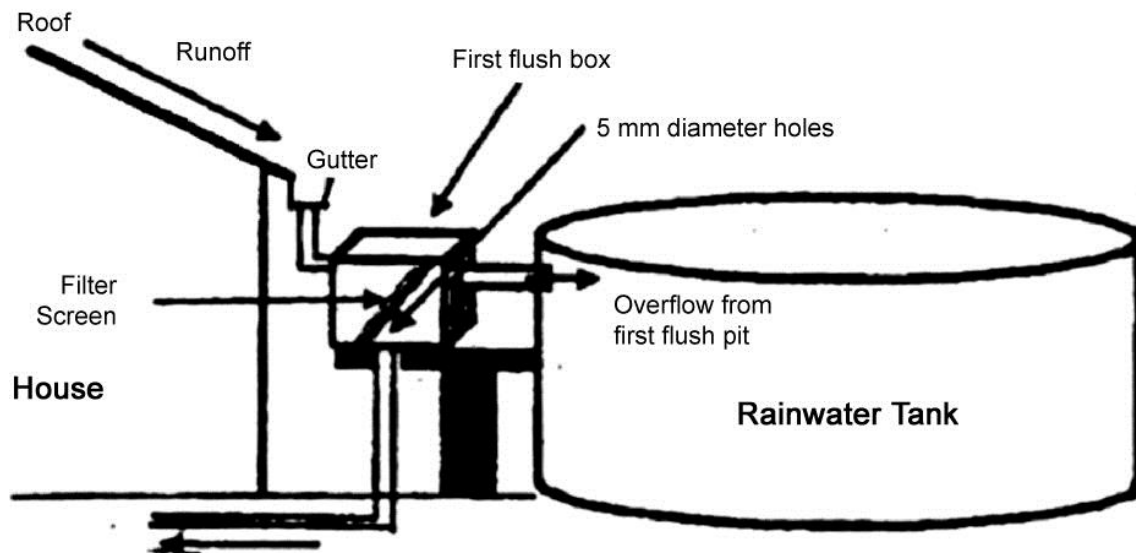
A porous pavement system is installed that satisfies each of the following criteria:

- at least two thirds of the area occupied by car parks, car parking spaces, driveways, courtyards, pathways or similar are laid with porous paving
- the porous paving consists of commercially available concrete or plastic modular pavers placed on a sand base in accordance with the manufacturer's recommendations.

### M4 RAINWATER UTILISATION-TOILET

A rainwater utilisation system is installed for toilets, and satisfies each of the following criteria:

- rainwater is sourced only from roof surfaces via a tank storage system
- the system is fitted with an effective first flush device for removing roof surface contamination (Figure 1 and Table 1 below).
- the system must be connected to the toilet fixtures and may also be connected irrigation fixtures, but to no other fixtures.
- any consent required from the water supply authority must be obtained prior to installation of any rainwater tank (Sydney Water have advised that they wish to be advised of all rainwater tank installations).
- systems that use mains water as a backup supply are fitted with a backflow prevention device' that is satisfactory to the local water supply authority
- tanks and pumps are located so that they do not impact upon the safety of pedestrians or vehicles and do not impact upon the amenity of adjoining residential properties by reason of noise or visual appearance.
- overflow from tanks is directed to an infiltration trench or a public drainage system.



Tank may be above or below ground.

Figure 1 – First Flush Diversion Device in Rainwater Tank System

Table 1 – Recommended Dimensions of First Flush Devices Box

Roof Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Infiltration Hole Diameter (m)
100	0.3	0.26	0.005
150	0.3	0.39	0.005
200	0.4	0.38	0.005
250	0.4	0.48	0.0005

## M5 ON-SITE INFILTRATION SYSTEM

An on-site infiltration system is installed that satisfies each of the following criteria:

- runoff from roof surfaces and at least two thirds of all paved areas is diverted to an infiltration trench or leaky well
- the site does not include any of the soil or terrain conditions referred to in Table 2a.
- trench dimensions are in accordance with Table 2b.
- the distance between the trench/ leaky well and nearby buildings satisfies the minimum separations specified in Table 2c.
- the trench is located clear of large trees, stormwater flow paths, vehicle pathways or heavy traffic pedestrian areas
- the upper surface of the infiltration trench is at least 300 millimetres below the ground surface
- the inlet to the trench is fitted with a silt trap (with inspection cover)
- the trench is filled with 40-75 mm aggregate and lined with geotextile fabric
- an overflow pipe connects the trench to a public drainage system
- design and construction is generally consistent with section 9.4 of *Managing Urban Stormwater: Soils & Construction* (Department of Housing, 1998).

Table 2a – Unsuitable Conditions for Infiltration Trenches

Loose and unstable sands
Soils with an permeability of <10mm/hr unless structure is certified by an engineer
Bedrock exposed at surface
Shallow soil (< 2metres) over rock or shale Steep terrain (slopes> 10%)
High water table (depth < 1 metres below surface)
Contaminated sites

Table 2b – Trench Dimensions

Permeability test results(see method below)		Allotment trench size (metres) (D/W/L,)
Time (minutes)	Difference in water depth (mm)	
60	Empty in 15 minutes	1/2/3
60	Empty in 30 minutes	1/2/3
60	Empty in 45 minutes	1/2/3
60	Empty in 60 minutes	1/2/3
60	Contains 650 mm	1/2/3
60	Contains 680 mm	1.5/2/4
60	Contains 690 mm	1.5/2/4
60	Contains more than 690 mm	As-specified by a professional engineer

**Note.** This test that can be performed by developers, landowners, council officers or accredited certifiers. The results can be compared to the Table above to determine the required trench size and suitability. The test has 3 steps, as follows:

1. Using a spade dig a hole approximately 0.5m square and one metre deep,
2. Fill the Hole with 700 mm of water and measure the initial water depth.
3. After an hour, measure the water depth again and determine the trench required from Table 2b above.

Table 2c – Minimum Distance Between Infiltration Trenches and Buildings

Soil Types	Minimum Distance from buildings
Sand	1 metres
Sandy clay	2 metres
Medium clay	4 metres
Heavy clay	5 metres

## M6 STORMWATER TREATMENT SYSTEM

A system is installed for the treatment of runoff from roads, car parks or other extensive paved areas, and satisfies each of the following criteria:

- the system includes components that are appropriate and adequate for the site, including:
  - gross pollutant traps
  - oil/sediment separators
  - grassed swales
  - vegetated filter strips
  - constructed wetlands
- commercially available components are installed and maintained in accordance with the manufacturer's recommendations

- design, construction and maintenance of site-specific components is generally consistent with relevant sections of *Managing Urban Stormwater: Soils & Construction* (Dept of Housing, 1998) and *The Constructed Wetlands Manual* (DLWC, 1998).

## **M7 INFILTRATION OR RETENTION BASIN NON RESIDENTIAL**

An infiltration or retention basin is installed that satisfies each of the following criteria:

- design, and construction and maintenance are consistent with section 9.4 of *Managing Urban Stormwater: Soils & Construction* (Department of Housing, 1998).
- there is sufficient site area to accommodate the basin (site area will generally need to be greater than 2 hectares)
- ponding depth 500mm maximum for infiltration basins and 1200 maximum (if not safety fenced) for retention basins
- the floor is graded level and covered with turf sod to promote infiltration, prevent erosion and bind sediments for infiltration basins
- runoff is distributed evenly over the basin floor to maximise infiltration and eliminate scour potential
- persistent flow is piped through the basin to prevent water logging and grass kill following frequent inundation in retention basins
- suitable overflow arrangements are provided for occasions when the infiltration capacity is exceeded
- basins located within waterway corridors are constructed 'offline'.
- the use of infiltration basins will not be permitted where soil profiles have a permeability >20mm/hr
- a sediment trap must be incorporated and maintained upstream of the installed infiltration basins.

## **M8 STORMWATER UTILISATION - IRRIGATION**

A storm water utilisation system is installed for irrigation use, and satisfies each of the following criteria:

- the irrigation system serves an actively managed area of at least 1000 m<sup>2</sup>
- rainwater is sourced from roof, driveway or paved surfaces via a tank storage system
- the system is fitted with suitable treatment devices, such as a first flush pit, oil/ sediment separator, artificial wetland etc.
- fixtures are marked 'NOT SUITABLE FOR DRINKING'
- tanks and pumps are located in accordance with applicable requirements contained in other Council documents
- any consent required from the water supply authority must be obtained prior to installation of any rainwater tank (Sydney Water have advised that they wish to be advised of all rainwater tank installations).
- overflow from tanks is directed to an infiltration trench or a public drainage system.

**Note.** The measures described above were sourced from the Water Sensitive Urban Development: Model Planning Provisions prepared on behalf of the Lower Hunter and Central Coast Environmental Management Strategy.

