

PART L27**WATER SENSITIVE URBAN DESIGN TREATMENTS****CONTENTS**

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1. GENERAL

- .1 This Part specifies the requirements for the construction and maintenance of Water Sensitive Urban Design (WSUD) Treatments, which includes biofiltration basins, swales, detention basins, retention basins and associated components.
- .2 The type and details of the WSUD treatment shall be in accordance with the drawings.
- .3 Bioretention systems (including raingardens, biofiltration swales, and bioretention basins) provide stormwater filtration through porous filter media, and water and nutrient uptake by vegetation.
- .4 Swales are vegetated or grassed linear channels that provide stormwater conveyance and assist in the removal of fine sediments and dissolved pollutants.
- .5 The following documents are referenced in this Part.
 - (a) AS 4419-2003 Soils for Landscaping and Garden Use
 - (b) AS2439-2007 Part 1: Perforated plastics drainage and effluent pipes and fittings – Perforated drainage pipe and associated fittings
 - (c) AS1254:2002 PVC pipes and fittings for storm and surface water applications
 - (d) Part CH50 Environmental Protection Issues.

2. EXTENT OF WORKS

- .1 Construction operations shall be confined within the Extent of Works area indicated on the Drawings. Prior to commencing any onsite operations, the Contractor shall submit a site plan showing the proposed locations of stockpiles and machinery routes. Construction activities shall not be undertaken within the drip zone of trees and/or tree protection zone.

3. CLEARING AND GRUBBING

- .1 The Contractor shall clear and grub the areas shown on the drawings. All deleterious material encountered in the excavation or immediately below it (including tree stumps, roots, stones and building debris exceeding 50 mm in diameter), which is unsuitable for respreading, shall be removed and disposed of at a location in accordance with Part CH50 Environmental Protection Issues.

4. SOIL TESTING

- .1 The Contractor shall undertake analysis of the existing soil to determine the appropriateness of its use in media layers. Testing shall be carried out in accordance with AS 4419-2003 – Soils for Landscaping and Garden Use - Appendix H. The existing soil may be used if the hydraulic conductivity is between 150 and 350mm/hr. If the hydraulic conductivity is outside this range, the soil shall be replaced with imported soil with hydraulic conductivity in the range of 100 to 300mm/hr.
- .2 Provision of the soil test results shall constitute a **HOLD POINT**.

5. **EARTHWORKS**

- .1 The base of Bioretention System shall be flat with a minimum longitudinal grade of 0.5% towards the outlet point.
- .2 The base of Swales shall be flat, and shall be evenly graded towards the outlet point. Battered edges shall have a minimum slope of 1:5.
- .3 Completion of the earthworks shall constitute a **HOLD POINT**.

6. **BIORETENTION SYSTEMS MEDIA LAYERS**

General

- .1 All media layers shall be clean, washed, graded, be free of debris, weeds, roots or other deleterious material, plant pathogens and other pests. All Media Layers shall comply with AS 4419-2003 Soils for Landscaping and Garden Use.

Filter Media (Top Layer)

- .2 All soil used as a filter media shall contain less than 5% of organic matter content, less than 100mg/kg of Phosphorus, a salt content and a pH within a range for healthy plant growth. The filter media shall be installed to the designed levels, shall be graded flat, and shall be lightly compacted.

Transition Media (Middle Layer)

- .3 The transition media shall be installed to the designed levels, shall be graded flat, and shall be lightly compacted.

Drainage Media (Bottom Layer)

- .4 The drainage media shall be installed to the designed levels, shall be graded flat, free of fine particles.

7. **MOISTURE CONTROL**

General

- .1 Installation shall be in accordance with the manufacturer's instructions for protection of road pavements, buildings and other constructions. The moisture barrier shall not be present underneath the planting layout.
- .2 Completion of the moisture barriers shall constitute a **HOLD POINT**.

Temporary Sediment Control

- .3 A temporary sediment control shall be installed immediately after the construction of the individual WSUD treatment to keep it free from silt and debris until it is fully operational.

8. **MULCH**

- .1 All mulch material shall slope toward the centre of the Water Sensitive Urban Design system and/or the base of the plants and shall be raked to an even surface flush with the surrounding finished levels. The mulch shall be well washed, free from deleterious material such as soil, weeds, sticks and sawdust. Mulch material shall be laid after planting.

9. **DRAINAGE**

- .1 The contractor shall construct the drainage system in accordance with the designed levels.
- .2 Underdrainage Pipework and fittings shall comply with AS2439-2007 "Part 1: Perforated plastics drainage and effluent pipes and fittings – Perforated drainage pipe and associated fittings", and shall slope towards the overflow pit at a minimum of 0.5% longitudinal grade.
- .3 Outlet pipework and fittings shall comply with AS1254:2002 "PVC pipes and fittings for storm and surface water applications"
- .4 An overflow system shall be installed which is free-draining and be positioned above the receiving waterway.
- .5 Erosion Control Protection Measures shall be used where there are inlet and outlet structures and in areas that are vulnerable to erosion.

- .6 Each WSUD treatment area shall have one screw capped 100mm uPVC pipe extended vertically from the underdrainage pipework to 150mm above the surface of the treatment.
- .7 Completion of the drainage shall constitute a **HOLD POINT**.

10. **MAINTENANCE**

Visual Inspection

- .1 The Contractor shall undertake visual inspections of the completed WSUD treatments and in accordance with the following:
 - (a) during a storm event within working hours;
 - (b) immediately after a storm event during working hours;
 - (c) as soon as practicable following storm events outside working hours and not later than the following day; and
 - (d) Inspection intervals no longer than 3 months.
- .2 At a minimum, the inspection shall examine sediment build-up, system blockages, litter and debris, scour, structural integrity, and vandalism. The contractor shall report on visual inspections using the form in Attachment L27A - Inspection Report.

Remedial Action

- .3 The Contractor shall take remedial action to restore the WSUD treatment to its original condition when any of the following are observed:
 - (a) sediment coverage exceeds 50% of the treatment area;
 - (b) sediment depth is within 100mm of the outlet/ overflow level;
 - (c) blockages to the inlet, outlet and inspection pit;
 - (d) litter and debris accumulates to greater than 30mm depth;
 - (e) scour and rilling;
 - (f) vandalism; or
 - (g) decline in the structural integrity of the treatment.

11. **HOLD POINTS**

- .1 The following is a summary of HOLD POINTs referenced in this Part:

CLAUSE REF.	HOLD POINT	RESPONSE TIME
4.	Completion of Soil Testing	5 Working Days
5.	Completion of Earthworks	1 Working Day
7.1	Installation of Moisture Barriers	1 Working Day
9.	Installation of Drainage components	1 Working Day

12. ATTACHMENT L27A – CONSTRUCTION & MAINTENANCE OF WATER SENSITIVE URBAN DESIGN TREATMENTS – INSPECTION REPORT

PROJECT TITLE:		ROAD NAME:	DATE OF INSPECTION:
PATCHES No.:		ROAD No:	INSPECTION BY:
FILE No.		MM:	

INSPECTION TYPE:
<input type="checkbox"/> Fortnightly
<input type="checkbox"/> Immediately after a storm event during working hours
<input type="checkbox"/> During a storm event within working hours
<input type="checkbox"/> As soon as practicable following storm events outside working hours and not later than the following day
<input type="checkbox"/> Every 3 months

DEFECT	REQUIRED CONDITION	ACTUAL CONDITION	MAINTENANCE REQ. (Y/N)	ACTIONS (Description of required maintenance & timeframe)	MAINTENANCE COMPLETED (Y/N)
Sediment Build-up	<ul style="list-style-type: none"> • Sediment coverage less than 50% of treatment area; and/or • Sediment depth less than 100mm of outlet/ overflow level. 				
System Blockages	<ul style="list-style-type: none"> • No debris, rubbish or silt obstructing the movement of water. 				
Litter & Debris	<ul style="list-style-type: none"> • No presence of litter; and/or • Debris less than 30mm depth. 				
Scour	No evidence of scour or rilling within treatment system.				
Structural Integrity	All structures and associated operations as per designed specifications.				
Vandalism	No vandalism present.				
Other					