

Master Specification

Part PR-LS-C10

Installation and Maintenance of Water Sensitive Urban Design

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Government of South Australia
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PR-LS-C10 Installation and Maintenance of Water Sensitive Urban Design

1 General

- a) This Master Specification Part specifies the requirements for the construction and maintenance of water sensitive urban design (WSUD) which includes bioretention systems and associated components, including:
 - i) the documentation requirements, as set out in section 2;
 - ii) the extent of works requirements, as set out in section 3;
 - iii) the clearing and grubbing requirements, as set out in section 4;
 - iv) the bioretention systems requirements, as set out in section 5;
 - v) the maintenance requirements, as set out in section 6; and
 - vi) the Hold Point and Witness Point requirements, as set out in section 7.
- b) The construction and maintenance of WSUD treatments must comply with the Reference Documents, including:
 - i) AS 2439.1 Perforated plastics drainage and effluent pipe and fittings, Part 1: Perforated drainage pipe and associated fittings;
 - ii) AS 4419 Soils for landscaping and garden use;
 - iii) AS 4970 Protection of trees on development sites; and
 - iv) AS/NZS 1254 PVC-U pipes and fittings for stormwater and surface water applications.
- c) The Contractor must install WSUD treatments in accordance with the type and details specified in the Design Documentation.

2 Documentation

2.1 Construction Document

In addition to the requirements of PC-CN3 "Construction Management", the Construction Documentation must include soil test results and reporting from the soil testing in accordance with section 5.1d).

3 Extent of works

- a) Construction operations associated with the installation of WSUD must be confined to those areas within the Earthworks Footprint.
- b) Construction activities within Tree Protection Zones (TPZ) must be in accordance with AS 4970 Protection of trees on development sites.

4 Clearing and grubbing

- a) The Contractor must clear and grub the areas shown in the Design Documentation.
- b) All deleterious material encountered during clearing and grubbing in the excavation (including tree stumps, roots, stones and building debris exceeding 50 mm in diameter) must be removed and disposed of off-Site by the Contractor.

5 Bioretention systems

5.1 Soil testing

- a) All imported soil must be tested to ensure it meets the hydraulic and horticultural requirements specified in the Design Documentation.
- b) The results from the soil testing in section 5.1a) must be submitted as follows:
 - i) horticultural soil test results must:
 - A. be submitted in accordance with PR-LS-C7 “Topsoil and Earthworks”; or
 - B. where PR-LS-C7 “Topsoil and Earthworks” does not form part of the Contract Documents, be submitted to the Principal which will constitute a **Hold Point**; and
 - ii) hydraulic soil test results must be provided to the Principal which will constitute a **Hold Point**.
- c) Imported soil must not be used for media layers until the Hold Points set out in section 5.1b) have been released.
- d) Soil test results and reporting from the soil testing in section 5.1a) must be submitted as part of the Construction Documentation.

5.2 Earthworks

- a) The Contractor must undertake earthworks associated with the installation of the bioretention system within the Earthworks Footprint in accordance with the Design Documentation.
- b) The base of the bioretention system must be flat with a minimum longitudinal grade of 0.5% towards the outlet point.
- c) The base of swales must be flat and evenly graded towards the outlet point.
- d) Battered edges and batter slopes of swales must have gradients no steeper than 1V:4H.
- e) The Contractor must provide the Principal with 24 hours’ notice for the Principal (or Construction Verifier) to inspect the earthworks associated with the installation of the bioretention system, which will constitute a **Hold Point**. The installation of below-ground drainage infrastructure, media layers and moisture control must not commence until this Hold Point has been released.

5.3 Moisture control

- a) Where moisture control is specified in the Design Documentation:
 - i) the Contractor must install the moisture barrier in accordance with the manufacturer’s instructions;
 - ii) the installation of the moisture barrier must not damage road pavements, buildings, and other constructions; and
 - iii) the moisture barrier must not be present underneath the planting layout.
- b) The Contractor must provide 3 days’ prior notice of completion of the installation of moisture barriers which will constitute a **Witness Point**. Covering up of the moisture barrier must not take place until the Contractor has proceeded past the Witness Point.

5.4 Temporary sediment control

- a) The Contractor must keep the bioretention system free from silt and debris until it is fully operational.
- b) In satisfying section 5.4a), the Contractor must install a temporary sediment control immediately after the construction of the individual bioretention system.

5.5 Drainage

- a) The Contractor must construct the drainage system in accordance with the designed levels specified in the Design Documentation.
- b) Underdrainage pipework and fittings forming part of the bioretention system drainage system must:
 - i) comply with AS 2439.1 Perforated plastics drainage and effluent pipe and fittings, Part 1: Perforated drainage pipe and associated fittings; and
 - ii) slope towards the overflow pit at a minimum of 0.5% longitudinal grade.
- c) Outlet pipework and fittings forming part of the bioretention system drainage system must comply with AS/NZS 1254 PVC-U pipes and fittings for stormwater and surface water applications.
- d) An overflow system in accordance with the Design Documentation must be installed which is free-draining and be positioned above the receiving waterway.
- e) Erosion control protection measures must be used where there are inlet and outlet structures and in areas that are vulnerable to erosion. Scour protection must be in accordance with RD-DK-D1 "Road Drainage Design".
- f) Each bioretention system area must have one screw capped 100 mm uPVC pipe extended vertically from the underdrainage pipework to 150 mm above the surface of the treatment as an inspection pit.
- g) The Contractor must provide the Principal with 24 hours' notice for the Principal (or Construction Verifier) to inspect the installation of all drainage components, which will constitute a **Hold Point**. The placement of media layers must not commence until this Hold Point has been released.

6 Maintenance

6.1 Visual inspection

- a) For the duration of the Landscape Maintenance Period, the Contractor must undertake visual inspections of the completed bioretention system:
 - i) at intervals not longer than 3 months; and
 - ii) at the beginning and end of winter.
- b) At a minimum, the visual inspection must examine sediment build-up, system blockages including vegetative growth, litter and debris, scour, structural integrity, and vandalism.
- c) The Contractor must report on visual inspections using the form in Appendix 1: Inspection report and submit the report to the Principal after the inspection.

6.2 Remedial action

- a) The Contractor must undertake remedial action to restore the bioretention system to its original design intent when any of the following is observed at the visual inspection required in section 6.1a):
 - i) sediment coverage exceeds 50% of the treatment area;
 - ii) sediment depth is within 100 mm of the outlet or overflow level;
 - iii) blockages to the inlets, outlets or inspection pits;
 - iv) vegetation inhibiting the designed hydrological function of the system;
 - v) plant and weed species present that were not specified in the Design Documentation of the bioretention system;

- vi) litter;
- vii) debris accumulating to greater than 30 mm depth;
- viii) scour and rilling;
- ix) vandalism; or
- x) decline in the structural integrity of the bioretention system including rip rap and gabion structures.

7 Hold Points and Witness Points

- a) Table PR-LS-C10 7-1 details the review period or notification period, and type (documentation or construction quality) for each Hold Point referred to in this Master Specification Part.
- b) Table PR-LS-C10 7-2 details the review period or notification period, and type (documentation or construction quality) for each Witness Point referred to in this Master Specification Part.

Table PR-LS-C10 7-1 Hold Points

Section reference	Hold Point	Documentation or construction quality	Review period or notification period
5.1b)i)B	Provision of horticultural soil test report	Documentation	5 Business Days review
5.1b)ii)	Provision of hydraulic soil test report	Documentation	5 Business Days review
5.2e)	Inspection of earthworks	Construction quality	24 hours notification
5.5g)	Inspection of drainage components	Construction quality	24 hours notification

Table PR-LS-C10 7-2 Witness Points

Section reference	Witness Point	Documentation or construction quality	Review period or notification period
5.3b)	Notification of completion of moisture barrier	Construction quality	3 days notification

8 Appendix 1: Inspection report

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

INSPECTION TYPE:
<input type="checkbox"/> Beginning of winter
<input type="checkbox"/> End of winter
<input type="checkbox"/> Every 3 months

DEFECT	REQUIRED CONDITION	ACTUAL CONDITION	MAINTENANCE REQUIRED (Y/N)	ACTIONS (Description of remedial action and timeframe)	MAINTENANCE COMPLETED (Y/N)
Sediment build-up	<ul style="list-style-type: none"> • Sediment coverage less than 50% of treatment area; and • Sediment depth not within 100 mm of outlet or overflow level. 				
System blockages	<ul style="list-style-type: none"> • No debris, rubbish, vegetation or silt obstructing the movement of water. 				
Litter and debris	<ul style="list-style-type: none"> • No presence of litter; and • Debris less than 30 mm depth. 				
Scour	No evidence of scour or rilling within treatment system.				
Structural integrity	Decline in the structural integrity of the bioretention system.				
Vandalism	No vandalism present.				
Other					