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aurora

Rain Gardens Installation Guide

INTRODUCTION

Water sensitive urban design (WSUD) seeks to ensure that development is carefully designed, constructed and maintained so as to minimise impacts on the natural water cycle. It is part of a contemporary movement towards more 'sustainable' solutions that protect the environment and conserve water resources.

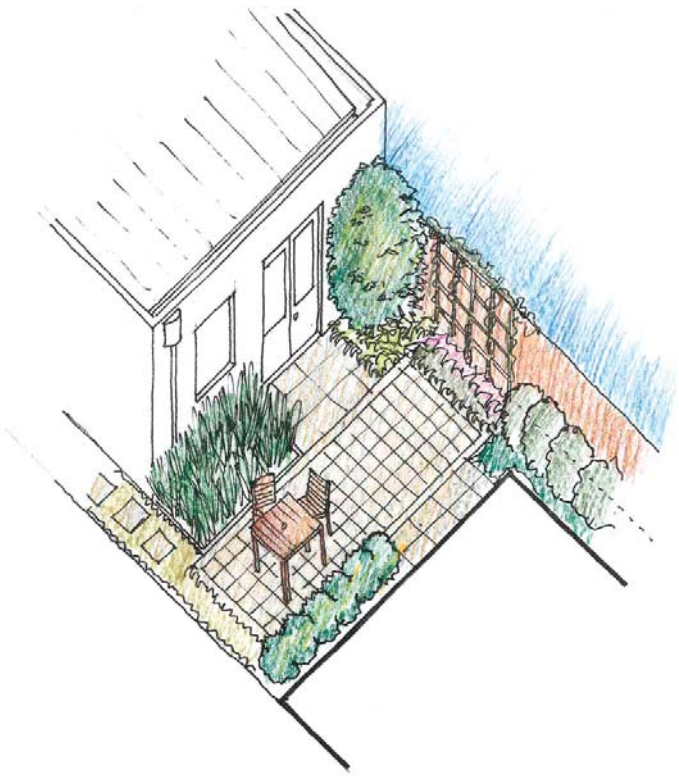
By utilising appropriate measures in the design and operation of the development, it is possible to:

- Restore and maintain natural water balance;
- Reduce flood risk in urban areas;
- Reduce erosion of waterways, slopes and banks;
- Improve water quality in streams and groundwater;
- Make more efficient use of water resources;
- Reduce the cost of providing and maintaining water infrastructure;
- Protect and restore aquatic and riparian ecosystems and habitats; and
- Protect the scenic, landscape and recreational values of streams.

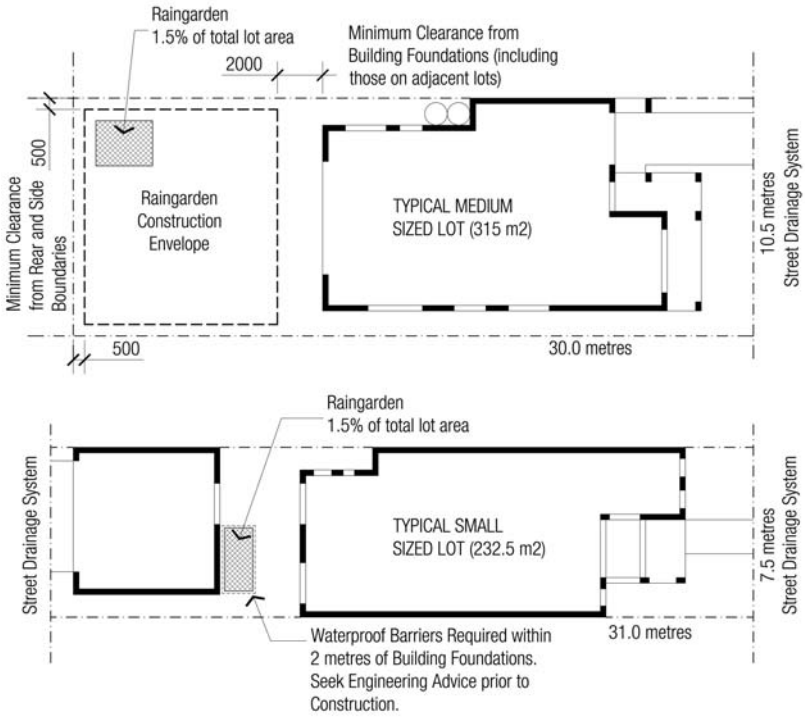
Aurora is one of the first developments to address all elements of the water cycle. Initiatives at Aurora include:

- Use of reclaimed water (treated wastewater) for toilet flushing, garden watering and irrigation (Distributed via a "third pipe" system);
- Lot and street-scale treatment of stormwater using bio-retention systems and rain gardens prior to discharge to natural waterways;
- Retention, protection and enhancement of natural waterways and drainage lines through the site; and
- Incorporation of water management and waterways into the environmental, recreational and cultural values of the development.

A planted bio-retention basin or 'Raingarden' is an integral part of water sensitive urban design at Aurora, and a requirement for all rear-draining lots within the estate.



01 - RAINGARDEN IN A SMALL COURTYARD



02 - TYPICAL RAINGARDEN SETOUT (MINIMUM REQUIREMENT) - NTS

BIO-RETENTION SYSTEMS

'Raingardens' are a form of bio-retention system that are specifically designed to integrate household gardens into the stormwater management system of the estate. Bio-retention systems treat stormwater by percolation through a vegetated soil media.

Treated stormwater passing through the vegetated media is collected via a sub-surface drainage system for discharge to the main stormwater drainage system. Bio-retention systems are filtration, not infiltration systems. Treated stormwater is not intended to enter groundwater. Raingardens should have an overflow by-pass system that ensures the allotment is adequately drained during high intensity rainfall events.

The detailed design for the raingarden system can vary provided it includes the basic elements outlined in this brochure.

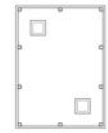
RAINGARDEN SIZE

The minimum area required for use as a Raingarden is **1.5%** of the total lot area. This figure is based on modelling by engineers that takes into account the requirements of the entire estate.

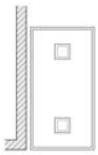
Typical Lot Area	Minimum 'Raingarden' Area
232.5 m^2	3.5 m^2
325.5 m^2	4.9 m^2
375.0 m^2	5.7 m^2
420.0 m^2	6.3 m^2
480.0 m^2	7.2 m^2

CLEARANCE FROM BUILDINGS

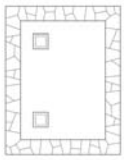
The recommended minimum clearance between a raingarden and any building or structure for heavy clay soil types is 2 (two) metres. If the raingarden is located closer than this, it should be sealed (using a pre-formed plastic tank) and/or specialist engineering advice sought.



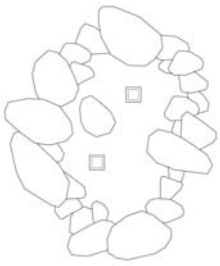
TIMBER EDGING



PRE-FORMED PLASTIC TANK

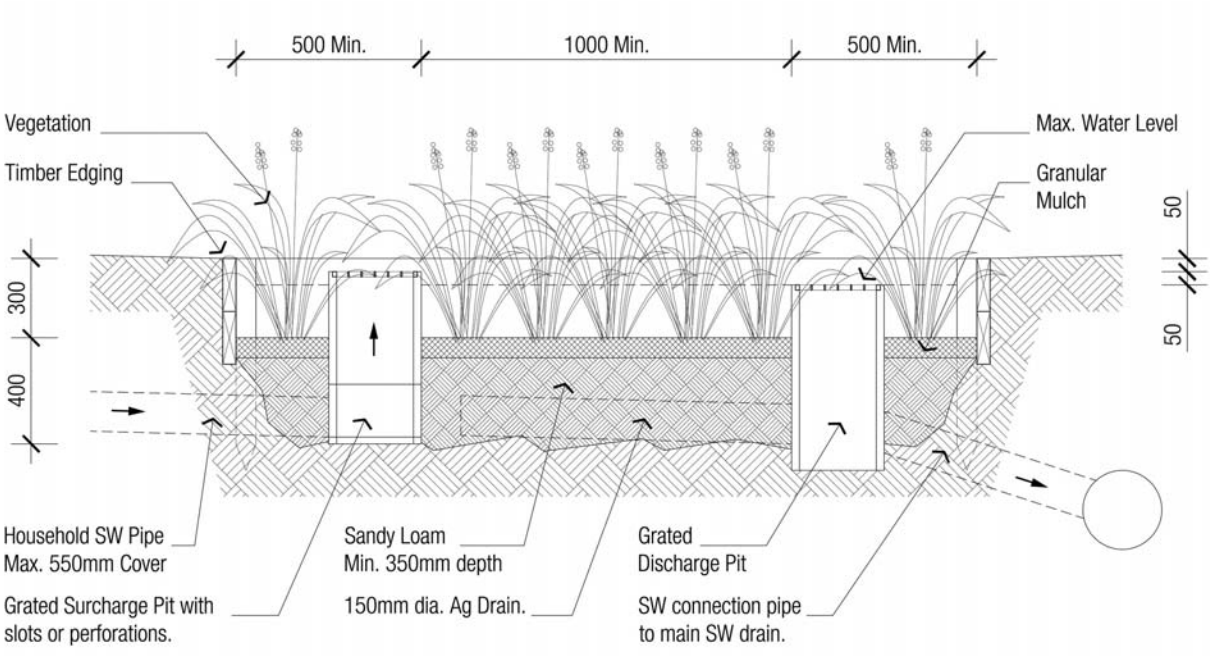


STONE EDGING



BOULDER EDGING

03 - SUGGESTED EDGE TREATMENTS



04 - TYPICAL RAINGARDEN SECTION (MINIMUM REQUIREMENT) - NTS

RAINGARDEN TECHNICAL SPECIFICATION

Surcharge Pit

- 346mm dia. Drain Sump/Surcharge Pit with fitted grated lid. Pipe to have 10 no. slots (length: 100mm, spacing: 30 degrees). Suggested Supplier: James Hardie Australia P/L.
- 300 or 450mm dia. Concrete Pipe with fitted grated lid. Pipe to be perforated with 5mm dia. holes at 100mm centres. Suggested Supplier: Rocla Pipes P/L.
- 300 x 300mm Drain Sump with risers, grated lid & inlet/outlet knockouts. Sump to be perforated with 5mm dia. holes at 100mm centres. Suggested Supplier: ACO Polycrete P/L.

Discharge Pit

- 346mm dia. Drain Sump/Surcharge Pit with fitted grated lid. Pipe to have 10 no. slots (length: 100mm, spacing: 30 degrees). Suggested Supplier: James Hardie Australia P/L.
- 300 or 450mm dia. Concrete Pipe with fitted lockable grated lid. Suggested Supplier: Rocla Pipes P/L.
- 300 x 300mm Drain Sump with risers, lockable grated lid & inlet/outlet knockouts. Suggested Supplier: ACO Polycrete P/L.

Household Stormwater Pipe & Ag Drains

- SW Pipes - 90, 100 or 150mm dia. uPVC pipe (or sustainable alternative).
- Ag Drains - 100 or 150mm dia. slotted uPVC pipe (or sustainable alternative).

Edging:

- Edging - Timber (200 x 50mm recycled hardwood edging with 75 x 75mm stakes), In-situ Concrete, Pre-cast Blocks or Locally Sourced Boulders.
- Pre-formed plastic tanks can be made to order to suit specific conditions.

Mulch & Topsoil:

- Mulch - 4-7mm screenings or similar. Materials might include crushed rock, gravel, brick, coarse river sand, scoria or river pebbles.
- Topsoil -free-draining sandy loam (Hydraulic conductivity: greater than 180mm/hr).

PLANT SPECIES SELECTION

The species best suited to the site's soil and climatic conditions are those that grow naturally within the local area. The following list includes a combination of native and exotic plants that could be used as part of an ornamental planting scheme. A list of local indigenous plant suppliers can be obtained from the City of Whittlesea.

RECOMMENDED PLANT SPECIES

Indigenous Groundcovers	
Brachycome multifida	Cut Leaf Daisy
Chrysocephalum apiculatum	Common Everlasting
Dichondra repens	Kidney Weed
Kennedia prostrata	Running Postman
Myoporum parvifolium	Creeping Boobialla
Viola hederacea	Native Violet
Other Groundcovers	
Ajuga reptans	Bugle Flower
Erigeron mucronatus	Seaside Daisy
Grevillea sp. (prostrate forms)	Grevillea species (prostrate form)
Indigenous Ferns, Grasses & Tussocks	
Blechnum cartilagineum	Gristle Fern
Caesia callianthа	Blue Grass Lily
Carex sp.	Sedge species
Dianella longifolia	Pale Flax Lily
Juncus sp.	Rush species
Lomandra longifolia	Spiny-headed Mat-rush
Stylidium graminifolium	Grass Trigger Plant
Other Ferns, Grasses & Tussocks	
Kniphofia sp.	Torch Lily/Red Hot Poker species
Phormium sp.	New Zealand Flax species
Indigenous Small Shrubs:	
Correa reflexa	Common Correa
Epacris impressa	Common Heath
Hibbertia prostrata	Stalked Guinea Flower
Pimelea humilis	Common Rice Flower
Pultenea daphnoides	Large-leaf Bush Pea
Other Small Shrubs:	
Baeckea sp.	Heath Myrtle
Cistus sp.	Rock Rose
Nandina domestica	Japanese Sacred Bamboo
Rosmarinus officinalis	Rosemary

LANDSCAPE DESIGN OPPORTUNITIES

Whilst this brochure outlines a basic raingarden specification, there are immense opportunities to incorporate the raingarden within the overall landscape design of the lot. The raingarden can be developed as an essential and aesthetically pleasing feature of the garden with the use of stonework, paving, timber decking and other landscape materials.

The information contained in this brochure is supplied as a guide and should not be taken as representative in any respect on the part of the vendors or their agents. Prepared by MDG Landscape Architects for VicUrban, in consultation with Coomes Consulting Group, Ecological Engineering and Douglas Partners P/L.