water smart city

Building a lined planter box raingarden

What is a planter box raingarden?

A raingarden is a specially prepared garden designed to receive and filter rain run-off from roofs or hard surfaces such as driveways or paving. You can create a raingarden in a planter box, positioning it to collect water from a diverted downpipe or rainwater tank overflow.

Building a raingarden is a simple way to help the environment and the health of our local waterways while providing a self-watering garden for your backyard.

Featuring layers of soil for filtration, gravel for drainage, and plants that can tolerate periods without rain, a raingarden helps to protect our creeks and rivers from stormwater pollutants.

With a slotted pipe beneath the soil to take away the filtered rainwater and an overflow pipe on the surface to prevent flooding, raingardens are designed to collect water from a diverted downpipe, rainwater tank overflow or pavement runoff.

Please note: A certified plumber must be used for stormwater connections and modifications.

Did you know that a raingarden is only wet during and immediately after rain, leaving it dry most of the time? This is due to the drainage and filtration properties of the soil combination used in the raingardens.

Step 1 - getting started

Location: Build your planter box as close as possible to the water source whether it be a downpipe or rainwater tank overflow. This will help minimise the additional plumbing needed to bring water to the raingarden. Your raingarden needs to sit at least 300mm away from your house.

Having decided on a location, it is important to determine the proximity of the existing stormwater pipe to make sure your raingarden is connected properly. Your local plumber can help with location and how and where to divert your downpipe so that the area doesn't flood during construction.

Stormwater reconnection: All connections or modifications to existing stormwater pipes need to be done by a licensed plumber. The plumber should ensure that pipes are reconnected into the property's stormwater and not another service such as the sewer.

Underground services: Be aware of any underground services (gas, electricity, water) that run near your house as this may determine where you can build your raingarden. Raingardens should not be built over or in close proximity to a septic system.

Materials: See Materials list for information about what you need to build a raingarden.

Size: You need to make sure that your raingarden is large enough to manage the amount of stormwater it will receive. If your raingarden is going to capture run-off from the roof via a downpipe, measure the area of roof that drains to the downpipe. Generally, the size of the raingarden should be approximately 2 per cent of the run-off area. Table 1 will help you work out the correct size.

Table 1

Area of run off (m^2)	Raingarden size (m^2)
50	1
100	2
150	3
200	4
250	5
300	6
350	7
400	8
450	9

continued over

The City of West Torrens / A: 165 Sir Donald Bradman Drive, Hilton 5033 / P: (08) 8416 6333 / F: (08) 8443 5709
E: csu@wtcc.sa.gov.au / W: westtorrens.sa.gov.au

City of West Torrens

Step 2 - planter box and pipe infrastructure

Preparing your planter box:
You can create a planter box out of any material as long as it is strong enough to hold soil. This could be a corrugated iron 'tank', an old wine barrel, or you could build your own planter box using plantation hardwood or similar.

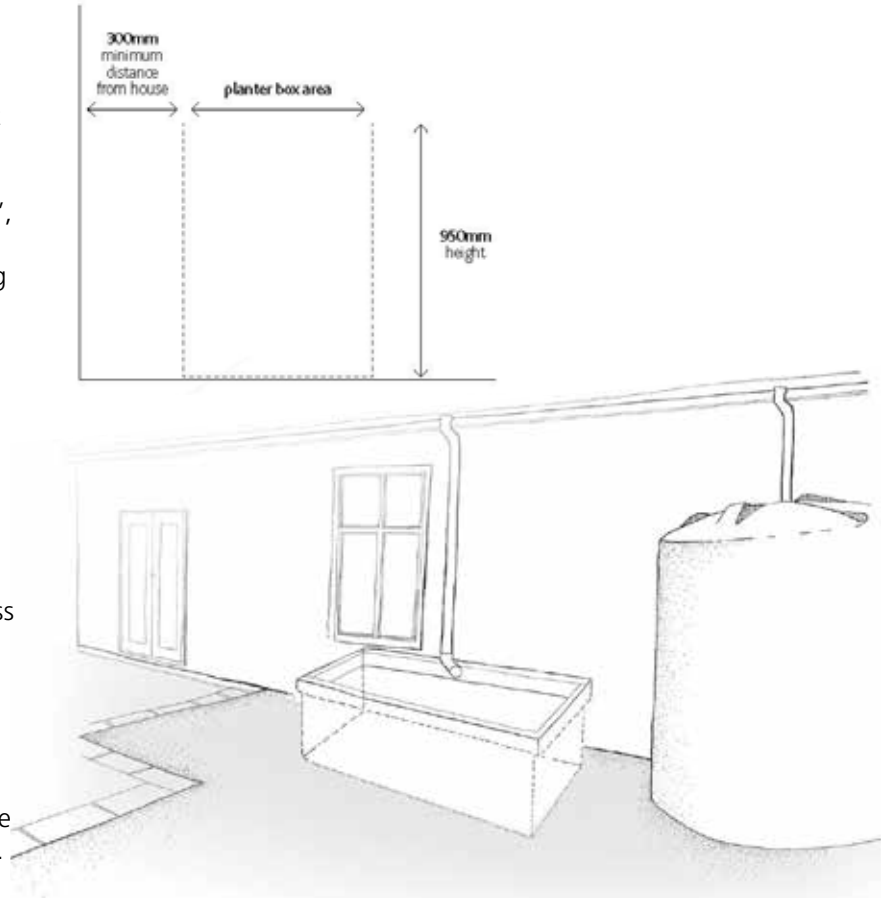
Line your planter box (sides and base) with a PVC liner. Overlap the sheets by 200mm and seal the joints with PVC tape. Place the 7mm screenings (gravel) to a depth of 50mm. This will form a base for the slotted drainage pipe. Make sure the screenings are washed and cleaned of excess dirt as this can create blockages in the raingardens drainage.

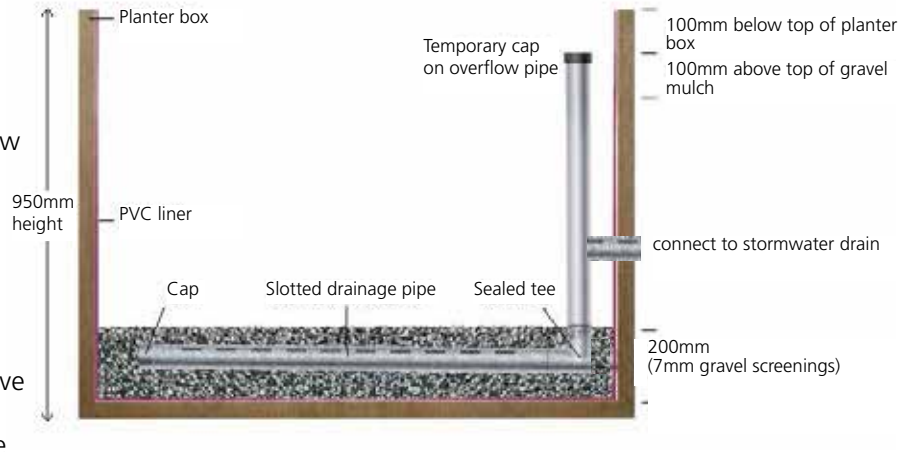
Pipe infrastructure: Lay a 90mm diameter slotted drainage pipe horizontally along the centre of the planter box base and cap one end of the slotted drainage pipe. Call your plumber to connect the drainage pipe back into the property's existing stormwater.
Handy Hint - if your raingarden is greater than 4m wide, you will need to install two slotted drainage pipes and two overflow pipes. These need to be evenly spaced across the planter box base to provide adequate drainage.

Connect the T connection pipe into the overflow pipe so the base of the connection sits above the sand transitional layer. This will provide a water well for the plants to tap into moisture over extended dry periods.

Connect the vertical 90mm diameter overflow pipe into the slotted drainage pipe using a 90 degree elbow pipe. When the raingarden is finished, the top of the overflow pipe should sit 100mm below the top edge of the planter box.

Install a temporary cap on top of the overflow pipe to prevent materials dropping into it during construction. Some plastic taped across the top of the pipe will work fine.





Step 3 - soil layers

Screenings layer: Add 7mm screenings (gravel) to a depth of 150mm over the slotted drainage pipe in the base of your raingarden. This brings the total depth of screenings (gravel) to 200mm. Be careful to not dislodge or damage the slotted drainage pipe when adding the additional screenings.
Sand layer: Mix 4 parts white washed sand with 1 part topsoil. Add this mix to the raingarden to a depth of 400mm.

Handy Hint - Ensure you firmly pat down each layer of soil when building your raingarden to help reduce the layers from sinking.

Step 4 - pipe adjustments, plants and mulch

Pipe adjustments: Redirect your downpipe into the garden using pipe bends where required. If possible, use two 45 degree bends connected together as this will provide a much gentler and more even flow of water, reducing the risk of erosion and prevent blockages within the downpipe. A 90 degree elbow pipe will do as an alternative.

Plants

In general, plants that grow well in a raingarden:

- like dry conditions but can tolerate temporary wet periods
- are perennial rather than annual
- have an extensive fibrous root system.

A wide range of plants are suitable for raingardens and your local nursery will be able to guide you on what is right for your area.

There are also particular plants that are really good at removing pollutants from stormwater. These include:

- Ficinia (formerly isolepis) nodosa
- Carex appressa
- Juncus flavidus
- Lomandra longifolia
- Melaleuca ericifolia
- Goodenia ovate

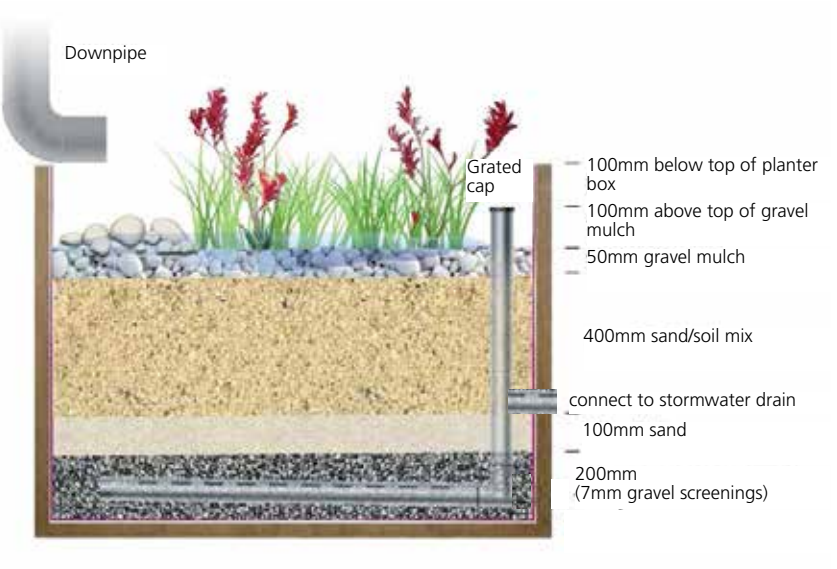
50 per cent of your raingarden should be planted with these species, the other 50 per cent can be made up of plants that like a dry environment with intermittent wet periods. It is important that the plants you select are suitable for the amount of sun and shade on your raingarden. See the 'Plant list' on reverse for suitable raingarden plants.

Regardless of the type of plants you select, it is important to plant densely to cover the raingarden. Set your plants out at roughly 6 plants per m^2. So for a $2m^2$ raingarden, you will need to buy 12 plants. Now start planting.

Mulch

To allow the spread of water gently over the raingarden, place some large flat rocks where water flows from the downpipe. Place smaller rocks in between the large rocks to fill the gaps and help prevent erosion. Alternatively a flow spreading device can be fitted to the downpipe.

Spread gravel mulch to a depth of 50mm around the plants. Remove the temporary end cap from overflow pipe and replace with a 90mm PVC finishing collar and domed pipe grate. Water the plants in - complying with your local water restrictions.



Once established, raingardens are low maintenance especially when planted with native plant species. They don't need to be watered, mowed or fertilised. However, a few simple tips can help your raingarden mature and function well.

- Gravel mulch will help retain moisture in your raingarden and prevent weeds from growing.
- Ensure that the overflow is never blocked.
- Remove any sediment or build up from the downpipe.
- Some weeding may need to take place until plants have matured.
- Evenly distribute water flow into your garden to limit erosion from heavy rainfall.
- Inspect your garden regularly - replace plants and repair erosion when necessary.

Note - if necessary, water your raingarden until your plants are established.

Need help? If you have questions about building a raingarden, your landscape gardener or local plumber may be able to help. For more information contact Council on 8416 6333.

Materials List - what you need to build your raingarden

Table 2 details the materials required to create a $2m^2$ raingarden. The cost of your raingarden will depend on its size and the materials you chose - sourcing recycled materials will reduce the cost significantly.

Salvage and save outlets that operate alongside waste transfer stations are a good place to source recycled materials. Costs can vary between $200 and $800 excluding plumbing charges.

Quantity	Material
2 l/m	90mm diameter slotted drainage pipe (Ag Pipe)
2 l/m	90mm diameter uPVC pipe*
$0.4m^3$	7mm screenings
$0.85m^3$	Sand (white washed)
$0.15m^3$	Topsoil
12	Plants (150mm pots)
$0.1m^3$	Gravel mulch
1	90mm diameter uPVC 90 degree bend or 2x45 degree bends
1	PVC grate 90mm finishing collar
1	PVC 90mm diameter domed pipe grate
1	PVC 90mm tee
1	PVC 90mm cap
$10m^2$	PVC liner
	PVC tape

*Costs per square metre will depend on the length of connections back to the existing stormwater drain.

l/m = lineal metre

m^2 = square metres

m^3 = cubic metres

mm = millimetres

Plant list - the following local indigenous plants grow well in raingardens.

Botanical name	Common name	Conditions	Size (HxW) cm
Callistemon sieberi	River bottlebrush	Full sun to partial shade	3m x 100
Cyperus gymnocaulos	Spiny flat-sedge	Full sun to partial shade	80 - 150 x 150
Disphyma crassifolium	Round-leaf pigface	Full sun	20cm high and spreading
Dianella species		Full sun to partial shade	60 - 120 x 40 - 150
Ficinia nodosa	Knobby club-rush	Full sun	50 - 150 x 60 - 200
Juncus kraussii	Sea rush	Full sun to partial shade	30 - 100 x 20 - 50
Leucaphyta brownii	Cushion bush	Full sun, salt tolerant	100 x 200
Lomandra species		Full sun to partial shade	60 - 120 x 50 - 100
Melaleuca halmaturorum	Swamp paperbark	Full sun	30m high x 3m wide
Myoporum parvifolium	Creeping boobialla	Full sun	20 - 30 x 300
Wahlenbergia stricta	Native bluebell	Full sun	15 - 50 x 90

All images courtesy Melbourne Water.