

Building an inground raingarden

What is an inground raingarden?

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.

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.

Featuring layers of soil for filtration, gravel for drainage, and plants that can tolerate periods without rain, a raingarden helps to protect our streams 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 disconnected 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 raingarden.



Building your raingarden

Step 1 – getting started

Location

Build your raingarden as close as possible to the water source – whether it is a downpipe, rainwater tank overflow, paved area or driveway. This will help minimise the additional plumbing needed to bring water to the raingarden.

Table 1 sets out how far away your raingarden needs to be from your house depending on how deep your existing foundations are. A minimum distance of 300mm from your house is recommended.

Ensure when digging near your foundations not to disturb areas directly underneath the foundations and area as shown below – ‘no dig zone’.

Handy Hint - Avoid building your raingarden underneath large trees as the root system will interfere with your excavations. As a general rule, the root zone will extend out to the edge of the tree canopy.

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

Stormwater reconnection

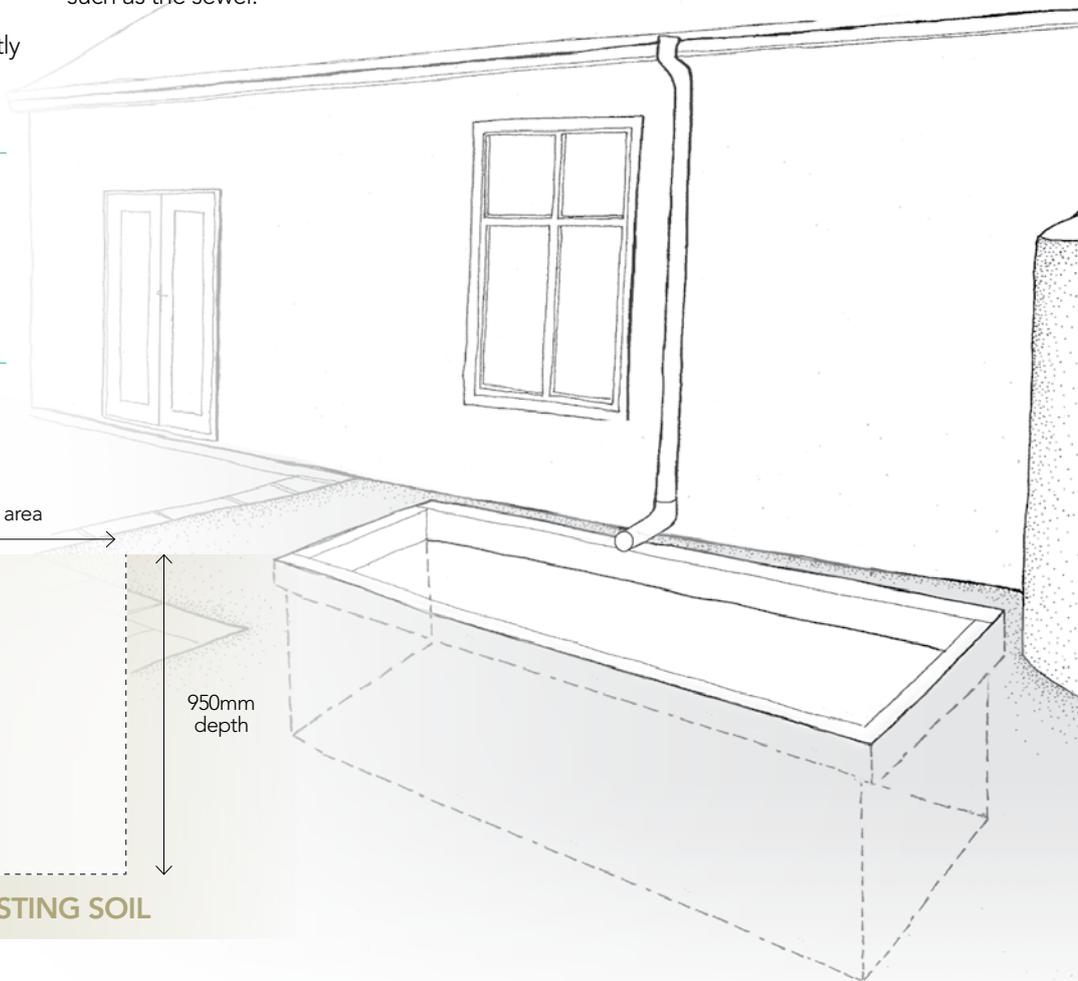
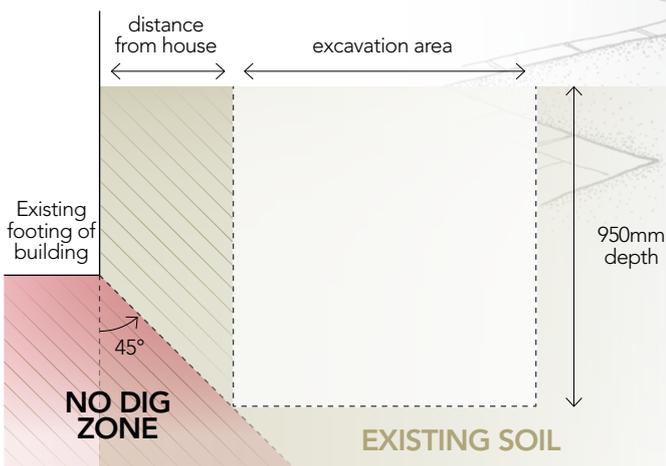
All connections or modifications to existing stormwater pipes need to be done by a licensed plumber. The plumber should ensure that pipes are reconnected into the property's stormwater and not another services such as the sewer.

Underground services

Be aware of any underground services (gas, electricity, water) that run near your house or under your garden as this will influence where you can excavate 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 that downpipe. Generally, the size of the raingarden should be approximately 2% of the run-off area. Table 2 will help you work out the correct size.

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 raingarden base to provide adequate drainage.

Table 2 – Raingarden sizing chart

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

Step 2 - excavation and pipe infrastructure

Excavation

Excavate your raingarden with a gentle slope towards the stormwater outlet (where the water will exit your raingarden).

Line your raingarden (base and sides) 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 clean of excess dirt as this can create blockages in the raingarden's drainage.

Pipe Infrastructure

Lay a 90mm diameter slotted drainage pipe horizontally along the centre of the raingarden 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.

Connect the vertical 90mm diameter overflow pipe into the slotted drainage pipe using a 90 degree elbow pipe and seal. When the raingarden is finished, the top of the overflow pipe should sit 100mm above the gravel mulch and 100mm below the surrounding ground level.

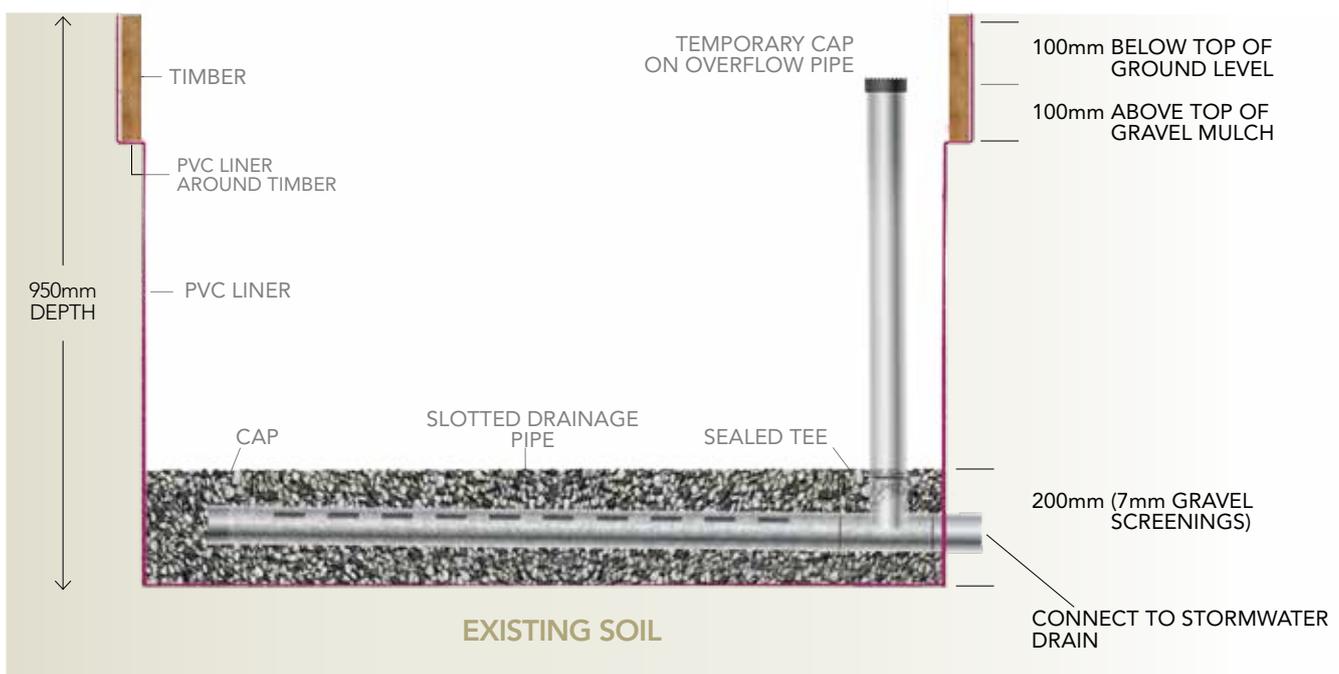
Install a temporary cap on top of the overflow pipe to prevent materials dropping into it during construction. Some plastic taped across the top of the pipe will work fine.

Frame

Install a frame to separate your raingarden from the surrounding soil. If using timber, ensure that it is no less than 50mm thick. While Class 1 or similar hardwood (200mm x 50mm) is ideal for this type of frame, you can use any material available that is a similar thickness and won't warp or bend over time.

Excavate a ledge around the top of the raingarden for the frame to rest on. The top edge of the frame needs to sit level with the surrounding ground.

Ensure that the PVC liner sits between the frame and surrounding ground. Secure the PVC liner to the frame to prevent surrounding soil entering the raingarden.



Building your raingarden

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 to total depth of screenings (gravel) to 200mm. Be careful when not to dislodge or damage the slotted drainage pipe when adding the additional screenings.

Sand layer

Place white washed sand to a depth of 100mm over the screenings (gravel) layer.

Sand/soil mix 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 put 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 raingarden 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.

Handy Hint – To help prevent your raingarden from overflowing, it is important that the raingarden frame sits higher than the top of the overflow pipe.

Plants

In general, plants that grow well in a raingarden:

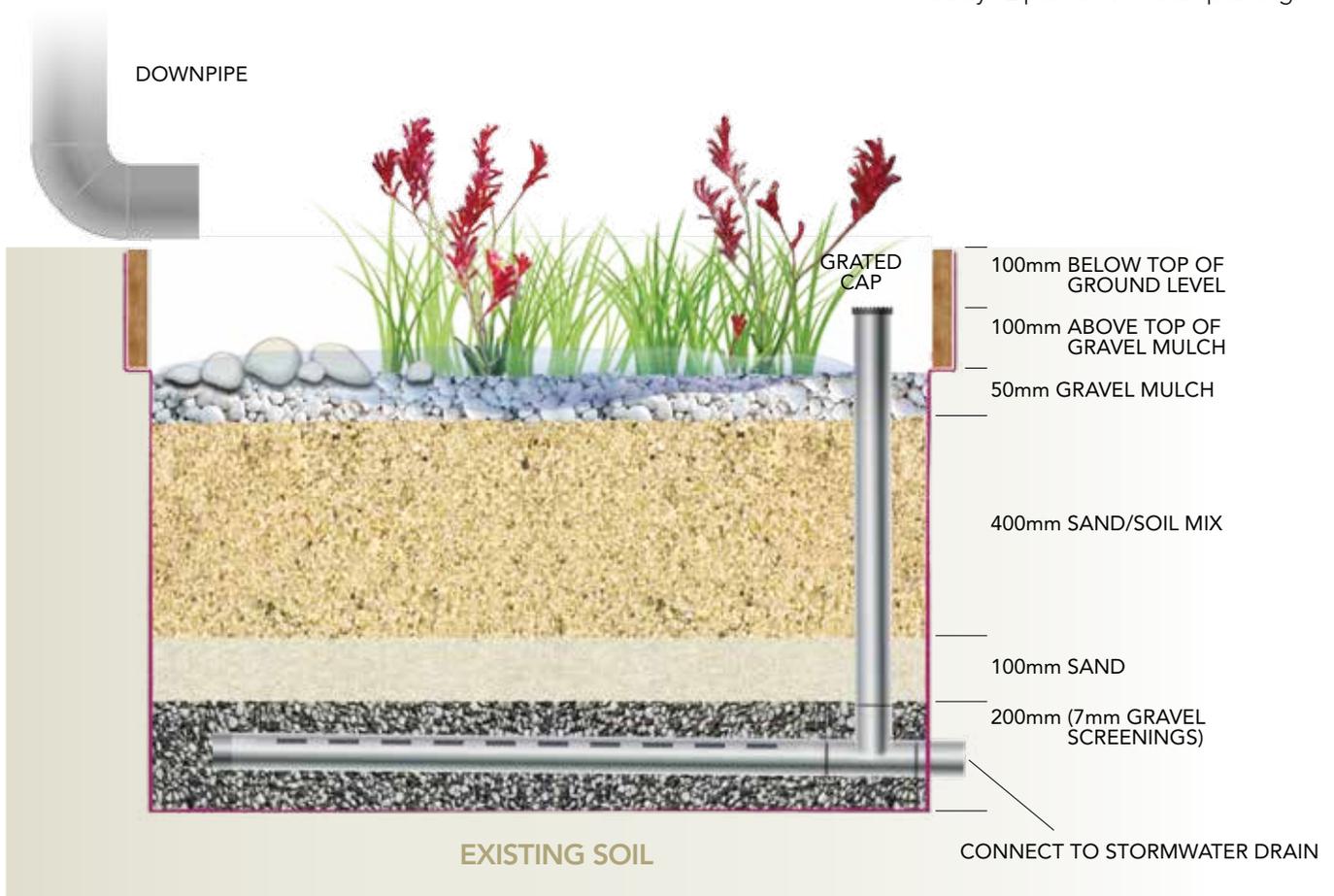
- › like dry conditions but can tolerate temporary wet periods
- › are perennial rather than annual
- › have an extensive fibrous root system.

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:

- › *Carex appressa*
- › *Lomandra longifolia*
- › *Juncus flavidus*
- › *Melaleuca ericifolia*
- › *Goodenia ovate*.

50% of your raingarden should be planted with these species, the other 50% 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 for a suggested list of 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 m². So for a 2m² raingarden, you will need to buy 12 plants. Now start planting.



Looking after your raingarden

Mulch

Spread gravel mulch to a depth of 50mm around the plants.

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.

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.

Need help?

If you have questions about building a raingarden, your landscape gardener or local plumber may be able to help.

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. Strategically placed rocks may help with this.

- › Inspect your garden regularly – replace plants and repair erosion when necessary.
- › Driving over or squashing your raingarden will affect its ability to work efficiently.
- › Avoid using organic (timber) mulch as this will float in the raingarden and may cause blockages.

Note – If necessary, water your raingarden until your plants have established in compliance with your local water restrictions.



Materials List – what you need to build your raingarden

Table 3 details the materials required to create a 2m² raingarden.

Table 3 – Raingarden materials list

QUANTITY	MATERIAL
6 l/m	200mmx50mm Class 1 hardwood sleepers
2 l/m	90mm diametre slotted drainage pipe (Ag Pipe)
2 l/m	90mm diametre 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 diametre uPVC 90 degree bend or 2x 45 degree bends
1	PVC grate 90mm finishing collar
1	PVC 90mm diametre domed pipe grate
1	PVC 90mm tee
1	PVC 90mm cap
10m ²	PVC liner
	PVC tape

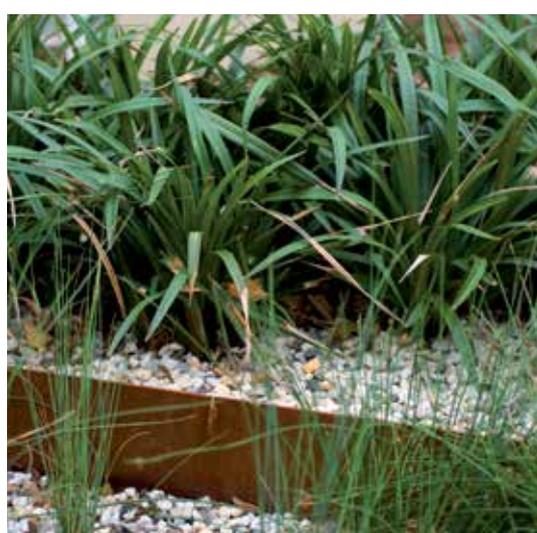
l/m = lineal metres m² = square metres m³ = cubic metres mm = millimetres



Plant List – the best plants for your raingarden

Table 4 lists some local plants that would grow well in small scale raingardens.

	GENUS	SPECIES	COMMON NAME
Grasses:	Austrostipa	ramosissima	Stout Bamboo Grass
	Entolasia	marginata	Wiry Panic Grass
	Hemarthria	uncinata	Carpet Grass
	Microlaena	stipoides	Weeping Grass
Small Plants (< 50cm tall):	Arthropodium	fimbriatum	Chocolate Lily
	Arthropodium	milleflorum	Vanilla Lily
	Hypoxis	hygrometrica	Golden Weather-grass
	Laxmannia	gracilis	Slender Wire Lily
Small Plants (50 - 100 cm tall):	Dianella	caerulea	Paroo Lily
	Gahnia	aspera	Saw Sedge
	Lepidosperma	laterale	Sword Sedge
	Lomandra	filiformis	Mat Rush
Groundcovers:	Centella	asiatica	Swamp Pennywort
	Dichondra	repens	Kidney Weed
	Geranium	homeanum	Native Geranium
	Veronica	plebeia	Trailing Speedwell
Climbers:	Clematis	aristata	Old Man's Beard
	Eustrephus	latifolius	Wombat Berry
Semi Aquatic - Aquatic and Saltmarsh Species:	Carex	appressa	Tussock Sedge
	Ficinia	nodosa	Nobby Rush
	Juncus	krausii	Sea Rush





Working together
for a healthy
Cooks River catchment

For more raingarden factsheets visit www.cooksriver.org.au

Get in touch with us at info@cooksriver.org.au



/CooksRiverAlliance



@cooks_river



@Cooks_River



/Companycooks-river-alliance



Australian Government



This program is supported by the Cooks River Alliance through funding from the Australian Government. Images and concept supplied courtesy of Melbourne Water.

Disclaimer: This publication may be of assistance to you but the Cooks River Alliance, member councils and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaim all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.