

Guide to Swale Planting

Water Sensitive Urban Design (WSUD) assets such as vegetated swales are required to perform important ecosystem services to manage the quality and quantity of stormwater runoff. Swales can be incorporated into urban designs along streets (within median strip or footpaths), in parklands, reserves, and between allotments where maintenance access can be preserved.

Functional components & planting in zones

Positions of plants should reflect the type of purpose they serve in the system. Swales can be divided into zones to guide vegetation planting. The major zones within the system and three functional components are shown in Figure 1 and described as follows:

1. The **Vegetated base** is the lower, central zone of the swale with planted vegetation which can tolerate extended inundation and dry conditions
2. **Batters** refer to the sloped sides of a swale flanking its vegetated base, typically with gradients ranging from 1:5 to 1:3. Vegetation in this area is generally less tolerant of prolonged inundation but highly tolerant to dry conditions.
3. The **Inlet** to a swale can simply be the area where water first flows into the asset. This can be at the end or at multiple points along the swale length
4. The **Outlet** of a swale strip is the point at which stormwater finishes running over the surface. Overflow weirs are used to take high flows to sub-surface drainage systems if the swale is at risk of over-topping and erosion

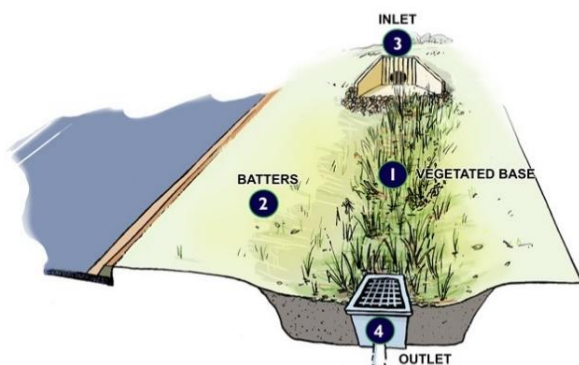


Figure 1. Schematic of conventional swale showing functional components

This planting guide and accompanied information is compiled and set out for practitioners as a formula for success with the expectation that there must be effective lifecycle and asset management from design right through construction then timely and effective handover to maintenance teams.

For some planting ideas and ordering, have a look at:

1. An Example Planting Palette with a range of species for the vegetated base and batters of a swale (page 3)
2. Our comprehensive Swale Plant Species Reference List native to the Greater Adelaide region (pages 4-8)
3. [Botanic Gardens of South Australia Plant Selector](#)
4. [Green Adelaide's guide to native plant nurseries in Adelaide.](#)

Objectives for swales

- ✓ Convey run-off as low flows at low gradient in lieu of, or in association with, underground pipe drainage systems
- ✓ Water quality – catching sediments, rubbish and filtering pollutants
- ✓ Flow & velocity reduction for flood mitigation and erosion control - protecting downstream aquatic environments
- ✓ Detention / Infiltration – reducing total run off protects downstream aquatic environments and supports plant growth
- ✓ Provision of habitat and biodiversity through informed native plant selections
- ✓ Greening and cooling
- ✓ Adding to local amenity & aesthetics
- ✓ Low maintenance.

Remember

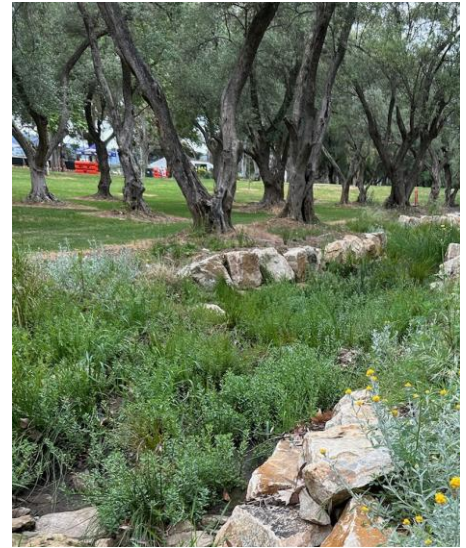
- To plan your swale planting early and order your species well in advance (at least 6 months)
- To plant a range of plant forms and root depths for treatment efficiency and resilience
- To seek expert advice from your local nursery for indigenous plants
- Frequent weeding suggests ineffective plant selection; consider alternatives to fill the niche
- Well-planted swales improve water percolation and infiltration as plant roots maintain soil porosity
- Rock mulch is not ideal as it traps heat, blocks plant spread, and makes sediment removal difficult
- Allow for a greater level of maintenance in the first 12 months.



Design Tips

When designing your swales, it is essential to choose a diverse range of plants. Swales are used to improve stormwater quality and reduce flow, but if planted thoughtfully, swales can also enhance biodiversity and beauty in our streetscapes and parks.

- ✓ **Sufficient biodiversity.** The preference along waterways is for native plants, and in particular local native plants. These are best adapted for local conditions and are unlikely to become invasive or threaten ecosystem health either on site or downstream. They also provide the best habitat outcomes for native wildlife such as local insects, amphibians, birds and mammals. The highest biodiversity and ecosystem service benefits (examples include water cleansing, pollination, nutrient cycling, healthy soils, erosion control) are achieved when conditions allow plants and wildlife to work together to create functional and stable ecosystems. A variety of plant stem and root types optimises filtration.
- ✓ **Plant density design targets** >6-8/m² at maturity, not necessarily at construction. Includes groundcovers. High density is required for competitive exclusion of weeds and other gross pollutants for amenity and reduced maintenance, for reduction of flow velocity for infiltration, erosion and sediment control. Maximal surface area of plant stems optimises filtration.
- ✓ **Resilient species** to withstand high flow velocity, temporary inundation as well as large inter-rain periods.
- ✓ Consider the context of your swale to ensure the plants selected are suitable for the intended location.



*Urban stormwater swale with detention basin and subsurface high flow bypass.
Image: Water Sensitive SA*



*An example of a vegetated swale at Pasadena Biodiversity Corridor, bringing multiple benefits to the urban landscape.
Image: Water Sensitive SA*



Example Planting Palette

Vegetated Base: filtration, flow velocity, infiltration

Ficinia nodosa
Knobby Club-rush



Carex bichenoviana
Notched sedge



Calocephalus citreus
Lemon Beauty-heads



Dichondra repens
Kidney Weed



Juncus subsecundus
Finger Rush



Myoporum parvifolium purpurea
Creeping Boobiala (purple)



Batters: soil stabilization, biodiversity, aesthetics

Eremophila glabra
Common Emu Bush



Leucophyta brownii
Cushion Bush



Callistemon rugulosus
Scarlett Bottlebrush



Poa labillardierei
Common Tussock Grass



Dianella revoluta
Black-anther Flax Lily



Myoporum parvifolium
Creeping Boobiala (green)





Swale plant species reference list native to the Greater Adelaide region

Sedges and Rushes

Zone 1 = Vegetated Base. Zone 2 = Batters

Image	Form	Zone		Species	Common name	Height (mm)	Preferred location	Comment
		1	2					
		✓		<i>Carex bichenoviana</i>	Bichenov's Sedge	400	All	Spreading sedge
		✓		<i>Carex inversa</i>	Knob Sedge	200	All	Tussock sedge, could be sown by seed if available
		✓		<i>Cyperus gymnocaulus</i>	Spiny Sedge	700	All	Effective in wet, poorer in dry conditions
		✓		<i>Gahnia filum</i>	Chaffy Saw-sedge	600-1100	Coastal	High biodiversity value
		✓		<i>Gahnia sieberiana</i>	Red Fruit Saw-sedge	1500-2000	Adelaide Hills	Sharp, drought tolerant, High biodiversity value
		✓		<i>Gahnia trifida</i>	Coast Saw-sedge	1000-1500	Coastal	Tall Sedge, high biodiversity value
		✓		<i>Ficinia nodosa</i>	Knobby Club-rush	500-1500	All	Tall, Formerly <i>Isolepis nodosa</i>
		✓		<i>Juncus kraussii</i>	Sea Rush	400-1400	All	Effective in wet, poorer in dry conds. High salt tolerance
		✓		<i>Juncus palidus</i>	Pale Rush	500-2000	All	Wetland species effective in wet conditions
		✓		<i>Juncus pauciflorus</i>	Loose Flower Rush	300-1000	All	Medium Sedge, not common
		✓		<i>Juncus subsecundus</i>	Finger Rush	300-1000	All	Wetland species



Grasses

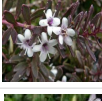
Zone 1 = Vegetated Base. Zone 2 = Batters

Image	Form	Zone		Species	Common name	Height (mm)	Preferred location	Comment
		1	2					
		✓		<i>Chorizandra enodis</i>	Black Bristle Brush	550	All	Prefers clay rich substrates
			✓	<i>Dianella brevicaulis</i>	Blueberry Lily	500-1000	All	Strappy, parrot-attracting, flowering
			✓	<i>Dianella revoluta</i>	Black anther flax lily	1000	All	Strappy, clumping, flowering
			✓	<i>Lomandra multiflora</i> spp <i>dura</i>	Iron Grass	250-850	All	Strappy
			✓	<i>Rytidosperma auriculata</i>	Lobed Wallaby Grass	700	All	(<i>Austrodanthon</i>) , prefers sandy soil, can est. from seed
			✓	<i>Rytidosperma caespitosum</i>	Ringed Wallaby Grass	900	All	Tufted med grass, prefer sandy, can est. from seed
			✓	<i>Rytidosperma carphoides</i>	Short Wallaby Grass	100-500	All	Low, prefer sandy soil. Can be established from seed
			✓	<i>Rytidosperma geniculatum</i>	Kneel Wallaby Grass	80-450	All	Low, prefer sandy soil. Can be established from seed
			✓	<i>Rytidosperma racemosum</i>	Wallaby Grass	200-600	Coastal	Hardy, drought tolerant. Low, can be established from seed
			✓	<i>Poa labillardierei</i>	Common Tussock Grass	800-1200	All	Effective in dry, poorer in wet conditions
		✓	✓	<i>Poa poiformis</i>	Blue Tussock Grass	1000	All	Effective in dry, poorer in wet conditions



Ground Covers

Zone 1 = Vegetated Base. Zone 2 = Batters

Image	Form	Zone		Species	Common name	Height (mm)	Preferred location	Comment
		1	2					
			✓	<i>Carprobrotus rossii</i>	Karkalla	100	All	Spreading succulent
		✓	✓	<i>Dichondra repens</i>	Kidney weed	200	All	Spreading herb, ground cover, weed suppressing
			✓	<i>Disphyma crassifolium</i>	Round-leaved Pig-face	20-300	All	Spreading succulent
			✓	<i>Eremophila glabra</i> 'Roseworthy'	Tar Bush 'Roseworthy'	200-300	All	Heat tolerant, flowering
			✓	<i>Kunzea pomifera</i>	Muntries	300	Coastal	Weed-suppressing, prefers sandy soil, edible fruit
			✓	<i>Mentha diemenica</i>	Slender Mint	100-150	All	Spreading herb rare but easily cultivated, emerges seasonally
			✓	<i>Mentha australis</i>	Native mint	100-200	All	Spreading herb rare but easily cultivated, emerges seasonally
		✓	✓	<i>Myoporum parvifolium</i>	Creeping Boobialla (broad leaf green)	500	All	Spreading herb, versatile
		✓	✓	<i>Myoporum parvifolium purpurea</i>	Creeping Boobialla (purple)	500	All	Spreading herb, versatile, colour contrast to green form
			✓	<i>Scaevola albida</i>	Small-fruit Fan Flower	100-200	All	Spreading herb, needs drainage, less heat tolerant



Shrubs

Zone 1 = Vegetated Base. Zone 2 = Batters

Image	Form	Zone		Species	Common name	Height (mm)	Preferred location	Comment
		1	2					
		✓	✓	<i>Calocephalus citreus</i>	Lemon Beauty-heads	300	All	Flowering, prefers clay-rich soil
			✓	<i>Chrysocephalum apiculatum</i>	Common Everlasting	600	All	Flowering, spreading
			✓	<i>Chrysocephalum semipapposum</i>	Clustered Everlasting	150-600	All	Flowering
			✓	<i>Goodenia varia</i>	Sticky Goodenia	1000	All	Shrub, spreading forms, easily cultivated, prefers sandy soil
			✓	<i>Leucophyta brownii</i>	Cushion Bush	1000	Adelaide Hills	Dwarf shrub, striking texture and grey foliage
			✓	<i>Leptospermum continentale</i>	Prickly tea-tree	1500	Adelaide Hills	Flowering
			✓	<i>Wahlenbergia luteola</i>	Bronze Bluebell	800	All	Spreading herb, extended flowering



Trees

Zone 1 = Vegetated Base. Zone 2 = Batters

Image	Form	Zone		Species	Common name	Height (mm)	Preferred location	Comment
		1	2					
			✓	<i>Banksia marginata</i>	Silver Banksia	2000	All	Butterfly-attracting, may require pruning
		✓	✓	<i>Callistemon rugulosus</i>	Scarlett Bottle-brush	3000	Adelaide Hills	Woody shrub
			✓	<i>Grevillea ilicifolia</i>	Holly Grevillea	700	Coastal & Plains	Flowering, tolerates alkaline soils
			✓	<i>Melaleuca decussata</i>	Cross-leaf Honey Myrtle	3000	Adelaide Hills	Flowering
			✓	<i>Melaleuca brevifolia</i>	Mallee Honey Myrtle	4000	Coastal	Hardy shade or shelter tree, tolerates periods of inundation
		✓	✓	<i>Eucalyptus cosmophylla</i>	Bog Gum	6000	Sandy, Adelaide hills	Small tree
			✓	<i>Melaleuca lanceolata</i>	Black Paperbark	10000	All	Bee-attracting