

APPENDIX 400.B – GSI FACILITY PLANTING REQUIREMENTS

- A. Purpose:** The purpose of this guidance document is to outline the planting requirements for establishing plant material in GSI facilities required in the Standards.
- B. Applicability:** This guidance document is applicable GSI facilities installed in all projects that are subject to the stormwater treatment requirements defined in the Standards.
- C. Soils / Growing Medium Requirements:** The soil and growing medium installed in the stormwater facility shall meet the following requirements:
1. The minimum depth of the growing medium or amended soil shall be per design – minimum depth is 12 inches.
 2. The growing medium or amended soil should be a mix of loamy soil, sand, and compost (30-40 percent compost, by volume), and shall be loose, friable, well-mixed, homogenous, free of wood pieces, plastic, and other foreign matter, and have no visible free water when placed in the facility. The pH of the mix shall be between 5 and 8.
 3. The final infiltration rate of the bottom of the facility must be tested and confirmed to be equal to or greater than the Design Infiltration Rate for the facility.
 4. After planting, the remaining areas of the facility shall be surfaced with 2 to 3 inches of either 1-1/2”-3/4” clean round rock (allowed throughout the facility) and/or hardwood chips (allowed only above the high-water level in the facility).
 5. Weed-free certification is required for all imported growing medium, soil, surface material, and seed mixes.
- D. Facility Planting Calendar:** To ensure the best chances of successful plant establishment, all planting should take place between October 15th and May 15th; unless regular watering is provided to ensure the plantings are viable in drier months. In addition, air temperatures during planting must be between 32- and 90-degrees Fahrenheit.
- E. Irrigation Requirements:** In-ground automated irrigation systems are required for all GSI facilities and must be designed and installed to meet these requirements:
1. Water the entire plant area of the facility with 1 inch of water per week through from the beginning of July through the end of October, throughout the warranty period, to establish the facility plantings.
 2. Water infrequently but deeply to help the plants become as drought tolerant as possible.
 3. Continued irrigation after the establishment period is at the discretion of the owner.

It is not required that the irrigation system be designed by the Engineer – the system may be provided as “design-build” by the installer.

F. Planting Ratio Requirements: Plantings shall be placed per the quantities listed in the Figures below.

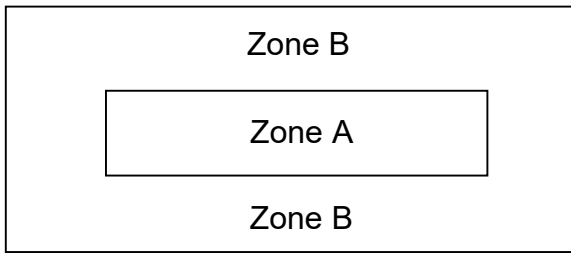


Diagram 1: Swale Planting Zones

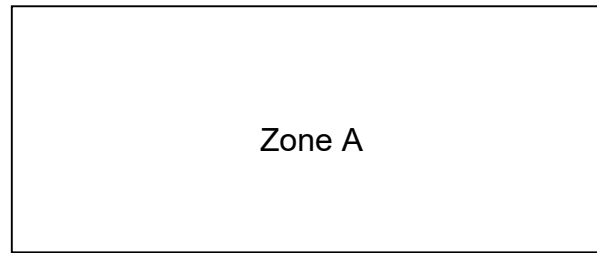


Diagram 2: Planter Planting Zones

Figure 400.B1. Facility Planting Zone Diagrams

Vegetation Group	Number of Plants	Per square Feet	Size/Spacing*
Zone A- Bottom of facility**			
Grass / Sedge / Rush	27	100	1 Gallon
And			
Perennial	15	100	1 Gallon
And			
Shrubs	3	100	1 Gallon
Zone B- Slopes of facility			
Groundcover / Perennial	20	100	1 Gallon
And			
Shrubs	5	100	1 Gallon

* Plants must meet ANSI Z-60.1 size specifications and standards. Visit <https://www.americanhort.org/education/american-nursery-stock-standards/> for details. Spacing should be per current nursery industry standards, while achieving the required density of plans in each Zone.

** Since stormwater planters do not have sloped sides, Zone A spacing may need to be adjusted in planters to allow proper layout for growth and sustainability. Modifications to be approved by the Director.

Figure 400.B-2. Facility Planting Zone Ratios

G. “Sight Restriction” Areas: Some plants are unsuitable in street-side facilities within the sight-restricted zone, as they conflict with the vision clearance requirements per City of Keizer Development Code: Vision Clearance (Section 2.312.09). Applicant is required to evaluate the proposed plantings to ensure the vision clearance requirements are met.

H. Warranty Maintenance Period: All new public GSI stormwater facilities will be subject to a warranty period including a performance security. These facilities must be maintained to ensure the facility is functioning properly. To successfully complete the warranty period the facility must meet the following conditions:

1. At least 80% of the plants (percentage of cover for grasses, sedges, groundcover and perennials; percentage of trees and shrubs by count) must be alive and in good health.
2. The facility must be free of weeds and invasive plants (as defined by Marion County Soil and Water Conservation District).
3. The facility must be free of trash, debris, and excess dead foliage or clippings.
4. All inlets and outlets shall be clear and operational, without erosion or channelization throughout or downstream of the facility.

Any conditions not met will be required to be remediated prior to release of the performance security.

I. Approved Plant List: The GSI facility design is required to utilize at least two different species from each group (per Zone), in the Figures below, to create a more diverse plant mix throughout the facility. Species other than those listed may be allowed, subject to approval by the Director.

Grass / Sedge / Rush Common Name	Latin Name	Maximum Height	Planting Zone	Allowed in “Sight Restriction” Areas
California Brome Grass	<i>Bromus carinatus</i>	4’	B	No
New Zealand Hair Sedge	<i>Carex comans</i>	2’	A	Yes
Dense Sedge	<i>Carex densa</i>	28”	A	Yes
Dewey Sedge	<i>Carex dewayana</i>	3’	A	Yes
Blue Sedge	<i>Carex flacca</i>	10”	B	Yes
Martens’ Sedge	<i>Carex mertensii</i>	3’	A	No
Japanese Sedge	<i>Carex morowii</i>	18”	A	Yes
Slough Sedge*	<i>Carex obnupta</i>	1’	A	No
Orange New Zealand Sedge	<i>Carex testacea</i>	2’	A	Yes
Foothill Sedge	<i>Carex tumulicola</i>	18”	A	Yes

Fox Sedge	<i>Carex vulpinodea</i>	3'	A	No
Tufted Hairgrass	<i>Deschampsia cespitosa</i>	3'	B	Yes
Blue Wild Rye	<i>Elymus glaucus</i>	5'	A	No
Slender Wheatgrass	<i>Elymus trachycaulus</i>	5'	B	No
Purple Love Grass	<i>Eragrostis spectabilis</i>	2'	B	Yes
Blue Fescue	<i>Festuca glauca</i>	1'	B	Yes
Idaho Fescue	<i>Festuca idahoensis</i>	14"	B	Yes
Chewings fescue	<i>Festuca rubra var. Commutata</i>	25"	B	No
Blue Oat grass	<i>Helictotrichon sempervirens</i>	3'	B	Yes
Common Rush	<i>Junctus effusus</i>	2'	A	Yes
Sword Leaf Rush	<i>Junctus ensifolius</i>	2'	A	Yes
Spreading Rush	<i>Junctus patens</i>	2'	A	No
Path Rush	<i>Junctus tenuis</i>	2'	A	Yes
Soft Rush	<i>Juncus effuses</i>	4'	A	No
Mondo Grass	<i>Ophiopogon sp.</i>	15"	B	Yes
Fountain Grass	<i>Pennisetum alopecuroides</i>	5'	B	Yes
Blue Eyed Grass	<i>Sisyrinchium angustifolium</i>	8"	A	Yes
Yellow Eyed Grass	<i>Sisyrinchium californicum</i>	8"	A	Yes
Prairie Dropseed	<i>Sporobolus heterolopus</i>	4'	B	Yes

* Slough sedge is not allowed in stormwater facilities located in the public right-of-way.

Figure 400.B-3. Approved Grasses and Sedges

Groundcover / Perennial Common Name	Latin Name	Maximum Height	Planting Zone	Allowed in "Sight Restriction" Areas
Common Yarrow	<i>Achillea millefolium</i>	3'	B	No
Nodding Onion	<i>Allium cernuum</i>	18"	A	Yes
Kinnikinnick	<i>Arctostaphylos uva-ursi</i>	8"	B	Yes
Purple Bergenia	<i>Bergenia purpurascens</i>	18"	A	Yes
Giant Camas	<i>Camassia leichtlinii</i>	3'	A/B	No
Common Camas	<i>Camassia quamash</i>	28"	A/B	Yes
Pacific Aster	<i>Chilensis symphyotrichum</i>	3'	B	No
Bearberry Cotoneaster	<i>Contoneaster dameri</i>	1'	A/B	Yes
Pacific Bleeding Heart	<i>Dicentra formosa</i>	18"	B	Yes

Narrow Leaf Purple Coneflower	<i>Echinacea angustifolia</i>	2'	B	No
Pale Purple Coneflower	<i>Echinacea pallada</i>	3'	B	No
Purple Coneflower	<i>Echinacea purpurea</i>	2'	B	No
Seaside Daisy	<i>Erigeron glaucus</i>	1'	B	Yes
Oregon Sunshine	<i>Eriophyllum lanatum</i>	10"	B	Yes
Coastal Strawberry	<i>Fragaria chiloensis</i>	6"	A	Yes
Wild Strawberry	<i>Fragaria vesca</i>	9"	A	Yes
Creeping Broom	<i>Genista pillosa</i>	18"	B	No
Daylilies	<i>Hemerocallis</i>	2'	A	Yes
Coral Bells	<i>Heuchera micrantha</i> var. <i>Micrantha</i>	16"	B	No
Japanese Iris	<i>Iris ensata</i>	2'	A/B	No
Iris Pacific Coast Hybrids	<i>Iris</i> Pacific Coast Hybrids	2'	A/B	Yes
Siberian Iris	<i>Iris sibirica</i>	3'	A/B	No
Oregon Iris	<i>Iris tenax</i>	1'	A/B	Yes
English Lavender	<i>Lavendula angustifolia</i>	3'	B	Yes
Riverbank Lupine	<i>Lupinus rivularis</i>	5'	A	No
Scarlet Monkeyflower	<i>Mimulus cardinalis</i>	3'	B	Yes
Yellow Monkeyflower	<i>Mimulus guttatus</i>	2'	A	Yes
Purple Monkeyflower	<i>Mimulus lewisii</i>	3'	A	Yes
Western Sword Fern	<i>Polystichum munitum</i>	6'	B	No
Cardwells Penstemon	<i>Penstemon cardwelli</i>	12"	A/B	Yes
Dwarf Primrose	<i>Primula</i> Dwarf	2"	A	Yes
Fairy Primrose	<i>Primula malicoides</i>	4"	A	No
Orange Cornflower	<i>Rudbeckia fulgida</i>	4'	B	No
Oregon Stonecrop	<i>Sedum oreganum</i>	18"	B	Yes
Broadleaf Stonecrop	<i>Sedum spathulifolium</i>	8"	B	Yes
Checkermallow	<i>Sidalcea campestris</i>	3'	A	No
Spiked Speedwell	<i>Veronica spicata</i>	3'	B	No

Figure 400.B-4. Approved Groundcover and Perennials

Shrub Common Name	Latin Name	Maximum Height	Planting Zone	Allowed in “Sight Restriction” Areas
Hairy Manzanita	<i>Arctostaphylos columbiana</i>	15'	B	No
Common Manzanita	<i>Arctostaphylos manzanitas</i>	20'	B	No
Black Chokeberry	<i>Aronia melanocarpa</i>	6'	B	No
California Lilacs	<i>Ceanothus</i> sp.	6'	B	No
Sweet Pepperbush	<i>Clethra alnifolia</i>	8'	B	No
Red Twig Dogwood	<i>Cornus sericea</i>	6'	A	No
Yellow Twig Dogwood	<i>Cornus sericea</i> 'Flaviramea'	6'	A	No
Kelsey Dogwood	<i>Cornus sericea</i> 'Kelseyi'	30"	A	Yes
Box Honeysuckle	<i>Lonicera nitida</i>	5'	B	No
Compact Oregon Grape	<i>Mahonia aquifolium</i> 'compacta'	3'	A	No
Cascade Barberry	<i>Mahonia nervosa</i>	2'	A	No
Creeping Oregon Grape	<i>Mahonia repens</i>	2'	B	Yes
Indian Plum	<i>Oemleria cerasiformis</i>	20'	B	No
Mock Orange	<i>Philadelphus lewisii</i>	6'	B	No
Pacific Ninebark	<i>Physocarpus capitatus</i>	15'	A	No
Yellow Flowering Currant	<i>Ribes aureum</i>	8'	A	No
Red-Flowering Currant	<i>Ribes sanguineum</i>	9'	A	No
Blue Elderberry	<i>Sambucus nigra</i> L. ssp. <i>caerulea</i>	12'	A/B	No
Sweet Box	<i>Sarcococca confusa</i>	5'	B	No
Birch Leaf Spirea	<i>Spirea betulifolia</i>	3'	A/B	No
Rose Meadowsweet	<i>Spirea desnsiflora</i>	3'	A/B	Yes
Shiny Leaf Spirea	<i>Spirea lucida</i>	3'	A/B	Yes

Figure 400.B-5. Approved Shrubs

Tree Common Name	Latin Name	Maximum Height	Planting Zone	Allowed in “Sight Restriction” Areas
Bigleaf Maple	<i>Acer macrophyllum</i>	100'	A/B	No
Vine Maple	<i>Acer circinatum</i>	25'	A/B	No
White Alder	<i>Alnus rhombifolia</i>	75'	B	No
Red Alder	<i>Alnus rubra</i>	120'	B	No
Pacific Madrone	<i>Arbutus menziesii</i>	125'	B	No
River Birch	<i>Betula nigra</i>	70'	A/B	No
Paper Birch	<i>Betula papyrifera</i>	70'	B	No
Incense Cedar	<i>Calocedrus decurrens</i>	100'	B	No
Eastern Redbud	<i>Cercis canadensis</i>	30'	B	No
Pacific Dogwood	<i>Cornus nuttallii</i>	66'	A/B	No
Common Dogwood	<i>Cornus sanguinea</i>	15'	A	No
Red Osier Dogwood	<i>Cornus stolonifera</i>	20'	A/B	No
Willamette Valley Ponderosa Pine	<i>Pinus ponderosa</i> var. <i>Willamettensis</i>	230'	B	No
Quaking Aspen	<i>Populus tremuloides</i>	50'	A/B	No
Swamp White Oak	<i>Quercus bicolor</i>	60"	A/B	No
Oregon White Oak	<i>Quercus garryana</i>	90'	A/B	No
Bald Cypress	<i>Taxodium distichum</i>	70'	A/B	No
Western Red Cedar	<i>Thuja plicata</i>	175'	A/B	No
Western Hemlock	<i>Tsuga heterophylla</i>	100'	B	No
Oregon Myrtle	<i>Umbellularia californica</i>	70'	B	No

NOTE: Trees are not allowed in stormwater facilities located in the public right-of-way, unless otherwise approved by the Director.

Figure 400.B-5. Approved Trees