APPENDIX D – Planting List and Example Planting Plans

Introduction

Landscaping is a critical element to improve both the function and appearance of GI Practices. Vegetation should be selected based on soil depth, sun exposure, water tolerance, salt tolerance, and other environmental conditions. This Appendix provides general landscape guidance, plant selection guidance for effective stormwater GI Practices, and two example bioretention parking lot island planting plans.

General Landscape Guidance

The design for plantings of vegetated stormwater facilities should minimize the need for herbicides, fertilizers, and pesticides at any time before, during, and after construction. After the planting has been established, the use of herbicides, fertilizers, and pesticides is highly discouraged.

The successful growth of plants, shrubs, and trees in GI practices is highly dependent on the soil depth. The following table provides the appropriate soil depth and plant type for GI practices.

Soil Depth (inches)	Vegetation
24	grasses/perennials
36 (minimum)	shrubs/trees
42–48 (optimum)	shrubs/trees

The planting plan shall include a sequence of construction, a description of the contractor's responsibilities, a planting schedule and installation specifications, initial maintenance requirements, and a warranty period stipulating requirements for plant survival.

Recommended Plants

Bioretention, Planters, and Bioswales

Plants for bioretention and other GI practices must be able to tolerate both wet and dry conditions. This list, while not exhaustive, includes many plants that will tolerate conditions in bioretention areas. The plants in this list have different preferences for both moisture and light, as shown in the columns labeled "Moisture" and "Sun." Additionally, most of these plants are native to Georgia and thus contribute the added benefit of providing habitat and food for native pollinators and wildlife. Plants that are not native to Georgia are marked with an asterisk (*). At the end of this Appendix are two example planting plans for bioretention parking lot islands.

Key

Height: Typical height range for mature plants
Moisture: The amount of soil moisture that plants will tolerate is defined as follows:

W (Wet) Frequently saturated soils
M (Moist) Moist soils that are periodically inundated
D (Dry) Areas not flooded after rains and frequently dry between rains; plants designated "D" will tolerate drought conditions

Sun: the amount of sunlight that plants require is defined as follows:

F (Full) Direct sunlight for at least 6 hours per day
P (Partial shade) Direct sunlight for 3 to 6 hours per day, or lightly filtered light all day
S (Shade) Less than 3 hours of direct sunlight per day, or heavily filtered light all day

Small Trees

Botanical Name	Common Name	Height	Moisture	Sun
Acer floridanum	Southern Sugar Maple	20'-25'	M	F/P/S
Amelanchier arboria	Serviceberry	15'-25'	M/D	F/P
Cercis canadensis	Redbud	20'-30'	M	F/P
Chionanthus virginicus	Fringe Tree	12'-20'	M	F/P
Hamamelis virginiana	Witchhazel	15'-30'	W/M	P/S
Ilex deciduas	Possumhaw	15'-25'	M/D	F/P
Ilex vomitoria	Yaupon Holly	20'-25'	M/D	F/P
Lagerstroemia indica	Crape Myrtle	15'-50'	M/D	F/P
Magnolia virgininana	Sweetbay Magnolia	10'-30'	W/M	F/P
Magnolia x soulangeana *	Saucer Magnolia *	15'-25'	M	F/P
Sassafras albidum	Sassafras	30'-60'	M/D	F/P

Med.-Large Trees

Botanical Name	Common Name	Height	Moisture	Sun
Acer rubrum	Red Maple	60'–90'	W/M/D	F/P
Betula nigra	River Birch	40'–70'	W/M	F/P
Carpinus caroliniana	Musclewood	30'–50'	W/M	F/P
Crataegus phaenopyrum	Washington Hawthorne	25'–30'	W/M/D	F/P
Fraxinux pennsylvanica	Green Ash	50'–70'	W/M/D	F
Ilex opaca	American Holly	30'–60'	M/D	F/P
Magnolia grandiflora	Southern Magnolia	40'–80'	M/D	F/P
Magnolia macrophylla	Bigleaf Magnolia	30'–40'	M	F/P
Nyssa sylvatica	Black Gum	35'–70'	W/M/D	F/P
Platanus occidentalis	American Sycamore	75'–100'	W/M	F
Queous lyrata	Overcup Oak	35'–50'	M/D	F
Quercus bicolor	Swamp White Oak	50'–60'	W/M/D	F/P
Quercus michauxii	Swamp Chestnut Oak	60'–80'	W/M	F
Quercus phellos	Willow Oak	60'–80'	W/M/D	F/P
Salix babylonica *	Weeping Willow *	30'–50'	W/M	F
Taxodium distichum	Bald Cypress	50'–100'	W/M/D	F/P

Shrubs–Evergreen

Botanical Name	Common Name	Height	Moisture	Sun
Ilex glabra	Inkberry	6–8'	M/W	F/P
Ilex vomitoria nana	Dwarf Yaupon	5'	W/M/D	F/P
Illicium floridanum	Florida Anise Tree	10'–15'	M	P/S
Illicium parviflorum	Small Anise Tree	7–10'	M/D	F/P
Myrica cerifera	Southern Waxmyrtle	10–15'	W/M/D	F/P

Shrubs–Deciduous

Botanical Name	Common Name	Height	Moisture	Sun
Callicarpa americana	Beautyberry	6'	M/D	F/P
Cephalanthus occidentalis	Buttonbush	3–10'	W	F
Clethra alnifolia	Summersweet	5'–10'	W/M/D	F/P
Cornus amomum	Silky Dogwood	6'–12'	W/M	F/P/S
Hibiscus moscheutos	Swamp Mallow	4'–8'	W/M	F/P
Hypericum densiflorum	Bushy St Johns wort	4–6'	M/D	F/P
Ilex verticillata	Winterberry	6'–10	W/M	F/P
Itea virginica	Virginia Sweetspire	4'	W/M/D	F/P
Lindera benzoin	Spicebush	6–12'	W/M/D	F/P
Sambucus canadensis	Elderberry	6–15'	W/M	F/P
Viburnum acerifolium	Mapleleaf viburnum	3'–6'	M/D	M/S
Viburnum dentatum	Arrowwood	5'–10'	W/M/D	F/P
Viburnum nudum	Possumhaw	6'–12'	W/M/D	F/P/S

Grasses and Allies

Botanical Name	Common Name	Height	Moisture	Sun
Acorus calamus	Sweet Flag	2'–4'	W/M	F/P
Carex spp	Sedges	up to 3'	varies	varies
Chasmanthium latifolium	River Oats	3'–5'	W/M/D	F/P/S
Juncus effusus	Soft Rush	1'–4'	W/M	F/P/S
Juncus tenuis	Path Rush	under 12"	W/M	F/P/S
Liriope muscari *	Monkey Grass *	18"–24"	M/D	F/P/S
Muhlenbergia cappliaris	Pink Muhly Grass	3'–4'	M/D	F/P
Ophiopogon japonicus *	Mondo Grass *	under 12"	M/D	F/P/S
Panicum virgatum	Switchgrass	2'–9'	M/D	F/P
Schizachyrium scoparium	Little Bluestem	2'–4'	M/D	F/P
Sorgasstrum nutans	Indiangrass	4'–8'	M/D	F/P

Herbaceous Perennials

Botanical Name	Common Name	Height	Moisture	Sun
Amsonia hubrechtii	Narrow Leaf Blue Star	2'–3'	M/D	F/P
Asclepias tuberosa	Butterflyweed	1'–3'	M/D	F/P
Chrysogonum virginianum	Green and Gold	6"	M/D	P/S
Coreopsis verticillata	Threadleaf Coreopsis	8"–20"	M/D	F/P
Echinacea purpurea	Purple Cone Flower	1'–3'	M/D	F/P
Eupatorium fistulosum	Joe Pye Weed	2'–7'	W/M/D	F/P
Hemerocallis spp. *	Daylily *	1–3'	M/D	F/P
Iris sibirica *	Siberian Iris *	1'–3'	W/M	F/P
Iris virginica	Blue Flag Iris	12"–24"	W/M	F/P
Lobelia cardinalis	Cardinal Flower	2'–4'	W/M	F/P/S
Monarda didyma	Beebalm	2'–4'	W/M	F/P
Osmunda cinnamomea	Cinnamon Fern	up to 4'	W/M	F/P/S
Osmunda spectabilis	American Royal fern	2'–5'	W/M	P/S
Phlox divaricata	Woodland Phlox	12"–18"	M	P/S
Phlox stolonifera	Creeping Phlox	6"–12"	M/D	F/P/S
Polystichum acrostichoides	Christmas Fern	1'–3'	M/D	P/S
Rudbeckia fulgida	Orange Coneflower	18"–36"	M/D	F/P
Rudbeckia hirta	Black–Eyed Susan	12"–36"	M/D	F/P/S
Solidago spp.	Goldenrod	1–4'	varies	F/P
Tiarella cordifolia	Foamflower	6"–12"	M	P/S

Infiltration Trenches

Infiltration trenches can be designed with a grass cover to aid pollutant removal and prevent clogging. The sand filter or trench is covered with permeable topsoil and planted with grass in a landscaped area. Properly planted, these facilities can be designed to blend into natural surroundings.

Grass should be capable of withstanding frequent periods of inundation and drought. Vegetated filter strips and buffers should fit into and blend with surrounding area. Native grasses are preferable, if compatible.

Design Constraints

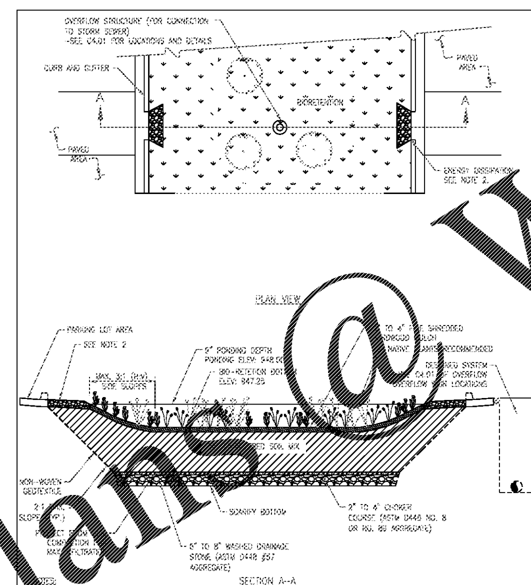
- Do not plant trees or provide shade within 15 feet of an infiltration or filtering area or where leaf litter will collect and clog infiltration area.
- Do not locate plants in areas that block maintenance access to the facility.
- Sod areas with heavy flows that are not stabilized with erosion control matting.
- Divert flows temporarily from seeded areas until stabilized.
- Planting on any area requiring a filter fabric should include material selected with care to ensure that no tap roots will penetrate the filter fabric.

Bioswales and Grass Filter Strips

The following table provides a number of grass species that perform well in the stressful environment of an open channel structural control such as a bioswale or grass filter strips.

Botanical Name	Common Name	Notes
Cynodon dactylon	Bermuda grass	
Andropogon gerardii	Big Bluestem	Not for bioswales
Agrostis palustris	Creeping Bentgrass	
Festuca rubra	Red Fescue	Not for bioswales
Phalaris arundinacea	Reed Canary grass	Bioswales
Agrostis alba	Redtop	
Bromus inermis	Smooth Brome	Not for bioswales
Panicum virgatum	Switch Grass	

Note 1: These grasses are sod forming and can withstand frequent inundation, and are thus ideal for the swale or grass channel environment. Most are salt-tolerant as well.
Note 2: Where possible, one or more of these grasses should be in the seed.
Note 3: In areas that need immediate stabilization, sod should be used.



NOTES:
1. REFER TO "BIORETENTION NOTES" FOR BIORETENTION CONSTRUCTION REQUIREMENTS.
2. REFER TO "PRETREATMENT: RIVER COBBLE FLUME" FOR ENERGY DISSIPATION AT CURB INLET.
3. DETAILS OF PIPE CONNECTIONS TO PROPOSED/EXISTING STORM SYSTEM SHALL BE AS DESIGNED BY THE PROJECT DESIGNER.

1 / C7.04 BIORETENTION AREA #1 DETAIL
TYPICAL SCALE: N.T.S.

NOTES:
1. INFILTRATION RATE SHALL BE ... VERIFIED BY ... PROFESSIONAL.
2. BIOSWALE SIZE AND LAYOUT SHALL BE AS INDICATED ON ... . SIZE SHALL BE BASED ON VOLUME NEEDED FOR STORAGE OF RRv.
3. TYPICAL STORAGE DEPTH FOR BIOSWALE ... . PLANTINGS SHOULD BE LOCATED ACCORDING TO THEIR WATER TOLERANCE AND ANTICIPATED FLOW DEPTH. WATER SHOULD NOT REMAIN IN BIOSWALE LONGER THAN 48 HOURS.
4. GRAVEL ... PERFORATED PIPE UNDERDRAIN SYSTEM
   c. DRAINAGE ... LAYER ASTM D448 SIZE NO. 57 WASHED STONE SEPARATED BY A THIN 2" TO 4" LAYER OF CHOKER STONE (ASTM D448 ... 8, 3/8" TO 1/8" OR ASTM D448 SIZE NO. 89, 3/8" TO 1/16").
   PERFORATED PIPE ... 6" PERFORATED HDPE (AASHTO M 252), 3/8" PERFORATION SPACED 6" ON CENTER, MINIMUM SLOPE OF ... SOCK PIPE SHALL BE PERMITTED). CONNECT UNDERDRAIN PIPES (IF USED) TO STORM SEWER SYSTEM PER PLANS. UNDERDRAIN PIPES SHALL BE PERFORATED OR SLOTTED AND SIZED BASED ON FLOW RATE. (4" MIN. DIA.).
   c. NON-WOVEN SEPARATION GEOTEXTILE SHALL BE UTILIZED ON THE SIDE SURFACE INTERFACES ONLY TO PREVENT SOIL MOVEMENT INTO THE SUBBASE.
5. REFER TO GUIDE SPECIFICATIONS FOR TOPSOIL AND ENGINEERED SOIL MIX REQUIREMENTS.
6. WHERE PERMEABLE PAVEMENTS (SUCH AS ASPHALT) ARE USED NEAR BIOSWALES, PROTECT STONE BASE UNDER PAVEMENT WITH GEOTEXTILE TO PREVENT SOIL MOVEMENT INTO PERMEABLE PAVEMENT BASE. SEE PERMEABLE PAVEMENT DETAIL.
7. WHERE LOW PERMEABILITY PAVEMENTS ARE USED NEAR BIOSWALES, PROTECT PAVEMENT BASE WITH IMPERVIOUS LINER TO MINIMIZE WATER MIGRATION UNDER PAVEMENT
8. BIOSWALES SHALL NOT BE CONSTRUCTED OVER SEPTIC TANKS.
9. INLETS TO BIOSWALE MAY INCLUDE SHEET FLOW ACROSS A GRASS FILTER STRIP (TYPICAL DETAIL NO. 12), DISCHARGE FROM A PIPE, CURB CUT WITH RIVER COBBLE FLUME (TYPICAL DETAIL NO. 11), FOREBAY, OR OTHER ENERGY DISSIPATION DEVICE.
10. TO PREVENT FAILURE DUE TO SEDIMENT ACCUMULATION, BIOSWALES SHALL BE CONSTRUCTED AFTER THEIR CONTRIBUTING DRAINAGE AREA HAS BEEN COMPLETELY STABILIZED. IF THIS IS NOT FEASIBLE, STORMWATER FLOW SHALL BE DIVERTED AROUND BIOSWALE.
11. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE USED TO PROTECT BIOSWALES. DIVERT POST-CONSTRUCTION STORMWATER RUNOFF AROUND BIOSWALES UNTIL VEGETATIVE COVER HAS BEEN ESTABLISHED.
12. HEAVY VEHICULAR AND FOOT TRAFFIC SHALL BE KEPT OUT OF BIOSWALES DURING AND AFTER CONSTRUCTION TO PREVENT SOIL COMPACTION.
13. NATIVE SOILS ALONG BOTTOM OF THE BIOSWALE SHALL BE TILLED TO MINIMUM DEPTH OF 6" PRIOR TO PLACEMENT OF AN UNDERDRAIN AND/OR ENGINEERED SOIL MIX.
14. DURING EXCAVATION, HEAVY MACHINERY SHALL NOT DRIVE OVER EXPOSED UNDERLYING SOILS.
15. EXCAVATE IN DRY CONDITIONS AS OFTEN AS PRACTICABLE.
16. USE TRACKED VEHICLES.
17. EXCAVATE FINAL 9" TO 12" WITH TEETH OF BUCKET (DO NOT SMEAR).
18. SUBSOILS SHALL BE SCARIFIED (NOT COMPACTED) PRIOR TO PLACEMENT OF CLEAN, WASHED DRAINAGE STONE.
19. IF STORMWATER BIOSWALE IS CONSTRUCTED NEXT TO AN EXISTING SIDEWALK, SOIL ELEVATIONS MUST BE BROUGHT TO TOP OF CURB AND SLOPE AWAY FROM CURB AT A 4:1 SLOPE.
20. STONE CHECK DAMS SHALL BE CONSTRUCTED OF GRADED SIZE 2" TO 10" STONE. MECHANICAL OR HAND PLACEMENT SHALL BE REQUIRED TO ENSURE COMPLETE COVERAGE OF ENTIRE WIDTH OF BIOSWALE, AND THAT CENTER OF DAM IS LOWER THAN EDGES. CHECK DAMS ARE REQUIRED WHEN SLOPE EXCEEDS 5% OR DEPTH OF IMPOUNDED WATER ON UPGRADIENT END OF BIOSWALE IS LESS THAN 50% OF THE MEDIA HEIGHT. SEE TYPICAL DETAILS NO. 24 AND NO. 25 FOR CHECK DAM OPTIONS.

2 / C7.04 BIORETENTION NOTES
TYPICAL SCALE: N.T.S.

MULCH LAYER SHOULD BE 3–4 INCHES OF FINE, SHREDDED HARDWOOD. PLEASE AVOID LIGHT MULCH MATERIAL THAT MAY FLOAT.

INSTALL ENGINEERED SOIL SHOULD BE A MINIMUM DEPTH OF 18IN FOR PLANS AND 3FT FOR TREES.

ENGINEERED SOIL MIX	
TEXTURE:	SANDY LOAM OR LOAMY SAND
SAND CONTENT :	35% – 80% CLEAN, WASHED SAND (DRY WEIGHT BASIS)
CLAY:	NO MORE THAN 15% (DRY WEIGHT BASIS)
TOPSOIL:	20% – 30% (DRY WEIGHT BASIS)
COMPOST:	10%–25% (DRY WEIGHT BASIS)

ALSO, THE INFILTRATION RATE SHOULD BE BETWEEN 2–4 INCH/HR

MAKE SURE THAT DURING INSTALLATION THAT THE SOIL IS NOT COMPACTED BY EQUIPMENT.

3 / C7.04 ENGINEERED SOIL MIX
TYPICAL SCALE: N.T.S.

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ANTONIO SAMPLE (Project Manager)	10/25/2019 (Date)
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