Practice Standards and Specifications

MULCHING

Definition Applications of a protective blanket of straw or other plant residue, gravel, or synthetic material to the soil surface.

Purpose To protect the soil surface from the forces of raindrop impact and crusted flow. Mulch fosters the growth of vegetation, reduced evaporation, increases the soil, and suppresses weed growth. Mulch is frequently used to accent landscape plantings.

Conditions Where Practice Applies Mulch temporary or permanent seedings immediately. Areas that cannot be seeded because of the season should be mulched to provide adequate protection of the soil surface. Use an organic mulch in this case. Dust must wind blows, and cover the area as soon as possible. Mulch around plantings of trees, shrubs, or ground covers to stabilize the soil between plants.

Planning Considerations A surface mulch is the most effective practical means of controlling runoff and erosion on disturbed areas. Mulch moderates temperatures, conserves moisture, resistant loss by evaporation, prevents crusting and sealing of the soil surface, moderates soil temperatures, provides a suitable microclimate for seed germination, and may increase the infiltration rate of the soil.

Organic mulches such as straw, wood chips, and shredded bark have been found to be the most effective. Do not use materials which may be sources of unwanted weed and grass seeds. Decomposition of some wood products ties up nitrogen in the soil and may cause a temporary shortage to needed landscape plants or add fertilizer with the mulch (Table 6.14a).

A variety of maps and fabrics have been developed in recent years for use as mulch, particularly in critical areas such as waterways and channels. Various types of tackiers materials are also available to anchor organic mulches.

Chemical soil stabilizers or soil binders, when used alone, are less effective than organic or fabric mulches. These products are intended useful for locking wood fiber mulches.

The choice of materials for mulching should be based on soil conditions, erosion, type of vegetation, and size of the area. A properly applied and tacked mulch is always beneficial. It is especially important when conditions for germination are not optimum, such as inadequate and early winter, and difficult areas such as cut slopes and slopes with southern exposures.

GROUND MULCHES

Straw is the mulch most commonly used in conjunction with seeding. The straw should come from wheat or oats ("wheat straw"), and may be spread by hand or with a mulch blower. Straw may be lost to wind and must be tacked down.

Wood chips are suitable for areas that will not be closely mowed, and around ornamental plantings. Chips do not require tacking. Because they decomposes slowly they must be treated with 12 pounds of nitrogen per ton to prevent

Table 6.14a
Mulching Materials and Application Rates

Material	Rate Per Acre	Quality	Notes
Organic Mulches			
Straw	1-2 tons	Dry, unchopped, unweathered, avoid weeds	Should come from wheat or oats; spread by hand or machine; must be tacked down
Wood chips	5-6 tons	All dry	Use a 50:50 mix nitrogen/lbs. Apply with mulch blower; chip handle; or by hand. Not for use in fine turf. Also referred to as wood cellulose. May be hydromulsed. Do not use in dust, only weather.
Wood fiber	0.5-1 tons		Apply with mulch blower; chip handle; or by hand. Do not use asphalt tack.
Bark	35 cubic yards	All dry; shredded or fiberized mulch, or chips.	Apply with mulch blower or by hand. Not for use in fine turf.
Corn stalks	4-6 tons	Cut or shredded in 4-6 in. lengths.	Green or dry; should contain mature seed
Serices lespedeza seed (seeing starts	1-3 tons	Green or dry; should contain mature seed	
Nets and Mats[2]			
Jute net	Cover area	Heavy, uniform, woven of single jute yarn.	Withstands waterflow. Best when used with organic mulch
Fiberglass net	Cover area		Withstands waterflow. Best when used with organic mulch
Excelsior (wood fiber) mat	Cover area		Withstands waterflow.
Fiberglass roving	0.5-1 tons	Continuous fibers of drawn glass bound together with a non-toxic agent	Apply with a commercial air applier. Tack with emulsified asphalt at a rate of 25-35 gal/100 sq ft.
Chemical Stabilizers[2]			
Acrylate	follow manufacturer's specifications		Not beneficial to plant growth
Aerospaze			
Curasol AK			
Petroset SB			
Terra Tack			
Cross Link			
Genapaze 743			
M-148			

[1]Refer to Practice No. 6.30, *Grass Lined Channels*.

[2]Use of trade names does not imply endorsement of product.

Table 6.11g
Seeding No. 1CP for: Well- to Poorly Drained Soils with Good Moisture Retention; Low Maintenance

Seeding mixture

Species[1]	Rate (lb/acre)
Tall fescue	80
Bermudas Bahiagrass	50
Serices lespedeza	30
Kobe lespedeza	10

Seeding notes
1. From Sept. 1 - Mar. 1, use unscarified serices seed.
2. On poorly drained sites omit serices and increase Kobe to 30 lb/acre.
3. Where a neat appearance is desired, omit serices and increase Kobe to 40 lb/acre.

Nurse plants
Between Apr. 15 and Aug. 15, add 10 lb/acre German millet or 15 lb/acre Sudangrass. Prior to May 1 or after Aug. 15, add 25 lb/acre rye (grain).

Seeding dates

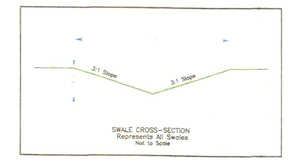
	Best	Possible
Early spring:	Feb. 15 - Mar. 20	Feb. 15 - Apr. 30
Fall:	Sept. 1 - Sept. 30	Sept. 1 - Oct. 31

Soil amendments
Apply lime and fertilizer according to soil tests, or apply 3,000-5,000 lb/acre ground agricultural limestone (use the lower rate on sandy soils) and 1,000 lb/acre 10-10-10 fertilizer.

Mulch
Apply 4,000 lb/acre grain straw or equivalent cover of another suitable mulch. Anchor straw by tacking with asphalt, netting, or crimping or by crimping with a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

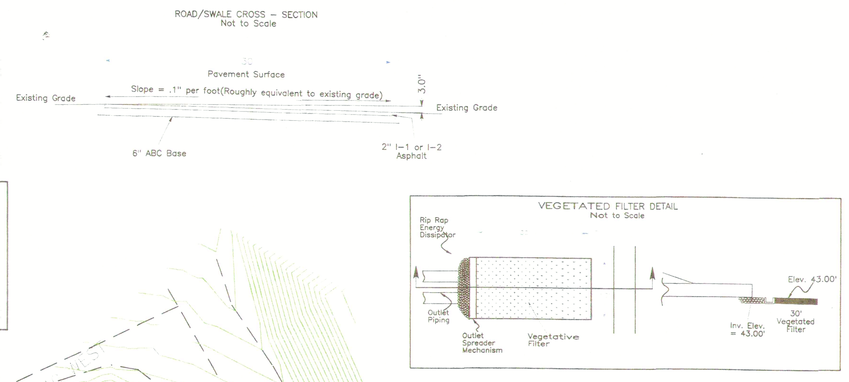
Maintenance
If growth is less than fully adequate, refertilize in the second year, according to soil tests or topdress with 500 lb/acre 10-10-10 fertilizer. Mow as needed when serices is omitted from the mixture. Reseed, fertilize, and mulch damaged areas immediately.

[1]Refer to *Appendix 6.02* for botanical names.



SWALE CROSS-SECTION
Represents All Swales
Not to Scale

ROAD/SWALE CROSS - SECTION
Not to Scale



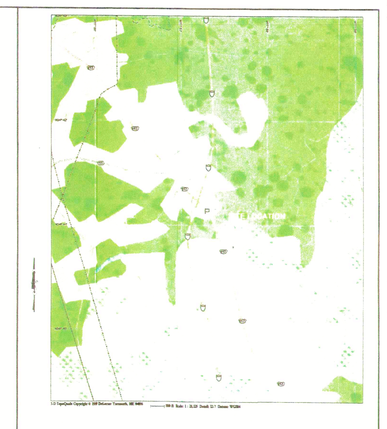


Table 6.11v
Seeding No. 7CP for: Grass-lined Channels; Coastal Plain, Lower Piedmont, and Dry Soils in the Central Piedmont

Seeding Mixture

Species[1]	Rate (lb/acre)
Common Bermudagrass	40-80 (1-2 lb/1,000 ft^2)

Seeding dates
Coastal Plain: Apr. - July
Piedmont: Apr. 15 - June 30

Soil amendments
Apply lime and fertilizer according to soil tests, or apply 3,000 lb/acre ground agricultural limestone and 500 lb/acre 10-10-10 fertilizer.

Mulch
Use jute, excelsior matting, or other effective channel lining material to cover the bottom of channels and ditches. The lining should extend above the highest calculated depth of flow. On channel side slopes above this height, and in drainages not requiring temporary linings, apply 4,00 lb/acre grain straw and anchor straw by stapling netting over the top.

Mulch and anchoring materials must not be allowed to wash down slope where they can clog drainage devices.

Maintenance
A minimum of 3 weeks is required for establishment. Inspect and repair mulch frequently. Refertilize the following Apr. with 50 lb/acre nitrogen.

[1]Refer to *Appendix 6.02* for botanical names.

Table 6.10c
Temporary Seeding Recommendations for Fall

Seeding mixture

Species	Rate (lb/acre)
Rye (grain)	120

Seeding dates
Mountains—Aug. 15 - Dec. 15
Coastal Plain and Piedmont—Aug. 15 - Dec. 30

Soil amendments
Follow soil tests or apply 2,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10-10-10 fertilizer.

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Repair and refertilize damaged areas immediately. Topdress with 50 lb/acre of nitrogen in March. If it is necessary to extend temporary cover beyond April 15, overseed with 50 lb/acre fescue (Fescinum and Grassin Plain) or Kentucky (Mountains) lespedeza in late February or early March.

Table 6.10b
Temporary Seeding Recommendations for Summer

Seeding mixture

Species	Rate (lb/acre)
German millet	40

In the Piedmont and Mountains, a small-stemmed Sudangrass may be substituted at a rate of 50 lb/acre.

Seeding dates
Mountains—May 15 - Aug. 15
Piedmont—May 1 - Aug. 15
Coastal Plain—Apr. 15 - Aug. 15

Soil amendments
Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.

Table 6.10a
Temporary Seeding Recommendations for Late Winter and Early Spring

Seeding mixture

Species	Rate (lb/acre)
Rye (grain)	
Annual lespedeza (Kobe in Piedmont and Coastal Plain, Korean in Mountains)	50

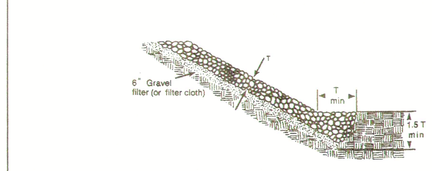
Omit annual lespedeza when duration of temporary cover is not to extend beyond June.

Seeding dates
Mountains—Above 2500 ft: Feb. 15 - May 15
Below 2500 ft: Feb. 1 - May 1
Piedmont—Jan. 1 - May 1
Coastal Plain—Dec. 1 - Apr. 15

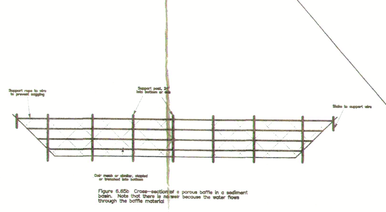
Soil amendments
Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.

Mulch
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.

Maintenance
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.



RIP RAP SLOPE STABILIZATION
NOT TO SCALE



IMPORTANT: In accordance with NC General Statute § 113A-57 "slopes left exposed will, within 21 calendar days of completion of any phase of grading, be planted or otherwise provided with ground cover*, devices, or structures sufficient to restrain erosion.

*Groundcover includes, but is not limited to pavement, gravel, crushed asphalt, vegetation, or manufactured erosion control products

NOTE TO DEVELOPER & CONTRACTORS: The primary means of erosion control for disturbed areas on this plan is establishment of ground cover as soon as possible after each ground disturbance. Ground cover includes straw mulch and tack, temporary or permanent vegetative cover (grass), gravel, and pavement. See the Construction Sequence and various specifications on this plan.

LEGEND

Flow Direction

Silt Fence

Swale Centerline

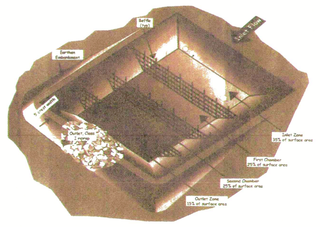
Canopy Tree

Understory tree/ Shrub

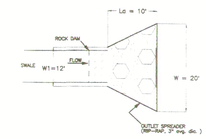
Existing Contour Line

Proposed Contour Line

0 30 60 120



OUTLET SPREADER DETAIL
Not to Scale



ROCK DAM DETAIL
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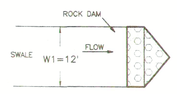
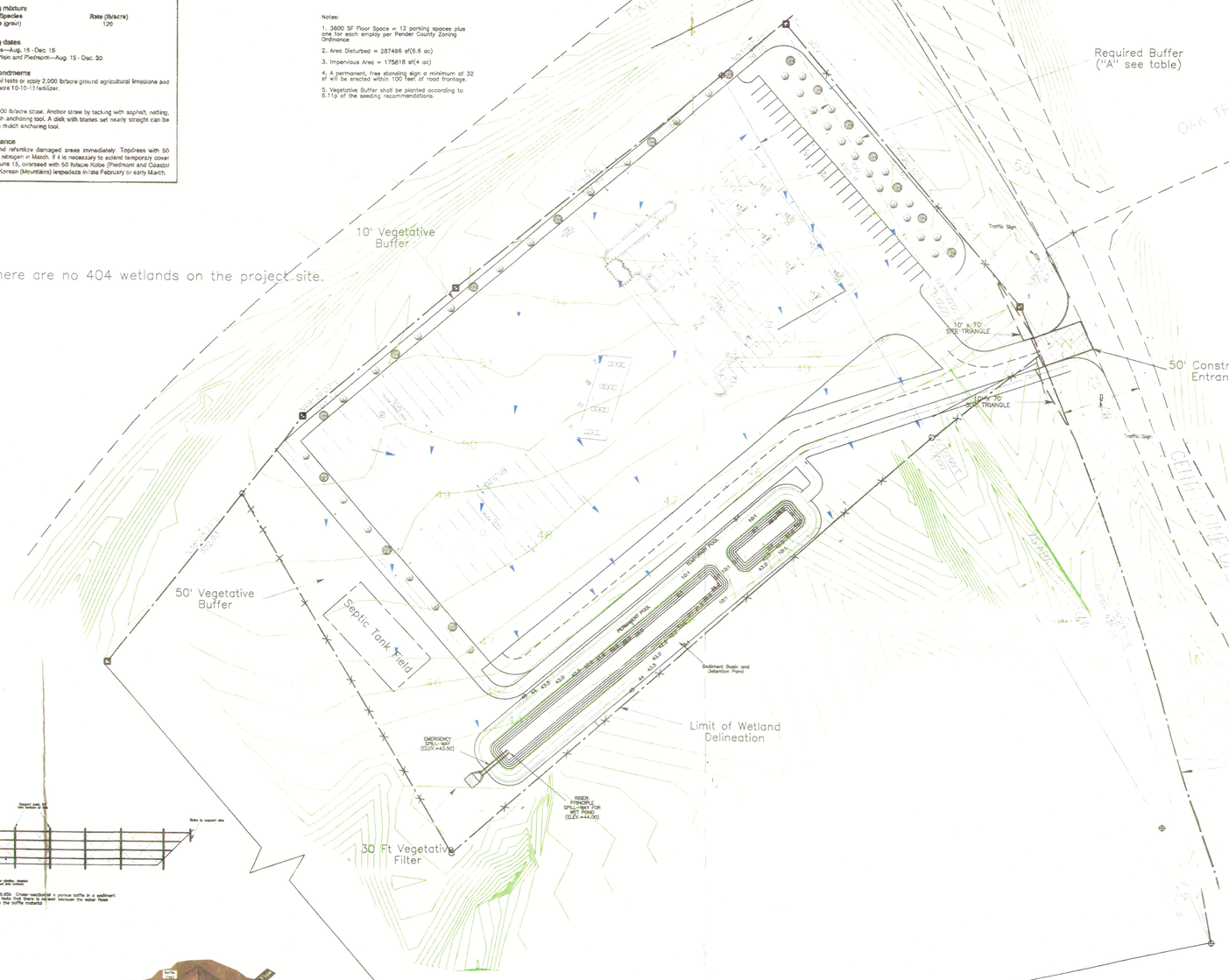


Complete Tract

There are no 404 wetlands on the project site.



CONSTRUCTION ENTRANCE DETAIL
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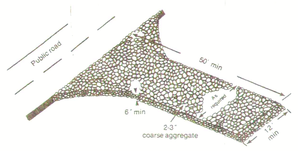


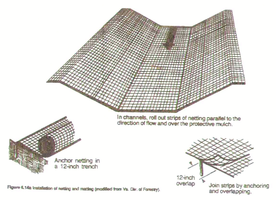


Figure 6.10b Installation of matting and matting (modified from Tex. Dir. of Forestry)

INSTALLATION OF MATTING AND MULCHING
Product designed to control erosion should be installed in accordance with manufacturer's instructions. Areas of concentrated flow require more careful installation than areas of sheet flow. Channels with a grade of less than 5% or on the surface where it is apparent that erosion is occurring (Figure 6.10a).

1. Apply lime, fertilizer and seed before laying the sod or mat.

2. Start laying the sod from the end of the channel or slope and unroll it down the grade. Allow matting to lay loosely so the soil and mulch cover but without wrinkles—do not stretch.

3. Tie sod on the end, bury the anchor and in a slot or trench no less than 6 inches deep, cover with soil, and tamp firmly as shown in Figure 6.10a. Staple the sod in a row 6 inches apart and 12 inches deep. Fill the trench and tamp firmly. When 2 rolls of sod are laid side by side, the adjacent edges should be overlapped 3 inches and stapled if needed. Each strip of matting should also be stapled down the center, every 3 ft. Do not stretch the sod when stapling edges.

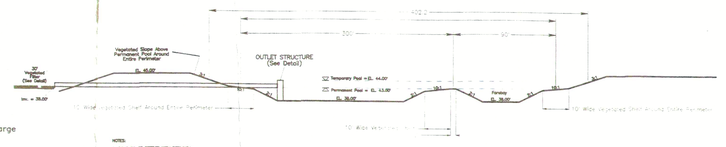
4. To join two strips, cut a trench in section the end of the new sod. Overlap the end of the previous roll 18 inches, as shown in Figure 6.10a and staple every 12 inches just before the section dam.

Maintenance: Inspect all matting periodically, and after rainstorms to check for rill erosion, undercutting or failure. Where erosion is observed, apply additional mulch. If undercutting or failure is observed, remove and reinstall mulch. Continue inspections and maintenance as firmly established.

References: *Surface Stabilization* 6.11, Permanent Seeding

Wetland Plants

Scientific name Common name	Form	Commercial Availability	Hydrobition Tolerance	Wildlife Value	Notes
Peltandra virginica Arrow arum	Emergent	Yes	up to 1 ft.	High, Berries are eaten by wood ducks	Full sun to Partial shade
Sagittaria latifolia Arrowhead, Duck potato	Emergent	Yes	up to 1 ft.	Moderate, Tubers and seeds eaten by ducks	Aggressive colonizer
Zizaniopsis miliacea Giantcutgrass	Perimeter	Yes	up to 3 in.	High, Waterfowl food and Songbirds food and cover	Tolerant to fluctuating water levels to partial shade
Zizaniopsis glomerulata Bushy Beargrass	Emergent	Yes	up to 1 ft.	N/A	Requires full sun
Zizania aquatica Common Wild Rice	Submergent	Yes	Yes	Low food value, Good habitat and shelter for ducks and songbirds	Free floating Silt. Shade tolerant, Rapid growth.
Bidens aristosa Common Tick-Seeds	Emergent	Yes	up to 6 in.	High, Seeds, cover, Waterfowl, songbirds.	Fast colonizer. Can tolerate periods of dry soil. Large seeds. High metal remover
Lemna spp. Common Duckweed	Submergent / Emergent	Yes	Yes	High, Food for waterfowl and fish	High metal remover
Decodon verticillatus Loosestrife	Emergent	Yes	up to 1 ft.	Low, except for waterfowl	Rapid growth. Shade tolerant,
Hibiscus moscheutos Marsh Hibiscus	Emergent	Yes	up to 3 in.	Low, Nectar	Full sun. Can tolerate periodic dry soil. Large seeds.
Pontederia cordata Pickerelweed	Emergent	Yes	up to 1 ft.	Moderate, Quality nectar for butterflies.	Full sun to partial shade.
Ceratophyllum demersum Hornwort	Submergent	Yes	Yes	Extremely high, Waterfowl, marsh and	Removes heavy metals
Leersia oryzoides Rice cutgrass	Emergent	Yes	up to 3 in.	High, Food and cover.	Full sun although tolerant of shade. Provides some food for waterfowl
Carex spp. Sedges	Emergent	Yes	up to 3 in.	High, Waterfowl and songbirds.	Many wetland and several upland species.
Scirpus cyperinus Soft-chaff Bulrush	Emergent	Yes	up to 1 ft.	Moderate, Good cover and food.	Full sun. Aggressive, especially on soil P. Rhizomes.
Polygonum spp. Smartweed	Emergent	Yes	up to 1 ft.	High, Waterfowl, songbirds, Seeds and cover.	Fast colonizer. Tolerant of fluctuating water levels.
Juncus effusus Soft Rush	Emergent	Yes	up to 1 ft.	Moderate	Tolerates wet or dry conditions.
Rumex verticillatus Swamp Dock	Emergent	Yes	up to 3 ft.	Moderate for food but high for cover	Fast colonizer. Tolerant of fluctuating water levels.
Panicum virgatum Switchgrass	Perimeter	Yes	up to 3 in.	High, Seeds, cover for waterfowl and songbirds.	Tolerates wet and dry conditions.
Andropogon gerardii Sweet Flag	Perimeter / Submergent	Yes	up to 3 in.	Low	Tolerant to dry periods but a metal indicator. Tolerates acidic conditions.
Elodea canadensis Waterweed	Submergent	Yes	Yes	Low	Good water oxygenator. High nutrient, copper, manganese and chromium removal.
Vallisneria americana Wild Celery	Submergent	Yes	Yes	High, Food for waterfowl, Habitats for fish and invertebrates.	Tolerant of murky water and high nutrient levels.
Zizania aquatica Wild Rice	Emergent	Yes	up to 1 ft.	High, Food for birds.	Prefers full sun.

Table from Design of Stormwater Wetlands Guidelines, guidelines for creating diverse and effective stormwater wetlands in the mid-Atlantic Region, Schueler.

NOTE: Consult with the US Department of Agriculture and/or The Natural Resource Commission Service for planting specifications.