separately. Rates of wood fiber should be at least 2000 lbs. per acre (2.24 t/ha). Surface roughening is particularly important when hydroseeding, as a roughened slope will provide some natural coverage of lime, fertilizer, and seed.

5. Legume inoculants should be used by the date indicated on the container. When dry seeding use four times the manufacturer's recommended rate and use ten times the recommended rate of inoculant when hydroseeding.

Mulching

All permanent seeding must be mulched immediately upon completion of seed application. Refer to MULCHING - Section 6.75 (ES BMP 1.75).

Maintenance of New Seedings

Irrigation: New seedings should be supplied with adequate moisture. Supply water as needed, especially late in the season, in abnormally hot or dry weather, or on adverse sites. Water application rates should be controlled to prevent runoff. Inadequate amounts of water may be more harmful than no water.

Re-seeding: Inspect seeded areas for failure and make necessary repairs and reseedings within the same season, if possible.

1. If vegetative cover is inadequate to prevent rill erosion, overseed and fertilize in accordance with soil test results.

2. If a stand has less than 40% cover, re-evaluate choice of plant materials and quantities of lime and fertilizer. Re-establish the stand following seedbed preparation and seeding recommendations, omitting lime and fertilizer in the absence of soil test results. NOTE: If vegetation has failed to grow, soil must be tested to determine if acidity or nutrient imbalances are responsible.

Fertilization: Seedlings should be fertilized one year after planting to insure proper stand density.

1. To established all-grass stands, apply 500 lbs./acre of 10-20-10 (12 lbs./1000 ft^2)(560 kg/ha) between August 15 and November 15. (The first fall following seeding.)

2. To legume-and-grass stands or pure legume stands, apply 500 lbs./acre of 0-20-20 (12 lbs./1000 ft^2)(560 kg/ha) in early May or between August 15-October 15.

GENERALLY, A STAND OF VEGETATION CANNOT BE DETERMINED TO BE FULLY ESTABLISHED UNTIL SOIL COVER HAS BEEN MAINTAINED FOR ONE FULL YEAR FROM PLANTING. DISTURBED AREAS WHICH ARE TO BE STABILIZED WITH PERMANENT VEGETATION MUST BE SEEDED OR PLANTED WITHIN 15 DAYS AFTER FINAL GRADE IS REACHED UNLESS TEMPORARY STABILIZATION IS APPLIED.

6.67 SODDING
(ES BMP 1.67)

Definition

Stabilizing fine-graded disturbed areas by establishing permanent grass stands with sod.

Purposes

1. To establish permanent turf immediately.

2. To prevent erosion and damage from sediment and runoff by stabilizing the soil surface.

3. To reduce the production of dust and mud associated with bare soil surfaces.

4. To stabilize drainageways where concentrated overland flow will occur.

Conditions Where Practice Applies

1. Disturbed areas which require immediate vegetative covers, or where sodding is preferred to other means of grass establishment.

2. Locations particularly suited to stabilization with sod are:

   a. slopes and buffer strips.

   b. waterways and swales, especially around drop inlets.

   c. residential or commercial lawns where quick use or aesthetics are factors.

Specifications

Soil Preparation

1. Prior to soil preparation, areas to be sodded shall be brought to final grade in accordance with the approval plan. These operations should leave as much topsoil as possible or replace the topsoil to a depth of four inches (10 cm).

2. Soil tests should be made to determine the exact requirements for lime and fertilizer. Soil tests may be conducted by the State Laboratory at the University of Florida or a reputable commercial laboratory. Information on state soil tests is available from county agricultural extension agents.

   When a soil test is not made the following soil amendments should be made:

Pulverized agricultural limestone at 100 lbs./1000 ft^2 (2 tons/acre)(4.48 t/ha)

Fertilizer at 25 lbs./1000 ft^2 (1000 lbs./acre)(1.12 t/ha) of 10-10-10 in fall or 25lbs./1000 ft^2 of 5-10-10 in spring. NOTE: Equivalent nutrients may be applied with other fertilizer formulations.

These amendments shall be spread evenly over the area to be sodded, and incorporated into the top 3 - 6 inches (8 - 15 cm) of the soil by discing, harrowing or other acceptable means.

3. Prior to laying sod, the soil surface shall be clear of trash, debris, roots, branches, stones and clods in excess of 2 inches (5 cm) in length or diameter. Sod shall not be applied to gravel or other non-soil surfaces.

4. Any irregularities in the soil surface resulting from topsoil or other operations shall be filled or leveled in order to prevent the formation of depressions or water pockets.

5. Areas to be topsoiled and topsoil used shall fulfill the requirements of TOPSOILING - Section 6.61 (ES BMP 1.61). No sod shall be spread on soil which has been treated with soil sterilants until enough time has elapsed to permit dissipation of toxic materials.

Sod Quality

1. Sod should be free of weeds and undesirable coarse weedy grasses. If possible, Certified or Approved turfgrass sod should be used.

2. Sod shall be machine cut at a uniform soil thickness of 3/4 inch (20 mm), plus or minus 1/4 inch (6 mm), at the time of cutting. This thickness shall exclude shoot growth and thatch.

3. Pieces of sod shall be cut to the supplier's standard width and length, with a maximum allowable deviation in any dimension of 5%. Torn or uneven pads will not be acceptable.

4. Standard size sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended from a firm grasp on one end of the section.

5. Sod shall be not cut or laid in excessively wet or dry weather.

6. Sod shall be harvested, delivered, and installed within a period of 36 hours

Sod Installation

A. Solid Sodding (Plate 6.67a)

1. Irrigate areas to be sodded with a minimum of 1/2-inch (13 mm) of water unless recent rains have provided equivalent moisture.

2. The first row of sod shall be laid in a straight line with subsequent rows placed parallel to and butting tightly against each other. Lateral joints shall be staggered to promote more uniform growth and strength. Care shall be exercised to insure that sod is not stretched or overlapped and that all joints are butted tight in order to prevent voids which would cause drying of the roots.

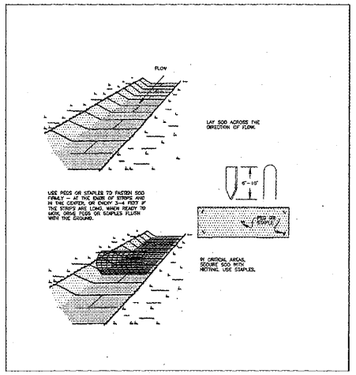


Plate 6.67b Sodding Swales and Waterways
Source: Virginia DSWC

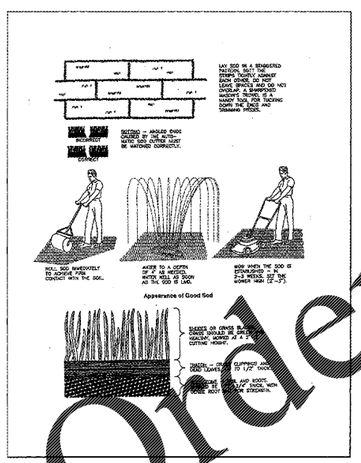


Plate 6.67a Sodding
Source: Virginia DSWC

3. On slopes 3:1 or greater, or wherever erosion may be a problem, sod shall be laid with staggered joints and secured by pegging or other approved methods. Sod shall be installed with the length perpendicular to the slope (on the contour). Begin laying sod at the bottom of the slope and work uphill. On very steep slopes, the use of ladders will facilitate the work and prevent damage to the sod.

4. Surface water cannot always be diverted from flowing over the face of the slope, but a capping strip of heavy jute or erosion netting, properly secured, along the crown of the slope will provide extra protection against lifting and undercutting of sod. This same technique can be used to fortify sod in water-carrying channels and other critical areas. Use wire staples to anchor heavy jute or erosion netting in channels.

5. As sodding of clearly defined areas is completed, sod shall be rolled or tamped to provide firm contact between roots and soil.

6. After rolling, sod shall be irrigated to a depth sufficient that the underside of the sod pad and the soil 4 inches (10 cm) below the sod is thoroughly wet.

7. During the first week, in the absence of adequate rainfall, watering shall be performed as often as necessary to maintain moist soil to a depth of at least 4 inches (10 cm).

8. The first mowing shall not be attempted until the sod is firmly rooted, usually after 2 - 3 weeks. Not more than 1/3 of the grass leaf should be removed at any one cutting.

B. Spot Sodding

1. Spot sodding is the planting of plugs or blocks, a minimum of 4 inches (10 cm) in diameter or square, of sod at measured intervals. The plugs or blocks should be placed one foot (30 cm) apart.

2. Sod spots within a row should be placed alternately and not directly opposite sod spots in adjacent rows.

3. Fit the plugs or blocks tightly into prepared holes and tamp them firmly into place.

4. Irrigate to a depth sufficient that the underside of the sod spot and the soil 4 inches (10 cm) below the sod is thoroughly wet.

C. Strip Sodding

1. Areas to be strip sodded should be fertilized, limed, prepared and smoothed as in solid sodding.

2. Lay the strips end to end in rows that are from 1 to 1-1/2 feet (30 to 45 cm) apart with the strips a minimum of 2 to 4 inches (5 to 10 cm) wide.

3. Roll or tamp the strips thoroughly to provide firm contact between roots and soil.

4. Irrigate to a depth sufficient that the underside of the strips and the soil 4 inches (10 cm) below the strips are wet.

D. Sodded Swales and Waterways (Plate 6.67b)

1. Care should be taken to prepare the soil adequately in accordance with this specification. The sod type shall consist of plant materials able to withstand the designed velocity. (See STORMWATER CONVEYANCE CHANNELS - Section 6.35 (ES BMP 1.35).

2. Sod strips in swales and waterways shall be laid perpendicular to the direction of flow. Care should be taken to butt ends of strips tightly.

3. After rolling or tamping, sod shall be pegged or stapled to resist washout during the establishment period. Chicken wire, jute or other netting may be pegged over the sod for extra protection in critical areas.

4. All other specifications for this practice shall be adhered to when sodding a swale or waterway.

Maintenance of Established Sod

1. After the first week, sod shall be watered as necessary to maintain adequate moisture in the root zone and prevent dormancy.

2. Apply lime and fertilizer under a regular program based on soil tests and on the use and general appearance of the vegetative cover. In the absence of soil tests, apply 1 - 2 tons/acre (45 - 90 lbs./1000 ft^2)(2.24 to 4.48 t/ha) of finely ground agricultural limestone every three years. Apply 400 - 500 lbs./acre (9 lbs./1000 ft^2) (448 - 560 kg/ha) of 10-10-10 fertilizer. To obtain better vegetative cover, topdress with 150 - 300 lbs./acre (6 - 12 lbs./1000 ft^2)(170 - 340 kg/ha) of 10-10-10 fertilizer during the growing season, but at least six weeks before the end of the growing season. If Centipede or St. Augustine grass is used, do not apply more than 1 pound of actual nitrogen per 1000 ft^2 (20 - 40 lbs./acre)(22 - 44 kg/ha).

3. Mow to control weeds, improve the appearance of the vegetative cover, and reduce fire hazard, as necessary. In general, the coarser the leaf texture of the grass, the higher it should be cut. Continuous close mowing will result in loss of vigor and reduced stand. No more than 1/3 of the grass leaf should be removed in any mowing.

6.75 MULCHING
(ES BMP 1.75)

Definition

Application of plant residues or other suitable materials to the soil surface.

Purposes

1. To prevent erosion by protecting the soil surface from raindrop impact and reducing the velocity of overland flow.

2. To foster the growth of vegetation by increasing available moisture and providing insulation against extreme heat and cold.

Conditions Where Practice Applies

1. Areas which have been permanently seeded should be mulched immediately following seeding.

2. Areas which cannot be seeded because of the season should be mulched to provide temporary protection to the soil surface. An organic mulch (not wood fiber alone) shall be used, and the area then seeded as soon as feasible in spring.

3. Mulch shall be used together with plantings of trees, shrubs, or certain ground covers which do not provide adequate soil stabilization by themselves.

4. Mulch shall be used in conjunction with temporary seeding operations specified in TEMPORARY SEEDING - Section 6.65 (ES BMP 1.65).

5. Mulches used in areas of concentrated flows or frequent inundation shall be properly anchored to prevent them from floating away.

Specifications

Types of Mulches

1. Organic Mulches

   Organic mulches may be used in any area where mulch is required, subject to the restrictions noted in Table 6.75a. Select mulch material based on site requirements, availability of materials, and availability of labor and equipment. Table 6.75a lists the most commonly used organic mulches. Other materials, such as peanut hulls and cotton burs, may be used.

   Mulch materials shall be spread uniformly, by hand or machine. When spreading straw by hand, divide the area to be mulched into approximately 1000 sq. ft. sections and place 70 - 90 lbs. (1-1/2 to 2 bales)(30 - 40 kg) of straw in each section to facilitate uniform distribution.

2. Nets , Mats, and Blankets

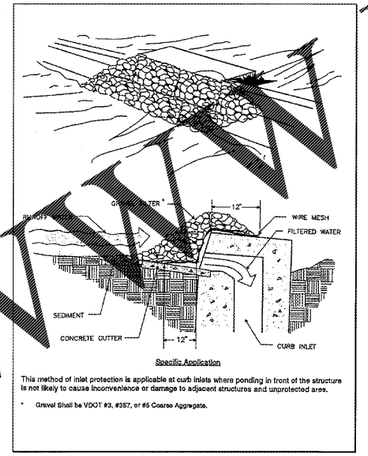
   Nets may be used alone on level areas, on slopes no steeper than 3:1, and in waterways as specified in STORMWATER CONVEYANCE CHANNELS - Section 5.35 (ES BMP 1.35). When mulching is done in late fall or during June, July, or August, or where soil is highly erodible, net should only be used in conjunction with an organic mulch such as straw. When net and organic mulch are used together, the net should be installed over the mulch except when the mulch is wood fiber. Wood fiber may be sprayed on top of the installed net. Excelsior binders are considered protective mulches and may be used alone on erodible soils and during all times of year.

Table 6.75a - Mulch Application

Mulches	Rate per acre	Rate per 1000 sq.ft.	Notes
Straw	1.5 - 2 tons	70 - 90 lbs.	Free from weeds and coarse matter. Must be anchored. Spread with mulch blower or by hand.
Wood Fibers	0.5 - 1.0 tons	25 - 50 lbs.	Fibers 1.5" min. length. Do not use alone in winter or during hot, dry weather. Apply as slurry.
Corn Stalks	4 - 6 tons	185 - 275 lbs.	Cut or shredded in 4 - 6" lengths. Air-dried. Do not use in fine turf areas. Apply with mulch blower or by hand.
Wood Chips	4 - 6 tons	185 -275 lbs.	Free of coarse matter. Air-dried. Treat with 12 lbs nitrogen per ton. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.
Shredded Bark Chips	50 - 70 cu. yds.	1 - 2 cu. yds.	Free of coarse matter. Air-dried. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.

Table 6.75a Organic Mulch Materials and Application Rates
Source: Virginia SWCC

Jute net shall be heavy, uniform cloth woven of single jute yarn, which if 36 to 48 inches (90 to 120 cm) wide shall weigh an average of 1.2 pounds per linear yard (0.6 kg/m). Other products designed to control erosion shall conform to manufacturer's specification and should be applied in accordance with manufacturer's instructions provided those instructions are at least as stringent as



Specific Application

This method of inlet protection is applicable at curb inlets where ponding in front of the structure is not likely to cause inconvenience or damage to adjacent structures and unprotected area.

* Gravel Shall be VDOT #3, #357, or #6 Coarse Aggregate.

Plate 4.08k Gravel Curb Inlet Sediment Filter
Source: Virginia DSWC

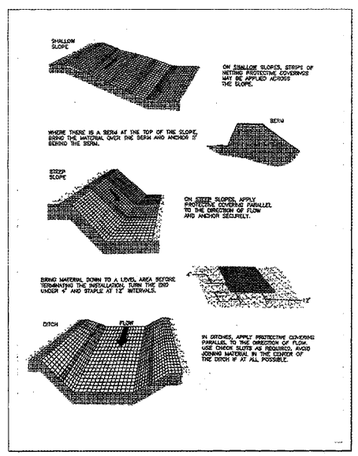


Plate 6.75a Typical Orientation of Treatment 1 - Soil Stabilization Blanket
Source: Adapted from Ludlow Products Brochure

1. Mulch anchoring tool: This is a tractor-drawn implement designed to punch mulch into the soil surface. This method provides maximum erosion control with straw. It is limited to use on slopes no steeper than 3:1, where equipment can operate safely. Machinery shall be operated on the contour.

2. Liquid mulch binders: Application of liquid mulch binders and tackifiers should be heaviest at edges of areas and at crests of ridges and banks, to prevent windblow. The remainder of the area should have binder applied uniformly. Binders may be applied after mulch is spread or may be sprayed into the mulch as it is being blown onto the soil. Applying straw and binder together is the most effective method.

   Chemical binders such as Petroset, Terratack, Road Oyl, and Aerospray may be used as recommended by the manufacturer to anchor mulch. These are expensive and therefore usually used in small areas or in residential areas where asphalt may be a problem. (Use of trade names does not constitute an endorsement by FDEP).

3. Mulch nettings - Lightweight plastic, cotton, or paper nets may be stapled over the mulch. Netting shall be secured by stakes, staples, or pins according to manufacturer's recommendations. See Plate 6.75g for details.

4. Peg and Twine - Because it is labor intensive, this method is feasible only in small areas where other methods cannot be used. Drive 8 - 10 inch (20 -25 cm) wooden pegs to within 3 inches (6 cm) of the soil surface, every 4 feet (1.2 m) in all directions. Stakes may be driven before or after straw is spread. Secure mulch by stretching twine between pegs in a criss-cross-within-a-square pattern. Turn twine 2 or more times around each peg.

Laying Nets, Mats, and Blankets

Nets, mats, and blankets should be installed according to the manufacturers' instructions provided that they are at least as stringent as stringent as the general recommendations below.

1. Start laying net from top of channel or top of slope and unroll downgrade.

2. Allow to lay loosely on soil--do not stretch.

3. **To secure net:** Upslope ends of net should be buried in a slot or trench no less than 6 inches (15 cm) deep. Tamp earth firmly over net. Staple the net every 12 inches (30 cm) across the top end. Edges of net shall be stapled every 3 feet (90 cm). Where 2 strips of net are laid side by side, the adjacent edges shall be overlapped 3 inches (8 cm) and stapled together. Staples shall be placed down the center of net strips at 3-foot (90 cm) intervals. DO NOT STRETCH net when applying staples.

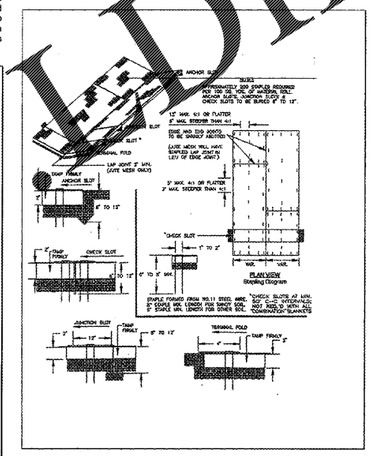


Plate 6.75b Typical Treatment 1 - Soil Stabilization Blanket Installation Guide
Source: VDOT Road and Bridge Standards

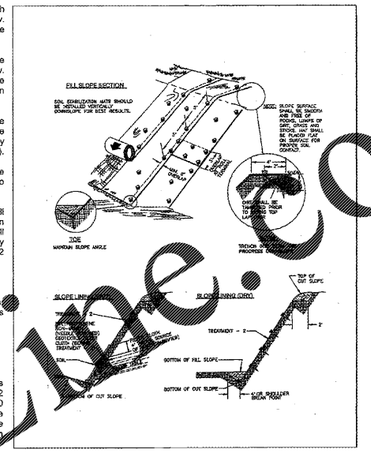


Plate 6.75d Typical Treatment 2 - Soil Stabilization Matting Slope Installation
Source: VDOT Road and Bridge Standards

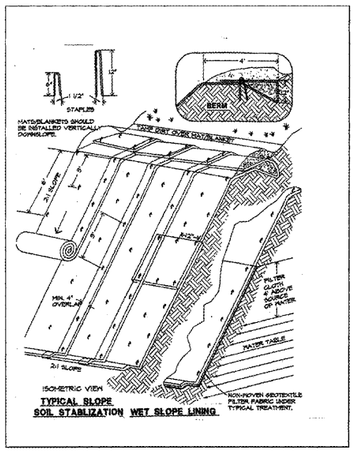


Plate 6.75c Erosion Blankets and Turf Reinforcement Mats - Slope Installation
Source: Erosion Draw

PERMANENT SEEDING NTS

Ingenium ENTERPRISES
PLANNING & ENGINEERING
221 ROSWELL ST.
SUITE 100
ALPHARETTA, GA 30009
770.417.8650
WWW.INGENIUMTEAM.COM

JAMES D. NIEF, P.E. No. 69898 STATE OF FLORIDA PROFESSIONAL ENGINEER
11/29/18

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY JAMES D. NIEF, PE ON THE DATE ADJACENT TO THE SEAL.

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

STATE OF FLORIDA AUTHORIZATION NUMBER 8370

PLANS PREPARED BY INGENIUM ENTERPRISES FORMERLY GRIFFAIL CRAWFORD

PANDA EXPRESS/CFT PLAZA
3866 GULF BREEZE PARKWAY
GULF BREEZE, FLORIDA

PLANS FOR:

CLIENT:
~~CFT NV DEVELOPMENTS,~~ LLC
1120 N. TOWN CENTER DR., SUITE 150
LAS VEGAS, NV 89144
PHONE: (626) 799-8989

REVISION HISTORY

1	--/--/----	5	--/--/----
2	--/--/----	6	--/--/----
3	--/--/----	7	--/--/----
4	--/--/----	8	--/--/----

PROJ. #	170256
DWG NAME	170256 C06.DWG
ISSUE DATE	11/27/2018
PROJ. MGR	BF

ESPC DETAILS III

C06.4
SHEET NUMBER

ISSUED FOR BID