Standard For Temporary Vegetative Cover For Soil Stabilization

Site Preparation

- A. Grade as needed and feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulch application, and mulch anchoring. All grading should be done in accordance with Standards for Land Grading, pg. 19-1.
- B. Install needed erosion control practices or facilities such as diversions, grade stabilization structures, channel stabilization measures, sediment basins, and waterways. See Standards 11 through 42.
- Immediately prior to seeding, the surface should be scarified 6" to 12" where there has been soil compaction. This practice is permissible only where there is no danger to underground utilities (cables, irrigation systems, etc.)

- Apply ground limestone and fertilizer according to soil test recommendations such as offered by Rutgers Co-operative Extension. Soil sample mailers are available from the local Rutgers Cooperative Extension offices. Fertilizer shall be applied at the rate of 500 pounds per acre or 11 pounds per 1,000 square feet of 10-20-10 or equivalent with 50% water insoluble nitrogen unless a soil test indicates otherwise. Apply limestone at the rate of 2 tons/acre unless soil testing indicates otherwise. Calcium carbonate is the equivalent and standard for measuring the ability of liming materials to neutralize soil acidity and supply calcium and magnesium to grasses and legumes.
- B. Work lime and fertilizer into the soil as nearly as practical to a depth of 4 inches with a disc, springtooth harrow, or other suitable equipment. The final harrowing or discing operation should be on the general contour. Continue tillage until a reasonably uniform seedbed is
- C. Inspect seedbed just before seeding. If traffic has left the soil compacted, the area must be retilled in accordance with the above.

D. For Soils high in sulfides or having a pH of 4 or less refer to Standard for Management of High Acid Producing Soils.

Seeding

A. Select seed from recommendation in Table 7-2.

SEED SELECTIONS	SEEDING RATE ¹ (pounds)		OPTIMUM SEEDING DATE ² Based on Plant Hardiness Zone ³	OPTIMUM
	Per Acre	Per 1000 sq. ft.	ZONE 6b	DEPTH ⁴ (inches)
COOL SEASON GRASSES				
1. Perrenial Ryegrass	100	1.0	March 1 May 15 August 15 October 1	0.5
2. Spring Oats	86	2.0	March 1 - May 15 August 15 - October 1	1.0
3. Winter Barley	96	2.2	August 15 - October 1	1.0
4. Annual ryegrass	100	1.0	March 15 - June 1 August 1 - September 15	0.5
5. Winter Cereal Rye	112	2.8	August 1 - November 15	1.0
WARM SEASON GRASSES				
6. Pearl Millet	20	0.5	May 15 - August 15	1.0
7. Millet	30	0.7	May 15 - August 15	1.0

- determined by a germination test result. No adjustment is required for coal season grasses.

 2. May be planted throughout summer if soil moisture is adequate or seeded area can be irrigated. 3. Plant Hardiness Zone (see figure 7-1, pg., 7-4.) 4. Twice the depth for sandy soils.
- B. Conventional Seeding. Apply seed uniformly by hand, cyclone (centrifugal) seeder, drop seeder, drill or cultipacker seeder. Except for drilled, hydroseeded or cultipacked seedings, seed shall be incorporated into the soil, to a depth of 1/4 to 1/2 inch, by raking or dragging. Depth of seed placement may be 1/4 inch deeper on coarse textured soil
- Hydroseeding is a broadcast seeding method usually involving a truck or trailer moun Hydroseeding is a broadcast seeding method usually involving a truck or trailer mounted tank, with an agitation system and hydraulic pump for mixing seed, water and fertilizer and spraying the mix onto the prepared seedbed. Mulch shall not be included in the tank with seed. Short fibered mulch may be applied with a hydroseeder following seeding. (also see Section IV Mulching) Hydroseeding is not a preferred seeding method because seed and fertilizer are applied to the surface and not incorporated into the soil. Poor seed to soil contact occurs reducing seed germination and growth. Hydroseeding may be used for areas too steep for conventional equipment to traverse or too obstructed with rocks, stumps, etc.
- D. After seeding, firming the soil with a corrugated roller will assure good seed—to—soil contact, restore capillarity, and improve seedling emergence. This is the preferred method. When performed on the contour, sheet erosion will be minimized and water conservation on site.

4. Mulching

Mulching is required on all seeding. Mulch will insure against erosion before grass is established and will promote faster and earlier establishment. The existence of vegetation sufficient to control soil erosion shall be deemed in compliance with this mulching requirement.

Straw or Hay. Unrotted small grain straw, hay free of seeds, or salt hay to be where a crimper is used instead of a liquid mulch-binder (tackifying or adhesive agent), the rate of application is 3 tons per acre. Mulch chapper-blowers must not grind the mulch. Hay mulch is not recommended for establishing fine turf or lawns due to the presence of weed seed. Application. Spread mulch uniformly by hand or mechanically so that approximately 95% of the

soil surface will be covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000 square feet sections and distribute 70 - 90 pounds within each section. Anchoring shall be accomplished immediately after placement to minimize loss by wind or water.

This may be done by one of the following methods, depending upon the size of the area

- Peg and Twine. Drive 8 to 10 inch wooden pegs to within 2 to 3 inches of the soil surface every 4 feet in all directions. Stakes may be driven before or after applying mulch. Secure mulch to soil surface by stretching twine between pegs in a cris-cross and a square pattern. Secure twine around each peg with two or more round turns. Mulch Nettings. Staple paper, jute, cotton, or plastic nettings to the soil surface. Use a
- 3. Crimper (mulch anchoring coulter tool). A tractor-drawn implement, somewhat like a disc harrow, especially designed to push or cut some of the broadcast long fiber mulch 3 to 4 inches into the soil so as to anchor it and leave part standing upright. This technique is limited to areas traversable by a tractor, which must operate on the contour of slopes. Straw mulch rate must be 3 tons per acre. No tackifying or adhesive agent is required.
- a. Applications should be heavier at edges where wind may catch the mulch, in valleys, and at crests of banks. The remainder of the area should be uniform in appearance.

4. Liquid Mulch-Binders.-May be used to anchor salt hay, hay or straw mulch.

- b. Use one of the following:
- (1) Organic and Vegetable Based Binders Naturally occurring, powder based, hydrophilic materials when mixed with water formulates a gel and when applied to mulch under satisfactory curing conditions will form membraned networks of insoluble polymers. The vegetable gel shall be physiologically harmless and not result in a phytotoxic effect or impede growth of turfgrass. Use at rates and weather conditions as recommended by the manufacturer to anchor mulch materials. Many new products are available, some of which may need further evaluation for use in this state.
- (3) Synthetic Binders High polymer synthetic emulsion, miscible with water when diluted and following application to mulch, drying and curing shall no longer be soluble or dispersible in water. It shall be applied at rates recommended by the manufacturer and remain tacky until germination of grass

Note: All names given above are registered trade names. This does not constitute

- no growth or germination inhibiting materials, used at the rate of 1,500 pounds per acre (or as recommended by the product manufacturer) and may be applied by a hydroseeder. This mulch shall not be mixed in the tank with seed. Use is limited to flatter slopes and during optimum
- Pelletized mulch. Compressed and extruded paper and/or wood fiber product, which may contain co-polymers, tackifiers, fertilizers and coloring agents. The dry pellets, when applied to a seeded area and watered, form a mulch mat. Pelletized mulch shall be applied in accordance with the manufacturers recommendations. Mulch may be applied by hand or mechanical spreader at the rate of 60-75 lb./1,000 square feet and activated with 0.2 to 0.4 inches of water. This material has been found to be beneficial for use on small lawn or renovation tackifier agent are not practical or desirable. Applying the full 0.2 to 0.4 inches of water after spreading pelletized mulch on the seed bed is extremely important for sufficient activation and expansion of the mulch to provide soil coverage.

Standards for Dust Control

seeding periods in spring and fall.

The following methods should be considered for controlling dust Mulches: See standards for stabilization with mulches only Vegetative Coverage: See standards for : Temporary Vegetative Cover, Permanent Vegetative Cover, Permanent Stabilization with Sod (p.6-1) Spray-On Adhesives: On Mineral soils (not effective on muck soils). Keep traffic off these areas

MATERIAL	WATER	TYPE OF NOZZLE	APPLY GAL/ACRE
Anionic asphalt emulsion	7:1	Coarse Spray	1200
Latex emulsion	12.5:1	Fine Spray	235
Resin in water	4:1	Fine Spray	300
Polyacrylamide (PAM)—spray on Polyacrylamide (PAM)—dry spread	Apply occording to manufacturer's instructions. Boy dee be used as a distitute to sediment basins to floculate and precipitate surpende colloids. See Sediment Basin Standard, p. 28-1		
Acidulated Soy Bean Soap Stick	None	Coarse Spray	1200

Tillage: To roughen surface and bring clods to the surface. This is an emergency measure which should be used before soil blowing starts. Begin plowing on windward side of sight. Chisel—type plows spaced about 12" apart, and spring—toothed harrows are examples of equipment which may produce the desired effect

Barriers: Solid board fences, snow fences, burlop fences, crate walls, bales of hay, and similar material can be used to Calcium Chloride: Shall be in the form of loose, dry granules or flakes fine enough to feed through commonly used spreaders at the rate that will keep surface moist but not cause pollution or plant damage. If used on steeper slopes then use other practices to prevent washing into streams or accumulation

around plants.

Stone: Cover surface with crushed stone or coarse gravel.

Standard For Permanent Vegetative Cover For Soil Stabilization

. Grade as needed and feasible to permit the use of conventional equipment for seedbed

preparation, seeding, mulch application, and mulch anchoring. All grading should be done in accordance with Standards for Land Grading.

Immediately prior to seeding and topsoil application, the subsoil shall be evaluated for compaction in accordance with the Standard for Land Grading. Topsoil should be handled only when it is dry enough to work without damaging the soil structure. A uniform application to a depth of 6 inches (unsettled) is required on all sites. Topsoil shall be amended with organic matter, as needed, in accodance with the Standard for Topsoiling.

Install needed erosion control pracices or facilities such as diversions, grade stabilization structures, channel stabilization measures, sediment basins, and waterways

Seedbed Preparation

Uniformly apply ground limestone and fertilizer to topsoil which has been spread and firmed according to soil test recommendations such as offered by Rutgers Co-operative Extension for best results. Soil sample mailers are available from the local Rutgers Co-operative Extension (http://njaes.rutgers.edu/county/). Fertilizer shall be applied at the rate of 500 pounds per acre or 11 pounds per 1,000 square feet of 10-10-10 or equivalent with 50% water insoluble nitrogen unless a soil test indicates otherwise and incorporated into the surface 4 inches. If fertilizer is not incorporated apply one half the rate described above during seedbed preparation and repeat another one half rate application of the same fertilizer within 3 to 5 weeks after seeding. Apply limestone in accordance with table 4-1 and the results of soil testing. Calcium carbonate is the equivalent and standard for measuring the ability of liming materials to neutralize soil activity and supply calcium and magnesium to grasses and legumes. Table 4-1 ia s general guideline for limestone application rates.

TABLE 4-1

Limestone¹ Application Rate by Soil Texture				
SOIL TEXTURE	TONS/ACRE	LBS./1000 SQ. FT.		
Clay, clay loam, and high organic soil	3	135		
Sandy loam, loam, silt loam	2	90		
Loamy sand, sand	1	45		

- 1. Pulverized dolomitic limestone is preferred for most soils south of the New Brunswick-Trenton
- . Work lime and fertilizer into the topsoil as nearly as practical to a depth of 4 inches with a disc, springtooth harrow, or other suitable equipment. The final harrowing or discing operation should be on the general contour. Continue tillage until a reasonably uniform seedbed is C. High acid producing soil.
- Soils having a pH of 4 or less or containing iron sulfide shall be covered with a minimum of 12 inches of soil having a pH of 5 or more before initiating seedbed preparation. See Standard for Management of High Acid Producing Soils for specific requirements.
- Seeding
- A. Select a mixture from Table 4-3 use mixture recommended by Rutgers Cooperative Extension or Natural Resources Conservation Service which is approved by the Soil Conservation District. Seed germination shall have been tested within 12 months of the planting date. No seed shall be accepted with a germination test date more than 12 months old unless

Table 4-3 SEEDING MIXTURES

-	Varm Season	Block		0.1
	Seed Selections	lbs./acre	Rates lbs./1000 s.	f. Based on Plant Hardiness Zone 6
1.	Switchgrass and/or Coastal Panicgrass plus or Flatpea	15 15 20	0.35 0.35 0.45	March 1 - April 30
2.	Deertongue or Switchgrass Redtop	15 20 1	0.35 0.45 0.10	March 1 - April 30
3.	Switchgrass Deertongue Little Bluestern Sheep Fescue plus Partridge pea	15 10 20 20 10	0.35 0.25 0.45 0.45 0.25	March 1 — April 30
4.	Switchgrass Big Bluestem Little Bluestem Sand Lovegrass Coastal Panicgrass	10 5 5 4 10	0.25 0.10 0.10 0.10 0.25	March 1 — April 30
	Bermudagrass Zoysiagrass (seed) Zoysiagrass (sprigs)	15 30	0.35 0.70	March 1 - April 30
	Fine Fescue (Blend) Hard Fescue Chewings Fescue Strong Creeping Red Fescue Kentucky Bluegrass Perennial Ryegrass plus White Clover	45 20 5	0.10 0.50 0.10	August 15 - October 1
7.	Strong Creeping Red Fescue Kentucky Bluegrass Perennial Ryegrass or Redtop plus White Clover	130 50 20 10 5	3 1 0.50 0.25 0.10	August 15 - October 1
8.	Tall fescue (turf-type) or Strong Creeping Red Fescue or Perennial Ryegrass Flatpea	30 30 30 25	0.7 0.7 0.7 0.60	March 1 — April 30
9.	Deertongue Redtop Wild Rye (Elymus) Switchgrass	20 2 15 25	0.45 0.05 0.35 0.60	March 1 — April 30
10	D. Tall fescue (turf-type) Perennial Ryegrass or White Clover	265 20 5	6 5 0.10	March 1 — April 30
11	I. Kentucky Bluegrass Turf-type Tall Fescue	45 22	5	August 15 - October 1
	2. Turf-type Tall Fescue (Blend of 3 cultivars)	350	8 D	etention Basin
13	 Hard Fescue and/or Chewings Fescue Strong Creeping Red Fescu or Perennial Ryegrass Kentucky Bluegrass (blend) 	175 e 45 45	4 1 1	August 15 - October 1
14	4. Tall Fescue Kentucky Bluegrass (blend) or Perennial Ryegrass (blen	265 20	6 0.50 0.50	August 15 - October 1
15	5. Hard Fescue Chewings Fescue Strong Creeping Red Fescu Perennial Ryegrass	130 45 e 45 10	3 1 1 0.25	August 15 - October 1 General Lawn & Recreation
16	5. Rough Bluegrass Strong Creeping Red Fescu	90 e 130	2.0	August 15 - October 1
17	7. Creeping Bentgrass Creeping Red Fescue Alkali Saltgrass	45 45 45	1 1 1	August 15 - October 1
18	B. Hard or Sheeps Fescue N.E. Wildflower mixture	25 12	0.60 0.35	March 1 – April 30 August 15 – October 1
_	9. Smooth Cordgrass Saltmeadow Cordgrass	veg veg		March 1 - April 30
20	O. American Beachgrass Coastal Panicgrass	veg 20	0.45	Before April 1
-	Purpleosier Willow	veg		Before May 10

Standard For Management Of High Acid Producing Soils

- Limit the excavation area and exposure time when high acid producing soils are encountered. 2. Topsoil stripped from the site shall be stored separately from temporarily stockpiled high acid
- Stockpiles of high acid producing soil should be located on level land to minimize its movement, especially when this material has a high clay content.
- covered with properly anchored, heavy grade sheets of polyethylene where possible. If not possible, stockpiles shall be covered with a minimum of 3 to 6 inches of wood chips to minimize erosion of the stockpile. Silt fence shall be installed at the toe of slope to contain movement of the stockpiled material. Topsoil shall not be applied to the stockpiles to prevent topsoil contamination with high acid producing soil.

Temporarily stockpiled high acid producing soil material to be stored more than 48 hours should be

- High acid producing soils with a pH of 4.0 or less, or containing iron sulfide, (including borrow from cuts or dredged sediment) shall be ultimately placed or buried with limestone applied at the rate of 10 tons per acre (or 450 pounds per 1,000 square feet of surface area) and covered with a ninimum of 12 inches of settled soil with a pH of 5.0 or more except as follows:
- a. Areas where trees or shrubs are to be planted shall be covered with a minimum of 24 inches of soil with a pH or 5 or more.

 b. Disposal areas shall not be located within 24 inches of any surface of a slope or bank, such as berms, stream banks, ditches and others to prevent potential lateral leaching
- Equipment used for movement of high acid producing soils should be cleaned at the end of each day to prevent spreading of high acid-producing soil materials to other parts of the site, into streams or stormwater conveyances, and to protect machinery from accelerated rusting. Non vegetative erosion control practices (stone tracking pads, strategically placed limestone check dam, sediment barrier, wood chips) should be installed to limit the movement of high acid-producing soils from, around, or off the site.
- Following burial or removal of high acid-producing soil, topsoiling and seeding of the site, (see Temporary Vegetative Cover for Soil Stabilization, Permanent Vegetative Cover for Soil Stabilization, and Topsoiling) monitoring must continue for a minimum of 6 months to ensure there is adequate stabilization and that no high acid-producing soil problems emerge. If problems still exist, the affected area must be treated as indicated above to correct the problem

- - Seeding rates specified are required when a report of compliance is requested prior to actual
 establishment of permanent vegetation. Up to 50% reduction in rates may be used when
 permanent vegetation is established prior to a report of compliance inspection. These rates
 apply to all methods of seeding. Establishing permanent vegetation means 80% vegetative
 coverage with the specified seed mixture for the seeded area and mowed once.
 - Warm season mixtures are grasses and legumes which maximize growth at high temperatures, generally 85°F and above. See Table 4-3 mixtures 1 to 5. Planting rates for warm season grasses shall be the amount of Pure Live Seed (PLS) as determined by germination testing results.
 - Cool Season Mixtures are grasses and legumes which maximize growth at temperatures below 85°F. Many grasses become active at 65°F. See Table 4-3, mixtures 6-21.
 Adjustment of planting rates to compensate for the amount of Pure Live Seed is not required for
 - B. Conventional Seeding is performed by applying seed uniformly by hand, cyclone (centrifugal) seeder, drop seeder, drill or cultipacker seeder. Except for drilled, hydroseeded or cultipacked seedings, seed shall be incorporated into the soil within 24 hours of seedbed preparation to a depth of 1/4 to 1/2 inch, by raking or dragging. Depth of seed placement may be 1/4 inch
- After seeding, firming the soil with a corrugated roller will assure good seed-to-soil contact, restore capillarity, and improve seedling emergence. This is the preferred method. When performed on the contour, sheet erosion will be minimized and water conservation on site will be maximized.
 - Hydroseeding is a broadcast seeding method usually involving a truck or trailer mounted tank with hydroseeding is a broadcast seeding method usually involving a truck or trailer mounted tank, with an agitation system and hydraulic pump for mixing seed, water and fertilizer and spraying the mix onto the prepared seedbed. Mulch shall not be included in the tank with seed. Short fibered mulch may be applied with hydroseeder following seeding. (also see Section 4 Mulching below) Hydroseeding is not a preferred seeding method because seed and fertilizer are applied to the surface and not incorporated into the soil. When poor seed to soil contact occurs, there is a reduced seed germination and growth.

4. Mulching

Mulching is required on all seeding. Mulch will insure against erosion before grass is established and will promote faster and earlier establishment. The existence of vegetation sufficient to control soil erosion shall be deemed compliance with this mulching requirement.

A. Straw or Hay. Unrotted small grain straw, hay free of seeds, or salt hay to be applied at the rate of 1-1/2 to 2 tons per acre (70-90 pounds per 1,000 square feet), except that where a crimper is used instead of a liquid mulch-binder (tackifying or adhesive agent), the rate of application is 3 tons per acre. Mulch chopper-blowers must not grind the mulch. Hay mulch is not recommended for establishing fine turf or lowns due to the presence of weed seed. The approved rates above have been met when the mulch covers the ground completely upon visu inspection, i.e. the inspector cannot see the ground below the mulch. Application. Spread mulch uniformly by hand or mechanically so that approximately 85% of the soil surface will be covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000 square feet sections and distribute 70 - 90 pounds within each section. Anchoring shall be accomplished immediately after placement to minimize loss by wind or water.

- Peg and Twine. Drive 8 to 10 inch wooden pegs to within 2 to 3 inches of the soil surface every 4 feet in all directions. Stakes may be driven before or after applying mulch. Secure mulch to soil surface by stretching twine between pegs in a cris—cross and a square pattern. Secure twine around each peg with two or more round turns.
- 2. Mulch Nettings. Staple paper, jute, cotton, or plastic nettings to the soil surface. Use a 3. Crimper (mulch anchoring coulter tool). A tractor-drawn implement, somewhat like a disc harrow, especially designed to push or cut some of the broadcast long fiber mulch 3 to 4 inche into the soil so as to anchor it and leave part standing upright. This technique is limited to areas traversable by a tractor, which must operate on the contour of slopes. Straw mulch rate
- must be 3 tons per acre. No tackifying or adhesive agent is required
- 4. Liquid Mulch-Binders.-May be used to anchor salt hay, hay or straw mulch. a. Applications should be heavier at edges where wind may catch the mulch, in valleys, and
- b. Use one of the following: (1) Organic and Vegetable Based Binders - Naturally occurring, powder based, hydrophilic materials when mixed with water formulates a gel and when applied to mulch under satisfactory curing conditions will form membraned networks of insoluble polymers. The vegetable gel shall be physiologically harmless and not result in a phytotoxic effect or impede growth of turfgrass. Use at rates and weather conditions as recommended by the manufacturer to anchor mulch materials. Many new products are available, some of which may need further
- (2) Synthetic Binders High polymer synthetic emulsion, miscible with water when diluted and following application to mulch, drying and curing shall no longer be soluble or dispersible in water. It shall be applied at rates recommended by the
- Note: All names given above are registered trade names. This does not constitute a recommendation of these products to the exclusion of other products.
- no growth or germination inhibiting materials, used at the rate of 1,500 pounds per acre (or as recommended by the product manufacturer) and may be applied by a hydroseeder. Mulch shall not be mixed in the tank with seed. Use is limited to flatter slopes and during optimum seeding periods in spring and fall.
- Pelletized mulch. Compressed and extruded paper and/or wood fiber product, which may contain co-polymers, tackifiers, fertilizers and coloring agents. The dry pellets, when applied to a seeded area and watered, forma mulch mat. Pelletized mulch shall be pplied in accordance with the manufacturers recommendations. Mulch may be applied by hand or mechanical spreader at the rate of 60-75 lb./1,000 square feet and activated with 0.2 to 0.4 inches of water. This material has been found to be beneficial for use on small lawn or renovation areas, seeded areas where weed-seed free mulch is desired or on sites where straw mulch and tackifier agent are not practical or desirable. Applying the full 0.2 to 0.4 inches of water after spreading pelletized mulch on the seed bed is extremely important for sufficient activation and expension of the mulch to provide soil coverage. and expansion of the mulch to provide soil coverage.
- 5. Irrigation (where feasible)

If soil moisture is deficient, and mulch is not used, supply new seedings with adequate water (a minimum of 1/4 inch twice a day until vegetation is well established). This is especially true when seedings are made in abnormally dry or hot weather or on droughty sites.

Since slow release nitrogen fertilizer (water insoluble) is prescribed in Section 2.A. Seedbed Preparation in this Standard, no follow-up of topdressing is mandatory. An exception may be made where gross nitrogen deficiency exists to the extent that turf failure may develop. In that instance, topdress with 10-10-10 or equivalent at 300 pounds per acre or 7 pounds per 1,000 square feet every 3 to 5 weeks until the gross nitrogen deficiency in the turf is graeliorated.

7. Establishing Permanent Vegetative Stabilization

The quality of permanent vegetation rests with the contractor. The timing of seeding, preparing the seedbed, applying nutrients, mulch and other management are essential. The seed application rates in Table 4-3 are required when a Report of Compliance is requested prior to actual establishment of permanent vegetation. Up to 50% reduction in application rates may be used when permanent vegetation is established prior to requesting a Report of Compliance from the district. These rates apply to all methods of seeding. Establishing permanent vegetation means 80% vegetative cover (of the seeded species) and mowed once. Note this designation of mowed once does not guarantee the permanency of the turf should

Standard For Topsoiling

Methods and Materials

Materials

- A. Topsoil should be friable, loamy, free of debris, objectionable weeds and stones, and contain no toxic substance or adverse chemical or physical condition that may be harmful to plant growth. Soluble salts should not be excessive (conductivity less than 0.5 millimhos per entimeter. More than 0.5 millimhos may desicate seedlings and adversely impact growth opsoil hauled in from offsite should have a minimum organic matter content of 2.75%. Organic matter content may be raised by additives.
- B. Topsoil substitute is a soil material which may have been amended with sand, silt, clay, organic matter, fertilizer or lime and has the appearance of topsoil. Topsoil substitutes may be utilized on sites with insufficient topsoil for establishing permanent vegetation. All topsoil substitute materials shall meet the requirements of topsoil noted above. Soil tests shall be performed to determine the components of sand, silt, clay, organic matter, soluble

. Stripping and Stockpiling

- Field exploration should be made to determine whether quantity and/or quality of surface soil justifies stripping.
- B. Stripping should be confined to the immediate construction area
- C. Where feasible, lime may be applied before stripping at a rate determined by soil tests to bring the soil pH to approximately 6.5. In lieu of soil tests, see lime rate guide in seedbed preparation for Permanent Vegetative Cover for Soil Stabilization.
- D. A 4-6 inch stripping depth is common, but may vary depending on the particular soil.
- Stockpiles of topsoil should be situated so as not to obstruct natural drainage or cause

Stockpiles should be vegetated in accordance with standards previously described herein; see standards for Permanent or Temporary Vegetative Cover for Soil Stabilization. Weeds should not be allowed to grow on stockpiles. . Site Preparation

- A. Grade at the onset of the optimal seeding period so as to minimize the duration and area of exposure of disturbed soil to erosion. Immediately proceed to establish vegetative cover in accordance with the specified seed mixture. Time is of the essence.
- Grade as needed and feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulch application and anchoring, and maintenance. See the Standard for Land Grading, pg. 19—1 in the State Standards manual.
- As guidance for ideal conditions, subsoil should be tested for lime requirement. Limestone, if needed, should be applied to bring soil to a pH of approximately 6.5 and incorporated into the soil as nearly as practical to a depth of 4 inches.
- Immediately prior to topsoiling, the surface should be scarified 6" to 12" where there has been soil compaction. This will help insure a good bond between the topsoil and subsoil. This practice is permissible only where there is no danger to underground utilities Employ needed erosion control practices such as diversions, grade stabilization structures, channel stabilization measures, sedimentation basins, and waterways. See Standards 11 through 42 in the State Standards manual.

- Topsoil should be handled only when it is dry enough to work without damaging soil
- Uniform application to a depth of 5 inches (unsettled) is recommended. Soils with a pH of 4.0 or less or containing iron sulfide shall be covered with a minimum depth of 12 inches of soil having a pH of 5.0 or more, in accordance with the Standard for Management of High Acid Producing Soil.

Construction Sequence

Item	Time Period	Description — Construction Activity
1	10 days	Install stabilized construction entrances at all points of ingress & egress and install tree protection & silt fences.
2	10 days	Strip & Slockpile existing millings from building area. Rough grade area, construct soil stockpiles separate from top stockpiles
3	180 days	Construct Building
4	30 days	Instell underground utilities.
5	30 days	Instell walkways, hensicvapped parking creas, install landscaping.
6	5 days	Add topsoil, seed and stabilizes all swales and disturbed areas. Install Curlex Erceion Blankets where required.
7	10 days	After complete restoration and establiment of vegetative areas, remove all soil erosion control measures.

Soil Erosion & Sediment Control Notes The Mercer County Soil Conservation District shall be notified 48 hours prior to starting land

- MCSCD, 508 Hughes Drive, Hamilton Square, NJ 08690
 Phone: 609-586-9603 Fax: 609-586-1117 Email: mercersoil@aol.com If applicable to this project, the owner should be aware of his or her obligation to file for a NJPDES Construction Activity Stormwater 5G3 Permit (NJG0088323) via the NJDEP online permitting stormwater Pollution Prevention Plan self-inspection logbook onsite at all times. This permit must be filed prior to the start of soil disturbance. The online application process will require entry of an SCD certification code, which is provided by the Soil Conservation District upon certification of the
- The Mercer County Soil Conservation District shall be notified of any changes in ownership. Any changes to the Certified Soil Erosion and Sediment Control Plan, including an increase in the

Control Plan, then the more restrictive permit requirements shall be followed.

- limit of disturbance, will require the submission of revised Soil Erosion and Sediment Control Plans to the District for recerbification. The revised plans must meet all current State Soil Erosion \$
- A copy of the certified Soil Erosion and Sediment Control plan shall be maintained on site at all times All Soil Erosion and Sediment Control practices shall be installed prior to any major soil disturbances, or in their proper sequence as outlined within the Sequence of Construction on the Certified Soil Erosion and Sediment Control Plan, and maintained until permanent protection is established. All work shall be done in accordance with the current STANDARDS for Soil Erosion and Sediment Control in NJ. If language contained within any other permit for this project is more restrictive than (but not contradictory to) what is contained within these notes or on the Certified Soil Erosion and Sediment
- The Standard for Stabilized Construction Access requires the installation of a 1½" to 2½" clean stone tracking pad at all construction driveways immediately after initial site disturbance, whether identified on the certified plan or not. The width shall span the full width of egress, and length shall be 50 ft. or more, depending on site conditions and as required by the STANDARD. This shall include individual lot access points within residential subdivisions. If the earess is to a County road, then a 20 ft. long pave. transition shall be provided between the edge of pavement and the stone access pad. A sub-base course will be applied immediately following rough grading and installation of improvements in order to stabilize streets, roads, driveways and parking areas. In areas where no utilities are present the sub-base shall be installed within 15 days of preliminary grading, provided that all other requirements related to detention basins, swales and the Sequence of Construction have been met.
- O.Any disturbed areas that will be left exposed more than 1.4 days and not subject to construction activity will immediately receive temporary stabilization. If the season prevents establishment of a temporary vegetative cover, or if the area is not topsoiled, then the disturbed areas will be mulched with straw, or equivalent material, at a rate of two (2) tons per acre, according to State STANDARDS. Sloped areas in excess of 3H: IV shall be provided with erosion control blankets. Critical areas subject to erosion (i.e. steep slopes, roadway embankments, environmentally sensitive areas) will receive temporary stabilization immediately after initial disturbance or rough grading Any steep slopes (i.e. slopes greater than 3:1) receiving pipeline or utility installation will be backfilled
- and stabilized daily, as the installation proceeds. 2.Permanent vegetation shall be seeded or sodded on all exposed areas within ten (10) days after final grading and topsoiling. All agronomic requirements contained within the STANDARDS and on the Certified Plan shall be employed. Mulch with binder, in accordance with the STANDARDS, shall be used on all seeded areas. Save all tags and/or bags used for seed, lime and ferbilizer, and provide them to the District inspector to verify that mixtures and rates meet the STANDARDS
- 3. At the time when the site preparation for permanent vegetative stabilization is going to be accomplished, any soil that will not provide a suitable environment to support adequate vegetative ground cover, shall be removed or treated in such a way that will permanently adjust the soil conditions and render it suitable for vegetative ground cover. If the removal or treatment of the soil will not provide suitable conditions, then non-vegetative means of permanent ground stabilization will have to be During the course of construction, soil compaction may occur within haul routes, staging areas and
- the topsoil and subsoil. This practice is permissible only where there is no danger to underground . Prior to seeding, topsoil shall be worked to prepare a proper seedbed. This shall include raking of the topsoil and removal of debris and stones, along with other requirements of the Standard for Permanen

other project areas. In accordance with the Standard for Topsoiling, compacted surfaces should be scarified 6" to 1.2" immediately prior to topsoil application. This will help ensure a good bond between

- . In accordance with the STANDARD for Management of High Acid Producing Soils, any soil having a pH of 4 or less or containing iron sulfides shall be buried with limestone in accordance with the STANDARD and be covered with a minimum of 1.2" of soil having a pH of 5 or more prior to topsoil application and seedbed preparation. If the area is to receive tree or shrub plantings, or is located on a slope, then the area shall be covered with a minimum of 24° of soil having a pH of 5 or more. Mulchina to the STANDARDS is required for obtaining a Conditional Report of Compliance.
- Conditional ROC's are only issued when the season prohibits seeding. Permanent stabilization musthen be completed during the optimum seeding season immediately following the Conditional ROC, or Hydroseeding is a two-step process. The first step includes seed, fertilizer, lime, etc., along with minimal amounts of mulch to promote consistency, good seed-to-soil contact, and give a visual indication of coverage. Upon completion of the seeding operation, hydromulch should be applied at a

minimum rate of 1500 lbs. per acre in second step. The use of hydro-mulch, as opposed to straw, is

- limited to optimum seeding dates as listed in the STANDARDS. The use of Hydromulch on sloped . The contractor is responsible for keeping all adjacent roads clean during life of the construction project All sediment washed, dropped, tracked or spilled onto paved surfaces shall be immediately removed. . The developer shall be responsible for remediating any erosion or sediment problems that arise as a
- result of ongoing construction, and for employing additional erosion and sediment control measures at the request of the Mercer County Soil Conservation District.
- . Conduit Outlet Protection must be installed at all required outfalls prior to the drainage system becoming operational. . All detention / retention basins must be fully constructed (inclusive of all structural components and liners) and permanently stabilized prior to paving or prior to the addition of any impervious surfaces. Permanent stabilization includes, but may not be limited to: topsoil, seed, straw mulch and binders or
- erosion control blankets on all seeding, all agronomic requirements as specified on the Certified Soil Prosion and Sediment Control Plan, installation of the outflow control structures and discharge storm drainage piping, low flow channels, conduit outlet protection, emergency spillways, and lap ring 5. The riding surface of all utility trenches within paved areas shall be 3/4° clean stone or base pavemen until such time as final pavement has been installed. Temporary soil riding surfaces are prohibited. 4. All construction dewatering (trenches, excayations, etc.) must be done through an inlet or outlet filter in
- accordance with the Standard for Dewatering or as depicted on the Certified Soil Erosion and Sediment Control Plan. Discharge locations for the dewatering operation must contain perennial vegetation or similar stable surface. i. All swales or channels that will receive runoff from paved surfaces must be permanently stabilized prior to the installation of pavement. If the season prohibits the establishment of permanent stabilization, the
- swales or channels may be temporarily stabilized in accordance with the STANDARDS. NJSA 4:24-39 et seq. requires that no Certificate of Occupancy or Temporary Certificate of Occupancy be issued by the Municipality before the provisions of the Certified Soil Erosion and

Sediment Control Plan have been satisfied. Therefore, all site work for site plans and all work around

individual lots in subdivisions must be completed before the District issues a Report of Compliance or

Conditional Report of Compliance, which must be forwarded to the Municipality prior to the issuance of

Certificate of Occupancy or Temporary Certificate of Occupancy, respectively. MERCER COUNTY SOIL CONSERVATION DISTRICT 508 HUGHES DRIVE

HAMILTON SQUARE, N.J. 08690

Soil De-compaction Testing Requirements

Soil Compaction Testing Requirements . Subgrade soils prior to the application of topsoil (see permanant seeding and stabilization notes for topsoil requirements) shall be free of excessive to a depth of 6.0 inches to enhance the establishment of permanent

- Areas of the site which are subject to compaction testing and/or mitigation are graphically denoted on the certified soil erosion control plan. Compaction testing locations are detoted on the plan. A copy of the plan
- or portion of the plan shall be used to mark locations of the tests, and attached to the compaction remediation form, available from the local soil conservation district. This form must be filled out and submitted prior to receiving a certificate of compliance from the district. 4. In the event taht testing indicates compaction in excess of the maximum thresholds indicated for the simplified testing methods (see details below) the contractor/owner shall have the option to perform either (1) compaction mitigation over the entire mitigation area denoted on the plan, or (2) perform

additional, more detailed testing to establish the limits of excessive compaction

- whereupon only the excessivly compacted would require compaction mitigation. Additional detailed testing shall be performed by a trained, licensed professional Soil Compaction Testing Methods A. Probing Wire test (see detail)
- 3. Hand-held Penetrometer Test (see detail) . Tube Bulk Density Test (licensed professional engineer required).
- Nuclear Density Test (licensed professional engineer required) Note: Additional testing methods which conform to ASTM standards and specifications. and which produce a dry weight, soil bulk density measurement may be allowed subject
- to district approval. Soil Compaction testing is not required if/when subsoil compaction remediation (scanfication/tillage (6" minimum depth) or similar) is proposed as a part of the sequence of construction,

Procedures for Soil Compaction Mitigation

Procedures shall be used to mitigate excessive soil compaction prior to replacement of topsoil, and the establishment of permanent vegetative cover. Restoration of compacted soils shall be through deep sacrification/tillage (6" minimum

depth where there is no danger to underground utilities (cables, irrigation systems, etc.). the alternative, another method as specified by a New Jercey Licensed Professional ngineer maybe subject to District Approval.

Standard For Stabilization With Mulch Only

- Site Preparation
- A. Grade as needed and feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulch application, and mulch anchoring. All grading should be done in accordance with Standards for Land Grading.
 B. Install needed erosion control practices or facilities such as diversions, grade stabilization structures, channel stabilization measures, sediment basins, and waterways.
 See Standards 11 through 42. Protective Materials
- A. Unrotted small—grain straw, at 2.0 tp 2.5 tans per acre is spread uniformly at 90 to 115 pounds per 1,000 square feet and anchored with a mulch anchoring tool, liquid mulch binders, or netting tie down. Other suitable materials may be used if approved by the Soil Conservation District. The approved rates above have been met when the mulch covers the ground completely, upon visual inspection, i.e. the soil cannot be seen below the mulch.

 B. Synthetic or organic soil stabilizers may be used under suitable conditions and in quantities as recommended by the manufacturer.

 C. Wood—fiber or paper—fiber mulch at the rate of 1,500 pounds per acre (or according to the manufacturer's requirements) may be applied by a hydroseeder.
- manufacturer's requirements) may be applied by a hydroseeder.

 Mulch netting, such as paper jute, excelsior, cotton, or plastic, may be used.

 Woodchips applied uniformly to a minimum depth of 2 inches may be used. Woodchips will not be used on areas where flowing water could wash them into an inlet and plug it.

 Gravel, crushed stone, or slag at the rate of 9 cubic yards per 1,000 sq. ft. applied uniformly to a minimum depth of 3 inches may be used. Size 2 or 3 (ASTM C-33) is recommended.
- Mulch Anchoring-mulch to minimize loss by wind or water. This may be done by one of the following methods, depending upon the size of the area and steepness of slopes.
- A. Peg and Twine— Drive 8 to 10 inch wooden pegs to within 2 to 3 inches of the soil surface every 4 feet in all directions. Stakes may be driven before or after applying mulch. Secure mulch to soil surface by stretching twine between pegs in a cris—cross and a square pattern. Secure twine around each peg with two or more round turns.
- B. Mulch Nettings—Staple paper, cotton, or plastic nettings over mulch. Use a degradable netting in areas to be mowed. Netting is usually available in rolls 4 feet wide and up to 300 feet long. C. Crimper Mulch Anchoring Coulter Tool—A tractor—drawn implement especially designed to punch and anchor mulch into the soil surface. This practice affords maximum erosion control, but its use is limited to those slopes upon which the tractor can operate safely. Soil penetration should be about 3 to 4 inches. On sloping land, the operation should be on the contour. D. Liquid Mulch-Binders
- Liquid Mulch—Binders

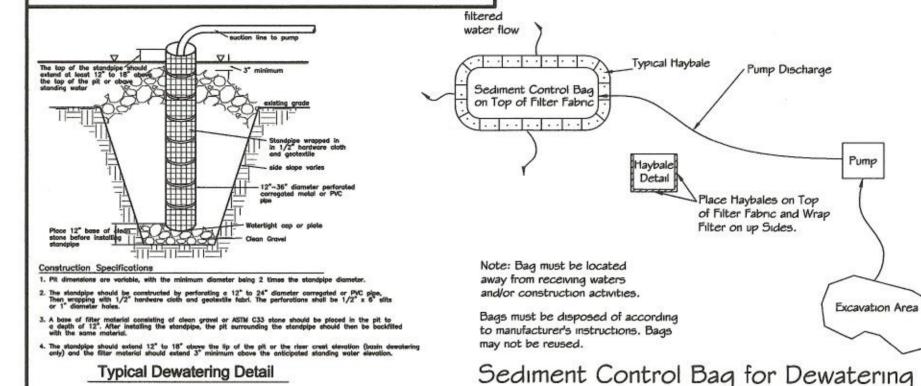
 Applications should be heavier at edges where wind catches the mulch, in valleys, and at crests of banks. Remainder of area should be uniform in appearance.

 Use one of the following:

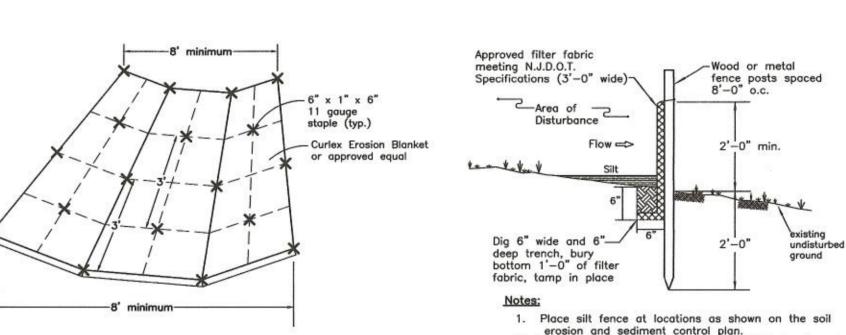
 a. Organic and Vegetable Based Binders— Naturally occurring, powder based, hydrophilic materials that mixed with water formulates a gel and when applied to mulch under satisfactory curing conditions will form membraned networks of insoluble polymers. The vegetable gel shall be physiologically harmless and not result in a phytotoxic effect of

by the manufacturer and remain tacky until germination of grass

impede growth of turfgrass. Vegetable based gels shall be applied at rates and weathe conditions recommended by the manufacturer. b. Synthetic Binders— High polymer synthetic emulsion, miscible with water when diluted and following application to mulch, drying and curing shall no longer be soluble or dispersible in water. It shall be applied at rates and weather conditions recommended



Dewatering Details not to scale



between the staples at the blanket edge.

- 1. The blanket shall be rolled out along the channel bottom and side slopes in the direction of the water flow. 2. Adjacent blankets shall be overlapped by six (6) inches so that one row of staples will fasten the edges along the seam.

Erosion Control Blanket Detail

3. A row of staples will be centered down the blanket located in

the project unless otherwise instructed by the Township Engineer. Proposed Silt Fence Detail

2. The slope of the land for at least 30 feet adjacent

4. Inspection shall be frequent and repair or replacement

5. Silt fence shall remain in place for the duration of

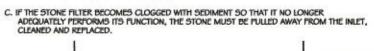
to any silt fence shall not exceed 5 %

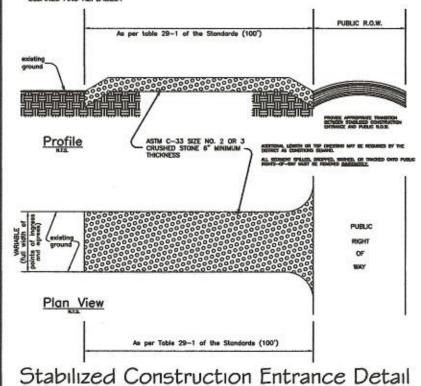
3. Silt fence shall be installed so water cannot

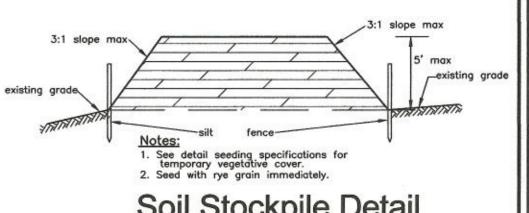
shall be made as promptly as possible.

bypass the fence around the sides.

- A. HARDWARE CLOTH OR COMPARABLE WIRE MESH WITH 1/2 OPENINGS SHALL BE PLACED OVER THE CURB INLET OPENING SO THAT AT LEAST 12 INCHES OF WIRE EXTENDS BEYOND THE INLET COVER AND GRATE AND AT LEAST 12 INCHES OF WIRE EXTENDS BEYOND THE INLET OPENING AND GRATE, AS ILLUSTRATED. B. STONE SHALL BE PILED AGAINST THE WIRE SO AS TO ANCHOR IT AGAINST THE GUTTER AND INLET COVER AND TO COVER THE INLET OPENING COMPLETELY. TWO (2) TO THREE (3) INCH COARSE AGGREGATE SHALL BE USED.





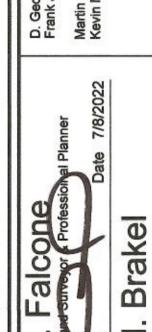


Soil Stockpile Detail

2	7/8/2022	As per Engineering & Planning Reviews	FJF
1	6/3/2022	As per SRC Review and Comment	FJF
NO.	DATE	DESCRIPTION	BY

0

Engineering Junction 9 0 Princeton



rakel 0 4

80€

=

Date: 5/6/2022 Scale: N.T.S. Drawn: FJF Check: FJF/KMB

Soil

Job#: F220401 Dwg: 008-SESC DETAILS View: Window

File # F220401 Sheet 8 of 10