

U-3612

**Project Special Provisions  
Erosion Control**

Guilford County

**SEEDING AND MULCHING:**

(West)

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre (kilograms per hectare).

## Shoulder and Median Areas

**August 1 - June 1**

20# (23kg)	Kentucky Bluegrass
75# (85kg)	Hard Fescue
25# (28kg)	Rye Grain
500# (560kg)	Fertilizer
4000# (4500kg)	Limestone

**May 1 - September 1**

20# (23kg)	Kentucky Bluegrass
75# (85kg)	Hard Fescue
10# (12kg)	German or Browntop Millet
500# (560kg)	Fertilizer
4000# (4500kg)	Limestone

## Areas Beyond the Mowing Pattern, Waste and Borrow Areas:

**August 1 - June 1**

100# (110kg)	Tall Fescue
15# (17kg)	Kentucky Bluegrass
30# (34kg)	Hard Fescue
25# (28kg)	Rye Grain
500# (560kg)	Fertilizer
4000# (4500kg)	Limestone

**May 1 - September 1**

100# (110kg)	Tall Fescue
15# (17kg)	Kentucky Bluegrass
30# (34kg)	Hard Fescue
10# (12kg)	German or Browntop Millet
500# (560kg)	Fertilizer
4000# (4500kg)	Limestone

## Approved Tall Fescue Cultivars

Adventure	Brookstone	Guardian	Red Coat
Adventure II	Bonanza	Houndog	Renegade
Airlie	Bonanza II	Inferno	Safari
Amigo	Bulldog 51	Jaguar	Shelby
Anthem	Chapel Hill	Jaguar III	Shenandoah
Anthem II	Chesapeake	Kentucky 31	Southern Choice II
Apache	Chieftain	Kitty Hawk	South Paw
Apache II	Coronado	Monarch	Tempo
Arid	Crossfire II	Montauk	Titan
Arid II	Debutante	Mustang	Tomahawk
Arid III	Duster	Olympic	Tacer
Aztec II	Falcon	Pacer	Trailblazer
Barfexas	Falcon III	Pixie	Tribute
Barfexas II	Finelawn	Pyramid	Wolfpack
Barrera	Finelawn I	Quest	Wrangler
Barrington	Finelawn Petite	Rebel	

Bingo	Genesis	Rebel Jr
Bravo	Grande	Rebel II

Approved Kentucky Bluegrass Cultivars:

Adelphi	Brilliant	Kenblue	Princeton
Apollo	Bristol	Liberator	Ram I
Bariris	Challenger	Merit	Rugby
Baron	Columbia	Nuglade	Sydsport
Baronie	Fylking	Odyssey	Touchdown
Bartitia	Glade	Plush	Vantage

Approved Hard Fescue Cultivars:

Aurora	Nordic	Spartan	Warwick
Bardur	Reliant	Valda	
Crystal	Scaldis	Waldina	

On cut and fill slopes 2:1 or steeper add 20# (23kg) Sericea Lespedeza January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. Upon written approval of the Engineer, a different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis.

**Native Grass Seeding And Mulching**

**Bluegrass**

Native Grass Seeding and Mulching shall be performed on the disturbed areas of wetlands, and adjacent to Stream Relocation and/or trout stream construction within a 50 foot (16 meter) zone on both sides of the stream or depression, measured from top of stream bank or center of depression. The stream bank of the stream relocation shall be seeded by a method that does not alter the typical cross section of the stream bank. Native Grass Seeding and Mulching shall also be performed in the permanent soil reinforcement mat section of preformed scour holes, and in other areas as directed.

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre (kilograms per hectare).

**August 1 - June 1**

**May 1 – September 1**

25# (28kg)	Kentucky Bluegrass	25# (28kg)	Kentucky Bluegrass
8# (9kg)	Big Bluestem	8# (9kg)	Big Bluestem
6# (7kg)	Indiangrass	6# (7kg)	Indiangrass
4# (5kg)	Switchgrass	4# (5kg)	Switchgrass
35# (39kg)	Rye Grain	25# (28kg)	German or Browntop Millet
500# (560kg)	Fertilizer	500# (560kg)	Fertilizer
4000# (4500kg)	Limestone	4000# (4500kg)	Limestone

Approved Kentucky Bluegrass Cultivars:

Adelphi	Columbia	Merit	Sydsport
Baron	Fylking	Plush	Touchdown
Bristol	Glade	Ram I	Vantage
Challenger	Kenblue	Rugby	

Fertilizer shall be 10-20-20 analysis. Upon written approval of the Engineer, a different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis.

Native Grass Seeding and Mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

**Measurement and Payment**

Native Grass *Seeding and Mulching* will be measured and paid for in accordance with Articles 1660-8 and 1660-9 of the *Standard Specifications*.

**TEMPORARY SEEDING:**

Fertilizer shall be the same analysis as specified for *Seeding and Mulching* and applied at the rate of 400 pounds (450kg) and seeded at the rate of 50 pounds per acre (55kg per hectare). German Millet, or Browntop Millet shall be used in summer months and rye grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

**FERTILIZER TOPDRESSING:**

Fertilizer used for topdressing shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre (560 kg per hectare). Upon written approval of the Engineer, a different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis.

**SUPPLEMENTAL SEEDING:**

The kinds of seed and proportions shall be the same as specified for *Seeding and Mulching*, and the rate of application may vary from 25# to 75# per acre (28kg to 85kg per hectare). The actual rate per acre (hectare) will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre (hectare), total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a sod seeder shall be used for incorporating seed into the soil as to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

**MOWING:**

The minimum mowing height on this project shall be six inches (152 mm).

**LAWN TYPE APPEARANCE:**

All areas adjacent to lawns must be hand finished as directed to give a lawn type appearance. Remove all trash, debris, and stones ¾" (19 mm) and larger in diameter or other obstructions that could interfere with providing a smooth lawn type appearance. These areas shall be reseeded to match their original vegetative conditions, unless directed otherwise by the Field Operations Engineer.

**SPECIALIZED HAND MOWING:****Description**

This work consists of specialized hand mowing around or under fixed objects, including but not limited to guardrails, signs, barriers and slopes in a method acceptable to the Engineer.

Specialized hand mowing shall be completed with mechanically powered trimmers, string trimmers, hand operated rotary mowers, or self-propelled mowers of sufficient size and quality to perform the work timely and efficiently.

The quantity of mowing to be performed will be affected by the actual conditions that occur during the construction of the project. The quantity of mowing may be increased, decreased or eliminated entirely as directed. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

**Measurement and Payment**

*Specialized Hand Mowing* will be measured and paid for as the actual number of hours worked while hand mowing along the surface of the ground, as directed. Where an area has been mowed more than once, as directed, separate measurement will be made each time the area is mowed.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Specialized Hand Mowing	Hour

**RESPONSE FOR EROSION CONTROL:**

The 2002 *Standard Specifications* are revised as follows:

Page 16-40, Section 1675,  
Delete Section 1675 and insert the following:

### **1675-1 Description**

Furnish the labor, materials, tools and equipment necessary to move personnel, equipment, and supplies to the project necessary for the pursuit of any or all of the following work as shown herein, by an approved subcontractor.

- (A) Seeding and Mulching
- (B) Temporary Seeding and Mulching
- (C) Temporary Mulching
- (D) Fertilizer Topdressing
- (E) Repair Seeding
- (F) Supplemental Seeding
- (G) Silt Fence Installation or Repair
- (H) Installation of Matting for Erosion Control

### **1675-2 Construction Methods**

Provide an approved subcontractor who performs an erosion control action as described in Form 1675. Each erosion control action may include one or more of the above work items.

### **1675-3 Measurement and Payment**

*Response for Erosion Control* will be measured and paid for by counting the actual number of times the subcontractor moves onto the project, including borrow and waste sites, and satisfactorily completes an erosion control action described in Form 1675. The provisions of Article 104-5 of the *Standard Specifications* will not apply to this item of work.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Response for Erosion Control	Each

### **ENVIRONMENTALLY SENSITIVE AREAS:**

#### **Description**

This project is located in an *Environmentally Sensitive Area*. This designation requires special procedures to be used for clearing and grubbing, temporary stream crossings, and grading operations within the Environmentally Sensitive Areas identified on the plans and as designated by the Engineer. This also requires special procedures to be used for seeding and mulching and staged seeding within the project.

The Environmentally Sensitive Area shall be defined as a 50-foot (15.2-meter) buffer zone on both sides of the stream or depression measured from top of streambank or center of depression.

### **Construction Methods**

(A) Clearing and Grubbing

In areas identified as Environmentally Sensitive Areas, the Contractor may perform clearing operations, but not grubbing operations until immediately prior to beginning grading operations as described in Article 200-1 of the *Standard Specifications*. Only clearing operations (not grubbing) shall be allowed in this buffer zone until immediately prior to beginning grading operations. Erosion control devices shall be installed immediately following the clearing operation.

(B) Grading

Once grading operations begin in identified Environmentally Sensitive Areas, work shall progress in a continuous manner until complete. All construction within these areas shall progress in a continuous manner such that each phase is complete and areas are permanently stabilized prior to beginning of next phase. Failure on the part of the Contractor to complete any phase of construction in a continuous manner in Environmentally Sensitive Areas will be just cause for the Engineer to direct the suspension of work in accordance with Article 108-7 of the *Standard Specifications*.

(C) Temporary Stream Crossings

Any crossing of streams within the limits of this project shall be accomplished in accordance with the requirements of Subarticle 107-13(B) of the *Standard Specifications*.

(D) Seeding and Mulching

Seeding and mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

Seeding and mulching shall be performed on the areas disturbed by construction immediately following final grade establishment. No appreciable time shall lapse into the contract time without stabilization of slopes, ditches and other areas within the Environmentally Sensitive Areas.

(E) Stage Seeding

The work covered by this section shall consist of the establishment of a vegetative cover on cut and fill slopes as grading progresses. Seeding and mulching shall be

done in stages on cut and fill slopes that are greater than 20 feet (6.1 meters) in height or greater than 2 acres (0.8 hectares) in area. Each stage shall not exceed the limits stated above.

Additional payments will not be made for the requirements of this section, as the cost for this work shall be included in the contract unit prices for the work involved.

**MINIMIZE REMOVAL OF VEGETATION:**

The Contractor shall minimize removal of vegetation at stream banks and disturbed areas within the project limits as directed.

**STOCKPILE AREAS:**

The Contractor shall install and maintain erosion control devices sufficient to contain sediment around any erodible material stockpile areas as directed.

**WASTE AND BORROW SOURCES:**

Payment for temporary erosion control measures, except those made necessary by the Contractor's own negligence or for his own convenience, will be paid for at the appropriate contract unit price for the devices or measures utilized in borrow sources and waste areas.

No additional payment will be made for erosion control devices or permanent seeding and mulching in any commercial borrow or waste pit. All erosion and sediment control practices that may be required on a commercial borrow or waste site will be done at the Contractor's expense.

**GRAVEL CONSTRUCTION ENTRANCE:**

**Description**

This work consists of furnishing, installing, and maintaining and removing any and all material required for the construction of a *Gravel Construction Entrance*.

**Materials**

Refer to Division 10

<b>Item</b>	<b>Section</b>
Filter Fabric for Drainage, Type 2	1056
Stone for Erosion Control, Class A	1042

## **Construction Methods**

The Contractor shall install a Gravel Construction Entrance in accordance with the detail in the plans and at locations as directed.

## **Measurement and Payment**

*Filter Fabric for Drainage* will be measured and paid for in accordance with Subarticles 876-5(C) and 876-6(C) of the *Standard Specifications*.

*Stone for Erosion Control, Class \_\_* will be measured and paid for in accordance with Articles 1610-4 and 1610-5 of the *Standard Specifications*.

Such price and payment shall be considered full compensation for all work covered by this section including all materials, construction, maintenance, and removal of *Gravel Construction Entrance*.

## **TEMPORARY DIVERSION:**

This work consists of installation, maintenance, and cleanout of *Temporary Diversions* in accordance with Section 1630 of the *Standard Specifications*. The quantity of excavation for installation and cleanout will be measured and paid for as *Silt Excavation* in accordance with Articles 1630-4 and 1630-5 of the *Standard Specifications*.

## **SAFETY FENCE:**

### **Description**

*Safety Fence* shall consist of furnishing, installing and maintaining polyethylene or polypropylene fence along the outside riparian buffer, wetland, or water boundary located within the construction corridor to mark the areas that have been approved to infringe within the buffer, wetland or water. The fence shall be installed prior to any land disturbing activities.

### **Materials**

Polyethylene or polypropylene fence shall be a highly visible preconstructed safety fence approved by the Engineer.

Either wood posts or steel posts may be used. Wood posts shall be nominal 2" x 4" (51 mm x 102 mm) or 4" x 4" (102 mm x 102 mm) lengths as required, structural light framing, grade No. 2, Southern Pine. Steel posts shall be at least 5 ft. (1.52 m) in length, approximately 1 3/8" (35 mm) wide measured parallel to the fence, and have a minimum weight of 1.25 lb./ft. (1.9 kg/m) of length. The steel post shall be equipped with an anchor plate having a minimum area of 14 square inches (90 square centimeters).



## Construction Methods

No additional clearing and grubbing is anticipated for the installation of this fence; however, if any clearing and grubbing is required, it will be the minimum required for the installation of the safety fence. Such clearing shall include satisfactory removal and disposal of all trees, brush, stumps and other objectionable material.

The fence shall be erected to conform to the general contour of the ground. When determined necessary, minor grading along the fence line shall be performed to meet this requirement provided no obstructions to proper drainage are created.

Posts shall be set and maintained in a vertical position and may be hand set or set with a post driver. If hand set, all backfill material shall be thoroughly tamped. Wood posts may be sharpened to a dull point if power driven. Posts damaged by power driving shall be removed and replaced prior to final acceptance. The tops of all wood posts shall be cut at a 30-degree angle. The wood posts may, at the option of the Contractor, be cut at this angle either before or after the posts are erected.

The fence fabric shall be attached to the wood posts with one 2" (51 mm) galvanized wire staple across each cable or to the steel posts with wire or other acceptable means.

The Contractor shall be required to maintain the safety fence in a satisfactory condition for the duration of the project as determined by the Engineer.

## Measurement and Payment

*Safety Fence* will be measured and paid for as the actual number of linear feet (linear meters) installed in place and accepted. Such payment will be full compensation including but not limited to clearing and grading, furnishing and installing fence fabric with necessary posts and post bracing, staples, tie wires, tools, equipment and incidentals necessary to complete this work.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Safety Fence	Linear Foot (Linear Meter)

## PERMANENT SOIL REINFORCEMENT MAT:

### Description

This work consists of furnishing and placing *Permanent Soil Reinforcement Mat*, of the type specified, over previously prepared areas as directed.

## Materials

The product shall be a permanent erosion control reinforcement mat and shall be constructed of 100% coconut fiber stitch bonded between a heavy duty UV stabilized cusped (crimped) netting overlaid with a heavy duty UV stabilized top net. The three nettings shall be stitched together on 1.5" (38 mm) centers UV stabilized polyester thread to form a permanent three-dimensional structure. The mat shall have the following physical properties:

Property	Test Method	Value	Unit
Ground Cover	Image Analysis	93	%
Thickness	ASTM D1777	0.63 (16)	in (mm)
Mass Per Unit Area	ASTM D3776	0.92 (0.50)	lb/sy (kg/m <sup>2</sup> )
Tensile Strength	ASTM D5035	480 (714.2)	lb/ft (kg/m)
Elongation	ASTM D5035	49	%
Tensile Strength	ASTM D5035	960 (1428.5)	lb/ft (kg/m)
Elongation	ASTM D5035	31	%
Tensile Strength	ASTM D1682	177 (80.3)	lbs (kg)
Elongation	ASTM D1682	22	%
Resiliency	ASTM D1777	80>	%
UV Stability *	ASTM D4355	151 (68.5)	lbs (kg)
Color (Permanent Net)		UV Black	
Porosity (Permanent Net)	Calculated	>95	%
Minimum Filament Diameter (Permanent Net)	Measured	0.03 (0.8)	in (mm)

\*ASTM D1682 Tensile Strength and % strength retention of material after 1000 hours of exposure in a Xenon-arc weatherometer.

Submit a certification (Type 1, 2, or 3) from the manufacturer showing:

- (A) the chemical and physical properties of the mat used, and
- (B) conformance of the mat with this specification.

## Construction Methods

Matting shall be installed in accordance with Subarticle 1631-3(B) of the *Standard Specifications*.

All areas to be protected with the mat shall be brought to final grade and seeded in accordance with Section 1660 of the *Standard Specifications*. The surface of the soil shall be smooth, firm, stable and free of rocks, clods, roots or other obstructions that would prevent the mat from lying in direct contact with the soil surface. Areas where the mat is to be placed will not need to be mulched.

### **Measurement and Payment**

*Permanent Soil Reinforcement Mat* will be measured and paid for as the actual number of square yards (square meters) measured along the surface of the ground over which Permanent Soil Reinforcement Mat is installed and accepted. Overlaps will not be included in the measurement, and will be considered as incidental to the work. Such payment shall be full compensation for furnishing and installing the mat, including overlaps, and for all required maintenance.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Permanent Soil Reinforcement Mat	Square Yard (Square Meter)

### **IMPERVIOUS DIKE:**

#### **Description**

This work consists of furnishing, installing, maintaining, and removing an *Impervious Dike* for the purpose of diverting normal stream flow around the construction site. The Contractor shall construct an impervious dike in such a manner approved by the Engineer. The impervious dike shall not permit seepage of water into the construction site or contribute to siltation of the stream. The impervious dike shall be constructed of an acceptable material in the locations noted on the plans or as directed.

#### **Materials**

Acceptable materials shall include but not be limited to sheet piles, sandbags, and/or the placement of an acceptable size stone lined with polypropylene or other impervious fabric.

Earth material shall not be used to construct an impervious dike when it is in direct contact with the stream unless vegetation can be established before contact with the stream takes place.

### **Measurement and Payment**

*Impervious Dike* will be measured and paid as the actual number of linear feet (linear meters) of impervious dike(s) constructed, measured in place from end to end of each separate installation that has been completed and accepted. Such price and payment will be full compensation for all work including but not limited to furnishing materials, construction, maintenance, and removal of the impervious dike.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Impervious Dike	Linear Foot (Linear Meter)

**TEMPORARY PIPE FOR CULVERT CONSTRUCTION:****Description**

This work consists of furnishing, installing, maintaining and removing any and all temporary pipe and temporary pipe t-sections used on this project in conjunction with the culvert construction.

**Construction Methods**

The Contractor shall install temporary pipe and temporary pipe t-sections in locations shown on the plans in such a manner approved by the Engineer. The temporary pipe shall provide a passageway for the stream through the work-site. The minimum size requirements will be as stated on the erosion control plans.

**Measurement and Payment**

   " Temporary Pipe (   mm Temporary Pipe) will be measured and paid for at the contract unit price per linear foot (linear meter) of temporary pipe approved by the Engineer and measured in place from end to end. Such price and payment will be full compensation for all work covered by this section including but not limited to furnishing all materials required for installation, construction, maintenance, and removal of temporary pipe and temporary pipe t-sections.

Payment will be made under:

**Pay Item**

   " Temporary Pipe (   mm Temporary Pipe)

**Pay Unit**

Linear Foot (Linear Meter)

**SPECIAL STILLING BASIN:****Description**

This work consists of furnishing, placing, and removing special stilling basin(s) as directed. The special stilling basin shall be used to filter pumped water during construction of drilled piers.

**Materials**

Refer to Division 10

**Item**

Filter Fabric for Drainage, Type 2  
Sediment Control Stone

**Section**

1056  
1005

The special stilling basin shall be a water permeable fabric bag that traps sand, silt, and fines as sediment-laden water is pumped into it.

The special stilling basin shall be a bag constructed to a minimum size of 10 ft. x 15 ft. (3 meters x 4.6 meters) made from a nonwoven fabric. It shall have a sewn-in 8" (203 mm) maximum spout for receiving pump discharge. The bag seams shall be sewn with a double needle machine using a high strength thread. The seams shall have a minimum wide width strength as follows:

<b>Test Method</b>	<b>Minimum Specifications</b>
ASTM D-4884	60 lb/in (10.7 kg/cm)

The fabric used to construct the bag shall be stabilized to provide resistance to ultra-violet degradation and meet the following specifications for flow rates, strength, and permeability:

<b>Property</b>	<b>Test Method</b>	<b>Minimum Specifications</b>
Weight	ASTM D-3776	8.0 oz/yd (248.03 g/m)
Grab tensile	ASTM D-4632	200.0 lb (90.72 kg)
Puncture	ASTM D-4833	130.0 lb (58.97 kg)
Flow rate	ASTM D-4491	80.0 gal/min/ft <sup>2</sup> (0.47 l/s/m <sup>2</sup> )
Permittivity	ASTM D-4491	1.2 l/sec
UV Resistance	ASTM D-4355	70.0%

### **Construction Methods**

The Contractor shall install the special stilling basin(s), filter fabric, and stone in accordance with the detail in the plans and at locations as directed.

The special stilling basin(s) shall be constructed such that it is portable and can be used adjacent to each drilled pier. The special stilling basin(s) shall be placed so the incoming water flows into and through the bag without causing erosion. The neck or spout of the bag shall be tied off tightly to stop the water from flowing out of the bag without going through the walls.

The special stilling basin(s) shall be replaced and disposed of when it is  $\frac{3}{4}$  full of sediment or when it is impractical for the bag to filter the sediment out at a reasonable flow rate. Prior approval from the Engineer shall be received before removal and replacement.

The Contractor shall be responsible for providing a sufficient quantity of bags to contain silt from pumped effluent during construction of drilled piers.

### **Measurement and Payment**

*Special Stilling Basin* will be measured and paid as the actual number of bags used during drilled pier construction as specified and accepted.

*Filter Fabric for Drainage* will be measured and paid for in accordance with Subarticles 876-5(C) and 876-6(C) of the *Standard Specifications*.

*Sediment Control Stone* will be measured and paid for in accordance with Articles 1610-4 and 1610-5 of the *Standard Specifications*.

Such price and payment will be full compensation for all work covered by this section, including but not limited to, furnishing all materials, placing and maintaining the special stilling basin(s), and removal and disposal of silt accumulations and bag.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Special Stilling Basin	Each