

U-2510A

**Project Special Provisions  
Erosion Control**

Mecklenburg 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.

## Shoulder and Median Areas

**August 1 - June 1**

20#	Kentucky Bluegrass
75#	Hard Fescue
25#	Rye Grain
500#	Fertilizer
4000#	Limestone

**May 1 - September 1**

20#	Kentucky Bluegrass
75#	Hard Fescue
10#	German or Browntop Millet
500#	Fertilizer
4000#	Limestone

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

**August 1 - June 1**

100#	Tall Fescue
15#	Kentucky Bluegrass
30#	Hard Fescue
25#	Rye Grain
500#	Fertilizer
4000#	Limestone

**May 1 - September 1**

100#	Tall Fescue
15#	Kentucky Bluegrass
30#	Hard Fescue
10#	German or Browntop Millet
500#	Fertilizer
4000#	Limestone

## Approved Tall Fescue Cultivars

Adventure	Bonanza II	Inferno	Rendition
Adventure II	Bulldog 51	Jaguar	Renegade
Airlie	Chapel Hill	Jaguar III	Safari
Amigo	Chesapeake	Kentucky 31	Shelby
Anthem	Chieftain	Kitty Hawk	Shenandoah
Anthem II	Coronado	Kitty Hawk 2000	Southern Choice II
Apache	Covenant	Monarch	South Paw
Apache II	Crossfire II	Montauk	Tempo
Arid	Debutante	Mustang	Titan
Arid II	Duster	Mustang III	Titan Ltd.
Arid III	Escalade	Olympic	Tomahawk
Aztec II	Falcon	Pacer	Tacer
Barlexas	Falcon III	Paraiso	Trailblazer
Barlexas II	Finelawn	Pixie	Tribute
Barrera	Finelawn I	Pyramid	Trooper
Barrington	Finelawn Petite	Quest	Wolfpack
Bingo	Genesis	Rebel	Wrangler

Bravo	Grande	Rebel Jr
Brookstone	Guardian	Rebel II
Bonanza	Houndog	Red Coat

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	Minotaur	Scaldis	Waldina
Bardur	Nordic	Spartan	Warwick
Crystal	Reliant	Valda	

On cut and fill slopes 2:1 or steeper add 20# 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 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.

**August 1 - June 1**

25#	Kentucky Bluegrass
8#	Big Bluestem
6#	Indiangrass
4#	Switchgrass
35#	Rye Grain

**May 1 – September 1**

25#	Kentucky Bluegrass
8#	Big Bluestem
6#	Indiangrass
4#	Switchgrass
25#	German or Browntop Millet

500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

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

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 Article 1660-8 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 and seeded at the rate of 50 pounds per acre. 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. 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. The actual rate per acre will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre, 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.

**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 3/4" 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:**

### **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

### **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.

### **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 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 in height measured along the slope, or greater than 2 acres 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 Standard Drawing No. 1607.01 and at locations as directed.

**Measurement and Payment**

*Filter Fabric for Drainage* will be measured and paid for in accordance with Article 876-4 of the *Standard Specifications*.

*Stone for Erosion Control, Class \_\_\_* will be measured and paid for in accordance with Article 1610-4 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 Article 1630-4 of the *Standard Specifications*.

**TEMPORARY EARTH BERMS:****Description**

This work consists of installing, maintaining, and removing any and all material required for the construction of temporary earth berms. The temporary earth berms shall be used to direct the flow of water to specific erosion control device(s), or to direct water flowing from offsite around/away from specific area(s) of construction.

**Construction Methods**

The Contractor shall install the temporary earth berms in accordance with the details in the plans and at locations indicated in the plans, and as directed. Upon installation, the earth berms shall be immediately stabilized as provided in Section 1620 of the *Standard Specifications*. Other stabilization methods may be utilized with prior approval from the Engineer.

Upon completion of the project, the temporary earth berms shall be removed. The earth material can be utilized in the filling of silt ditches and detention devices, or graded to match the existing contours and permanently seeded and mulched.

**Measurement and Payment**

The installation of the temporary earth berms will be paid for as *Borrow Excavation* as provided in Section 230 of the *Standard Specifications* or included in the lump sum price for grading.



Stabilization of the temporary earth berms will be paid for as *Temporary Seeding* as provided in Section 1620 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 the temporary earth berms.

### **SPECIAL SEDIMENT CONTROL FENCE:**

#### **Description**

This work consists of the construction, maintenance, and removal of *Special Sediment Control Fence*. Place special sediment control fence as shown on the plans or as directed.

#### **Materials**

(A) Posts

Steel posts shall be at least 5 ft. in length, approximately 1 3/8" wide measured parallel to the fence, and have a minimum weight of 1.25 lb/ft of length. The post shall be equipped with an anchor plate having a minimum area of 14.0 square inches, and shall have a means of retaining wire in the desired position without displacement.

(B) 1/4" Hardware Cloth

Hardware cloth shall have 1/4" openings constructed from #24 gauge wire. Install hardware cloth in accordance with Standard Drawing No. 1606.01.

(C) Sediment Control Stone

Sediment Control Stone shall meet the requirements of Section 1005 of the *Standard Specifications*. Install stone in accordance with Standard Drawing No. 1606.01.

#### **Construction Methods**

The Contractor shall maintain the special sediment control fence until the project is accepted or until the fence is removed, and shall remove and dispose of silt accumulations at the fence when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

#### **Measurement and Payment**

1/4" *Hardware Cloth* will be measured and paid for in accordance with Article 1632-5 of the *Standard Specifications*.

*Sediment Control Stone* will be measured and paid for in accordance with Article 1610-4 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" or 4" x 4" lengths as required, structural light framing, grade No. 2, Southern Pine. Steel posts shall be at least 5 ft. in length, approximately 1 3/8" wide measured parallel to the fence, and have a minimum weight of 1.25 lb./ft. of length. The steel post shall be equipped with an anchor plate having a minimum area of 14 square inches.

#### **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" 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 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

## 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" centers UV stabilized polyester thread to form a permanent three-dimensional structure. The mat shall have the following physical properties:

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

\*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 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

### **COIR FIBER BAFFLE:**

#### **Description**

Furnish material, install and maintain coir fiber baffles according to the details in the plans or in locations as directed. Coir Fiber Baffles shall be installed in silt basins and sediment dams at drainage outlets. Work includes providing all materials, placing, securing, excavating and backfilling of *Coir Fiber Baffles*.

## Materials

### (A) Coir Fiber Mat

Matting: Provide matting to meet the following requirements:

	100% coconut fiber (coir) twine woven into high strength matrix
Thickness -	0.30 in. minimum
Tensile Strength	1348 x 626 lb/ft minimum
Elongation	34% x 38% maximum
Flexibility (mg-cm)	65030 x 29590
Flow Velocity	Observed 11 ft/sec
Weight	20 oz/SY
Size	6.6 x 164 ft (120 SY)
"C" Factor	0.002
Open Area (measured)	50%

### (B) Staples

Provide staples made of 0.125 in. diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

### (C) Posts

Steel posts shall be at least 5 ft. in length, approximately 1 3/8" wide measured parallel to the fence, and have a minimum weight of 1.25 lb/ft of length. The post shall be equipped with an anchor plate having a minimum area of 14.0 square inches, and shall be of the self-fastener angle steel type to have a means of retaining wire and coir fiber mat in the desired position without displacement.

### (D) Wire

Provide 8-gauge wire strand of variable lengths.

## Construction Methods

Place the coir fiber baffles immediately upon excavation of basins. Install three (3) baffles in basins with a spacing of one fourth (1/4) the basin length and according to the detail sheets. Two (2) coir fiber baffles shall be installed in basins less than 20 ft. in length with a spacing of one third (1/3) the basin length.

Steel posts shall be placed at a depth of 2 ft. below the basin surface, with a maximum spacing of 4 ft. Attach an 8-gauge wire strand to the steel posts at a height of 3 ft. with plastic ties or wire fasteners. Install a steel post into side of the basin at a variable depth and a height of 3 ft. from the bottom of the basin to anchor coir fiber mat. Secure anchor post to the upright steel post in basin with wire fasteners.

The coir fiber mat shall be draped over the wire strand to a minimum of 3 ft. of material on each side of the strand. Secure the coir fiber mat to the wire strand with plastic ties or wire fasteners. Place staples across the matting at ends and junctions approximately 1 ft. apart at the bottom and side slopes of basin. Overlap matting at least 6" where 2 or more widths of matting are installed side by side. Refer to details in the plan sheets. The Engineer may require adjustments in the stapling requirements to fit individual site conditions.

### **Measurement and Payment**

*Coir Fiber Baffles* will be measured and paid for by the actual number of linear feet of coir fiber baffles which are installed and accepted. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to install the coir fiber baffles.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Coir Fiber Baffle	Linear Foot

### **SKIMMER BASIN WITH BAFFLES:**

#### **Description**

Provide a skimmer basin to remove sediment from construction site runoff at locations shown on the plans. See the Skimmer Basin with Baffle Detail sheet. Work includes constructing sediment basin, installation of coir fiber baffles, installation of Faircloth Skimmer or other approved equivalent device, providing and placing filter fabric emergency spillway liner, providing coir fiber mat stabilization for the skimmer outlet, disposing of excess materials, removing filter fabric liner and skimmer, backfilling basin area with suitable material and providing proper drainage when basin area is abandoned.

#### **Materials**

<b>Item</b>	<b>Section</b>
Filter Fabric for Drainage, Type 2	1056

*Coir Fiber Baffles* shall meet the specifications as provided elsewhere in this contract.

Provide appropriately sized Faircloth skimmer or other approved equivalent device.

Matting: Coir fiber matting for stabilization of the skimmer outlet shall meet the following requirements:

100% coconut fiber (coir) twine woven into high strength matrix	
Thickness -	0.30 in. minimum
Tensile Strength	1348 x 626 lb/ft minimum
Elongation	34% x 38% maximum
Flexibility (mg-cm)	65030 x 29590
Flow Velocity	Observed 11 ft/sec
Weight	20 oz/SY
Size	6.6 x 164 ft (120 SY)
"C" Factor	0.002
Open Area (measured)	50%

Anchors: Staples, stakes, or reinforcement bars shall be used as anchors.

#### Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

#### Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

#### Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

### **Construction Methods**

Excavate basin according to the erosion control plans with basin surface free of obstructions, debris, and pockets of low-density material. Construct the emergency spillway according to Skimmer Basin with Baffles Detail sheet in the plans. Construct the coir fiber baffles according to the details in the plans and as provided elsewhere in this contract.

Install Faircloth skimmer or other approved equivalent device according to manufacturer recommendations.

Line emergency spillway with filter fabric unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury edges of fabric in a trench at least 5" deep and tamp firmly. Make vertical overlaps a minimum of 18" with upstream fabric overlapping the downstream fabric. Secure fabric with eleven gauge wire staples

shaped into a *u* shape with a length of not less than 6" and a throat not less than 1" in width. Place staples along outer edges and throughout the fabric a maximum of 3 ft. horizontally and vertically.

At the skimmer outlet, provide a smooth soil surface free from stones, clods, or debris that will prevent contact of the coir fiber matting with the soil. Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Wooden stakes, reinforcement bars, or staples may be used as anchors in accordance with the details in the plans and as directed. Place anchors across the matting at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the matting 3 ft. apart.

**Measurement and Payment**

*Silt Excavation* will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*, as calculated from the typical section throughout the length of the basin as shown on the final approved plans.

*Filter Fabric for Drainage* will be measured and paid for in accordance with Article 876-4 of the *Standard Specifications*.

*Coir Fiber Baffles* will be measured and paid for as provided elsewhere in this contract.

\_\_\_" *Skimmer* will be measured in units of each.

*Coir Fiber Mat* will be measured and paid for as the actual number of square yards measured along the surface of the ground over which coir fiber mat is installed and accepted.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
___" Skimmer	Each
Coir Fiber Mat	Square Yard

**TIERED SKIMMER BASIN WITH BAFFLES:**

**Description**

Provide a tiered skimmer basin to remove sediment from construction site runoff at locations shown on the plans. See the Tiered Skimmer Basin Detail sheet. Tiered Skimmer Basins shall be installed in areas where topography creates a large elevation difference between the inlet and outlet of a single skimmer basin. Work includes constructing sediment basins, installation of coir fiber baffles, installation of temporary slope drains, installation of Faircloth Skimmer or other approved equivalent device,



providing and placing filter fabric emergency spillway liners, providing coir fiber mat stabilization for the skimmer outlet, disposing of excess materials, removing filter fabric liner and skimmer, backfilling basin area with suitable material and providing proper drainage when basin area is abandoned.

### Materials

Item	Section
Filter Fabric for Drainage, Type 2	1056
Temporary Slope Drain	1622

*Coir Fiber Baffles* shall meet the specifications as provided elsewhere in this contract.

Provide appropriately sized Faircloth skimmer or other approved equivalent device.

Matting: Coir fiber matting for stabilization of the skimmer outlet shall meet the following requirements:

100% coconut fiber (coir) twine woven into high strength matrix	
Thickness -	0.30 in. minimum
Tensile Strength	1348 x 626 lb/ft minimum
Elongation	34% x 38% maximum
Flexibility (mg-cm)	65030 x 29590
Flow Velocity	Observed 11 ft/sec
Weight	20 oz/SY
Size	6.6 x 164 ft (120 SY)
"C" Factor	0.002
Open Area (measured)	50%

Anchors: Staples, stakes, or reinforcement bars shall be used as anchors.

#### Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

#### Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

**Staples:**

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

**Construction Methods**

Excavate basins according to the erosion control plans with basin surface free of obstructions, debris, and pockets of low-density material. Construct the emergency spillways according to Tiered Skimmer Basin Detail sheet in the plans. Construct the coir fiber baffles according to the details in the plans and as provided elsewhere in this contract.

Install a minimum of 2 (two) temporary slope drains to dewater the upper basin to the lower basin. The outlet of the slope drains shall be placed on the bottom elevation of the lower basin.

Install Faircloth skimmer or other approved equivalent device according to manufacturer recommendations.

Line emergency spillways with filter fabric unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury edges of fabric in a trench at least 5" deep and tamp firmly. Make vertical overlaps a minimum of 18" with upstream fabric overlapping the downstream fabric. Secure fabric with eleven gauge wire staples shaped into a *u* shape with a length of not less than 6" and a throat not less than 1" in width. Place staples along outer edges and throughout the fabric a maximum of 3 ft. horizontally and vertically.

At the skimmer outlet, provide a smooth soil surface free from stones, clods, or debris that will prevent contact of the coir fiber matting with the soil. Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Wooden stakes, reinforcement bars, or staples may be used as anchors in accordance with the details in the plans and as directed. Place anchors across the matting at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the matting 3 ft. apart.

**Measurement and Payment**

*Silt Excavation* will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*, as calculated from the typical section throughout the length of the basin as shown on the final approved plans.

*Filter Fabric for Drainage* will be measured and paid for in accordance with Article 876-4 of the *Standard Specifications*.

*Coir Fiber Baffles* will be measured and paid for as provided elsewhere in this contract.

\_\_\_" *Skimmer* will be measured in units of each.

*Coir Fiber Mat* will be measured and paid for as the actual number of square yards measured along the surface of the ground over which coir fiber mat is installed and accepted.

*Temporary Slope Drain* will be measured and paid for in accordance with Article 1622-4 of the *Standard Specifications*.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
___" Skimmer	Each
Coir Fiber Mat	Square Yard

### **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 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

**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 and culvert removal.

**Materials**

Refer to Division 10

<b>Item</b>	<b>Section</b>
Filter Fabric for Drainage, Type 2	1056
Sediment Control Stone	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' x 15' made from a nonwoven fabric. It shall have a sewn-in 8" (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

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
Grab tensile	ASTM D-4632	200.0 lb
Puncture	ASTM D-4833	130.0 lb
Flow rate	ASTM D-4491	80.0 gal/min/sf
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 Standard Drawing No. 1630.06 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 and the culvert removal. 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 and culvert removal.

### **Measurement and Payment**

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

*Filter Fabric for Drainage* will be measured and paid for in accordance with Article 876-4 of the *Standard Specifications*.

*Sediment Control Stone* will be measured and paid for in accordance with Article 1610-4 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