

R-2241A

**Project Special Provisions  
Erosion Control**

**Person County**

**STABILIZATION REQUIREMENTS:**

Stabilization for this project shall comply with the time frame guidelines as specified by the NCG-010000 general construction permit effective August 3, 2011 issued by the North Carolina Department of Environment and Natural resources Division of Water Quality. Temporary or permanent ground cover stabilization shall occur within 7 calendar days from the last land-disturbing activity, with the following exceptions in which temporary or permanent ground cover shall be provided in 14 calendar days from the last land-disturbing activity:

- Slopes between 2:1 and 3:1, with a slope length of 3 meters or less
- Slopes 3:1 or flatter, with a slope of length of 15 meters or less
- Slopes 4:1 or flatter

The stabilization timeframe for High Quality Water (HQW) Zones shall be 7 calendar days with no exceptions for slope grades or lengths. High Quality Water Zones (HQW) Zones are defined by North Carolina Administrative Code 15A NCAC 04A.0105 (25). Temporary and permanent ground cover stabilization shall be achieved in accordance with the provisions in this contract and as directed.

**SEEDING AND MULCHING:**

**(East)**

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 kilograms per hectare.

All Roadway Areas

**March 1 - August 31**

55kg	Tall Fescue
12kg	Centipede
28kg	Bermudagrass (hulled)
560kg	Fertilizer
4500kg	Limestone

**September 1 - February 28**

55kg	Tall Fescue
12kg	Centipede
40kg	Bermudagrass (unhulled)
560kg	Fertilizer
4500kg	Limestone

Waste and Borrow Locations

**March 1 - August 31**

85kg	Tall Fescue
28kg	Bermudagrass (hulled)
560kg	Fertilizer
4500kg	Limestone

**September 1 - February 28**

85kg	Tall Fescue
40kg	Bermudagrass (unhulled)
560kg	Fertilizer
4500kg	Limestone

Note: 55kg of Bahiagrass may be substituted for either Centipede or Bermudagrass only upon Engineer's request.

#### Approved Tall Fescue Cultivars

2 <sup>nd</sup> Millennium	Duster	Magellan	Rendition
Avenger	Endeavor	Masterpiece	Scorpion
Barlexas	Escalade	Matador	Shelby
Barlexas II	Falcon II, III, IV & V	Matador GT	Signia
Barrera	Fidelity	Millennium	Silverstar
Barrington	Finesse II	Montauk	Southern Choice II
Biltmore	Firebird	Mustang 3	Stetson
Bingo	Focus	Olympic Gold	Tarheel
Bravo	Grande II	Padre	Titan Ltd
Cayenne	Greenkeeper	Paraiso	Titanium
Chapel Hill	Greystone	Picasso	Tomahawk
Chesapeake	Inferno	Piedmont	Tacer
Constitution	Justice	Pure Gold	Trooper
Chipper	Jaguar 3	Prospect	Turbo
Coronado	Kalahari	Quest	Ultimate
Coyote	Kentucky 31	Rebel Exeda	Watchdog
Davinci	Kitty Hawk	Rebel Sentry	Wolfpack
Dynasty	Kitty Hawk 2000	Regiment II	
Dominion	Lexington	Rembrandt	

On cut and fill slopes 2:1 or steeper Centipede shall be applied at the rate of 6 kilograms per hectare and add 23kg of Sericea Lespedeza from January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. 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 and as directed.

#### Native Grass Seeding and Mulching

(East)

Native Grass Seeding and Mulching shall be performed on the disturbed areas of wetlands and riparian areas, and adjacent to Stream Relocation construction within a 15.2 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 kg per hectare.

**March 1 - August 31**

20kg	Creeping Red Fescue
7kg	Indiangrass
9kg	Little Bluestem
5kg	Switchgrass
28kg	Browntop Millet
560kg	Fertilizer
4500kg	Limestone

**September 1 - February 28**

20kg	Creeping Red Fescue
7kg	Indiangrass
9kg	Little Bluestem
5kg	Switchgrass
39kg	Rye Grain
560kg	Fertilizer
4500kg	Limestone

Approved Creeping Red Fescue Cultivars:

- |          |        |      |           |
|----------|--------|------|-----------|
| Aberdeen | Boreal | Epic | Cindy Lou |
|----------|--------|------|-----------|

Fertilizer shall be 10-20-20 analysis. 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 and as directed.

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 450 kilograms and seeded at the rate of 55kg per hectare. Sweet Sudan Grass, 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 on all roadway areas except slopes 2:1 and steeper shall be 10-20-20 8 grade and shall be applied at the rate of 560kg per hectare. 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 10-20-20 analysis and as directed.

Fertilizer used for topdressing on slopes 2:1 and steeper and waste and borrow areas shall be 16-8-8 grade and shall be applied at the rate of 560kg per hectare. 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 and as directed.

**SUPPLEMENTAL SEEDING:**

The kinds of seed and proportions shall be the same as specified for *Seeding and Mulching*, with the exception that no centipede seed will be used in the seed mix for supplemental seeding. The rate of application for supplemental seeding may vary from 28kg to 85kg per hectare. The actual rate per hectare will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per 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 102mm.

**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 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 man 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	MHR

### **REFORESTATION:**

#### **Description**

*Reforestation* will be planted along the outside borders of the road, and in other areas as directed. *Reforestation* is not shown on the plan sheets. See the Reforestation Detail Sheet.

All non-maintained riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated with native woody species.

The entire *Reforestation* operation shall comply with the requirements of Section 1670 of the *Standard Specifications*.

#### **Materials**

*Reforestation* shall be bare root seedlings 305-457mm tall.

#### **Construction Methods**

*Reforestation* shall be planted as soon as practical following permanent *Seeding and Mulching*. The seedlings shall be planted in a 4.9-meter wide swath adjacent to mowing pattern line, or as directed.

Root dip: The roots of reforestation seedlings shall be coated with a slurry of water, and either a fine clay (kaolin) or a superabsorbent that is designated as a bare root dip. The type, mixture ratio, method of application, and the time of application shall be submitted to the Engineer for approval.

With the approval of the Engineer, seedlings may be coated before delivery to the job or at the time of planting, but at no time shall the roots of the seedlings be allowed to dry out. The roots shall be moistened immediately prior to planting.

Seasonal Limitations: *Reforestation* shall be planted from November 15 through March 15.

#### **Measurement and Payment**

*Reforestation* will be measured and paid for in accordance with Article 1670-17 of the *Standard Specifications*.

**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.

<b>Section</b>	<b>Erosion Control Item</b>	<b>Unit</b>
1605	Temporary Silt Fence	M
SP	Special Sediment Control Fence	M/MTON
1615	Temporary Mulching	HA
1620	Seed - Temporary Seeding	KG
1620	Fertilizer - Temporary Seeding	MTON
1631	Matting for Erosion Control	SM
SP	Coir Fiber Mat	M
SP	Coir Fiber Baffles	M
SP	Permanent Soil Reinforcement Mat	SM
1660	Seeding and Mulching	HA
1661	Seed - Repair Seeding	KG
1661	Fertilizer - Repair Seeding	MTON
1662	Seed - Supplemental Seeding	KG
1665	Fertilizer Topdressing	MTON
SP	Safety/Highly Visible Fencing	M
SP	Response for Erosion Control	EA

**Construction Methods**

Provide an approved subcontractor who performs an erosion control action as described in the NPDES Inspection Form SPPP30. 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

**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.

**ACCESS AND HAUL ROADS:**

At the end of each working day, the Contractor shall install or re-establish temporary diversions or earth berms across access/haul roads to direct runoff into sediment devices. Silt fence sections that are temporarily removed shall be reinstalled across access/haul roads at the end of each working day.

**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 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*.

## **SPECIAL SEDIMENT CONTROL FENCE:**

### **Description**

This work consists of furnishing materials, and 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 1.5 meters in length, approximately 35 mm wide measured parallel to the fence, and have a minimum weight of 1.86 kg/m of length. The post shall be equipped with an anchor plate having a minimum area of 9000 square millimeters, and shall have a means of retaining wire in the desired position without displacement.

#### **(B) 6.4 mm Hardware Cloth**

Hardware cloth shall have 6.35mm openings constructed from #24 gauge wire. Install hardware cloth in accordance with the detail in the plans.



(C) Sediment Control Stone

Sediment Control Stone shall meet the requirements of Section 1005 of the *Standard Specifications*. Install stone in accordance with the detail in the plans.

**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**

*6.4mm 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 AND JURISDICTIONAL FLAGGING:**

**Description**

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

Interior boundaries for jurisdictional areas noted above shall be delineated by stakes and highly visible flagging.

Jurisdictional boundaries at staging areas, waste sites, or borrow pits, whether considered outside or interior boundaries shall be delineated by stakes and highly visible flagging.

**Materials**

(A) Safety Fencing

Polyethylene or polypropylene fence shall be a highly visible preconstructed safety fence approved by the Engineer. The fence material shall have an ultraviolet coating.

Either wood posts or steel posts may be used. Wood posts shall be hardwood with a wedge or pencil tip at one end, and shall be at least 1.5 m in length with a minimum nominal 51 mm x 51 mm cross section. Steel posts shall be at least 1.5 m in length, and have a minimum weight of 1.25 kg/m of length.

(B) Boundary Flagging

Wooden stakes shall be 1.2 m in length with a minimum nominal 19 mm x 45 mm cross section. The flagging shall be at least 25 mm in width. The flagging material shall be vinyl and shall be orange in color and highly visible.

**Construction Methods**

No additional clearing and grubbing is anticipated for the installation of this fence. The fence shall be erected to conform to the general contour of the ground.

(A) Safety Fencing

Posts shall be set at a maximum spacing of 3 m, maintained in a vertical position and 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 geotextile shall be attached to the wood posts with one 51 mm galvanized wire staple across each cable or to the steel posts with wire or other acceptable means.

Place construction stakes to establish the location of the safety fence in accordance with Article 105-9 or Article 801-1 of the *Standard Specifications*. No direct pay will be made for the staking of the safety fence. All stakeouts for safety fence shall be considered incidental to the work being paid for as "Construction Surveying", except that where there is no pay item for construction surveying, all safety fence stakeout will be performed by state forces.

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.

(B) Boundary Flagging

Boundary flagging delineation of interior boundaries shall consist of wooden stakes on 7.6 m maximum intervals with highly visible orange flagging attached. Stakes shall be installed a minimum of 152 mm into the ground. Interior boundaries may be staked on a tangent that runs parallel to buffer but must not encroach on the buffer at any location. Interior boundaries of hand clearing shall be identified with a different colored flagging to distinguish it from mechanized clearing.

Boundary flagging delineation of interior boundaries will be placed in accordance with Article 105-9 or Article 801-1 of the *Standard Specifications*. No direct pay will be made for delineation of the interior boundaries. This delineation will be considered incidental to the work being paid for as *Construction Surveying*, except that where there is no pay item or construction surveying the cost of boundary flagging delineation shall be included in the unit prices bid for the various items in the contract. Installation for delineation of all jurisdictional boundaries at

staging areas, waste sites, or borrow pits shall consist of wooden stakes on 7.6 m maximum intervals with highly visible orange flagging attached. Stakes shall be installed a minimum of 152 mm into the ground. Additional flagging may be placed on overhanging vegetation to enhance visibility but does not substitute for installation of stakes.

Installation of boundary flagging for delineation of all jurisdictional boundaries at staging areas, waste sites, or borrow pits shall be performed in accordance with Subarticle 230-4(B)(3)(d) or Subarticle 802-2(F) of the *Standard Specifications*. No direct pay will be made for this delineation, as the cost of same shall be included in the unit prices bid for the various items in the contract.

The Contractor shall be required to maintain alternative stakes and highly visible flagging 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 as the actual number of linear feet of polyethylene or polypropylene fence installed in place and accepted. Such payment will be full compensation including but not limited to furnishing and installing fence geotextile 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 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 synthetic or coconut fibers evenly distributed throughout the mat between a bottom UV stabilized netting and a heavy duty UV stabilized top net. The matting shall be stitched together with UV stabilized polypropylene thread to form a permanent three-dimensional structure. The mat shall have the following minimum physical properties:

<b>Property</b>	<b>Test Method</b>	<b>Value</b>	<b>Unit</b>
Light Penetration	ASTM D6567	9	%
Thickness	ASTM D6525	10	mm
Mass Per Unit Area	ASTM D6566	0.293	kg/m <sup>2</sup>
Tensile Strength	ASTM D6818	572	kg/m
Elongation (Maximum)	ASTM D6818	49	%

Resiliency	ASTM D1777	>70	%
UV Stability *	ASTM D4355	≥80	%
Porosity (Permanent Net)	ECTC Guidelines	≥85	%
Maximum Permissible Shear Stress (Vegetated)	Performance Bench Test	≥39.1	kg/m <sup>2</sup>
Maximum Allowable Velocity (Vegetated)	Performance Bench Test	≥4.9	m/s

\*ASTM D1682 Tensile Strength and % strength retention of material after 1000 hours of exposure.

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 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 Meter

**SKIMMER BASIN WITH BAFFLES:**

**Description**

Provide a skimmer basin to remove sediment from construction site runoff at locations shown in the erosion control plans. See the Skimmer Basin with Baffles Detail sheet provided in the erosion control plans. Work includes constructing sediment basin, installation of temporary

slope drain pipe and coir fiber baffles, furnishing, installation and cleanout of Faircloth Skimmers or other approved equivalent device, providing and placing stone pad on bottom of basin underneath skimmer device, providing and placing fabric emergency spillway liner, providing coir fiber mat stabilization for the skimmer outlet, disposing of excess materials, removing temporary slope drain, coir fiber baffles, fabric liner and skimmer device, backfilling basin area with suitable material and providing proper drainage when basin area is abandoned.

## Materials

Item	Section
Stone for Erosion Control, Class B	1042
Fabric for Soil Stabilization, Type 4	1056
Fertilizer for Temporary Seeding	1060-2
Seed for Temporary Seeding	1060-4
Seeding and Mulching	1060-4
Matting for Erosion Control	1060-8
Staples	1060-8
Temporary Slope Drain	1622-2

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

Provide appropriately sized Faircloth skimmer or other approved equivalent device.

Provide Schedule 40 PVC pipe with a length of 2m to attach to the skimmer and the coupling connection to serve as the arm pipe. For skimmer sizes of 64mm and smaller, the arm pipe diameter shall be 38mm. For skimmer sizes of 76mm and larger, refer to manufacturer recommendation.

Provide 102mm diameter Schedule 40 PVC pipe to attach to coupling connection of Faircloth skimmer to serve as the barrel pipe through the earthen dam.

Coir Fiber Mat: 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 -	7.6mm minimum
Tensile Strength	1650.5 x 766.5 kg/m minimum
Elongation	34% x 38% maximum
Flexibility (mg-cm)	65030 x 29590
Flow Velocity	Observed 3.35m/s
Weight	678g/SM
Size	100 SM
"C" Factor	0.002
Open Area (measured)	50%

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

**Wooden Stakes:**

Provide hardwood stakes 305mm - 610mm long with a 51mm x 51mm 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 25mm - 51mm long head at the top with a 25mm - 51mm notch following to catch and secure the coir fiber mat.

**Steel Reinforcement Bars:**

Provide uncoated #10 steel reinforcement bars 610mm nominal length. The bars shall have a 102mm diameter bend at one end with a 102mm straight section at the tip to catch and secure the coir fiber mat.

**Staples:**

Provide staples made of 3.18mm diameter new steel wire formed into a *u* shape not less than 305mm in length with a throat of 25mm 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. Install temporary slope drain pipe and construct the emergency spillway according to the Skimmer Basin with Baffles Detail sheet in the erosion control plans. Temporary slope drain pipe at inlet of basin may be replaced by fabric as directed. 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. Install 102mm Schedule 40 PVC pipe into dam on the lower side of basin 305mm from the bottom of the basin and according to the detail, and attach the 2 meter arm pipe to the coupling connection and Faircloth skimmer according to manufacturer recommendations. Attach the rope included with the skimmer to the tee between the vent socket and the tube inlet, and the other end to a wooden stake or metal post. Clean out skimmer device when it becomes clogged with sediment and/or debris and is unable to float at the top of water in skimmer basin. Take appropriate measures to avoid ice accumulation in the skimmer device. Construct a stone pad of Class B stone directly underneath the skimmer device at bottom of basin. The pad shall be a minimum of 305mm in height, and shall have a minimum cross sectional area of 1.2 meters by 1.2 meters.

Line emergency spillway with 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 127 mm deep and tamp firmly. If fabric for the emergency spillway is not one continuous piece of material, make horizontal overlaps a minimum of 457 mm 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 305 mm and a throat not less than 25 mm in width. Place staples along outer edges and throughout the fabric a maximum of 0.9 meter horizontally and vertically.

Fabric shall be placed to the bottom and across the entire width of the basin according to the Skimmer Basin with Baffles detail.

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 0.3 meters apart. Place anchors along the outer edges and down the center of the matting 0.9 meters apart.

All bare side slope sections of the skimmer basin shall be seeded with a temporary or permanent seed mix as directed and in accordance with Articles 1620-3, 1620-4, 1620-5, 1660-4, 1660-5 and 1660-7 of the *Standard Specifications*. Straw or excelsior matting shall be installed on all bare side slope sections immediately upon the completion of seeding and in accordance with Subarticle 1631-3(B) of the *Standard Specifications*.

### **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.

*Fabric for Soil Stabilization* will be measured and paid for in accordance with Article 270-4 of the *Standard Specifications*.

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

\_\_\_mm *Skimmer* will be measured in units of each. \_\_\_mm *Skimmer* will be measured and paid for as the maximum number of each size skimmer acceptably installed and in use at any one time during the life of the project. Barrel and arm pipe, cleanout, relocation and reinstallation of \_\_\_mm *Skimmer* is considered incidental to the measurement of the quantity of \_\_\_mm *Skimmer* and no separate payment will be made. No separate payment shall be made if \_\_\_mm *Skimmer*, barrel and/or arm pipe are damaged by ice accumulation.

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

*Temporary Slope Drains* will be measured and paid for in accordance with Article 1622-4 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*.

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

*Seed for Temporary Seeding* will be measured and paid for in accordance with Article 1620-6 of the *Standard Specifications*.

*Fertilizer for Temporary Seeding* will be measured and paid for in accordance with Article 1620-6 of the *Standard Specifications*.

*Matting for Erosion Control* will be measured and paid for in accordance with Article 1631-4 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>
___mm Skimmer	Each
Coir Fiber Mat	Square Meter

### **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 -	7.6mm minimum
Tensile Strength	1650.5 x 766.5 kg/m minimum
Elongation	34% x 38% maximum
Flexibility (mg-cm)	65030 x 29590
Flow Velocity	Observed 3.35m/s
Weight	678g/SM
Size	100 SM
"C" Factor	0.002
Open Area (measured)	50%

(B) Staples

Provide staples made of 3.18 mm diameter new steel wire formed into a *u* shape not less than 305 mm in length with a throat of 25 mm in width.



**(C) Posts**

Steel posts shall be at least 1.5 m in length, approximately 35 mm wide measured parallel to the fence, and have a minimum weight of 1.86 kg/m of length. The post shall be equipped with an anchor plate having a minimum area of 9000 square millimeters, 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 9-gauge high-tension 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 6 m in length with a spacing of one third (1/3) the basin length.

Steel posts shall be placed at a depth of 0.6 m below the basin surface, with a maximum spacing of 1.2 m. The top height of the coir fiber baffles shall not be below the elevation of the emergency spillway base of dams and basins. Attach a 9-gauge high-tension wire strand to the steel posts at a height of 0.9 m with plastic ties or wire fasteners. Install a steel post into side of the basin at a variable depth and a height of 0.9 m 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 0.9 m 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 0.3 m apart at the bottom and side slopes of basin. Overlap matting at least 152 mm 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 meters 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:

**Pay Item**

Coir Fiber Baffle

**Pay Unit**

Linear Meter

## **COIR FIBER WATTLES WITH POLYACRYLAMIDE (PAM):**

### **Description**

Coir Fiber Wattles are tubular products consisting of coir fibers (coconut fibers) encased in coir fiber netting. Coir Fiber Wattles are used on slopes or channels to intercept runoff and act as a velocity break. Coir Fiber Wattles are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation of coir fiber wattles, matting installation, PAM application, and removing wattles.

### **Materials**

Coir Fiber Wattle shall meet the following specifications:

100% Coir (Coconut) Fibers	
Minimum Diameter	305 mm
Minimum Density	56 kg/m <sup>3</sup> +/- 10%
Net Material	Coir Fiber
Net Openings	5 cm x 5 cm
Net Strength	40.8 kg
Minimum Weight	3.9 kg/m +/- 10%

Anchors: Stakes shall be used as anchors.  
Wooden Stakes:

Provide hardwood stakes a minimum of 610 mm long with a 51 mm x 51 mm nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving down into the underlying soil.

Matting shall meet the requirements of Article 1060-8 of the *Standard Specifications*, or shall meet specifications provided elsewhere in this contract.

Provide staples made of 3 mm diameter new steel wire formed into a *u* shape not less than 305 mm in length with a throat of 25 mm in width.

Polyacrylamide (PAM) shall be applied in powder form and shall be anionic or neutrally charged. Soil samples shall be obtained in areas where the wattles will be placed, and from offsite material used to construct the roadway, and analyzed for the appropriate PAM flocculant to be utilized with each wattle. The PAM product used shall be listed on the North Carolina Department of Environment and Natural Resources (NCDENR) Division of Water Quality (DWQ) web site as an approved PAM product for use in North Carolina.

### **Construction Methods**

Coir Fiber Wattles shall be secured to the soil by wire staples approximately every 0.3 linear meters and at the end of each section of wattle. A minimum of 4 stakes shall be installed on the

downstream side of the wattle with a maximum spacing of 0.6 linear meters along the wattle, and according to the detail. Install a minimum of 2 stakes on the upstream side of the wattle according to the detail provided in the plans. Stakes shall be driven into the ground a minimum of 254 mm with no more than 51 mm projecting from the top of the wattle. Drive stakes at an angle according to the detail provided in the plans.

Only install coir fiber wattle(s) to a height in ditch so flow will not wash around wattle and scour ditch slopes and according to the detail provided in the plans and as directed. Overlap adjoining sections of wattles a minimum of 152 mm.

Installation of matting shall be in accordance with the detail provided in the plans, and in accordance with Subarticle 1631-3(B) of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Apply PAM over the lower center portion of the coir fiber wattle where the water is going to flow over at a rate of 50 grams per wattle, and 25 grams of PAM on matting on each side of the wattle. PAM applications shall be done during construction activities after every rainfall event that is equal to or exceeds 12 mm.

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

### **Measurement and Payment**

*Coir Fiber Wattles* will be measured and paid for by the actual number of linear meters of wattles 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 Wattles*.

Matting will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

*Polyacrylamide(PAM)* will be measured and paid for by the actual weight in kilograms of PAM applied to the coir fiber wattles. 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 apply the *Polyacrylamide(PAM)*.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Polyacrylamide(PAM)	Kg
Coir Fiber Wattle	Linear Meter

**TEMPORARY ROCK SILT CHECK TYPE A WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM):****Description**

Temporary Rock Silt Checks Type A with Excelsior Matting and Polyacrylamide (PAM) are devices utilized in temporary and permanent ditches to reduce runoff velocity and incorporate PAM into the construction runoff to increase settling of sediment particles and reduce turbidity of runoff. Temporary Rock Silt Checks Type A with Excelsior Matting and PAM are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation of Temporary Rock Silt Checks Type A, matting installation, PAM application, and removing Temporary Rock Silt Checks Type A with Excelsior Matting and PAM.

**Materials**

Structural stone shall be class B stone that meets the requirements of Section 1042 of the *Standard Specifications* for Stone for Erosion Control, Class B.

Sediment control stone shall be #5 or #57 stone, which meets the requirements of Section 1005 of the *Standard Specifications* for these stone sizes.

Matting shall meet the requirements of Excelsior Matting in Subarticle 1060-8(B) of the *Standard Specifications*, or shall meet specifications provided elsewhere in this contract.

Polyacrylamide (PAM) shall be applied in powder form and shall be anionic or neutrally charged. Soil samples shall be obtained in areas where the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM will be placed, and from offsite material used to construct the roadway, and analyzed for the appropriate PAM flocculant to be utilized with each Temporary Rock Silt Check Type A. The PAM product used shall be listed on the North Carolina Department of Environment and Natural Resources (NCDENR) Division of Water Quality (DWQ) web site as an approved PAM product for use in North Carolina.

**Construction Methods**

Temporary Rock Silt Checks Type A shall be installed in accordance with Subarticle 1633-3(A) of the *Standard Specifications*, Roadway Standard Drawing No. 1633.01 and the detail provided in the plans.

Installation of matting shall be in accordance with the detail provided in the plans, and anchored by placing Class B stone on top of the matting at the upper and lower ends.

Apply PAM at a rate of 100 grams over the center portion of the Temporary Rock Silt Checks Type A and matting where the water is going to flow over. PAM applications shall be done during construction activities and after every rainfall event that is equal to or exceeds 12 mm.

The Contractor shall maintain the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM until the project is accepted or until the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM are removed, and shall remove and dispose of silt accumulations at the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

**Measurement and Payment**

*Temporary Rock Silt Checks Type A* will be measured and paid for in accordance with Article 1633-5 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Matting will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

*Polyacrylamide(PAM)* will be measured and paid for by the actual weight in kilograms of PAM applied to the Temporary Rock Silt Checks Type A. 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 apply the *Polyacrylamide(PAM)*.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Polyacrylamide(PAM)	Kg

**CULVERT DIVERSION CHANNEL:**

**Description**

This work consists of providing a *Culvert Diversion Channel* to detour the existing stream around the culvert construction site at locations shown on the plans. Work includes constructing the diversion channel, disposing of excess materials, providing and placing fabric liner, maintaining the diversion area in an acceptable condition, removing fabric liner, backfilling diversion channel area with suitable material, and providing proper drainage when diversion channel area is abandoned.

**Materials**

Refer to Division 10

<b>Item</b>	<b>Section</b>
Fabric for Soil Stabilization, Type 4	1056

## Construction Methods

Grade channel according to the plans with channel surface free of obstructions, debris, and pockets of low-density material. Utilize suitable material and provide disposal area for unsuitable material.

Line channel with fabric unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury top of slope fabric edge in a trench at least 127 mm deep and tamp securely. Make vertical overlaps a minimum of 457 mm with upstream fabric overlapping the downstream fabric.

Secure fabric with 3.05 mm wire staples shaped into a *u* shape with a length of not less than 152 mm and a throat not less than 25 mm in width. Place staples along outer edges and throughout the fabric a maximum of 0.9 meters horizontally and vertically.

## Measurement and Payment

*Culvert Diversion Channel* will be measured and paid for as the actual number of cubic meters excavated, as calculated from the typical section throughout the length of the diversion channel as shown on the final approved plans.

*Fabric for Soil Stabilization* will be measured and paid for in accordance with Article 270-4 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 *Culvert Diversion Channel*.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Culvert Diversion Channel	Cubic 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 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 Meter

## TEMPORARY STREAM CROSSING:

### Description

This work consists of the construction and maintenance of culverted temporary stream crossings. Temporary stream crossings are not shown on the plan sheets, and shall be determined as directed.

The quantity of stream crossings to be installed will be affected by the actual conditions that occur during the construction of the project. The quantity of stream crossings 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.

## Materials

Refer to Division 10

<b>Item</b>	<b>Section</b>
No. 57 Stone	1005
Stone for Erosion Control, Class B	1042-1
Filter Fabric for Drainage, Type 2	1056
Temporary Pipe for Stream Crossing	SP

**Construction Methods**

Stream crossings shall be constructed according to the stream crossing detail provided in the plans or as directed.

The Contractor shall determine the diameter of pipe(s) that will pass the peak or bankfull flow, whichever is less, from a 2-yr. peak storm, without overtopping. Filter Fabric shall be placed on natural ground, on streambanks, and in streambed beneath the temporary pipe(s) and stone according to the detail. Class B stone shall be installed around the pipe(s), in the stream channel, and on the crossing road sideslopes. Place No. 57 Stone on top of Class B stone according to the detail provided in the plans.

**Measurement and Payment**

*No. 57 Stone* will be measured and paid for as provided elsewhere in this contract.

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

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

*Temporary Pipe for Stream Crossing* will be measured and paid for at the contract unit price per 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, labor, equipment and incidentals necessary to construct the stream crossings.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Temporary Pipe for Stream Crossing	Linear Meter

**STREAMBANK REFORESTATION:**

**Description**

*Streambank Reforestation* will be planted in areas designated on the plans and as directed. See the *Streambank Reforestation Detail Sheets*.

The entire *Streambank Reforestation* operation shall comply with the requirements of Section 1670 of the *Standard Specifications*.



## Materials

### Live Stakes:

*Type I Streambank Reforestation* shall be live stakes, planted along both streambanks. Live stakes shall be 13mm - 51mm in diameter. Stakes shall also be 0.6 meters - 0.9 meters in length.

Live staking plant material shall consist of a random mix made up of 50% Black Willow (*Salix nigra*) and 50% Silky Dogwood (*Cornus amomum*). Other species may be substituted upon approval of the Engineer. All plant material shall be harvested locally (within the same physiographic ecoregion and plant hardiness zone) or purchased from a local nursery, with the approval of the Engineer. All live stakes shall be dormant at time of acquisition and planting.

### Coir Fiber Matting:

Provide matting that meets the following requirements:

100% coconut fiber (coir) twine woven into high strength matrix	
Thickness -	7.6mm minimum
Tensile Strength	1650.5 x 766.5 kg/m minimum
Elongation	34% x 38% maximum
Flexibility (mg-cm)	65030 x 29590
Flow Velocity	Observed 3.35m/s
Weight	678g/SM
Size	100 SM
"C" Factor	0.002
Open Area (measured)	50%

Staples, stakes, or reinforcement bars shall be used as anchors and shall meet the following requirements:

#### Wooden Stakes:

Provide hardwood stakes 305mm - 610mm long with a 51mm x 51mm 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 25mm - 51mm long head at the top with a 25mm - 51mm notch following to catch and secure the coir fiber mat.

#### Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 610mm nominal length. The bars shall have a 102mm diameter bend at one end with a 102mm straight section at the tip to catch and secure the coir fiber mat.

#### Staples:

Provide staples made of 3.18mm diameter new steel wire formed into a *u* shape not less than 305mm in length with a throat of 25mm in width.

Bare Root Seedlings:

*Type II Streambank Reforestation* shall be bare root seedlings 305mm – 457mm tall.

### **Construction Methods**

Coir fiber matting shall be installed on the streambanks where live staking is to be planted as shown on the Streambank Reforestation Detail Sheets and in locations as directed. Work includes providing all materials, excavating and backfilling, and placing and securing coir fiber mat.

Provide a smooth soil surface free from stones, clods, or debris that will prevent the contact of the matting with the soil. Place the matting immediately upon final grading and permanent seeding. Take care to preserve the required line, grade, and cross section of the area covered.

Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Bury the top slope end of each piece of matting in a narrow trench at least 152mm deep and tamp firmly. Where one roll of matting ends and a second roll begins, overlap the end of the upper roll over the buried end of the second roll so there is a 152mm overlap. Construct check trenches at least 305mm deep every 15.2 meters longitudinally along the edges of the matting, or as directed. Fold over and bury matting to the full depth of the trench, close and tamp firmly. Overlap matting at least 152mm where 2 or more widths of matting are installed side by side.

Wooden stakes, reinforcement bars, or staples may be used as anchors in accordance with the Streambank Reforestation Detail Sheets and as directed. Place anchors across the matting at ends, junctions, and check trenches approximately 0.3 meters apart. Place anchors down the center of each strip of matting 0.9 meters apart. Place anchors along all lapped edges 0.3 meters apart. Refer to the Streambank Reforestation Detail Sheets for anchoring pattern. The Engineer may require adjustments in the trenching or anchoring requirements to fit individual site conditions.

During preparation of the live stakes, the basal ends shall be cleanly cut at an angle to facilitate easy insertion into the soil, while the tops shall be cut square or blunt for tamping. All limbs shall be removed from the sides of the live cutting prior to installation.

Live stakes shall be installed within 48 hours of cutting. Outside storage locations should be continually shaded and protected from wind and direct sunlight. Live cut plant material shall remain moist at all times before planting.

Stakes shall be spaced approximately 1.2 meters on center. Live stakes shall be installed according to the configuration presented on the Streambank Reforestation Detail Sheets.

Tamp live stakes perpendicularly into the finished bank slope with a dead blow hammer, with buds oriented in an upward direction. Stakes should be tamped until approximately  $\frac{3}{4}$  of the

stake length is within the ground. The area around each live stake shall be compacted by foot after the live stake has been installed.

25mm – 51mm shall be cut cleanly off of the top of each live stake with loppers at an angle of approximately 15 degrees following installation. Any stakes that are split or damaged during installation shall be removed and replaced.

The bare root seedlings shall be planted as soon as practical following permanent *Seeding and Mulching*. The seedlings shall be planted from top of bank out, along both sides of the stream, as designated on the plans.

Root dip: The roots of reforestation seedlings shall be coated with a slurry of water, and either a fine clay (kaolin) or a superabsorbent that is designated as a bare root dip. The type, mixture ratio, method of application, and the time of application shall be submitted to the Engineer for approval.

With the approval of the Engineer, seedlings may be coated before delivery to the job or at the time of planting, but at no time shall the roots of the seedlings be allowed to dry out. The roots shall be moistened immediately prior to planting.

Seasonal Limitations: Streambank reforestation shall be planted from November 15 through March 15.

### **Measurement and Payment**

*Streambank Reforestation* will be measured and paid for as the actual number of hectares of land measured along the surface of the ground, which has been acceptably planted in accordance with this section.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Streambank Reforestation	Hectare
<b><u>TEMPORARY SILT FENCE:</u></b>	<b>(10-19-10)</b>

Revise the *Standard Specifications* as follows:

Page 16-1, **Subarticle 1605-2(C) Filter Fabric**, replace the only sentence with the following:

Provide Type 3 Engineering Fabric meeting the requirements of Section 1056 of the *Standard Specifications*.

Page 16-2, **Article 1605-3 INSTALLATION**, replace the third sentence with the following:

Filter fabric may be used without woven wire fence backing in accordance with the following conditions:

Page 16-2, **Subarticle 1605-3(B)** Post spacing is inclined....., replace first item in list with the following:

- (1) Attach filter fabric to the post with wire or other acceptable methods.