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**PROJECT SPECIAL PROVISIONS**

**ROADWAY**

**CLEARING AND GRUBBING – METHOD III:**

(4-6-06) (Rev 3-18-08)

SP2 R02

Perform clearing on this project to the limits established by Method “III” shown on Standard No. 200.03 of the *2006 Roadway Standard Drawings*.

Revise the *2006 Standard Specifications* as follows:

**Page 2-2, Article 200-3, Clearing, add the following as the 6th paragraph:**

At bridge sites, clear the entire width of the right of way beginning at a station 3 feet back of the beginning extremity of the structure and ending at a station 3 feet beyond the ending extremity of the structure.

**SLOPE STABILIZATION:**

**(SPECIAL)**

General:

Steepened slopes of 1.25:1 are required in the vicinity of Station 146+00. Where this area or other areas are directed to be steepened, the following will apply: This special provision governs the design and construction of slope stabilization systems in accordance with the approved plans at locations determined by the Engineer. This special provision is not intended for deep slope failures. The slope stabilization systems described in this provision are intended for the repair of shallow slope failures, commonly called “sloughing failures”, where the failure plane is no more than 5 ft (1.5 m) below the surface. Work includes preparing plans and supporting calculations, installing nails or anchors, grading, seeding, installing facing and connections and testing nails or anchors.

Select a soil stabilization system consisting of either the Platipus soil anchoring system, launched soil nails, driven soil nails, helical anchors, or approved equal soil stabilization systems.

For further information concerning the Platipus soil anchoring system, contact:

Platipus Anchors Limited  
1788 Rhodonite Court  
Castle Rock, CO 80108  
Telephone: (866) 752-8478  
<http://www.platipus-anchors.com>

For further information concerning launched soil nails, contact:

Soil Nail Launcher, Inc.  
549 South Broadway  
Grand Junction, CO 81503  
Telephone: (970) 270-4624  
<http://www.soilnaillauncher.com>

For further information concerning driven soil nails, contact:

North Carolina Shoring & Underpinning  
619 Oberlin Road  
Raleigh, NC 27605  
Telephone: (919) 828-2880  
Tom@Morrisonengineers.com

Subsurface Construction Company  
1107 Fuller Street  
Raleigh, NC 27603  
(919) 857-4609  
Jeffery@subsurfaceconstruction.com

Helical anchors are widely available from many manufacturers. One such manufacturer of helical anchors is A. B. Chance, a Division of Hubbell Power Systems, Inc.

Quality Assurance:

The Contractor shall have a minimum three years experience installing the selected slope stabilization system. The Contractor's superintendent shall have a minimum of three (3) years experience and on-site personnel shall have a minimum of one (1) year experience installing the selected slope stabilization system. Experience should be of a similar nature and complexity as that of the proposed work. Do not use consultants or manufacturers' representatives to satisfy these requirements.

Conduct a preconstruction meeting with the Contractor, the Contractor's superintendent, the Resident or Maintenance Engineer and/or his or her representative and the Geotechnical Operations Engineer to discuss construction and inspection of the slope stabilization system. This meeting should occur after the Contractor has mobilized to the site and all submittals have been approved.

Design Submittal:

Submit three (3) copies of plans and supporting calculations sealed by a North Carolina Licensed Professional Engineer to the Engineer for review. The Engineer will respond with comments within 15 business days.

The Contractor may elect to perform a subsurface investigation to characterize the subsurface conditions at the site and/or the Engineer may provide any site specific subsurface information available. In the absence of a site specific subsurface information, use the following default soil parameters for design in accordance with this provision.

Total Unit Weight = 120 pcf (18.8 kN/m<sup>3</sup>)  
Friction Angle = 30 degrees  
Cohesion = 0 psf (kPa)

Extend nails a minimum of 10 ft (3 m) beyond the failure plane. Extend anchors a minimum of 5 ft (1.5 m) beyond the failure plane. Design all components for a 50 year service life with the exception of the turf reinforcement mat. Use the following references for design and other references as approved by the Engineer.

For launched soil nails:

- Application Guide for Launched Soil Nails, USDA Forest Service, EM 7179-12A FHWA-FPL-93-003, July 1994
- Project Report for Launched Soil Nails - 1992 Demonstration Project, USDA Forest Service, EM 7179-12B, FHWA-FPL-93-004, July 1994

For driven soil nails:

- The Service Load Design (SLD) procedures contained in the FHWA “Manual for Design and Construction Monitoring of Soil Nail Walls”, Report No. FHWA-SA-96-096 or other widely accepted slip-surface, limiting-equilibrium or slope stability methods. The required partial safety factors, allowable strength factors and minimum global stability soil factors of safety shall be in accordance with the FHWA manual unless directed otherwise by the Engineer.

For Platipus soil anchoring system:

- Manufacturers’ recommendations or as directed by the Engineer.

For helical anchors:

- Manufacturers’ recommendations or as directed by the Engineer.

Nails or anchors may not extend beyond the Right of Way or Easement line.

#### Construction Submittal:

Submit three (3) copies of the Construction Submittal to the Engineer for review. The Engineer will respond with comments within 15 business days. Do not begin construction until all submittal requirements are satisfied and acceptable to the Engineer. No adjustments in contract time will be allowed due to incomplete submittals.

The Engineer may suspend the work if the Contractor substitutes non-approved personnel, materials or procedures for approved personnel, materials and procedures. No additional payment will be made for costs resulting from suspension of work.

Items listed below that are included in the Design Submittal do not need to be resubmitted.

Include in the Construction Submittal:

- 1) List identifying the superintendent, equipment operators and any other on-site personnel assigned to the project. Include a summary of each individual’s experience that is sufficiently complete to evaluate each individual’s qualifications.

- 2) Proposed schedule and detailed construction sequence.
- 3) Description of the verification testing method, including details of the jacking frame and appurtenant bracing, identification number and certified calibration records for each load cell, test jack pressure gauge and jack master pressure gauge. Calibration records shall include the date tested, device identification number and calibration test results. Load cells and pressure gauges shall be certified for an accuracy of at least two (2) percent of the applied certification loads by a qualified independent testing laboratory within six (6) months of the submittal date.
- 4) Manufacturer and/or vendor certifications stating all materials meet the requirements of this provision.
  - For soil nails, provide certified mill test results for nails together with properly marked samples from each heat specifying the ultimate strength, yield strength, elongation and composition.
  - For Platipus anchors, provide manufacturers' product certificates certifying that materials comply with specified performance characteristics and physical properties.
  - For helical anchors, provide certified mill test results for anchors together with properly marked samples from each heat specifying the ultimate strength, yield strength, elongation and composition.
  - For turf reinforcement mats, provide manufacturers' product certificates showing the chemical and physical properties of the mat used and conformance of the mat with this provision.
  - For bearing plates and connection hardware, provide manufacturers' product certificates certifying that materials comply with specified performance characteristics and physical properties.

Materials:

Provide materials conforming to the applicable sections of the Standard Specifications and the following:

Soil Nails (launched or driven)

Soil nails may be either solid or hollow steel bars with a nominal outer diameter of at least 1 in (25 mm) and the length shown on the plans. Hollow steel bars shall have a minimum wall thickness of 0.120 in (3 mm). Use ASTM A615, Grade 60 or 75 (420 or 540), threaded or un-threaded deformed steel bars without splices or welds. All bars shall be new, straight, undamaged and hot-dipped galvanized to meet ASTM A153. Do not reuse excess cutoffs from previously driven nails.

### Platipus System

Soil anchors, bearing plates and connections shall be in accordance with the manufacturers' specifications or as directed by the Engineer.

### Helical Anchors

Helical screw anchors shall have a minimum ultimate tensile capacity of 70,000 pounds (331 kN) and a minimum working torque capacity of 5,500 foot-pounds (75 kN-m). The shafts shall be steel per ASTM A29 with a minimum yield strength of 70 ksi (482 MPa) or better, a solid square cross section a minimum 1.5 in (38 mm) by 1.5 in (38 mm) and the length shown on the plans. The flights shall be steel per ASTM A29 with a minimum yield strength of 50 ksi (345 MPa) or better, a minimum 8 in (200 mm) in diameter, a minimum 3/8 in (9 mm) thick and spaced no more than a nominal 29 in (735 mm) apart. Use coupling bolts for adapters and extensions with minimum ultimate double shear strength of 70,000 pounds (331 kN). All anchors shall be new, straight, undamaged and hot-dipped galvanized to meet ASTM A153.

### Turf Reinforcement Mats (TRM)

Turf reinforcement mats shall be three-dimensional, lofty geosynthetic specially designed for erosion control on steepened slopes. The matrix shall be composed of tan or green monofilament yarns woven into a uniform configuration of resilient pyramid-like projections or entangled with a high tenacity geogrid or steel wire mesh. The matrix should exhibit very high interlock and reinforcement capacity with both soil and root systems and demonstrate high tensile modulus. TRMs manufactured from discontinuous or loosely held together by stitched or glued netting or composite of any type are not allowed. All components shall be 100% synthetic and resistant to biological, chemical and ultraviolet degradation. TRMs shall meet the following physical properties:

Property	Test Method	Requirement
Mass per Unit Area	ASTM D5261	14 oz/yd <sup>2</sup> (475 g/m <sup>2</sup> )
Thickness	ASTM D1777	0.5 in (12.7 mm)
Grab Tensile Strength	ASTM D5035	3,000 x 1,500 lb/ft (43.8 x 22 kN/m)
Tensile Elongation	ASTM D5035	55 % (Max)
Resilency	ASTM D1777	80 %
UV Resistance	ASTM D4355	80 % @ 1000 hrs
Ground Cover Factor	Light Projection Analysis	75 %

### Bearing Plates and Connection Hardware

Bearing plates shall be a minimum of 6 in x 6 in x 0.5 in (152 mm x 152 mm x 12.5 mm). Use couplers, accessories and other devices as needed. Bearing plates and connection hardware shall meet the requirements of ASTM A36 and be hot-dipped galvanized to meet ASTM A153.

Handling and Storage:

Carefully store all steel components (anchors, nails, bearing plates, connection hardware, etc.) on supports to prevent contact with the ground. Damage to steel as a result of abrasion, cuts or nicks and welds and weld spatter will be cause for rejection. Protect steel from dirt, rust and other deleterious substances at all times. Corrosion or pitting of steel will be cause for rejection. Do not ground welding leads to the nail or anchor steel.

Verification Testing:

A minimum of one (1) verification test is required to verify the Contractors' methods and the nail or anchor design capacity. The Engineer will determine the locations and number of these tests.

Supply all material, equipment and labor to perform the verification tests. Ensure that verification test nails or anchors extend a minimum of 15 ft (4.6 m) or 10 ft (3 m), respectively, beyond the slope face. Collect all required test data in the presence of the Engineer.

Testing equipment includes a jack and pressure gauge, dial or vernier gauges, a master pressure gauge and supports for the dial gauges and a reaction frame.

Provide a jack and a pressure gauge calibrated as a unit. Use a pressure gauge graduated in 100 psi (700 kPa) increments or less with a range not exceeding twice the anticipated maximum pressure during testing, unless otherwise approved by the Engineer. The ram travel of the jack shall be greater than 4 in (100 mm). The jack shall be capable of applying each load in less than one (1) minute.

Provide a minimum of two (2) dial or vernier gauges capable of measuring to 0.001 in (0.025 mm). Use dial gauges with a minimum stroke of 3 in (75 mm).

Provide a master pressure gauge calibrated by the test jack and pressure gauge. Provide recent calibration curves.

Provide a reaction frame sufficiently rigid and of adequate dimension so deformation of the test apparatus requiring repositioning of any components does not occur.

Center the jack over the nail or anchor. Independently support the jack so the jack does not bear on the nail or anchor. Position the jack such that unloading and repositioning of the jack during the test will not be required.

Align the dial gauges within five (5) degrees of the nail or anchor axis. Support the gauges independent of the jacking set-up. Align the bearing plates, load cell and stressing anchorage, ensuring no part of the reaction frame bears within 6 in (150 mm) of the edge of the test nail or anchor unless otherwise approved by the Engineer.

Perform verification tests by incrementally loading the nail or anchor to 150 percent of the design test load, according to the following schedule.

<u>LOAD</u>	<u>HOLD TIME</u>
AL	Until Stable
0.25DTL	Until Stable
0.50DTL	Until Stable
0.75DTL	Until Stable
1.00DTL	Until Stable
1.25DTL	Until Stable
1.50DTL	10 or 60 minutes

Maintain all load increments within five (5) percent of the intended load; long enough to obtain a stable reading of the nail or anchor movement.

The alignment load (AL) should be the minimum load required to align the testing apparatus and should not exceed five percent of the design load (DTL). Dial gauges should be “zeroed” after the alignment load has been applied.

For nails, use the following equation to determine the design load.

$$DTL = L_B \times A_D$$

where,

DTL	=	Design Test Load
$L_B$	=	As-Built Test Length (ft or m)
$A_D$	=	Design Adhesion (lb/ft or kN/m)

For anchors, use the design test load shown on the plans.

A verification test nail or anchor is acceptable when a pullout failure does not occur at the maximum test load. Pullout failure load is defined as the load at which attempts to increase the test load result in continued excessive pullout movement of the test nail or anchor. Record the pullout failure load as part of the test data.

Verification tests that are not acceptable may require re-design and a revised Design Submittal or additional verification tests as determined by the Engineer. Complete all verification tests to the satisfaction of the Engineer before beginning construction of the slope stabilization system.

#### Construction:

Restore the slope as shown on the plans or as directed by the Engineer. If needed, maintain a drainage system to direct water away from the site. Protect the slope face until the turf reinforcement mat (TRM) can be installed.

Seed the slope in accordance with Section 1660 of the Standard Specifications. Ensure the surface of the slope is smooth, firm, stable and free of rocks, clods, roots or other obstructions that would prevent the mat from lying in direct contact with the surface of the slope.

Place the TRM such that the machine direction extends from the top of slope to the bottom of slope. Fasten the TRM to the slope to prevent movement during nail or anchor installation. The TRM may be precut at nail or anchor locations if the nail or anchor cannot penetrate the TRM without causing large movements. Overlap the TRM 2 ft (0.6 m) at joints and secure the overlap with a full row of nails or anchors.

Install nails or anchors at the locations and to the lengths as shown in the plans or as directed by the Engineer. Nails or anchors may be added, eliminated or relocated as determined by the Engineer to accommodate actual site conditions.

Do not pre-drill nail holes. Install launched nails in a single stroke, at a speed over 200 miles per hour (320 km per hour). Cut off the exposed portion of installed nails flush with ground level or as directed by the Engineer. Dispose of the cut-off portions of soil nails at no additional cost to the Department. Install driven nails as shown on the plans.

Install anchors as shown on the plans in accordance with the manufacturers' recommended tolerances or as directed by the Engineer. Replace any anchor that exceeds such tolerances.

Connect the bearing plates to the nails or anchors as shown on the plans and as directed by the Engineer. After the nails or anchors have been secured to the TRM, continue driving the nails or anchors into the soil so that the head assemblies are compressed into the soil surface a minimum of 1 in (25 mm).

Measurement and Payment:

The quantity of slope stabilization to be paid for will be the actual area of square foot (square meters) of turf reinforcement mat to construct the slope stabilization system. Where overlaps in the turf reinforcement mat occur, slope stabilization will only be paid for once.

Slope stabilization will be paid for at the unit bid price for "Slope Stabilization" per square foot (square meter) of turf reinforcement mat. The unit bid price will constitute full compensation for all the materials, labor, tools, equipment, testing and incidentals required to design and construct the soil stabilization system.

Slope Stabilization.....square foot (square meter)

EMBANKMENTS:

(5-16-06)

SP2R18

Revise the 2006 Standard Specifications as follows:

**Page 2-22, Article 235-4(B) Embankment Formation**, add the following:

- (16) Do not place rock or broken pavement in embankment areas where piles or drilled shaft foundations are to be constructed. This shall include but not be limited to piles and foundations for structures, metal signal poles, overhead sign structures, and high mount lighting.

**SHALLOW UNDERCUT:**

(9-18-07)

SP2 R35 A

**Description**

Undercut to a depth of 6 to 24 inches and place fabric for soil stabilization and Class IV Subgrade Stabilization at locations shown on the plans or as directed by the Engineer.

**Materials**

Refer to Division 10 of the *Standard Specifications*.

<b>Item</b>	<b>Section</b>
Select Material, Class IV	1016
Fabric for Soil Stabilization, Type 4	1056

Use Class IV Select Material for Class IV Subgrade Stabilization. If Class IV Subgrade Stabilization does not meet the requirements of Article 1010-2 of the *Standard Specifications*, the Engineer, at his discretion, may consider the material reasonably acceptable in accordance with Article 105-3 of the *Standard Specifications*.

**Construction Methods**

Perform undercut excavation in accordance with Section 225 of the *Standard Specifications*. Place fabric for soil stabilization in accordance with Article 270-3 of the *Standard Specifications* before backfilling. Backfill with Class IV Subgrade Stabilization by end dumping subgrade stabilization material on the fabric. Do not operate heavy equipment on the fabric until it is covered with Class IV Subgrade Stabilization. Compact subgrade stabilization material to 92% of AASHTO T180 as modified by the Department or to the highest density that can be reasonably obtained.

Maintain Class IV Subgrade Stabilization in an acceptable condition and minimize the use of heavy equipment on subgrade stabilization material in order to avoid damaging the backfill. Provide and maintain drainage ditches and drains as required to prevent entrapment of water in backfill.

**Measurement and Payment**

*Class IV Subgrade Stabilization* will be measured and paid for at the contract unit price per ton. The quantity to be paid for will be the actual number of tons of subgrade stabilization material that has been incorporated into the completed and accepted work. The material will be measured by being weighed in trucks on certified platform scales or other certified weighing devices. This work includes but is not limited to furnishing, hauling, handling, placing, compacting and maintaining the subgrade stabilization material.

*Undercut Excavation* will be measured and paid for in accordance with Section 225 of the *Standard Specifications*.

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

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Class IV Subgrade Stabilization	Ton

**RIP RAP ENERGY DISSIPATER:**

(9-16-08)

SPI

**Description**

This work consists of the construction and maintenance of an armored outlet structure located at culvert outlets or ditch termini.

**Materials**

Refer to Division 10 of the *Standard Specifications*:

<b>Item</b>	<b>Section</b>
Class I Riprap	Section 1042
Filter Fabric for Drainage, Type 2	Section 1056

**Construction Methods**

Riprap Energy dissipaters shall be constructed in accordance with the detail shown in the plans or as directed. From the outlet invert of a culvert or bottom of a ditch excavation will drop to a specified depth. Excavation will continue to widen through the dissipater. Rip rap will be placed along the banks and bottom of the dissipater and along the apron.

Excavate ditch in accordance with Section 204 of the *Standard Specifications*.

The quantity of energy dissipater material may be affected by site conditions during construction of the project. The quantity of materials may be increased, decreased, or eliminated at the direction of the Engineer. 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**

*Class I Riprap* will be measured and paid for in accordance with Section 876 of the *Standard Specifications*.

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

*Drainage Ditch Excavation* will be measured and paid for in accordance with Section 240 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, labor, equipment, and incidentals necessary to construct the riprap energy dissipater.

**FALSE SUMPS:**

(7-1-95)

SP2 R40

Construct false sumps in accordance with the details in the plans and at locations shown in the plans or at other locations as directed by the Engineer.

Payment for the work of construction of the false sumps will be made at the contract unit price per cubic yard for *Unclassified Excavation* or *Borrow Excavation* depending on the source of material, or included in *Grading-Lump Sum*.

**SHOULDER AND FILL SLOPE MATERIAL:**

(5-21-02)

SP2 R45 C

**Description**

Perform the required shoulder and slope construction for this project in accordance with the applicable requirements of Section 560 and Section 235 of the *2006 Standard Specifications* except as follows:

Construct the top 6 inches of shoulder and fill slopes with soils capable of supporting vegetation.

Provide soil with a P.I. greater than 6 and less than 25 and with a pH ranging from 5.5 to 6.8. Remove stones and other foreign material 2 inches or larger in diameter. All soil is subject to test and acceptance or rejection by the Engineer.

Obtain material from within the project limits or approved borrow source.

**Compensation**

When the Contractor elects to obtain material from an area located beneath a proposed fill sections which does not require excavation for any reason other than to generate acceptable shoulder and fill slope material, the work of performing the excavation will be considered incidental to the item of *Borrow Excavation* or *Shoulder Borrow*. If there is no pay item for *Borrow* or *Shoulder Excavation* in the contract, this work will be considered incidental to *Unclassified Excavation*. Stockpile the excavated material in a manner to facilitate measurement by the Engineer. Fill the void created by the excavation of the shoulder and fill slope material with suitable material. Payment for material used from the stockpile will be made at the contract unit price for *Borrow Excavation* or *Shoulder Borrow*. If there is no pay item for *Borrow Excavation* or *Shoulder Borrow*, then the material will be paid for at the contract unit price for *Unclassified Excavation*. The material used to fill the void created by the excavation of the

shoulder and fill slope material will be made at the contract unit price for *Unclassified Excavation, Borrow Excavation, or Shoulder Borrow*, depending on the source of the material.

Material generated from undercut excavation, unclassified excavation or clearing and grubbing operations that is placed directly on shoulders or slope areas, will not be measured separately for payment, as payment for the work requiring the excavation will be considered adequate compensation for depositing and grading the material on the shoulders or slopes.

When undercut excavation is performed at the direction of the Engineer and the material excavated is found to be suitable for use as shoulder and fill slope material, and there is no area on the project currently prepared to receive the material generated by the undercut operation, the Contractor may construct a stockpile for use as borrow at a later date. Payment for the material used from the stockpile will be made at the contract unit price for *Borrow Excavation* or *Shoulder Borrow*.

When shoulder material is obtained from borrow sources or from stockpiled material, payment for the work of shoulder construction will be made at the contract unit price per cubic yard for *Borrow Excavation* or *Shoulder Borrow* in accordance with the applicable provisions of Section 230 or Section 560 of the *2006 Standard Specifications*.

**FLOWABLE FILL:**

(9-17-02) (Rev 8-21-07)

SP3 R30

**Description**

This work consists of all work necessary to place flowable fill in accordance with these provisions, the plans, and as directed.

**Materials**

Provide flowable fill material in accordance with Article 340-2 of the *2006 Standard Specifications*.

**Construction Methods**

Discharge flowable fill material directly from the truck into the space to be filled, or by other approved methods. The mix may be placed full depth or in lifts as site conditions dictate. The Contractor shall provide a method to plug the ends of the existing pipe in order to contain the flowable fill.

**Measurement and Payment**

At locations where flowable fill is called for on the plans and a pay item for flowable fill is included in the contract, *flowable fill* will be measured in cubic yards and paid for as the actual number of cubic yards that have been satisfactorily placed and accepted. Such price and payment will be full compensation for all work covered by this provision including but not limited to the mix design, furnishing, hauling, placing and containing the flowable fill.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Flowable Fill	Cubic Yard

**PIPE TESTING:**  
4-17-07

SP3 R33

Revise the *2006 Standard Specifications* as follows:

**Page 3-3, Article 300-6**, add the following as a new paragraph before (A):

The Department reserves the right to perform forensic testing on any installed pipe.

**PIPE ALTERNATES:**  
(7-18-06) (Rev 4-17-07)

SP3 R36

**Description**

The Contractor may substitute Aluminized Corrugated Steel Pipe, Type IR or HDPE Pipe, Type S or Type D up to 48 inches in diameter in lieu of concrete pipe in accordance with the following requirements.

**Material**

<b>Item</b>	<b>Section</b>
HDPE Pipe, Type S or D	1032-10
Aluminized Corrugated Steel Pipe, Type IR	1032-3(A)(7)

Aluminized Corrugated Steel Pipe will not be permitted in counties listed in Article 310-2 of the *2006 Standard Specifications*.

**Construction Methods**

Aluminized Corrugated Steel Pipe Culverts and HDPE Pipe Culverts shall be installed in accordance with the requirements of Section 300 of the *2006 Standard Specifications* for Method A, except that the minimum cover shall be at least 12 inches. Aluminized Corrugated Steel Pipe Culvert and HDPE Pipe Culvert will not be permitted for use under travelways, including curb and gutter.

**Measurement and Payment**

\_\_\_\_\_ "*Aluminized Corrugated Steel Pipe Culvert* to be paid for will be the actual number of linear feet installed and accepted. Measurement will be in accordance with Section 310-6 of the *2006 Standard Specifications*.

\_\_\_\_\_ "HDPE Pipe Culvert to be paid for will be the actual number of linear feet installed and accepted. Measurement will be in accordance with Section 310-6 of the 2006 Standard Specifications.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
_____ " Aluminized Corrugated Steel Pipe Culverts, _____ " Thick	Linear Foot
_____ " HDPE Pipe Culverts	Linear Foot

**REINFORCED BRIDGE APPROACH FILL:**

(3-18-03) (Rev 9-16-08)

SP4 R01A

**Description**

This work consists of all work necessary to construct reinforced bridge approach fills in accordance with these provisions and the plans, and as directed by the Engineer.

**Materials**

**(A) Geomembrane**

Provide geomembrane that is impermeable, composed of polyethylene polymers or polyvinyl chloride, and meets the following physical requirements:

<b>Property</b>	<b>Requirements</b>	<b>Test Method</b>
Thickness	25 mils Minimum	ASTM D1593
Tensile Strength at Break	100 lb/inch Minimum	ASTM D638
Puncture Strength	40 lbs Minimum	ASTM D 4833
Moisture Vapor Transmission Rate	0.018 oz/yd <sup>2</sup> per Day Maximum	ASTM E96

**(B) Fabric**

Refer to Section 1056 for Type 2 Engineering Fabric and the following:

Use a woven fabric consisting of strong rot-proof synthetic fibers such as polypropylene, polyethylene, or polyester formed into a stable network such that the filaments or yarns retain their relative positions to each other.

<b>Fabric Property</b>	<b>Requirements</b>	<b>Test Method</b>
Minimum Flow Rate	2 gallons/min/square foot	ASTM D 4491

Lamination of fabric sheets to produce the physical requirements of a fabric layer will not be accepted. Furnish letters of certification from the manufacturer with each shipment of the fabric and geomembrane attesting that the material meets the requirements of this provision; however, the material is subject to inspection, test, or rejection by the Engineer at any time.

During all periods of shipment and storage, wrap the geomembrane and fabric in a heavy-duty protective covering to protect the material from ultraviolet rays. After the protective wrapping has been removed, do not leave the material uncovered under any circumstances for longer than 4 days.

**(C) Select Material**

Provide select material meeting the requirements of Class III, Type 1 or Type 2, or Class V select material of Section 1016 of the *2006 Standard Specifications*. When select material is required under water, use select material class V only, up to one foot above the existing water elevation.

**(D) 4 inch Diameter Corrugated Drainage Pipe and Fittings**

Provide pipe and fittings that meet all the applicable requirements of Section 815 or 816 of the *2006 Standard Specifications*.

**Construction Methods**

Place the geomembrane and fabric as shown on the plans or as directed by the Engineer. Perform the excavation for the fabric reinforced fill to the limits shown on the plans. Provide an excavated surface free of obstructions, debris, pockets, stumps, and cleared of all vegetation. The geomembrane or fabric will be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation, handling or storage. Lay all layers smooth, and free from tension, stress, folds, wrinkles or creases. Place all the fabric layers with the machine direction (roll direction) parallel to the centerline of the roadway. A minimum roll width of 10.0 feet for the fabric is required. Overlap geomembrane or fabric splices parallel to the centerline of the roadway a minimum of 18 inches. Geomembrane or fabric splices parallel to the backwall face will not be allowed.

Deposit and spread select material in successive, uniform, approximately horizontal layers of not more than 10 inches in depth, loose measurement, for the full width of the cross section, and keep each layer approximately level. Place and compact each layer of select material fill no more than 10 inches thick with low ground pressure equipment. Use hand operated equipment to compact the fill material within three feet of the backwall and wingwalls as directed by the Engineer. Compact select material to a density equal to at least 95% of that obtained by compacting a sample of the material in accordance with AASHTO T99 as modified by the Department. Compact the top eight inches of select material to a density to at least 100% of that obtained by compacting a sample of the material in accordance with AASHTO T99 as modified by the Department. Density requirements are not applicable to select material, class V; however compact the fill with at least four passes of low ground pressure equipment on the entire surface as directed by the Engineer. The compaction of each layer of select material shall be inspected and approved by the Department prior to the placement of the next fill layer. No equipment will be allowed to operate on the drainage pipe or any geomembrane/fabric layer until it is covered with at least six inches of fill material. Compaction shall not damage the drainage pipe, geomembrane, or fabric under the fill. Cover the geomembrane/fabric with a layer of fill

material within four days after placement of the geomembrane/fabric. Geomembrane and fabric that are damaged as a result of installation will be replaced as directed by the Department at no additional cost.

Place the geomembrane on the ground, and attach and secure it tightly to the vertical face of the backwall and wingwalls with adhesives, duct-tape, nails or any other method approved by the Engineer. Place the first fabric layer on the surface of the geomembrane with the same dimensions of the geomembrane. No material or void is allowed between the geomembrane and the first fabric layer. Place and fold the remaining fabric layers on the edges as shown on the plans or as directed by the Engineer. Provide vertical separation between fabric layers as specified on the plans. The number of fabric layers will be shown in the plans.

Place four inch diameter perforated drainage pipe along the base of the backwall and sloped to drain as shown on the plans. Completely wrap perforated drainage pipe and #78M stone with Type 2 Engineering Fabric as shown on the plan detail. Install a pipe sleeve through the bottom of or under the wing wall prior to placing concrete for the wing wall. The pipe sleeve shall be of adequate strength to withstand the wingwall load. Place the pipe sleeve in position to allow the drainage pipe to go through the wing wall with a proper slope. Connect four-inch diameter nonperforated (plain) drainage pipe with a coupling to the perforated pipe near the inside face of the wingwall. Place the nonperforated drainage pipe through the pipe sleeve, extend down to the toe of the slope and connect, to a ditch or other drainage systems as directed by the Engineer. For bridge approaches in cut sections where no side slope is available, direct the drainage pipe outlet to the end slope down to the toe using elbows as directed by the Engineer.

### Measurement and Payment

*Reinforced Bridge Approach Fill, Station \_\_\_\_\_* will be paid for at the contract lump sum price. Such price and payment will be full compensation for both approach fills at each bridge installation, including but not limited to furnishing, placing and compacting select material, furnishing and placing geomembrane and woven fabric, furnishing and placing pipe sleeve, drainage pipe, and stone, furnishing and installing concrete pads at the end of outlet pipes, excavation and any other items necessary to complete the work.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Reinforced Bridge Approach Fill, Station _____	Lump Sum

### AGGREGATE BASE COURSE:

12-19-06

SP5 R03

Revise the *2006 Standard Specifications* as follows:

**Page 5-11, Article 520-5 Hauling and Placing Aggregate Base Material**, 6th paragraph, replace the first sentence with the following:

Base course that is in place on November 15 shall have been covered with a subsequent layer of pavement structure or with a sand seal. Base course that has been placed

between November 16 and March 15 inclusive shall be covered within 7 calendar days with a subsequent layer of pavement structure or with a sand seal.

**PREPARATION OF SUBGRADE AND BASE:**

(1-16-96)

SP5 R05

On mainline portions and ramps of this project, prepare the subgrade and base beneath the pavement structure in accordance with the applicable sections of the *Standard Specifications* except use an automatically controlled fine grading machine utilizing string lines, laser controls, or other approved methods to produce final subgrade and base surfaces meeting the lines, grades, and cross sections required by the plans or established by the Engineer.

No direct payment will be made for the work required by this provision as it will be considered incidental to other work being paid for by the various items in the contract.

**AGGREGATE FOR SOIL-CEMENT BASE:**

(7-18-06)

SP5 R15

Revise the *2006 Standard Specifications* as follows:

**Page 5-27, Article 542-1.** Delete the first sentence and substitute the following:

The work covered by this section consists of constructing and curing a soil-cement base by treating the subgrade, existing subbase, or existing base, or any combination of these materials, by pulverizing, adding portland cement, adding aggregate when required, mixing, wetting, and compacting the mixture to the required density.

**Page 5-27, Article 542-2.** Add the following:

<b>Item</b>	<b>Section</b>
Aggregate, Std. Size ABC	1005

**Page 5-29, Article 542-7.** Add the following after the first paragraph:

Prior to spreading cement, aggregate shall be spread at the rate shown in the plans.

**Page 5-32, Article 542-16.** Add the following paragraph after the first paragraph:

*Aggregate for Soil-Cement Base* will be measured and paid for in tons at the contract unit price per ton. The aggregate will be measured by weighing in trucks or certified platform scales or other certified weighing devices. No deductions will be made for any moisture contained in the aggregate at the time of weighing.

Add the following to the pay items:

<b>Pay Item</b>	<b>Pay Unit</b>
Aggregate for Soil-Cement Base	Ton

**ASPHALT PAVEMENTS - SUPERPAVE:**

(7-18-06) (Rev 12-18-07)

SP6 R01

Revise the *2006 Standard Specifications* as follows:

**Page 6-2, Article 600-9 Measurement and Payment, delete the second paragraph.**

**Page 6-12, Subarticle 609-5(C)2, Required Sampling and Testing Frequencies, first partial paragraph at the top of the page, delete last sentence and add the following:**

If the Engineer allows the mix to remain in place, payment will be made in accordance with Article 105-3.

**Page 6-12, Subarticle 609-5(C)2, QUALITY CONTROL MINIMUM SAMPLING AND TESTING SCHEDULE**

**First paragraph, delete and replace with the following.**

Sample and test the completed mixture from each mix design per plant per year at the following minimum frequency during mix production:

**Second paragraph, delete the fourth sentence, and replace with the following**

When daily production of each mix design exceeds 100 tons and a regularly scheduled full test series random sample location for that mix design does not occur during that day's production, perform at least one partial test series consisting of Items A and B in the schedule below.

**Page 6-12, Subarticle 609-5(C)2(c) Maximum Specific Gravity, add after (AASHTO T 209):**

*or ASTM D 2041*

**Page 6-13, last line and on page and Page 6-14, Subarticle 609-5(C)2(e) Retained Tensile Strength, add a heading before the first paragraph as follows:**

(i) Option 1

**Insert the following immediately after the first paragraph:**

(ii) Option 2

Mix sampled from truck at plant with one set of specimens prepared by the Contractor and then tested jointly by QA and QC at a mutually agreed upon lab site within the first 7 calendar days after beginning production of each new mix design.

**Second paragraph, delete and replace with the following:**

Test all TSR specimens required by either option noted above on either a recording test press or a test press that maintains the peak load reading after the specimen has broken.

**Subarticle 609-5(C)(3) Control Charts, delete the second sentence of the first paragraph and replace with the following:**

For mix incorporated into the project, record full test series data from all regularly scheduled random samples or directed samples that replace regularly scheduled random samples, on control charts the same day the test results are obtained.

**Page 6-15, Subarticle 609-5(C)(3) Control Charts, first paragraph on this page, delete the last sentence and substitute the following:**

Denote the moving average control limits with a dash green line and the individual test limits with a dash red line.

**Subarticle 609-5(C)(3)(a), (b) and (c), replace (a) (b) and (c) with the following:**

- (a) A change in the binder percentage, aggregate blend, or  $G_{mm}$  is made on the JMF, or,
- (b) When the Contractor elects to stop or is required to stop production after one or two moving average values, respectively, fall outside the moving average limits as outlined in subarticle 609-5(C)6 or,
- (c) If failure to stop production after two consecutive moving averages exceed the moving average limits occurs, but production does stop at a subsequent time, re-establish a new moving average beginning at the actual production stop point.

**Subarticle 609-5(C)(4) Control Limits, replace the first paragraph and the CONTROL LIMITS Table on page 6-16 with the following.**

The following are established as control limits for mix production. Apply the individual limits to the individual test results. Control limits for the moving average limits are based on a moving average of the last 4 data points. Apply all control limits to the applicable target source.

**CONTROL LIMITS**

Mix Control Criteria	Target Source	Moving Average Limit	Individual Limit
2.36 mm Sieve	JMF	±4.0 %	±8.0 %
0.075mm Sieve	JMF	±1.5 %	±2.5 %
Binder Content	JMF	±0.3 %	±0.7 %
VTM @ N <sub>des</sub>	JMF	±1.0 %	±2.0 %
VMA @ N <sub>des</sub>	Min. Spec. Limit	-0.5%	-1.0%
P <sub>0.075</sub> / P <sub>be</sub> Ratio	1.0	±0.4	±0.8
%G <sub>mm</sub> @ N <sub>ini</sub>	Max. Spec. Limit	N/A	+2.0%
TSR	Min. Spec. Limit	N/A	- 15%

**Page 6-16, Subarticle 609-5(C)(5) Warning Bands, delete this subarticle in its entirety.**

**Pages 6-16 through 6-19, Subarticle 609-5(C)(6), delete the word "warning" and substitute the words "moving average".**

**Page 6-16, Subarticle 609-5(C)(6) Corrective Actions, first paragraph, first sentence, delete and replace with the following:**

Immediately notify the Engineer when moving averages exceed the moving average limits.

**Page 6-17, third full paragraph, delete and replace with the following:**

Failure to stop production when required due to an individual mix test not meeting the specified requirements will subject all mix from the stop point tonnage to the point when the next individual test is back on or within the moving average limits, or to the tonnage point when production is actually stopped, whichever occurs first, to being considered unacceptable.

**Sixth full paragraph, delete the first, second, and third sentence and replace with the following:**

Immediately notify the Engineer when any moving average value exceeds the moving average limit. If two consecutive moving average values for any one of the mix control criteria fall outside the moving average limits, cease production of that mix, immediately notify the Engineer of the stoppage, and make adjustments. The Contractor may elect to stop production after only one moving average value falls outside the moving average limits.

**Page 6-18, Subarticle 609-5(C)(6) Corrective Actions second full paragraph, delete and replace with the following:**

If the process adjustment improves the property in question such that the moving average after four additional tests is on or within the moving average limits, the Contractor may continue production with no reduction in payment

**Page 6-18, delete the third and fourth full paragraphs, including the Table for Payment for Mix Produced in the Warning Bands and substitute the following:**

If the adjustment does not improve the property in question such that the moving average after four additional individual tests is outside the moving average limits, the mix will be evaluated for acceptance in accordance with Article 105-3. Reduced payment for or removal of the mix in question will be applied starting from the plant sample tonnage at the stop point to the sample tonnage when the moving average is on or within the moving average limits. In addition, any mix that is obviously unacceptable will be rejected for use in the work.

**Page 6-19, First paragraph, delete and replace with the following:**

Failure to stop production and make adjustments when required due to two consecutive moving average values falling outside the moving average limits will subject all mix produced from the stop point tonnage to the tonnage point when the moving average is back on or within the moving average limits or to the tonnage point when production is actually stopped, whichever occurs first, to being considered unacceptable. Remove this material and replaced with materials which comply with the Specifications at no additional costs to the Department, unless otherwise approved. Payment will be made for the actual quantities of materials required to replace the removed quantities, not to exceed the original amounts.

**Page 6-20, Subarticle 609-5(D)(1) General, delete the third full paragraph, and replace with the following:**

Perform the sampling and testing at the minimum test frequencies as specified above. Should the density testing frequency fail to meet the minimum frequency as specified above, all mix without the required density test representation will be considered unsatisfactory. If the Engineer allows the mix to remain in place, payment will be made in accordance with Article 105-3.

**Page 6-23, Subarticle 609-5(D)(5) Limited Production Procedure, delete the first paragraph including (a), (b), (c) and substitute the following:**

Proceed on limited production when, for the same mix type and on the same contract, one of the following conditions occur (except as noted in the first paragraph below).

- (a) Two consecutive failing lots, except on resurfacing\*
- (b) Three consecutive failing lots on resurfacing\*
- (c) Two consecutive failing nuclear control strips.

\* Resurfacing is defined as the first new uniform layer placed on an existing pavement.

**Page 6-28, Subarticle 610-3(A) Mix Design-General, fourth paragraph, third sentence:**

Substitute 20% for 15%

**Fifth paragraph, first, second and third sentences:**

Substitute 20% for 15%

**Page 6-28, Subarticle 610-3(A) Mix Design-General, add the following as the fourth paragraph:**

Reclaimed Asphalt Pavement (RAP) or Reclaimed Asphalt Shingles (RAS) may be incorporated into asphalt plant mixes in accordance with Article 1012-1 and the following applicable requirements.

**Page 6-35, Table 610-3 delete and replace with the following:**

**TABLE 610-3  
ASPHALT PLACEMENT- MINIMUM TEMPERATURE REQUIREMENTS**

<b>Asphalt Concrete Mix Type</b>	<b>Minimum Air Temperature</b>	<b>Minimum Surface Temperature</b>
ACBC, Type B 25.0B, C, B 37.5C	35°F	35°F
ACIC, Type I 19.0B, C, D	35°F	35°F
ACSC, Type S 4.75A, SF 9.5A, S 9.5B	40°F	50°F*
ACSC, Type S 9.5C, S 12.5C	45°F	50°F
ACSC, Type S 9.5D, S 12.5D	50°F	50°F

\* 35°F if surface is soil or aggregate base for secondary road construction.

**Page 6-44, Article 610-8 Spreading and Finishing, third full paragraph, replace the first sentence with the following:**

Use the 30 foot minimum length mobile grade reference system or the non-contacting laser or sonar type ski *with at least four referencing stations mounted on the paver at a minimum length of 24 feet* to control the longitudinal profile when placing the initial lanes and all adjacent lanes of all layers, including resurfacing and asphalt in-lays, unless otherwise specified or approved.

**Page 6-50, Article 610-13 Density Acceptance, delete the second paragraph and replace with the following:**

As an exception, when the first layer of mix is a surface course and is being placed directly on an unprimed aggregate or soil base, the layer will be included in the "Other" construction category.

**Page 6-53, Article 620-4 Measurement and Payment, sixth paragraph, delete the last sentence.**

**Page 6-54, Article 620-4 Measurement and Payment, add the following pay item:**

<b>Pay Item</b>	<b>Pay Unit</b>
Asphalt Binder for Plant Mix, Grade PG 70-28	Ton

**Page 6-69, Table 660-1 Material Application Rates and Temperatures, add the following:**

Type of Coat	Grade of Asphalt	Asphalt Rate gal/yd <sup>2</sup>	Application Temperature °F	Aggregate Size	Aggregate Rate lb./sq. yd. Total
Sand Seal	CRS-2 or CRS-2P	0.22-0.30	150-175	Blotting Sand	12-15

**Page 6-75, Subarticle 660-9(B), add the following as sub-item (5)**

(5) Sand Seal

Place the fully required amount of asphalt material in one application and immediately cover with the seal coat aggregate. Uniformly spread the fully required amount of aggregate in one application and correct all non-uniform areas prior to rolling.

Immediately after the aggregate has been uniformly spread, perform rolling.

When directed, broom excess aggregate material from the surface of the seal coat.

When the sand seal is to be constructed for temporary sealing purposes only and will not be used by traffic, other grades of asphalt material meeting the requirements of Articles 1020-6 and 1020-7 may be used in lieu of the grade of asphalt required by Table 660-1 when approved.

**Page 6-76, Article 661-1 Description, add the following as the 2nd paragraph:**

Provide and conduct the quality control and required testing for acceptance of the UBWC in accordance with "Quality Management System for Asphalt Pavements (OGAFC, PADL, and Ultra-Thin HMA Version)", included in the contract.

**Page 6-80, Subarticle 661-3(A) Equipment, add the following as the first paragraph:**

Use asphalt mixing plants in accordance with Article 610-5.

Page 10-41, Table 1012-1, delete the last row of entries for OG AFC and add the following:

Mix Type	Course Aggregate Angularity <sup>(b)</sup> ASTM D5821	Fine Aggregate Angularity % Minimum AASHTO T304 Method A	Sand Equivalent % Minimum AASHTO T176	Flat & Elongated 5:1 Ratio % Maximum ASTM D4791 Section 8.4
S 9.5 D	100/100	45	50	10
OG AFC	100/100	N/A	N/A	10
UBWC	100/85	40	45	10

Delete Note (c) under the Table 1012-1 and replace with the following:

- (c) Does not apply to Mix Types SF 9.5A and S 9.5B.

Page 10-43 through 10-45, Subarticle 1012-1(G), delete this in its entirety and replace with the following:

**(G) Reclaimed Asphalt Pavement (RAP)**

**(1) Mix Design RAP**

Incorporate RAP from stockpiles or other sources that have been tested for uniformity of gradation and binder content prior to use in an asphalt mix design. Use reclaimed asphalt pavement that meets all requirements specified for *one* of the following *two* classifications.

**(a) Millings**

Existing reclaimed asphalt pavement (RAP) that is removed from its original location by a milling process as specified in Section 607. Millings should be such that it has a uniform gradation and binder content and all materials will pass a 2" sieve prior to introduction into the plant mixer unit.

**(b) Processed RAP**

RAP that is processed in some manner (possibly by crushing and/or use of a blending method) to produce a uniform gradation and binder content in the RAP prior to use in a recycled mix. Process RAP so that all materials have a uniform gradation and binder content and will pass a 2" sieve prior to introduction into the plant mixer unit.

**(2) Mix Production RAP**

During mix production use RAP that meets the criteria for one of the following categories:

(a) **Mix Design RAP**

RAP contained in the mix design stockpiles as described above may be used in all applicable JMFs. These stockpiles have been pretested; however, they are subject to required QC/QA testing in accordance with Subarticle 609-5(C)(2).

(b) **New Source RAP**

New Source RAP is defined as any acceptable material which was not included in the stockpile or other source when samples were taken for mix design purposes. Process new source RAP so that all materials have a uniform gradation and binder content and will pass a 2" sieve prior to introduction into the plant mixer unit.

After a stockpile of processed RAP or millings has been sampled and mix designs made from these samples, do not add new source RAP to the original stockpile without prior field testing to insure gradation and binder uniformity. Sample and test new source RAP before blending with the existing stockpile.

Store new source RAP in a separate stockpile until the material can be sampled and tested for comparison with the original recycled mix design data. New source RAP may also be placed against the existing stockpile in a linear manner provided it is sampled for mix design conformity prior to its use in the recycled mix.

Unprocessed RAP is asphalt material that was not milled and/or has not been processed to obtain a uniform gradation and binder content and is not representative of the RAP used during the applicable mix design. Unprocessed RAP shall not be incorporated into any JMFs prior to processing. Different sources of unprocessed RAP may be stockpiled together provided it is generally free of contamination and will be processed prior to use in a recycled mix. RAP contamination in the form of excessive dirt, debris, clean stone, concrete, etc. will not be allowed. Incidental amounts of dirt, concrete, and clean stone may be acceptable. Unprocessed RAP may be processed and then classified as a new source RAP as described above.

Field approval of new source RAP will be based on Table 1012-2 below and volumetric mix properties on the mix with the new source RAP included. Provided the Table 1012-2 tolerances are met, volumetric properties of the new mix will then be performed. If all volumetric mix properties meet the mix design criteria for that mix type, the new source RAP may continue to be used.

If the gradation, binder content, or any of the volumetric mix properties are not within the allowable tolerances of Table 1012-2, do not use the new source RAP unless approved by the Engineer. The Contractor may elect to either not use the stockpile, to request an adjustment to the JMF, or to redesign the mix.

<b>TABLE 1012-2</b>									
<b>NEW SOURCE RAP GRADATION and BINDER TOLERANCES</b>									
<b>(Apply Tolerances to Mix Design Data)</b>									
Mix Type	0-20% RAP			20 <sup>+</sup> -25 % RAP			25 <sup>+</sup> % RAP		
Sieve (mm)	Base	Inter.	Surf.	Base	Inter.	Surf.	Base	Inter.	Surf.
P <sub>b</sub> %	± 0.7%			± 0.4%			± 0.3%		
25.0	±10	-	-	±7	-	-	±5	-	-
19.0	±10	±10	-	±7	±7	-	±5	±5	-
12.5	-	±10	±6	-	±7	±3	-	±5	±2
9.5	-	-	±8	-	-	±5	-	-	±4
4.75	±10	-	±10	±7	-	±7	±5	-	±5
2.36	±8	±8	±8	±5	±5	±5	±4	±4	±4
1.18	±8	±8	±8	±5	±5	±5	±4	±4	±4
0.300	±8	±8	±8	±5	±5	±5	±4	±4	±4
0.150	-	-	±8	-	-	±5	-	-	±4
0.075	±4	±4	±4	±2	±2	±2	±1.5	±1.5	±1.5

**ASPHALT BINDER CONTENT OF ASPHALT PLANT MIXES:**

(11-21-00)

SP6 R15

The approximate asphalt binder content of the asphalt concrete plant mixtures used on this project will be as follows:

Asphalt Concrete Base Course	Type B 25.0	4.3%
Asphalt Concrete Intermediate Course	Type I 19.0	4.7%
Asphalt Concrete Surface Course	Type S 4.75A	7.0%
Asphalt Concrete Surface Course	Type SF 9.5A	6.5%
Asphalt Concrete Surface Course	Type S 9.5	6.0%
Asphalt Concrete Surface Course	Type S 12.5	5.5%

The actual asphalt binder content will be established during construction by the Engineer within the limits established in the *2006 Standard Specifications*.

**ASPHALT PLANT MIXTURES:**

(7-1-95)

SP6 R20

Place asphalt concrete base course material in trench sections with asphalt pavement spreaders made for the purpose or with other equipment approved by the Engineer.

**PRICE ADJUSTMENT - ASPHALT BINDER FOR PLANT MIX:**

(11-21-00)

SP6 R25

Price adjustments for asphalt binder for plant mix will be made in accordance with Section 620 of the *2006 Standard Specifications*.

The base price index for asphalt binder for plant mix is \$ **803.85** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **August 1, 2008**.

**FINAL SURFACE TESTING - ASPHALT PAVEMENTS (Rideability):**

(5-18-04) (Rev. 7-15-08)

SP6 R45

On portions of this project where the typical section requires two or more layers of new pavement, perform acceptance testing of the longitudinal profile of the finished pavement surface in accordance with these provisions using a North Carolina Hearne Straightedge (Model No. 1). Furnish and operate the straightedge to determine and record the longitudinal profile of the pavement on a continuous graph. Final surface testing is an integral part of the paving operation and is subject to observation and inspection by the Engineer as deemed necessary.

Push the straightedge manually over the pavement at a speed not exceeding 2 miles per hour. For all lanes, take profiles in the right wheel path approximately 3 feet from the right edge of pavement in the same direction as the paving operation, unless otherwise approved due to traffic control or safety considerations. As an exception, lanes adjacent to curb and gutter, expressway gutter, or shoulder berm gutter may be tested in the left wheel path. Make one pass of the straightedge in each full width travel lane. The full lane width should be comparable in ride quality to the area evaluated with the Hearne Straightedge. If deviations exist at other locations across the lane width, utilize a 10 foot non-mobile straightedge or the Hearne Straightedge to evaluate which areas may require corrective action. Take profiles as soon as practical after the pavement has been rolled and compacted, but no later than 24 hours following placement of the pavement, unless otherwise authorized by the Engineer. Take profiles over the entire length of final surface travel lane pavement exclusive of -Y- line travel lanes less than or equal to 1000 feet in length, ramps less than or equal to 1000 feet in length, turn lanes less than or equal to 1000 feet in length, structures, approach slabs, paved shoulders, loops, and tapers or other irregular shaped areas of pavement, unless otherwise approved by the Engineer. Test in accordance with this provision all mainline travel lanes, full width acceleration or deceleration lanes, -Y- line travel lanes greater than 1000 feet in length, ramps, full width turn lanes greater than 1000 feet in length, and collector lanes.

At the beginning and end of each day's testing operations, and at such other times as determined by the Engineer, operate the straightedge over a calibration strip so that the Engineer can verify correct operation of the straightedge. The calibration strip shall be a 100 foot section of pavement that is reasonably level and smooth. Submit each day's calibration graphs with that day's test section graphs to the Engineer. Calibrate the straightedge in accordance with the current NCDOT procedure titled *North Carolina Hearne Straightedge - Calibration and Determination of Cumulative Straightedge Index*. Copies of this procedure may be obtained from the Department's Pavement Construction Section.

Plot the straightedge graph at a horizontal scale of approximately 25 feet per inch with the vertical scale plotted at a true scale. Record station numbers and references (bridges, approach slabs, culverts, etc.) on the graphs. Distances between references/stations must not exceed 100 feet. Have the operator record the Date, Project No., Lane Location, Wheel Path Location, Type Mix, and Operator's Name on the graph.

Upon completion of each day's testing, evaluate the graph, calculate the Cumulative Straightedge Index (CSI), and determine which lots, if any, require corrective action. Document the evaluation of each lot on a QA/QC-7 form. Submit the graphs along with the completed QA/QC-7 forms to the Engineer, within 24 hours after profiles are completed, for verification of the results. The Engineer will furnish results of their acceptance evaluation to the Contractor within 48 hours of receiving the graphs. In the event of discrepancies, the Engineer's evaluation of the graphs will prevail for acceptance purposes. The Engineer will retain all graphs and forms.

Use blanking bands of 0.2 inches, 0.3 inches, and 0.4 inches to evaluate the graph for acceptance. The 0.2 inch and 0.3 inch blanking bands are used to determine the Straightedge Index (SEI), which is a number that indicates the deviations that exceed each of the 0.2 inch and 0.3 inch bands within a 100 foot test section. The Cumulative Straightedge Index (CSI) is a number representing the total of the SEIs for one lot, which consist of not more than 25 consecutive test sections. In addition, the 0.4 inch blanking band is used to further evaluate deviations on an individual basis. The CSI will be determined by the Engineer in accordance with the current procedure titled "North Carolina Hearne Straightedge - Calibration and Determination of Cumulative Straightedge Index".

The pavement will be accepted for surface smoothness on a lot by lot basis. A test section represents pavement one travel lane wide not more than 100 feet in length. A lot will consist of 25 consecutive test sections, except that separate lots will be established for each travel lane, unless otherwise approved by the Engineer. In addition, full width acceleration or deceleration lanes, ramps, turn lanes, and collector lanes, will be evaluated as separate lots. For any lot that is less than 2500 feet in length, the applicable pay adjustment incentive will be prorated on the basis of the actual lot length. For any lot which is less than 2500 feet in length, the applicable pay adjustment disincentive will be the full amount for a lot, regardless of the lot length.

If during the evaluation of the graphs, 5 lots require corrective action, then proceed on limited production for unsatisfactory laydown in accordance with Article 610-12 of the *Standard Specifications*. Proceeding on limited production is based upon the Contractor's initial evaluation of the straightedge test results and shall begin immediately upon obtaining those results. Additionally, the Engineer may direct the Contractor to proceed on limited production in accordance with Article 610-12 due to unsatisfactory laydown or workmanship.

Limited production for unsatisfactory laydown is defined as being restricted to the production, placement, compaction, and final surface testing of a sufficient quantity of mix necessary to construct only 2500 feet of pavement at the laydown width. Once this lot is complete, the final surface testing graphs will be evaluated jointly by the Contractor and the Engineer. Remain on

limited production until such time as acceptable laydown results are obtained or until three consecutive 2500 foot sections have been attempted without achieving acceptable laydown results. The Engineer will determine if normal production may resume based upon the CSI for the limited production lot and any adjustments to the equipment, placement methods, and/or personnel performing the work. Once on limited production, the Engineer may require the Contractor to evaluate the smoothness of the previous asphalt layer and take appropriate action to reduce and/or eliminate corrective measures on the final surface course. Additionally, the Contractor may be required to demonstrate acceptable laydown techniques off the project limits prior to proceeding on the project.

If the Contractor fails to achieve satisfactory laydown results after three consecutive 2500 foot sections have been attempted, cease production of that mix type until such time as the cause of the unsatisfactory laydown results can be determined.

As an exception, the Engineer may grant approval to produce a different mix design of the same mix type if the cause is related to mix problem(s) rather than laydown procedures. If production of a new mix design is allowed, proceed under the limited production procedures detailed above.

After initially proceeding under limited production, the Contractor shall immediately notify the Engineer if any additional lot on the project requires corrective action. The Engineer will determine if limited production procedures are warranted for continued production.

If the Contractor does not operate by the limited production procedures as specified above, the 5 lots, which require corrective action, will be considered unacceptable and may be subject to removal and replacement. Mix placed under the limited production procedures for unsatisfactory laydown will be evaluated for acceptance in accordance with Article 105-3.

The pay adjustment schedule for the Cumulative Straightedge Index test results per lot is as follows:

<b>Pay Adjustment Schedule for Cumulative Straightedge Index (CSI)</b> <b>(Obtained by adding SE Index of up to 25 consecutive 100 foot test sections)</b>				
*CSI	ACCEPTANCE CATEGORY	CORRECTIVE ACTION	PAY ADJUSTMENT	
			Before Corrective	After Corrective Action
0-0	Acceptable	None	\$300 incentive	None
1-0 or 2-0	Acceptable	None	\$100 incentive	None
3-0 or 4-0	Acceptable	None	No Adjustment	No Adjustment
1-1, 2-1, 5-0 or 6-0	Acceptable	Allowed	\$300 disincentive	\$300 disincentive
3-1, 4-1, 5-1 or 6-1	Acceptable	Allowed	\$600 disincentive	\$600 disincentive
Any other Number	Unacceptable	Required	Per CSI after Correction(s) (not to exceed 100% Pay)	

**\*Either Before or After Corrective Actions**

Correct any deviation that exceeds a 0.4 inch blanking band such that the deviation is reduced to 0.3 inches or less.

Corrective actions shall be performed at the Contractor's expense and shall be presented for evaluation and approval by the Engineer prior to proceeding. Any corrective action performed shall not reduce the integrity or durability of the pavement that is to remain in place. Corrective action for deviation repair may consist of overlaying, removing and replacing, indirect heating and rerolling. Scraping of the pavement with any blade type device will not be allowed as a corrective action. Provide overlays of the same type mix, full roadway width, and to the length and depth established by the Engineer. Tapering of the longitudinal edges of the overlay will not be allowed.

Corrective actions will not be allowed for lots having a CSI of 4-0 or better. If the CSI indicates *Allowed* corrective action, the Contractor may elect to take necessary measures to reduce the CSI in lieu of accepting the disincentive. Take corrective actions as specified if the CSI indicates *Required* corrective action. The CSI after corrective action shall meet or exceed *Acceptable* requirements.

Where corrective action is allowed or required, the test section(s) requiring corrective action will be retested, unless the Engineer directs the retesting of the of the entire lot. No disincentive will apply after corrective action if the CSI is 4-0 or better. If the retested lot after corrective action has a CSI indicating a disincentive, the appropriate disincentive will be applied.

Test sections and/or lots that are initially tested by the Contractor that indicate excessive deviations such that either a disincentive or corrective action is necessary, may be re-rolled with asphalt rollers while the mix is still warm and in a workable condition, to possibly correct the problem. In this instance, reevaluation of the test section(s) shall be completed within 24 hours of pavement placement and these test results will serve as the initial test results.

Incentive pay adjustments will be based only on the initially measured CSI, as determined by the Engineer, prior to any corrective work. Where corrective actions have been taken, payment will be based on the CSI determined after correction, not to exceed 100 percent payment.

Areas excluded from testing by the N.C. Hearne Straightedge will be tested by using a non-mobile 10-foot straightedge. Assure that the variation of the surface from the testing edge of the straightedge between any two contact points with the surface is not more than 1/8 inch. Correct deviations exceeding the allowable tolerance in accordance with the corrective actions specified above, unless the Engineer permits other corrective actions.

Furnish the North Carolina Hearne Straightedge(s) necessary to perform this work. Maintain responsibility for all costs relating to the procurement, handling, and maintenance of these devices. The Department has entered into a license agreement with a manufacturer to fabricate, sell, and distribute the N.C. Hearne Straightedge. The Department's Pavement Construction Section may be contacted for the name of the current manufacturer and the approximate price of the straightedge.

No direct payment will be made for the work covered by this section. Payment at the contract unit prices for the various items covered by those sections of the specifications directly applicable to the work constructed will be full compensation for all work covered by this section including, but not limited to, performing testing in accordance with this specification, any corrective work required as a result of this testing and any additional traffic control as may be necessary.

**MASONRY DRAINAGE STRUCTURES:**

(10-16-07)

SP8 R01

Revise the *2006 Standard Specifications* as follows:

**Page 8-31, Article 840-4 Measurement and Payment**, add the following at the end of the second paragraph:

For that portion of *Masonry Drainage Structure* measured above a height of 10.0 feet, payment will be made at 1.3 times the contract unit price per linear foot for *Masonry Drainage Structure*.

**BORROW EXCAVATION AND SHPO DOCUMENTATION FOR BORROW/WASTE**

**SITES:**

(12-18-07) (4-15-08)

SP8 R02

Revise the *2006 Standard Specifications* as follows:

**Division 2 Earthwork**

**Page 2-16, Subarticle 230-1(D)**, add the words: *The Contractor specifically waives* as the first words of the sentence.

**Page 2-17, Article 230-4(B) Contractor Furnished Sources, first paragraph, first sentence** replace with the following:

Prior to the approval of any borrow sources developed for use on any project, obtain certification from the State Historic Preservation Officer of the State Department of Cultural Resources certifying that the removal of the borrow material from the borrow sources(s) will have no effect on any known district, site building, structure, or object, architectural and/or archaeological that is included or eligible for inclusion in the National Register of Historic Places.

**Division 8 Incidentals**

**Page 8-9, Article 802-2 General Requirements, add the following as the 1st paragraph:**

Prior to the removal of any waste from any project, obtain certification from the State Historic Preservation Officer of the State Department of Cultural Resources certifying that the deposition of the waste material to the proposed waste area will have no effect on any known district, site building, structure, or object, architectural and/or archaeological that is

included or eligible for inclusion in the National Register of Historic Places. Furnish a copy of this certification to the Engineer prior to performing any work in the proposed waste site.

**Page 8-10, Article 802-2, General Requirements, 4th paragraph, add the following as the 2nd sentence:**

The Department's borrow and waste site reclamation procedures for contracted projects is available on the NCDOT website and shall be used for all borrow and waste sites on this project.

**ENDWALLS:**

(5-20-08)

SP8 R25

Revise the *Standard Specifications* as follows:

**Page 8-28, Article 838-4 Replace the 1st and 2nd paragraph with the following:**

*Endwalls* will be measured and paid for in cubic yards of concrete or brick that have been completed and accepted. This quantity will be computed from the dimensions shown on the plans or from revised authorized dimensions. Where precast concrete units have been approved and are used in lieu of cast-in-place units the quantity to be paid for will be computed the same as if cast-in-place units were used, as no reduction in pay quantity will be made due to the use of precast in lieu of cast in place endwalls.

*Reinforced Endwalls* will be measured and paid for in cubic yards of concrete or brick that have been completed and accepted. This quantity will be computed from the dimensions shown on the plans or from revised authorized dimensions. Where precast concrete units have been approved and are used in lieu of cast-in-place units the quantity to be paid for will be computed the same as if cast-in-place units were used, as no reduction in pay quantity will be made due to the use of precast in lieu of reinforced cast in place endwalls.

**TEMPORARY 9" X 12" ASPHALT CURBING:**

The 9" x 12" asphalt curb shall be constructed in accordance with Std. 846.01 of the Roadway Standard Drawings for 9" x 12" concrete curb and in accordance with the plans.

The quantity of 9" x 12" asphalt curb to be paid for will be the actual number of linear feet of 9" x 12" asphalt curb, measured in place along the center of the curb.

The quantity of 9" x 12" asphalt curb, measured as provide for above, will be paid for at the contract unit price per linear foot for "Temporary 9" x 12" Asphalt Curbing". Such price and payment shall be full compensation for furnishing, hauling and placing all material, disposal of surplus material, and all equipment, tools, labor and incidentals necessary to complete the work.

**CONVERT EXISTING MANHOLE TO CATCH BASIN:**

(1-1-02) (Rev. 7-18-06)

SP8 R50

At the proper phase of construction, convert the existing manhole at locations indicated in the plans or where directed, to catch basin in accordance with the details in the plans and the applicable requirements of Sections 840 and 859 of the *2006 Standard Specifications*.

*Convert Existing Manhole to Catch Basin* will be measured and paid for as each, completed and accepted. Such price and payment is considered full compensation for all equipment, materials, labor, tools, and incidentals necessary to complete each conversion satisfactorily.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Convert Existing Manhole to Catch Basin	Each

**CONVERT EXISTING DROP INLET TO CATCH BASIN:**

(1-1-02) (Rev. 7-18-06)

SP8 R50

At the proper phase of construction, convert the existing drop inlet at locations indicated in the plans or where directed, to catch basin in accordance with the details in the plans and the applicable requirements of Sections 840 and 859 of the *2006 Standard Specifications*.

*Convert Existing Drop Inlet to Catch Basin* will be measured and paid for as each, completed and accepted. Such price and payment is considered full compensation for all equipment, materials, labor, tools, and incidentals necessary to complete each conversion satisfactorily.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Convert Existing Drop Inlet to Catch Basin	Each

**CONVERT EXISTING DROP INLET TO JUNCTION BOX WITH MANHOLE COVER:**

(1-1-02) (Rev. 7-18-06)

SP8 R50

At the proper phase of construction, convert the existing drop inlet at locations indicated in the plans or where directed, to junction box with manhole cover in accordance with the details in the plans and the applicable requirements of Sections 840 and 859 of the *2006 Standard Specifications*.

*Convert Existing Drop Inlet to Junction Box with Manhole Cover* will be measured and paid for as each, completed and accepted. Such price and payment is considered full compensation for all equipment, materials, labor, tools, and incidentals necessary to complete each conversion satisfactorily.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Convert Existing Drop Inlet to Junction Box with Manhole Cover	Each

**CONVERT EXISTING JUNCTION BOX TO CATCH BASIN:**

(1-1-02) (Rev. 7-18-06)

SP8 R50

At the proper phase of construction, convert the existing junction box at locations indicated in the plans or where directed, to catch basin in accordance with the details in the plans and the applicable requirements of Sections 840 and 859 of the *2006 Standard Specifications*.

*Convert Existing Junction Box to Catch Basin* will be measured and paid for as each, completed and accepted. Such price and payment is considered full compensation for all equipment, materials, labor, tools, and incidentals necessary to complete each conversion satisfactorily.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Convert Existing Junction Box to Catch Basin	Each

**GUARDRAIL ANCHOR UNITS, TYPE 350:**

(4-20-04)

SP8 R65

**Description**

Furnish and install guardrail anchor units in accordance with the details in the plans, the applicable requirements of Section 862 of the *2006 Standard Specifications*, and at locations shown in the plans.

**Materials**

The Contractor may at his option, furnish any one of the guardrail anchor units.

Guardrail anchor unit (ET-2000) as manufactured by:

Trinity Industries, Inc.  
 2525 N. Stemmons Freeway  
 Dallas, Texas 75207  
 Telephone: 800-644-7976

The guardrail anchor unit (SKT 350) as manufactured by:

Road Systems, Inc.  
 3616 Old Howard County Airport  
 Big Spring, Texas 79720  
 Telephone: 915-263-2435

Prior to installation the Contractor shall submit to the Engineer:

(A) FHWA acceptance letter for each guardrail anchor unit certifying it meets the requirements of NCHRP Report 350, Test Level 3, in accordance with Section 106-2 of the *2006 Standard Specifications*.

(B) Certified working drawings and assembling instructions from the manufacturer for each guardrail anchor unit in accordance with Section 105-2 of the *2006 Standard Specifications*.

No modifications shall be made to the guardrail anchor unit without the express written permission from the manufacturer. Perform installation in accordance with the details in the plans, and details and assembling instructions furnished by the manufacturer.

### **Construction Methods**

Guardrail end delineation is required on all approach and trailing end sections for both temporary and permanent installations. Guardrail end delineation consists of yellow reflective sheeting applied to the entire end section of the guardrail in accordance with Section 1088-3 of the *2006 Standard Specifications* and is incidental to the cost of the guardrail anchor unit.

### **Measurement and Payment**

Measurement and payment will be made in accordance with Articles 862-6 of the *2006 Standard Specifications*.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Guardrail Anchor Units, Type 350	Each

### **IMPACT ATTENUATOR UNITS, TYPE 350:**

(4-20-04) (Rev 7-18-06)

SP8 R75

### **Description**

Furnish and install impact attenuator units and any components necessary to connect the impact attenuator units in accordance with the manufacturer's requirement, the details in the plans and at locations shown in the plans.

### **Materials**

#### **NON-GATING IMPACT ATTENUATOR UNITS:**

The impact attenuator unit (QUADGUARD) as manufactured by:

Energy Absorption Systems, Inc.  
One East Wacker Drive  
Chicago, Illinois 60601-2076  
Telephone: 312-467-6750

The impact attenuator unit (TRACC) as manufactured by:

Trinity Industries, Inc.  
2525 N. Stemmons Freeway  
Dallas, Texas 75207  
Telephone: 800-644-7976

**GATING IMPACT ATTENUATOR UNITS:**

The impact attenuator unit (BRAKEMASTER) as manufactured by:

Energy Absorption Systems, Inc.  
One East Wacker Drive  
Chicago, Illinois 60601-2076  
Telephone: 312-467-6750

The impact attenuator unit (CAT) as manufactured by:

Trinity Industries, Inc.  
2525 N. Stemmons Freeway  
Dallas, Texas 75207  
Telephone: 800-644-7976

Prior to installation the Contractor shall submit to the Engineer:

(A) FHWA acceptance letter for each impact attenuator unit certifying it meets the requirements of NCHRP Report 350, Test Level 3, in accordance with Article 106-2 of the *2006 Standard Specifications*.

(B) Certified working drawings and assembling instructions from the manufacturer for each impact attenuator unit in accordance with Article 105-2 of the *2006 Standard Specifications*.

No modifications shall be made to the impact attenuator unit without the express written permission from the manufacturer. Perform installation in accordance with the details in the plans, and details and assembling instructions furnished by the manufacturer.

**Construction Methods**

If the median width is 40 feet or less, the Contractor shall supply one of the NON-GATING Impact Attenuator Units listed in the Materials Section herein.

If the median width is greater than 40 feet, the Contractor may use any of the GATING or NON-GATING Impact Attenuator Units listed in the Materials Section herein.

**Measurement and Payment**

*Impact Attenuator Unit, Type 350* will be measured and paid for at the contract unit price per each. Such prices and payment will be full compensation for all work covered by this provision including but not limited to furnishing, installing and all incidentals necessary to complete the work.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Impact Attenuator Unit, Type 350	Each

**FENCE:**

(3-6-06)

SP8 R86

Revise the *2006 Standard Specifications* as follows:

**Page 8-54, Subarticle 866-3(A)**, second sentence,

Add *existing fencing* after stumps

**EARLY FENCING**

SPI 8-18

The Contractor's attention is directed to the fact that as a part of his first operations, he is required to install the barbed wire fence prior to removing the existing fence on the following parcels:

<b>Number</b>	<b>Parcel</b>	<b>Name</b>
1.	Parcel 103Z	Amaryllis Fleming
2.	Parcel 107Z	Amaryllis Fleming
3.	Parcel 002	John Strickland
4.	Parcel 033	Graham Enterprises
5.	Parcel 033A	VMC Investments
6.	Parcel 35	P. Luther Brown
7.	Parcel 38	P. Arthur Brown
8.	Parcel 038A	P. Arthur Brown

This fencing is necessary to constrain the livestock in the appropriate area.

**TEMPORARY 4-STRAND BARBED WIRE FENCE WITH POSTS:**

(7-1-95) (Rev 7-18-06)

SP8 R85

**Description**

Construct a temporary 4-strand barbed wire fence with posts at locations directed by the Engineer. Use only barbed wire and posts that have been approved by the Engineer. Provide

Provide post spacing of 12 feet. Construct the fence and maintain it with the barbed wire taut and securely fastened to the posts at all times.

After the fence has served its purpose and is no longer needed, as determined by the Engineer, it becomes the property of the Contractor.

### **Measurement and Payment**

*Temporary 4-Strand Barbed Wire Fence with Posts* will be measured and paid for as the actual number of linear feet of fence constructed and accepted, measured in place from center of end post to center of end post. Such price and payment will be full compensation for all materials, labor, fence maintenance, and incidentals necessary to satisfactorily complete the work.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Temporary 4-Strand Barbed Wire Fence with Posts	Linear Foot

### **STEEL U-CHANNEL POSTS:**

(7-18-06)

SP9 R02

Revise the *2006 Standard Specifications* as follows:

**Page 9-15 Subarticle 903-3(D)** first paragraph, last sentence, delete the last sentence and add the following:

Use posts of sufficient length to permit the appropriate sign mounting height. Spliced posts are not permitted on new construction.

### **AGGREGATE PRODUCTION:**

(11-20-01)

SP10 R05

Provide aggregate from a producer who uses the current Aggregate Quality Control/Quality Assurance Program that is in effect at the time of shipment.

No price adjustment is allowed to contractors or producers who use the program. Participation in the program does not relieve the producer of the responsibility of complying with all requirements of the *2006 Standard Specifications*. Copies of this procedure are available upon request from the Materials and Test Unit.

### **CONCRETE BRICK AND BLOCK PRODUCTION:**

(11-20-01)

SP10 R10

Provide concrete brick and block from a producer who uses the current Solid Concrete Masonry Brick/Unit Quality Control/Quality Assurance Program that is in effect on the date that material is received on the project.

No price adjustment is allowed to contractors or producers who use the program. Participation in the program does not relieve the producer of the responsibility of complying with all requirements of the *2006 Standard Specifications*. Copies of this procedure are available upon request from the Materials and Test Unit.

**PORTLAND CEMENT CONCRETE (Alkali-Silica Reaction):**

(2-20-07)

SP10 R16

Revise the *2006 Standard Specifications* as follows:

**Article 1024-1(A)**, replace the 2nd paragraph with the following:

Certain combinations of cement and aggregate exhibit an adverse alkali-silica reaction. The alkalinity of any cement, expressed as sodium-oxide equivalent, shall not exceed 1.0 percent. For mix designs that contain non-reactive aggregates and cement with an alkali content less than 0.6%, straight cement or a combination of cement and fly ash, cement and ground granulated blast furnace slag or cement and microsilica may be used. The pozzolan quantity shall not exceed the amount shown in Table 1024-1. For mixes that contain cement with an alkali content between 0.6% and 1.0%, and for mixes that contain a reactive aggregate documented by the Department, regardless of the alkali content of the cement, use a pozzolan in the amount shown in Table 1024-1.

Obtain the list of reactive aggregates documented by the Department at:<http://www.ncdot.org/doh/operations/materials/pdf/quarryasrprob.pdf>

<b>Table 1024-1</b>	
<b>Pozzolans for Use in Portland Cement Concrete</b>	
<i>Pozzolan</i>	<i>Rate</i>
Class F Fly Ash	20% by weight of required cement content, with 1.2 lbs Class F fly ash per lb of cement replaced
Ground Granulated Blast Furnace Slag	35%-50% by weight of required cement content with 1 lb slag per lb of cement replaced
Microsilica	4%-8% by weight of required cement content, with 1 lb microsilica per lb of cement replaced

**GLASS BEADS:**

(7-18-06)

SP10 R35

Revise the *2006 Standard Specifications* as follows:

**Page 10-223, 1087-4(C) Gradation & Roundness**

Replace the second sentence of the first paragraph with the following:

*All Drop-On and Intermixed Glass Beads shall be tested in accordance with ASTM D1155.*

Delete the last paragraph.

**ENGINEERING FABRICS TABLE 1056-1:**

(7-18-06)

SP10 R40

Revise the *2006 Standard Specifications* as follows:

**Page 10-100, Table 1056-1**, replace the values for Trapezoidal Tear Strength with the following:

Physical Property	ASTM Test Method	Type 1	Type 2	Type 3		Type 4
				Class A	Class B	
Typical Applications		Shoulder Drain	Under Riprap	Temporary Silt Fence		Soil Stabilization
Trapezoidal Tear Strength	D4533	45 lb	75 lb	--	--	75 lb

**MACRO-SYNTHETIC FIBERS FOR CONCRETE REINFORCEMENT**

(7-15-08)

SP 10 R42

**Description**

Substitute as an option, macro-synthetic fibers in lieu of 4" x 4" W1.4 x W1.4 welded wire fabric reinforcement for selected precast concrete products in accordance with the following requirements.

**Materials**

Item	Section
Portland Cement Concrete	1077-5

Substitute macro-synthetic fibers only for steel reinforcement with an area of steel of 0.12 in<sup>2</sup>/ft or less in the following items:

- (A) Precast Drainage Structure units in accordance with the requirements of *Standard Drawing 840.45*.
- (B) Precast Manhole 4.0' Riser Sections in accordance with the requirements of *Standard Drawing 840.52*.

All other requirements, including reinforcement for these precast concrete items will remain the same.

*Submittal* Submit to the Department for approval by the precast producer and fiber manufacturer, independently performed test results certifying the macro-synthetic fibers and the precast concrete products meet the requirements listed herein:

**(A) Macro-Synthetic Fibers**

- (1) Manufacture from virgin polyolefins (polypropylene and polyethylene) and comply with ASTM C 1116.4.1.3.

*Fibers manufactured from materials other than polyolefins* Submit test results certifying resistance to long-term deterioration when in contact with the moisture and alkalis present in cement paste and/or the substances present in air-entraining and chemical admixtures.

- (2) Fiber length - no less than 1-1/2 inch.
- (3) Macro-synthetic fibers - aspect ratio (length divided by the equivalent diameter of the fiber) between 45 and 150.
- (4) Macro-synthetic fibers - Minimum tensile strength of 40 ksi when tested in accordance with ASTM D 3822.
- (5) Macro-synthetic fibers - minimum modulus of elasticity of 400 ksi when tested in accordance with ASTM D 3822.

**(B) Fiber Reinforced Concrete**

- (1) Approved structural fibers may be used as a replacement of steel reinforcement in allowable structures of NCDOT Standards 840.45 and 840.52. The dosage rate, in pounds of fibers per cubic yard, shall be as per recommended by the fiber manufacturer to provide a minimum average residual strength (in accordance with ASTM C 1399) of concrete of no less than that of the concrete with the steel reinforcement that is being replaced, but no less than 5 lbs. per cubic yard. Submit the recommendations of the manufacturer that correlate the toughness of steel-reinforced concrete with that of the recommended dosage rate for the fiber-reinforced concrete.
- (2) Fiber reinforced concrete - 4.5% air content,  $\pm$  1.5% tolerance.
- (3) Fiber reinforced concrete - develop a minimum compressive strength 4000 psi in 28 days.
- (4) Workability of the concrete mix - determine in accordance with ASTM C995. The flow time - not be less than 7 seconds or greater than 25 seconds.
- (5) Assure the fibers are well dispersed and prevent fiber balling during production. After introduction of all other ingredients, add the plastic concrete and mix the plastic concrete for at least 4 minutes or for 50 revolutions at standard mixing speed.

**Measurement and Payment**

No separate payment will be made for substitution of macro-fiber synthetic reinforcement for the steel reinforcing. The price bid for the precast units will be full compensation for furnishing and incorporating the macro-fiber synthetic reinforcement.

**PORTABLE CONCRETE BARRIER:**

(2-20-07)

SP10 R50

The *2006 Standard Specifications* is revised as follows:

**Page 10-245, Article 1090-1(A) General**, add the following after the first sentence:

The requirement for approved galvanized connectors will be waived if the barrier remains the property of the Contractor.

**TEMPORARY SHORING:**

(2-20-07) (Rev. 9-25-07)

SP11 R02

**Description**

Design and construct temporary shoring in accordance with the contract. Temporary shoring includes standard shoring, temporary mechanically stabilized earth (MSE) walls and non-anchored temporary shoring. Trench boxes are not considered temporary shoring. "Standard shoring" refers to *standard temporary shoring* and *standard temporary MSE walls*. Notes on plans may restrict the use of one or both types of standard shoring. Notes on plans may also require or prohibit temporary MSE walls.

Unless noted otherwise on the plans, temporary shoring is required as shown on the plans and to maintain traffic. Temporary shoring to maintain traffic is defined as shoring necessary to provide lateral support to the side of an excavation or embankment parallel to an open travelway when a theoretical 2:1 (H:V) slope from the bottom of the excavation or embankment intersects the existing ground line closer than 5 ft from the edge of pavement of the open travelway.

This provision is not applicable to anchored temporary shoring or the installation of pipes, drop inlets and utilities unless noted otherwise on the plans. Provide all shoring submittals before beginning work.

**Materials****(A) Certifications, Storage and Handling**

Provide Type 7 Contractor's Certifications in accordance with Article 106-3 of the *Standard Specifications* for all shoring materials used with the exception of reinforcing fabrics and geogrids. Furnish Type 2 Typical Certified Mill Test Reports in accordance with Article 106-3 of the *Standard Specifications* for all seam strengths and reinforcing fabric and geogrid properties. Provide minimum average roll values (MARV) in accordance with ASTM D4759 for test reports. For testing reinforcing fabric and geogrids, a lot is defined as a single day's production.

Load, transport, unload and store shoring materials such that they are kept clean and free of damage. Identify, store and handle all geogrids and geotextile fabrics in accordance with ASTM D4873. Geogrids and fabrics with defects, flaws, deterioration or damage will be rejected. Do not leave fabrics or geogrids uncovered for more than 7 days.

**(B) Shoring Backfill**

Use shoring backfill for the construction of all temporary shoring including backfilling behind non-anchored temporary shoring and in the reinforced zone for temporary MSE walls. Unless backfilling around culverts, use shoring backfill that meets the requirements of Class II Type I, Class III, Class V or Class VI select material in accordance with Section 1016 of the *Standard Specifications* or AASHTO M145 for soil classification A-2-4 with a maximum plasticity index (PI) of 6. For backfilling around culverts, use shoring backfill as defined herein except for A-2-4 soil.

**(C) Non-anchored Temporary Shoring**

Use steel shapes, plates and piles that meet the requirements of ASTM A36 and steel sheet piles that meet the requirements of Article 1084-2 of the *Standard Specifications*. Use timber lagging with a minimum allowable bending stress of 1000 psi that meets the requirements of Article 1082-1 of the *Standard Specifications*. For standard temporary shoring, use pile sections and lengths and lagging sizes as shown on the plans.

**(D) Temporary MSE Walls**

Use welded wire reinforcement forms, facings, mesh and mats that meet the requirements of AASHTO M55 or M221. Use connector bars and wires for welded wire wall components and support struts that meet the requirements of AASHTO M32. For standard temporary MSE walls, use wire gauges, strut sizes and welded wire components as shown on the plans.

**(1) Geotextile Fabrics**

Use geotextile fabrics that meet the requirements of Article 1056-1 of the *Standard Specifications*.

**(a) Reinforcing Fabric**

The reinforcement direction (RD) is defined as the direction perpendicular to the wall face and the cross-reinforcement direction (CRD) is defined as the direction parallel to the wall face.

Use woven polyester or polypropylene fabric that meets the following properties:

Property	Test Method	Requirement (MARV)
Wide Width Tensile Strength @ Ultimate (RD)	ASTM D4595	Varies – 200 lb/in min
Wide Width Tensile Strength @ Ultimate (CRD)	ASTM D4595	100 lb/in min
Trapezoidal Tear Strength	ASTM D4533	100 lb min
CBR Puncture Strength	ASTM D6241	600 lb min
UV Resistance after 500 hrs	ASTM D4355	70 %
Apparent Opening Size (AOS), US Sieve	ASTM D4751	20 min – 70 max
Permittivity	ASTM D4491	0.20 sec <sup>-1</sup>

For standard temporary MSE walls (temporary fabric wall) use reinforcing fabric wide width tensile strengths and lengths in the RD as shown on the plans.

**(b) Retention Fabric**

Retain shoring backfill at the face of temporary MSE walls with retention fabric. Use fabric that meets the requirements of Class 3 and the UV resistance, AOS and permittivity for separation geotextile in accordance with AASHTO M288.

**(2) SierraScape Temporary Wall**

Use uniaxial (UX) geogrids composed of high-density polyethylene (HDPE) manufactured by Tensar Earth Technologies. Test geogrids in accordance with ASTM D6637. Use connection rods manufactured by Tensar Earth Technologies to transfer the load between the facings and geogrids.

For standard temporary MSE walls (SierraScape temporary wall) use geogrid types and lengths as shown on the plans.

**(3) Terratrel Temporary Wall**

Use ribbed reinforcing steel strips manufactured by The Reinforced Earth Company that meet the requirements of ASTM A572, Grade 65. Use connector rods that meet the requirements of AASHTO M31, Grade 60 and hair pin connectors that meet the requirements of ASTM A1011, Grade 50. Use bolts, nuts and washers that meet the requirements of AASHTO M164.

For standard temporary MSE walls (Terratrel temporary wall) use ribbed steel strip size and lengths, rod lengths and diameters, hairpin connectors, bolts, nuts and washers as shown on the plans.

### **Embedment**

“Embedment” is defined as the depth of shoring below the bottom of the excavation or the grade in front of the shoring. For cantilever shoring, embedment is the depth of the piling below the grade in front of the shoring. For temporary MSE walls, embedment is the difference between the grade elevation in front of the wall and the elevation of the bottom of the reinforced zone.

### **Portable Concrete Barriers**

Provide portable concrete barriers in accordance with the plans and if shoring is located within the clear zone as defined in the *AASHTO Roadside Design Guide*. Use NCDOT portable concrete barriers (PCBs) in accordance with Roadway Standard Drawing No. 1170.01 and Section 1170 of the *Standard Specifications*. Use Oregon Tall F-Shape Concrete Barriers in accordance with detail drawing and special provision obtained from:

<http://www.ncdot.org/doh/preconstruct/wztc/DesRes/English/DesResEng.html>

The clear distance is defined as the horizontal distance from the back face of the barrier to the edge of pavement and the minimum required clear distance is shown on the traffic control plans. At the Contractor’s option or if the minimum required clear distance is not available, set an unanchored PCB against the traffic side of the shoring and design shoring for traffic impact or use the “surcharge case with traffic impact” for the standard temporary shoring. An anchored PCB or Oregon barrier is required for barriers above and behind temporary MSE walls.

### **Contractor Designed Shoring**

“Contractor designed shoring” is defined as non-anchored temporary shoring or temporary MSE walls designed by the Contractor. Unless prohibited or required, Contractor designed shoring is optional. Contractor designed shoring is required when notes on plans prohibit the use of standard shoring. Non-anchored Contractor designed shoring is prohibited when notes on plans require the use of temporary MSE walls and Contractor designed temporary MSE walls are prohibited when notes on plans prohibit the use of temporary MSE walls.

Before beginning design, survey the shoring location to determine existing elevations and actual design heights. Submit design calculations and drawings including typical sections for review and acceptance showing details of the proposed design and construction sequence in accordance with Article 105-2 of the *Standard Specifications*. Have shoring designed, detailed and sealed by a Professional Engineer registered in the State of North Carolina. Submit 3 hard copies of design calculations and 10 hard copies of drawings and an electronic copy (pdf or jpeg format on CD or DVD) of both the calculations and drawings.

Design non-anchored temporary shoring in accordance with the *AASHTO Guide Design Specifications for Bridge Temporary Works* and temporary MSE walls in accordance with the

*AASHTO Allowable Stress Design Standard Specifications for Highway Bridges.* Use the following soil parameters for shoring backfill in the reinforced zone.

Total Unit Weight = 120 pcf  
Friction Angle = 30 degrees  
Cohesion = 0 psf

Design temporary shoring in accordance with the in-situ assumed soil parameters shown on the plans. Design shoring for a 3-year design service life and a traffic surcharge equal to 240 psf. This surcharge is not applicable for construction traffic. If a construction surcharge will be present within a horizontal distance equal to the height of the shoring, design the shoring for the required construction surcharge. If the edge of pavement or a structure to be protected is within a horizontal distance equal to the height of the shoring, design shoring for a maximum deflection of 3". Otherwise, design shoring for a maximum deflection of 6".

For non-anchored temporary shoring, the top of shoring elevation is defined as the elevation where the grade intersects the back face of the shoring. For traffic impact, apply 2 kips/ft to the shoring 1.5 ft above the top of shoring elevation. When designing for traffic impact, extend shoring at least 32" above the top of shoring elevation. Otherwise, extend shoring at least 6" above the top of shoring elevation.

### **Standard Shoring**

Unless notes on plans prohibit the use of one or both types of standard shoring, standard shoring is optional. Submit a "Standard Temporary MSE Wall Selection Form" for each standard temporary MSE wall location and a "Standard Temporary Shoring Selection Form" for up to three standard temporary shoring locations. Submit selection forms at least 14 days before beginning shoring construction. Obtain standard shoring selection forms from:

<http://www.ncdot.org/doh/preconstruct/highway/geotech/formdet/standards.html>

#### **(A) Standard Temporary Shoring**

Determine the shoring height, traffic impact, groundwater condition and slope or surcharge case for each standard temporary shoring location. Determine the minimum required extension, embedment and sheet pile section modulus or H pile section from the plans for each location.

#### **(B) Standard Temporary MSE Walls**

Choose a standard temporary MSE wall from the multiple temporary MSE wall options shown in the plans. Do not use more than one option per wall location.

Step bottom of reinforced zone in increments equal to vertical reinforcement spacing for the wall option chosen. Determine the wall height and slope or surcharge case for each section of standard temporary MSE wall. With the exception of either the first or last

section of wall, use horizontal section lengths in increments equal to the following for the wall option chosen.

<b>Standard Temporary MSE Wall Option</b>	<b>Increment</b>
Temporary Fabric Wall	9 ft min (varies)
Hilfiker Temporary Wall	10 ft min (varies)
SierraScape Temporary Wall	18 ft – 7 1/4 in
Retained Earth Temporary Wall	24 ft
Terratrel Temporary Wall	19 ft – 8 in

Determine the appropriate facings and/or forms and reinforcement length, spacing, strength, type, density and/or size from the plans for each wall section.

### **Construction Methods**

When using an anchored PCB, anchor the barrier in accordance with Roadway Standard Drawing 1170.01 and Section 1170 of the *Standard Specifications*. Control drainage during construction in the vicinity of temporary shoring. Collect and direct run off away from temporary MSE walls, shoring and shoring backfill.

#### **(A) Non-anchored Temporary Shoring**

Install and interlock sheet piling or install piles as shown on the plans or accepted submittals with a tolerance of 1/2 inch per foot from vertical. Contact the Engineer if the design embedment is not achieved. If piles are placed in drilled holes, perform pile excavation to the required elevations and backfill excavations with concrete and lean sand grout.

Remove grout as necessary to install timber lagging. Install timber lagging with a minimum bearing distance of 3” on each pile flange. Backfill voids behind lagging with shoring backfill.

Perform welding in accordance with the accepted submittals and Article 1072-20 of the *Standard Specifications*.

#### **(1) Pile Excavation**

Excavate a hole with a diameter that will result in at least 3” of clearance around the entire pile. Use equipment of adequate capacity and capable of drilling through soil and non-soil including rock, boulders, debris, man-made objects and any other materials encountered. Blasting is not permitted to advance excavations. Blasting for core removal is permitted only when approved by the Engineer. Dispose of drilling spoils in accordance with Section 802 of the *Standard Specifications*. Drilling spoils consist of all excavated material including water removed from excavations by either pumping or drilling tools.

If unstable, caving or sloughing soils are encountered, stabilize excavations with clean watertight steel casing. Steel casings may be either sectional type or one continuous corrugated or non-corrugated piece. Provide casings of ample strength to withstand handling and driving stresses and the pressures imposed by concrete, earth or backfill. Use steel casings with an outside diameter equal to the hole size and a minimum wall thickness of 1/4 inch.

Before placing concrete, check the water inflow rate in the excavation after any pumps have been removed. If the inflow rate is less than 6" per half hour, remove any water and free fall the concrete into the excavation. Ensure that concrete flows completely around the pile. If the water inflow rate is greater than 6" per half hour, propose and obtain approval of the concrete placement procedure before placing concrete.

Center the pile in the excavation and fill the excavation with Class A concrete in accordance with Section 1000 of the *Standard Specifications* except as modified herein. Provide concrete with a slump of 6 to 8 inches. Use an approved high-range water reducer to achieve this slump. Place concrete in a continuous manner to the bottom of shoring or the elevations shown on the accepted submittals. Fill the remainder of the excavation with a lean sand grout and remove all casings.

**(B) Temporary MSE Walls**

The Engineer may require a wall preconstruction meeting to discuss the construction and inspection of the temporary MSE walls. If required, conduct the meeting with the Site Superintendent, the Resident or Bridge Maintenance Engineer, the Bridge Construction Engineer and the Geotechnical Operations Engineer before beginning wall construction.

Perform all necessary clearing and grubbing in accordance with Section 200 of the *Standard Specifications*. Excavate as necessary as shown on the plans or accepted submittals. Notify the Engineer when foundation excavation is complete. Do not place shoring backfill or first reinforcement layer until obtaining approval of the excavation depth and foundation material.

If applicable, install foundations located within the reinforced zone in accordance with the plans or accepted submittals.

Erect and maintain facings and forms as shown on the plans or accepted submittals. Stagger vertical joints of facings and forms to create a running bond when possible unless shown otherwise on the plans or accepted submittals.

Place facings and forms as near to vertical as possible with no negative batter. Construct temporary MSE walls with a vertical and horizontal tolerance of 3" when measured with a 10 ft straight edge and an overall vertical plumbness (batter) and horizontal alignment of less than 6".

Place reinforcement at locations and elevations shown on the plans or accepted submittals and in slight tension free of kinks, folds, wrinkles or creases. Repair or replace any damaged reinforcement. Contact the Engineer when existing or future structures such as foundations, pavements, pipes, inlets or utilities will interfere with reinforcement. To avoid structures, deflect, skew and modify reinforcement.

Do not splice reinforcement in the reinforcement direction (RD), i.e., parallel to the wall face. Seams are allowed in the cross-reinforcement direction (CRD). Bond or sew adjacent reinforcing fabric together or overlap fabric a minimum of 18" with seams oriented perpendicular to the wall face.

Place shoring backfill in 8 to 10 inch thick lifts and compact in accordance with Subarticle 235-4(C) of the *Standard Specifications*. Use only hand operated compaction equipment within 3 ft of the wall face. Do not damage reinforcement when placing and compacting shoring backfill. End dumping directly on the reinforcement is not permitted. Do not operate heavy equipment on reinforcement until it is covered with at least 10" of shoring backfill. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet.

Cover reinforcing and retention fabric with at least 3" of shoring backfill. Place top reinforcement layer between 4 and 24 inches below top of wall as shown on the plans or accepted submittals.

Bench temporary MSE walls into the sides of excavations where applicable. If the top of wall is within 5 ft of finished grade, remove top form or facing and incorporate the top reinforcement layer into the fill when placing fill in front of the wall. Temporary MSE walls remain in place permanently unless required otherwise.

### **Measurement and Payment**

*Temporary Shoring* will be measured and paid for at the contract unit price per square foot of exposed face area at locations shown on the plans or required by the Engineer. For temporary MSE walls, the wall height will be measured as the difference between the top and bottom of wall and does not include the embedded portions of the wall or any pavement thickness above the wall. For all other temporary shoring, the shoring height will be measured as the difference between the top and bottom of shoring elevation. The bottom of shoring elevation is defined as where the grade intersects the front face of the shoring. The top of shoring elevation is defined as where the grade intersects the back face of the shoring. No payment will be made for any extension of shoring above the top of shoring or any embedment below the bottom of shoring. Such price and payment will be full compensation for furnishing all labor, tools, equipment, materials and all incidentals necessary to design and install the temporary shoring and complete the work as described in this provision.

No payment will be made for temporary shoring not shown on the plans or required by the Engineer including shoring for OSHA reasons or the Contractor's convenience. No value

engineering proposals will be accepted based solely on revising or eliminating the shoring locations shown on the plans or the estimated quantities shown in the bid item sheets as a result of actual field measurements or site conditions.

No additional payment will be made for anchoring PCBs or providing Oregon barriers in lieu of unanchored PCBs. Additional costs for anchoring PCBs or providing Oregon barriers will be considered incidental to *Temporary Shoring*.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Temporary Shoring	Square Foot

**CHANGEABLE MESSAGE SIGNS:**

(11-21-06)

SP11 R11

Revise the *2006 Standard Specifications* as follows:

**Page 11-9, Article 1120-3,** Replace the 3rd sentence with the following:

Sign operator will adjust flash rate so that no more than two messages will be displayed and be legible to a driver when approaching the sign at the posted speed.

**PAVEMENT MARKING LINES:**

(11-21-06) (Rev. 9-18-07)

SP12 R01

Revise the *2006 Standard Specifications* as follows:

**Page 12-2, 1205-3(D) Time Limitations for Replacement,** add the following at the beginning of the chart:

Facility Type	Marking Type	Replacement Deadline
Full-control-of-access multi-lane roadway (4 or more total lanes) and ramps, including Interstates	All markings including symbols	By the end of each workday's operation if the lane is opened to traffic

**Page 12-14, Subarticle 1205-10, Measurement and Payment,** delete the first sentence of the first paragraph and replace with the following:

*Pavement Marking Lines* will be measured and paid for as the actual number of linear feet of pavement marking lines per application that has been satisfactorily placed and accepted by the Engineer.

**PERMANENT SEEDING AND MULCHING:**

(7-1-95)

SP16 R01

The Department desires that permanent seeding and mulching be established on this project as soon as practical after slopes or portions of slopes have been graded. As an incentive to obtain an early stand of vegetation on this project, the Contractor's attention is called to the following:

For all permanent seeding and mulching that is satisfactorily completed in accordance with the requirements of Section 1660, Seeding and Mulching, and within the following percentages of elapsed contract times, an additional payment will be made to the Contractor as an incentive additive. The incentive additive will be determined by multiplying the number of acres of seeding and mulching satisfactorily completed times the contract unit bid price per acre for Seeding and Mulching times the appropriate percentage additive.

<b>Percentage of Elapsed Contract Time</b>	<b>Percentage Additive</b>
0% - 30%	30%
30.01% - 50%	15%

Percentage of elapsed contract time is defined as the number of calendar days from the date of availability of the contract to the date the permanent seeding and mulching is acceptably completed divided by the total original contract time.