

**PROJECT SPECIAL PROVISIONS**

Roadway

7-1-95

SP1R01

**CLEARING AND GRUBBING:**

09-17-02

Perform clearing on this project to the limits established by Method "III" shown on Standard No. 200.03 of the Roadway Standards.

The 2002 Standard Specifications shall be revised as follows:

Page 2-3, Article 200-5

Delete the first sentence of this article and insert the following:

The property owner will have no right to use or reserve for his use any timber on the project. All timber cut during the clearing operations is to become the property of the Contractor, and shall be either removed from the project by him, or else shall be satisfactorily disposed of as hereinafter provided.

SP2R01

**BURNING RESTRICTIONS:**

7-1-95

Open burning is not permitted on any portion of the right-of-way limits established for this project. Do not burn the clearing, grubbing or demolition debris designated for disposal and generated from the project at locations within the project limits, off the project limits or at any waste or borrow sites in this county. Dispose of the clearing, grubbing and demolition debris by means other than burning, according to state or local rules and regulations.

SP2R05

**BUILDING AND UNDERGROUND STORAGE TANK REMOVAL:**

01-01-02

Rev. 06-21-05

I. Building Removal

Remove the buildings and appurtenances listed below in accordance with Section 215 of the *Standard Specifications* and the following:

Prior to removal of any building, comply with the notification requirements of *Title 40 Code of Federal Regulations*, Part 61, Subpart M, which are applicable to asbestos. Give notification to the North Carolina Department of Health and Human Services, Division of Public Health Epidemiology Branch and/or the appropriate county agency when the county performs enforcement of the Federal Regulation. Submit a copy of the notification to the Engineer prior to the building removal.

Perform removal and disposal of asbestos in accordance with the requirements of *Title 40 Code of Federal Regulations*; comply with all Federal, State and local regulations when performing building removal and/or asbestos removal and disposal. Any fines resulting from violations of any regulation are the sole responsibility of the Contractor and the Contractor agrees to indemnify and hold harmless the Department against any assessment of such fines.

The Department has performed asbestos assessments for building items identified below. Copies of this report may be obtained through the Division Right-of-Way Agent. When asbestos is discovered after the opening of bids for the project, the Engineer may have the work performed by others or the cost of asbestos removal and disposal will be paid for in accordance with Article 104-7 of the *Standard Specifications*. When a building has had or will have asbestos removed and the Contractor elects to remove the building such that it becomes a public area, the Contractor is responsible for any additional costs incurred including final air monitoring.

## II. Underground Storage Tank Removal

Prior to removal of any Underground Storage Tank (UST), comply with the notification requirements of the *Title 40 Code of Federal Regulations*, Part 280.71(a). Give notification to the appropriate regional office of the North Carolina Department of Environment and Natural Resources, Division of Waste Management, UST Section. Submit a copy of the notification to the Engineer prior to the removal of the underground storage tank.

Permanently close UST systems by removal and disposal in compliance with the regulations set forth in *Title 40, Code of Federal Regulations*, Part 280.71 and *North Carolina Administrative Code (NCAC)* Title 15A, Chapter 2, Subchapter 2N and any applicable local regulations. Assess Underground Storage Tank sites at closure for the presence of contamination as required in *NCAC* Title 15A, Chapter 2, Subchapter 2N, Section .0803 and as directed by the appropriate Regional Office of the Division of Waste Management. Remove and dispose of UST systems and contents in a safe manner in conformance with requirements of *American Petroleum Institute Bulletin 1604*, "Removal and Disposal of Used Underground Petroleum Storage Tanks", Chapters 3 through 6. (Note: As an exception to these requirements, the filling of the tank with water as a means of expelling vapors from the tank as described in Section 4.2.6.1 of *API Bulletin 1604*, will not be allowed. Comply with all Federal, State and local regulations when performing UST removal and contaminated material disposal. Any fines resulting from violations of any regulation are the sole responsibility of the Contractor and the Contractor agrees to indemnify and hold harmless the Department against any assessment of such fines.

Where underground storage tanks are indicated below, there will be no direct payment for the assessment or closure. When the contract does not indicate the presence of storage tanks and storage tanks are discovered after the opening of bids for the project, the Engineer may have the work performed by others or the cost of assessment, closure, and/or removal will be paid for in accordance with Article 104-7 of the *Standard Specifications*.

Disposition of any contaminated material associated with underground storage tanks will be made as provided in Article 107-26 of the *Standard Specifications*.

Building Removal (Item No. 1)  
Parcel 009 – Right of Survey Station 14+30, Survey Line L  
One-Story Frame Dwelling

Building Removal (Item No. 2)  
Parcel 009 – Right of Survey Station 14+50, Survey Line L  
One-Story Frame Dwelling

SP2R15

**EMBANKMENTS:**

05-16-06

Revise the *Standard Specifications* as follows:

Page 2-21, Article 235-4(B) Embankment Formation, add the following as the last bullet:

- 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.

SP2R18

**EXCAVATION OF ROCK BY USE OF EXPLOSIVES:**

1-01-02

The Contractor’s attention is directed to Article 107-11 of the *Standard Specifications*.

In addition to the requirements of this Article, submit to the Engineer a written report after each blast that gives complete details of the blast procedure. Submit the blast report on forms provided by the Engineer within 24 hours after each blast.

The Engineer will, as necessary, monitor blasting operations with an engineering seismograph. In order to facilitate such work, provide to the Engineer seven days advance notice before the initial blasting is performed and 24 hours notice of subsequent blasting operations.

Cooperate with the Engineer in establishing a signal system that will allow vibrations to be effectively monitored.

The monitoring blast vibrations by the Engineer or the submission of blast reports by the Contractor in no way relieves the Contractor of his responsibilities as defined in Article 107-11.

SP2R20

**ROADWAY EXCAVATION**

03-15-05<sub>R</sub>

Revise the 2002 *Standard Specifications* as follows:

Page 2-8, delete Article 225-2 and replace with the following:

**Erosion Control Requirements**

Install erosion control measures as required by the plans prior to any kind of land-disturbing activity.

1. Unless otherwise required by the plans, conduct operations in such a manner that cut and fill slopes are completely graded to final slopes in a continuous operation, and permanently seeded and mulched in accordance with the requirements of the *Specifications*.
2. Should the Contractor fail to comply with the requirements specified in No. 1 above within the time frames established by the *Sedimentation and Pollution Control Act*, the Contractor shall perform temporary seeding and mulching on any exposed areas at his own expense.
3. When the Contractor fails or neglects to coordinate grading with the permanent seeding and mulching operation, the Engineer may suspend the Contractor's grading operation in accordance with the provisions of Article 108-7 of the *Standard Specifications* until the work is coordinated in a manner acceptable to the Engineer. Failure to perform the directed work may result in the Engineer having the work performed in accordance with Article 105-16 of the *Standard Specifications*.

SP2R25

**#57 STONE:**

7-1-95

The #57 stone shall meet the requirements of Section 1005 of the *Standard Specifications*.

The stone shall be placed and compacted as directed by the Engineer.

The quantity of #57 stone to be paid for will be the actual number of metric tons of stone which has been incorporated into the completed and accepted work. The stone will be measured by being weighed in trucks on certified platform scales or other certified weighing devices.

The quantity of #57 stone, measured as provided for above, will be paid for at the contract unit price per metric ton for "#57 Stone". The above prices and payment will be full compensation for furnishing, hauling, placing, and all incidentals necessary to complete the work.

SPI

**TEMPORARY DETOURS:**

**7-1-95**

Construct temporary detours required on this project in accordance with the typical sections in the plans or as directed.

Payment for the construction of the detours will be made at the contract unit prices for the various items involved. After the detours have served their purpose, remove the portions deemed unsuitable for use as a permanent part of the project as directed by the Engineer. Salvage and stockpile the aggregate base course removed from the detours at locations within the right of way, as directed by the Engineer, for removal by State Forces. Pipe culverts and stockpile the aggregate base course removed from the detours at locations removed from the detours remain the property of the Contractor. Remove pipe culverts from the project when they are no longer needed. Place pavement and earth material removed from the detour in embankments or dispose of in waste areas furnished by the Contractor. Aggregate base course and earth material that is removed will be measured and will be paid for at the contract unit price per cubic yard (cubic meter) for "Unclassified Excavation". Pavement that is removed will be measured and will be paid for at the contract unit price per square yard (square meter) for "Removal of Existing Pavement". Pipe culverts that are removed will be measured and will be paid for at the contract unit price per linear foot (meter) for "Pipe Removal". Such prices and payments will be full compensation for the work of removing, salvaging, and stockpiling aggregate base course; placing and removing pipe culverts; and for placing earth material and pavement in embankments or disposing of earth material and pavement in waste areas.

SP2R30

**EMERGENCY SPILL BASIN:**

**05-18-04**

The Contractor shall construct an emergency spill basin in accordance with the detail in the plans, at the location shown in the plans and as directed by the Engineer.

Spill basin shall be constructed to provide the capacity and freeboard shown in the detail.

Payment for the work of constructing the emergency spill basin will be made at the contract lump sum price for "Emergency Spill Basin." Such price and payment will be full compensation for all excavation, sandbags, hauling and satisfactory disposal of earth material and all incidentals necessary to complete the work.

SPI

**CONCRETE PAVED DITCH LEVEL SPREADER:**

**03-18-03**

Description:

Construct and maintain level spreaders at the locations shown on the plans and in accordance with the details in the plans. The purpose of the level spreader is to collect stormwater discharged from a drainage system and to direct the stormwater into the buffer areas in a sheet flow condition. Work includes excavation, concrete, PVC pipe, #57 stone and filter fabric and shaping, furnishing and placing permanent soil reinforcement matting.

Materials:

Concrete paved ditch .....Section 850

Provide permanent erosion control reinforcement mat constructed of 100% coconut fiber stitch, bonded between heavy duty UV stabilized cusped (crimped) netting, overlaid with heavy duty UV stabilized top net. Stitch together three nettings on 1.5-inch (38-mm) centers using UV stabilized polyester thread to form a permanent three dimensional structure.

Physical properties:

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

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

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

- 1) Chemical and physical properties of the mat used, and
- 2) Conformance of the mat with this specification

PVC pipe shall be Schedule 40 and met the requirements of ASTM D 2665.

Soil Preparation:

Bring areas to be protected with the mat to final grade and seed in accordance with section 1660. Work surface of the soil so that is smooth, firm, stable and free of rocks, clods, roots or other obstructions which would prevent the mat from lying in direct contact with the soil surface. Areas where the mat is to be placed will not need to be mulched.

Method of Measurement:

The quantity of Permanent Soil Reinforcement Matting to be paid for shall be the actual number of square yards (square meters) which have been incorporated into the completed and accepted work.

Measurement for Concrete Paved Ditch and Drainage Ditch Excavation will be in accordance with sections 850 and 240 of the Standard Specifications.

Basis of Payment:

The quantity of Permanent Soil Reinforcement Matting, measured as provided herein, will be paid for at the contract unit price per Square Yard (Square Meter) for "Permanent Soil Reinforcement Matting".

Basis of payment for Concrete Paved Ditch and Drainage Ditch Excavation will be in accordance with section 850 and 240 of the Standard Specification.

The cost of furnishing and installing the PVC pipe shall be included in the contract bid price for “ \_\_\_\_ (mm) Concrete Paved Ditch”.

Payment will be made under:

____” (mm) Concrete Paved Ditch	Square Yard (Square Meter)
Filter Fabric	Square yard (Square Meter)
Drainage Ditch Excavation	Cubic Yard (Cubic Meter)
#57 Stone	Ton (Metric Ton)
Permanent Soil Reinforcement Mat	Square Yard (Square Meter)

**DRY DETENTION DRAWDOWN STRUCTURE:**

Construct Dry Detention Drawdown Structure in accordance with the details in the plans and as directed by the Engineer.

Payment for the work of constructing the Dry Detention Drawdown Structure will be made at the contract unit price each for” Dry Detention Drawdown Structure”. Such price and payment will be full compensation for all materials, labor and incidentals necessary to satisfactorily complete the work.

**RIP RAPPED ENERGY DISSIPATER:**

**Description**

This work consists of the construction and maintenance of an armored outlet structure. Could be located at culvert outlets or ditch termini. Dissipates energy of storm flows, which provides stability and reduces erosion.

The quantity of energy dissipater material(s) may be effected by site conditions during construction of the project. The quantity of materials may be increased, decreased, or eliminated entirely 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.

**Materials**

Per Division 2 &10 of Standard Specifications

<b>Item</b>	<b>Section</b>
Class I Rip Rap	Section 1042
Filter Fabric for Drainage, Type 2	Section 1056
Drainage Ditch Excavation	Section 240

Boulders shall be used as header and footer rocks for this device.

**Construction Methods**

Rip Rapped 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.

**Measurement and Payment**

*Class I rip rap* 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 rock cross vanes.

**ROCK WEIR:**

**Description**

This work consists of the construction and maintenance of physical barriers placed in and along the ditches at locations designated on the plans to reduce stormflow velocities and improve stabilization.

The quantity of rock weirs to be installed will be affected by the actual conditions that occur during the construction of the project. The quantity of rock weirs may be increased, decreased, or eliminated entirely 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.



**Materials**

Refer to Division 2 & 10

<b>Item</b>	<b>Section</b>
Boulder (Metric Ton)	1042 and SP for Structure Stone
Drainage Ditch Excavation (m <sup>3</sup> )	240
Filter Fabric for Drainage, Type (m <sup>2</sup> )	1056

**Construction Methods**

Rock weirs shall be constructed in accordance with the Rock Weir Detail shown in the plans or as directed. Install header and footer rocks across ditch according to the detail and place Type 2 filter fabric on the upgrade side. Minimize voids between the header and footer rocks. The rock weir shall be keyed into the bank as shown on the Rock Weir Detail.

**Measurement and Payment**

*Boulders* will be measured and paid for as provided elsewhere in this contract.

*Drainage Ditch Excavation* will be measured and paid for in accordance with Section 240 of the *Standard Specifications*.

*Filter Fabric for Drainage* will be measured and paid for in accordance with Section 876 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 rock weirs.

**SHALLOW UNDERCUT:**

**2-19-02**

(Rev 7-18-06)

Perform undercut excavation and place a combination of fabric for soil stabilization and Class IV Subgrade Stabilization at locations as directed by the Engineer. Work includes performing undercut excavation, disposing of unsuitable material, furnishing and placing fabric for soil stabilization; and furnishing, placing and compacting Class IV Subgrade Stabilization.

**MATERIALS**

Fabric for Soil Stabilization.....	Section 270
Class IV Subgrade Stabilization.....	Section 1016-3, Class IV; or Material meeting gradation requirements of Table 520-1, Column C

CONSTRUCTION METHODS

Perform undercut excavation in accordance with Section 225 and/or Section 226.

Place fabric for soil stabilization in accordance with Section 270.

Place Class IV Subgrade Stabilization by back dumping material on previously placed fabric.

Compact material to 95% of AASHTO T-99, Method "D" density or compact material to the highest density that can be reasonably obtained.

METHOD OF MEASUREMENT

Undercut Excavation will be measured in accordance with Section 225 and/or Section 226.

Fabric for Soil Stabilization will be measured in accordance with Article 270-4.

Class IV Subgrade Stabilization, as accepted in place, will be measured by the ton (metric ton), in accordance with Section 106-7.

BASIS OF PAYMENT

Payment will be made for quantities as measured above for the pay items listed below:

<b>Pay Item</b>	<b>Pay Unit</b>	
Undercut Excavation	Cubic Yard (Cubic Meter)	
Fabric for Soil Stabilization	Square Yard(Square Meter)	
Class IV Subgrade Stabilization	Ton (Metric Ton)	
		SP2R35

**BORROW EXCAVATION:**

**2-19-02**

Revise the 2002 Standard Specifications as follows:

Page 2-20, Article 230-6

After the first paragraph, insert the following paragraph:

"No direct payment will be made for the work of Evaluation of Potential Wetlands and Endangered Species as outlined above. Payment at the contract unit price for the pay item 'Borrow Excavation' or 'Grading - Lump Sum' will be considered full compensation for this work.'

SP2R37

**FALSE SUMPS:**

7-1-95c

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 (cubic meter) for "Unclassified Excavation or "Borrow Excavation" depending on the source of material, or included in "Grading-Lump Sum"

SP2R40

**SHOULDER AND FILL SLOPE MATERIAL:**

5-21-02

**General:**

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

Construct the top 6 inches (150-mm) 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 (50 mm) 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 (cubic meter) for "Borrow Excavation" or "Shoulder Borrow" in accordance with the applicable provisions of Section 230 or Section 560 of the Standard Specifications.

SP2R50

**ROCK EMBANKMENT:**

**7-1-95**

Description:

Construct the rock embankments in accordance with Sections 230 and 235 of the Standard Specifications, the detail shown on the plans and the following provisions:

Materials:

Use blasted rock to construct the rock embankments detailed on the plans and at locations shown on the plans or directed by the Engineer. Provide blasted rock that meets the following requirement:

Class VII in accordance with Article 1016-3 of the Standard Specifications.

No rippable rock will be permitted in the above described embankments.

Density requirements will not apply to rock embankments, but construct the formation of rock embankments as outlined above.

Method of Measurement:

The quantity of rock embankment to be paid for will be the actual number of tons (metric tons) of rock embankment which has been incorporated into the completed and accepted work.

The rock embankment will be measured by being weighed in trucks on approved platform scales or by other approved weighing devices.

Basis of Payment:

The quantity of rock embankment, measured as provided for above, will be paid for at the contract unit price per ton (metric ton) for "Rock Embankment". Such price and payment will be full compensation for all work covered by this provision including but not limited to furnishing, hauling, placing, and maintaining the rock embankment.

SP2R80

Payment will be made under:

Rock Embankment.....Ton (Metric Ton)

**" (mm) WELDED STEEL PIPE:** **1-15-02**

Use \_\_\_" (mm) welded steel pipe as shown on the plans that conforms to Section 330 of the Standard Specifications.

Install the pipe by dry boring and jacking. Carefully dry bore the pipe true to the line and grade given. Hold the bore to a minimum to insure that there is no settlement. Remove and replace any pipe that has been damaged due to the Contractor's operation at no cost to the Department. Completely fill all voids around the outside of the pipe to the satisfaction of the Engineer.

Measurement will be made in accordance with Article 330-4 of the Standard Specifications.

The quantity of pipe as measured above will be paid for at the contract unit price per linear foot (meter) for "\_\_\_" (mm) Welded Steel Pipe, \_\_\_" (mm) Thick, Grade B (By Boring and Jacking)". Such price and payment will be full compensation for all work described herein including dry boring, jacking, tools, materials, labor, workmanship, and all other incidentals necessary to complete the work.

SP3R25

Payment will be under:

\_\_\_" (mm) Welded Steel Pipe, \_\_\_" (mm) Thick, Grade B  
(By Boring and Jacking) .....Linear Foot (Meter)

**PIPE ALTERNATES:** **6-20-06**

**Description**

The Contractor may substitute Aluminized Corrugated Steel Pipe, Type IR or HDPE Pipe, Type S or Type D up to 48 inches (1219mm) in diameter in lieu of concrete pipe in accordance with the following requirements.

**Material**

<b>Item</b>	<b><u>Section</u></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 *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 *Standard Specifications* for Method A, except that the minimum cover shall be at least 12 inches (305mm). Aluminized Corrugated Steel Pipe Culvert and HDPE Pipe Culvert will not be permitted for use under travelways, including curb and gutter.

**Measurement and Payment**

The quantity of \_\_\_\_ "(mm) *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 *Standard Specifications*.

The quantity of \_\_\_\_ "(mm) *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 *Standard Specifications*.

Payment will be made under:

<b>Pay Item</b>	<b><u>Pay Unit</u></b>
____ "(mm) Aluminized Corrugated Steel Pipe Culverts,	Linear Foot (lm)
____ " (mm) Thick	
____ "(mm) HDPE Pipe Culverts	Linear Foot (lm)

SP3R35

**REINFORCED BRIDGE APPROACH FILLS**

**03-18-03**  
Rev. 7-18-06

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

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 (0.6 mm) Minimum	ASTM D1593
Tensile Strength at Break	100 lb/inch (18 KN/M) Minimum	ASTM D638
Puncture Strength	40 lbs (0.2KN) Minimum	ASTM D 4833
Moisture Vapor Transmission Rate	0.018 ounce/yard <sup>2</sup> (0.615 gm/ m <sup>2</sup> ) per Day Maximum	ASTM E96

**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 (1358 cm <sup>3</sup> /sec/square meter)	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.

**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 *Standard Specifications*. When select material is required under water, use select material class V only, up to one foot (300mm) above the existing water elevation.

**4 inch (100 mm) Diameter Corrugated Drainage Pipe and Fittings**

FTMS 101 C 2065

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

## CONSTRUCTION

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 (3.0 meters) for the fabric is required. Overlap geomembrane or fabric splices parallel to the centerline of the roadway a minimum of 18 inches (450 mm). 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 (250 mm) 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 (250 mm) thick with low ground pressure equipment. Use hand operated equipment to compact the fill material within three feet (0.9 m) 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 (200 mm) 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 (150 mm) 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 (100 mm) 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 (100-mm) 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**

All work covered by this provision will be paid for at the contract lump sum price for "Reinforced Bridge Approach Fills, Station \_\_\_\_". 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:

**Pay Item**  
Reinforced Bridge Approach Fills,  
Station \_\_\_\_

**Pay Unit**  
Lump Sum

SP4R01

**AGGREGATE BASE COURSE:**

**12-19-06**

Revise the *2002 Standard Specifications* as follows:

Page 5-10, 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.

SP5R03

**PREPARATION OF SUBGRADE AND BASE:**

**1-16-96**

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.

SP5R05

**AGGREGATE FOR SOIL-CEMENT BASE:**

**1-01-02R**

Revise the 2002 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 after line 3:

"Aggregate, Std. Size ABC.....Section 1005"

Page 5-28, Article 542-7. Add the following paragraph after the first paragraph:

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

Page 5-30, Article 542-16. Add the following paragraph after the first paragraph:

"The quantity of aggregate to be paid for will be the number of tons (metric tons) of aggregate that have been incorporated into the completed and accepted work. The aggregate will be measured by weighing in trucks on 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."

Page 5-31, Article 542-17. Add the following paragraph after the first paragraph:

"The quantity of aggregate, measured as provided in Article 542-16, will be paid for at the contract unit price per ton (metric ton) for "Aggregate for Soil-Cement Base"."

Add the following at the end of the last paragraph:

"Aggregate for Soil-Cement Base.....Ton (Metric Ton)"

SP5R15

**LIME AND CEMENT TREATED SOIL**

**11-18-03**

Revise the 2002 Standard Specifications as follows:

Page 5-4, Article 501-8. In the second sentence of the first paragraph, **change 40 days to 24 days.**

Page 5-28, Article 542-7. In the second sentence of the first paragraph, **change 45 days to 24 days.**

SP5R20

**ASPHALT PAVEMENTS – SUPERPAVE:**

**05-17-05**  
Rev 04-18-06

Revise the 2002 *Standard Specifications* as follows:

PRIME COAT

Page 6-2, **Article 600-9**

Delete the first paragraph and substitute the following:

The quantity of prime coat to be paid will be the number of gallons (liters) of prime coat material that has been satisfactorily placed on the roadway. Each distributor load of prime coat material delivered and utilized on the project will be measured. Deductions will be made from each measured tank of material for all material placed on the roadway that exceeds the application rate established by the Engineer by more than 0.03 gallons per square yard (0.14 liters per square meter).

ASPHALT TACK COAT

Page 6-4, **Article 605-8**

Insert the following after paragraph one.

Take necessary precautions to limit the tracking and/or accumulation of tack coat material on either existing or newly constructed pavements. Excessive accumulation of tack may require corrective measures.

FIELD VERIFICATION AND JOB MIX FORMULA ADJUSTMENTS

Page 6-7, **Article 609-4**

Delete the first paragraph and substitute the following:

Conduct field verification of the mix at each plant within 30 calendar days prior to initial production of each mix design, when required by the Allowable Mix Adjustment Policy and when directed as deemed necessary.

Page 6-7, **Article 609-4**

Add the following sentence after the first sentence of the second paragraph in this Article:

Mix obtained from NCDOT or non-NCDOT work may be used for this purpose provided it is sampled, tested, and the test data handled in accordance with current procedures in the Department's *HMA/QMS Manual* and the following provisions.

Page 6-8, **Article 609-4**

Delete the first paragraph and substitute the following:

Retain records of these calibrations and mix verification tests, including Superpave Gyratory Compactor (SGC) printouts, at the QC laboratory. In addition, furnish copies, including SGC printouts, to the Engineer for review and approval within one working day after beginning production of the mix.

Page 6-8, **Article 609-4**

Add the following sentence at the end of the last paragraph:

Any mix produced that is not verified may be assessed a price reduction at the Engineer's discretion in addition to any reduction in pay due to mix and/or density deficiencies.

Page 6-8, **Subarticle 609-5(A)**

Delete the second sentence in the fourth paragraph and substitute the following:

This person is responsible for monitoring all roadway paving operations and all quality control processes and activities, to include stopping production or implementing corrective measures when warranted.

Page 6-9, **Subarticle 609-5(C)1**

Add the following sentences at the end of the first paragraph of this Article:

Identify any additional quality control samples taken and tested at times other than the regularly scheduled random samples or directed samples which take the place of regularly scheduled as process control (PC) samples on the appropriate forms. Process Control test results should not be plotted on control charts nor reported to Quality Assurance Laboratory.

Page 6-9, **Subarticle 609-5(C)1**

Delete the second sentence in the second paragraph and substitute the following:

Retain the QC compacted volumetric test specimens for 5 calendar days, commencing the day the specimens are prepared.

Page 6-10, **Subarticle 609-5(C)2**

In the first full paragraph on this page, add to the reference AASHTO T 168 "Modified"

Revise Items B, C, D and E on this page as follows:

- B. Gradation on Recovered Blended Aggregate from Mix Sample (AASHTO T 30 Modified) Grade on all sieves specified on JMF
- C. Maximum Specific Gravity (AASHTO T 209 or ASTM D 2041), optional (ASTM D 6857)
- D. Bulk Specific Gravity of Compacted Specimens (AASHTO T166), optional (ASTM D 6752), Average of 3 specimens at  $N_{des}$  gyrations (AASHTO T 312)
- E. Air Voids (VTM) (AASHTO T 269), Average of 3 specimens at  $N_{des}$  gyrations

Page 6-11, **Subarticle 609-5(C)2**

At the top of this page, delete Item B., " Reclaimed Asphalt Pavement..." and substitute the following:

- B. Reclaimed Asphalt Pavement (RAP) Binder Content and Gradation (AASHTO T 308 Modified or T 164 and AASHTO T 30 Modified) (sampled from stockpiles or cold feed system at beginning of production and weekly thereafter). Have RAP approved for use in accordance with Article 1012-1(G). (Split Sample Required)

Page 6-11, **Subarticle 609-5(C)2**

Delete Item E at the end of this Subarticle and Substitute the following:

- E. Reclaimed Asphalt Shingle Material (RAS) Binder Content and Gradation (AASHTO T 308 Modified or T 164 and AASHTO T 30 Modified) (sampled from stockpiles or cold feed system at beginning of production and weekly thereafter). Have RAS approved for use in accordance with Article 1012-1(F). (Split Sample Required)

Page 6-11, **Subarticle 609-5(C)3**

Delete the first paragraph and substitute the following:

Maintain standardized control charts furnished by the Department at the field laboratory. For mix incorporated into the project, record full test series data from all regularly scheduled random samples or directed samples which replace regularly scheduled random samples, on control charts the same day the tests are obtained.

In addition, partial test series results obtained due to reasons outlined in Subarticle 609-5(C)2 will be reported to Quality Assurance personnel on the proper forms, but will not be plotted on the control charts.

Page 6-12, **Subarticle 609-5(C)3**

Delete item 3 in the list below the second full paragraph and substitute the following:

3. If failure to stop production after two consecutive moving averages exceed the warning limits occurs, but production does stop at a subsequent time, re-establish a new moving average beginning at the actual production stop point.

Page 6-12, **Subarticle 609-5(C)3**

Delete the first and second sentence in the third full paragraph and substitute the following:

In addition, re-establish the moving averages for all mix properties.

**CONTROL LIMITS**

Page 6-12, **Subarticle 609-5(C) 4**

At the bottom of this page, delete the table and substitute the following:

**CONTROL LIMITS**

Mix Control Criteria	Target Source	Warning Limit	Moving Average Limit	Individual Limit
2.36mm Sieve	JMF	±4.0 %	±5.0 %	±8.0 %
0.075mm Sieve	JMF	±1.5 %	±2.0 %	±2.5 %
Binder Content	JMF	±0.3 %	±0.5 %	±0.7 %
VTM @ N <sub>des</sub>	JMF	±1.0 %	±1.5 %	±2.0 %
VMA @ N <sub>des</sub>	Min. Spec. Limit	-0.5%	-0.8%	-1.0%
P <sub>0.075</sub> / P <sub>be</sub> Ratio	Max. Spec. Limit	0.0	N/A	+0.4%
%G <sub>mm</sub> @ N <sub>ini</sub>	Max. Spec. Limit	N/A	N/A	+2.0%
TSR	Min. Spec. Limit	N/A	N/A	-15.0%

Page 6-13, **Subarticle 609-5(C)6**

Delete the second paragraph of this Subarticle and substitute the following:

Immediately cease production and immediately notify the Engineer when any of the following occur:

1. When an individual test result for a mix control criteria (including results for required partial test series on mix) exceeds both the individual test control limits and the applicable specification design criteria, or,
2. When two consecutive field TSR values fail to meet the minimum specification requirement, or,
3. When two consecutive binder content test results exceed the individual limits.

Do not resume normal plant production until one of the following has occurred.

Option 1: Approval has been granted by the appropriate QA Supervisor.

Option 2: The mix in question has been satisfactorily verified in accordance with Article 609-4. Normal production may resume based on the approval of the contractor’s Level II technician, provided notification and the verification test results have been furnished to the QA Laboratory.

Failure to fully comply with one of the above provisions will result in immediate production stoppage by the Engineer. Normal production shall not then resume until a complete verification process has been performed and approved by the Engineer.

Page 6-13, **Subarticle 609-5(C)6**

Delete the last sentence of the seventh paragraph of this Subarticle and add the following:

Do not resume normal plant production until one of the following has occurred.

Option 1: Approval has been granted by the appropriate QA Supervisor.

Option 2: The mix in question has been satisfactorily verified in accordance with Article 609-4. Normal production may resume based on the approval of the contractor’s Level II technician, provided notification and the verification test results have been furnished to the QA Laboratory.

Failure to fully comply with one of the above provisions will result in immediate production stoppage by the Engineer. Normal production shall not then resume until a complete verification process has been performed and approved by the Engineer.

Allowable Retesting for Mix Deficiencies:

Page 6-14, **Subarticle 609-5C(7)**

In the first paragraph, insert the following as the fourth sentence:

The Contractor under the supervision of the Department’s QA personnel will perform these retests.

**FIELD COMPACTION QUALITY CONTROL**

Page 6-15, **Subarticle 609-5(D)1**

In the last sentence of the third paragraph of this subarticle, insert the wording “and wedging as shown in the HMA/QMS Manual, “ after the wording “temporary pavements”

Delete the first and second sentences in the fourth paragraph and substitute the following:

Base and intermediate mix types (surface mixes not included) utilized for pavement widening of less than 4.0 feet and all mix types used in tapers, irregular areas and intersections (excluding full width travel lanes of uniform thickness), will not be subject to the sampling and testing frequency specified above provided the pavement is compacted using approved equipment and

procedures. However, the Engineer may require occasional density sampling and testing to evaluate the compaction process.

**Page 6-16, Subarticle 609-5(D)1**

Delete item number 2 at the top of this page. Item number 3 should be re-numbered as 2 after the specified deletion.

Pavement Samples (Cores)

**Page 6-16, Subarticle 609-5(D)2**

In the first paragraph, delete the second sentence and insert the following as the last sentence in that paragraph:

The use of a separator medium beneath the layer to be tested is prohibited.

**Page 6-16, Subarticle 609-5(D)2**

Delete the last paragraph in this Subarticle and substitute the following:

Where samples have been taken, clean the inside surfaces of the sample hole, dry, properly apply tack coat, place and compact new mix of the same type to conform with the surrounding area within one working day of the sample being taken. Use a circular tamp or other approved device to achieve compaction.

**LIMITED PRODUCTION PROCEDURE**

**Page 6-17, Subarticle 609-5(D) 5**

Delete the first paragraph and substitute the following:

Proceed on limited production when, for the same mix type, one of the following items occur:

- (1) Two consecutive failing lots, excluding lots representing an individual resurfacing map or portion thereof.
- (2) Three consecutive failing lots, with each lot representing an individual resurfacing map or portion thereof.
- (3) Two consecutive failing nuclear control strips.

Pavement within each construction category (New and Other), as defined in Article 610-13, and pavement placed simultaneously by multiple paving crews will be evaluated independently for limited production purposes.



Delete the first sentence in the last paragraph and substitute the following:

If the Contractor does not operate by the limited production procedures as specified above, the two consecutive failing density lots, three consecutive failing lots with each lot representing an individual resurfacing map or portion thereof, or two consecutive failing nuclear control strips, whichever is applicable, and all mix produced thereafter will be considered unacceptable. Remove this material and replace with material that complies with the Specifications, unless otherwise approved.

#### DOCUMENTATION (RECORDS)

Page 6-18, **Subarticle 609-5(E)**

Delete the third and fourth sentence in the first full paragraph and substitute the following:

Maintain all QC records, forms and equipment calibrations for a minimum of 3 years from their completion date.

Delete the second full paragraph and substitute the following:

Falsification of test results, documentation of observations, records of inspection, adjustments to the process, discarding of samples and/or test results, or any other deliberate misrepresentation of the facts will result in the revocation of the applicable person's QMS certification. The Engineer will determine acceptability of the mix and/or pavement represented by the falsified results or documentation. If the mix and/or pavement in question is determined to be acceptable, the Engineer may allow the mix to remain in place at no pay for the mix, asphalt binder and other mix components. If the mix and/or pavement represented by the falsified results is determined not to be acceptable, remove and replace with mix, which complies with the Specifications. Payment will be made for the actual quantities of materials required to replace the falsified quantities, not to exceed the original amounts.

#### QUALITY ASSURANCE

Page 6-18, **Article 609-6**

In Item 1 under Plant Mix Quality Assurance, substitute "5 percent" for "10 percent".

In Item 2 under Plant Mix Quality Assurance, substitute "sampling and testing procedures" for "tests".

In Item 4 under Plant Mix Quality Assurance, add "for that increment" after the word "sample".

In Item 5 under Plant Mix Quality Assurance, add "at a frequency equal to or greater than 10 percent of the QC sample frequency"; or

Insert the following after Item 5 under Plant Mix Quality Assurance:

- 6. By any combination of the above.

Delete the paragraph below Plant Mix Quality Assurance, and replace with the following:

The Engineer will conduct assurance tests on both split QC samples taken by the Contractor and verification samples taken by the Department. These samples may be the regular quality control samples or a sample selected by the Engineer from any location in the process or verification samples taken at random by the Department. The frequency will be equal to or greater than 5 percent of that required of the Contractor as stated in Subarticle 609-5(C)2. The Engineer may select any or all samples for assurance testing.

In Item 1 under Density Quality Assurance, delete the wording at the end of the sentence “at a frequency equal to or greater than 10 percent of the frequency required of the Contractor”.

In Item 3 under Density Quality Assurance, substitute 5 percent for 10 percent.

Page 6-19, **Article 609-6**

In Item 4 under Density Quality Assurance, add “at a frequency equal to or greater than 10 percent of the QC sample frequency.”

Insert the following after Item 4 under Density Quality Assurance:

- 5. By periodically directing the recalculation of random numbers for the Quality Control core or nuclear density test locations. The original QC test locations may be tested by QA and evaluated as verification tests.

LIMITS OF PRECISION

Page 6-19, **Article 609-6**

In the limits of precision table, delete the last three rows and substitute the following:

QA retest of prepared QC Gyrotory Compacted

Volumetric Specimens	± 0.015
Retest of QC Core Sample	± 1.2% (% Compaction)
Comparison of QA Core Sample	± 2.0% (% Compaction)
QA Verification Core Sample	± 2.0% (% Compaction)
Nuclear Comparison of QC Test	± 2.0% (% Compaction)
QA Nuclear Verification Test	± 2.0% (% Compaction)

Delete the first paragraph below the Limits of Precision table and insert the following two paragraphs.

The Engineer will immediately investigate the reason for differences if any of the following occur:

1. QA test results of QC split sample does not meet above limits of precision, or
2. QA test results of QC split sample does not meet the individual test control limits or the specification requirements, or
3. QA verification sample test results exceed the allowable retesting tolerances.

If the potential for a pavement failure exists, the Engineer may suspend production, wholly or in part, in accordance with the requirements of Article 108-7 while the investigation is in progress. The Engineer's investigation may include, but not be limited to the following:

1. Joint testing of any remaining split samples
2. Review and observation of the QC technician's sampling and testing procedures,
3. Evaluation and calibration of QC testing equipment, and/or
4. Comparison testing of other retained quality control samples, and/or additional density core samples.

In the third sentence of the second paragraph below the limits of precision table, insert "or verification test results" after "quality assurance test results".

#### ASPHALT CONCRETE PLANT MIX PAVEMENTS – DESCRIPTION

##### Page 6-20, **Article 610-1**

Insert the following after the last paragraph:

A high frequency of asphalt plant mix, density, or mix and density deficiencies occurring over an extended duration of time may result in future asphalt, which is represented by mix and/or density test results not in compliance with minimum specification requirements, being excluded from acceptance at an adjusted contract unit price in accordance with Article 105-3. This acceptance process may apply to all asphalt produced and /or placed and may continue until the Engineer determines a history of quality asphalt production and placement is reestablished.

#### MATERIALS

##### Page 6-21, **Article 610-2**

Delete reference of Anti-strip additive (chemical) to **Article 1020-2** and substitute **Article 1020-8**.

## COMPOSITION OF MIXTURES (MIX DESIGN AND JOB MIX FORMULA)

Page 6-21, **Subarticle 610-3(A)**

At the end of the second paragraph, add the following sentence:

In addition, submit Superpave gyratory compactor printouts for all specimens compacted at  $N_{des}$  during the mix design process.

Insert the following paragraph after the second paragraph:

For the final surface layer of the specified mix type, use a mix design with an aggregate blend gradation above the maximum density line on the 2.36 mm and larger sieves.

Insert the following at the end of the third paragraph:

When the percent of binder contributed from RAS or a combination of RAS and RAP exceeds 20 percent of the total binder in the completed mix, the virgin binder PG grade shall be one grade below (both high and low temperature grade) the binder grade specified in Table 610-2 for the mix type.

Delete the fourth paragraph and substitute the following:

For Type S 9.5D and Type S 12.5D mixes, the maximum percentage of reclaimed asphalt material is limited to 15% and shall be produced using virgin asphalt binder grade PG 76-22. For all other recycled mix types, when the percentage of RAP is 15 percent or less of the total mixture, the virgin binder PG grade shall be as specified in Table 610-2 for the specified mix type. When the percentage of RAP is greater than 15 but not more than 25 percent of the total mixture, the virgin binder PG grade shall be one grade below (both high and low temperature grade) the specified grade for the mix type. When the percentage of RAP is greater than 25 percent of the total mixture, the Engineer will establish and approve the asphalt binder grade.

Page 6-23, **Subarticle 610-3(A)**

After Item 12 at the top of the page, add Item 13 as follows:

13. TSR data in accordance with AASHTO T 283(Modified).

Page 6-23, **Subarticle 610-3(A)**

Under the quantities of mix components insert the following paragraph:

In addition to the required mix design submittal forms, the Contractor shall deliver six (6) Superpave Gyratory Compactor specimens to the Department's Central Asphalt Laboratory for the following surface mix types: SF 9.5A, S 9.5B, S 9.5C, S 9.5D, S 12.5C and S 12.5D. The Contractor will prepare these specimens using lab produced mix in accordance with AASHTO T 312 (Modified). These specimens shall be compacted to a height of 75 mm and to a void content

(VTM) of 4.0% +/- 0.5%. These specimens will be tested for rutting susceptibility using the Asphalt Pavement Analyzer in the Materials and Test Central facility or other approved facility.

Page 6-23, **Subarticle 610-3(A)**

In the last sentence of the second paragraph on this page, change “10 days” to “20 days”.

Page 6-23, **Subarticle 610-3(B)**

Add the following paragraph after the first paragraph of this subarticle:

Surface mix designs will be tested by the Department for rutting susceptibility. Rut depth requirements for each surface mix type and traffic level are specified in Table 610-2. Mix designs that fail to meet these requirements will be considered unacceptable and must be redesigned by the Contractor such that rut depths are acceptable.

JOB MIX FORMULA

Page 6-24, Subarticle 610-3(C)

Delete Table 610-1 and associated notes. Substitute the following:

**TABLE 610-1  
SUPERPAVE AGGREGATE GRADATION DESIGN CRITERIA**

Standard Sieves (mm)	Percent Passing Criteria (Control Points)											
	Mix Type (Nominal Maximum Aggregate Size)											
	4.75 mm (a)		9.5 mm (c)		12.5 mm (c)		19.0 mm		25.0 mm		37.5 mm	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
50.0											100.0	
37.5									100.0		90.0	100.0
25.0							100.0		90.0	100.0		90.0
19.0					100.0		90.0	100.0		90.0		
12.5			100.0		90.0	100.0		90.0				
9.5	100.0		90.0	100.0		90.0						
4.75	90.0	100.0		90.0								
2.36	65.0	90.0	32.0(b)	67.0(b)	28.0	58.0	23.0	49.0	19.0	45.0	15.0	41.0
1.18												
0.600												
0.300												
0.150												
0.075	4.0	8.0	4.0	8.0	4.0	8.0	3.0	8.0	3.0	7.0	3.0	6.0

- (a) For Type S 4.75A, a minimum of 50% of the aggregate components shall be manufactured material from the crushing of stone.
- (b) For Type SF 9.5A, the percent passing the 2.36 mm sieve shall be a minimum of 60% and a maximum of 70%.
- (c) For the final surface layer of the specified mix type, use a mix design with an aggregate blend gradation above the maximum density line on the 2.36 mm and larger sieves.



Delete Table 610-2 and associated notes. Substitute the following:

**TABLE 610-2  
SUPERPAVE MIX DESIGN CRITERIA**

Mix Type	Design	Binder	Compaction Levels		Volumetric Properties (c)				
	ESALs	PG	No. Gyration @		Max. Rut Depth	VMA	VTM	VFA	%Gmm
	millions	Grade			(mm)	% Min.	%	Min. - Max.	@ N <sub>ini</sub>
(e)	(a)	(b)	N <sub>ini</sub>	N <sub>des</sub>					
S-4.75A	<0.3	64 -22	6	50	-----	20.0	7.0-15.0		
SF-9.5A	<0.3	64 -22	6	50	11.5	16.0	3.0 - 5.0	70 - 80	≤ 91.5
S-9.5B	0.3 - 3	64 -22	7	75	9.5	15.0	3.0 - 5.0	65 - 80	≤ 90.5
S-9.5C	3 - 30	70 -22	8	100	6.5	15.0	3.0 - 5.0	65 - 76	≤ 90.0
S 9.5D	> 30	76 -22	9	125	4.5	15.0	3.0 - 5.0	65 - 76	≤ 90.0
S-12.5C	3 - 30	70 -22	8	100	6.5	14.0	3.0 - 5.0	65 - 75	≤ 90.0
S-12.5D	> 30	76 -22	9	125	4.5	14.0	3.0 - 5.0	65 - 75	≤ 90.0
I-19.0B	< 3	64 -22	7	75	-----	13.0	3.0 - 5.0	65 - 78	≤ 90.5
I-19.0C	3 - 30	64 -22	8	100	-----	13.0	3.0 - 5.0	65 - 75	≤ 90.0
I-19.0D	> 30	70 -22	9	125	-----	13.0	3.0 - 5.0	65 - 75	≤ 90.0
B-25.0B	< 3	64 -22	7	75	-----	12.0	3.0 - 5.0	65 - 78	≤ 90.5
B-25.0C	> 3	64 -22	8	100	-----	12.0	3.0 - 5.0	65 - 75	≤ 90.0
B-37.5C	> 3	64 -22	8	100	-----	11.0	3.0 - 5.0	63 - 75	≤ 90.0
	<b>Design Parameter</b>					<b>Design Criteria</b>			
All Mix	1. Dust to Binder Ratio (P <sub>0.075</sub> / P <sub>be</sub> )					0.6 - 1.4			
Types	2. Retained Tensile Strength (TSR)(AASHTO T 283 Modified)					85 % Min. (e)			

- Notes:**
- (a) Based on 20 year design traffic.
  - (b) When Recycled Mixes are used, select the binder grade to be added in accordance with Subarticle 610-3(A).
  - (c) Volumetric Properties based on specimens compacted to N<sub>des</sub> as modified by the Department.
  - (d) AASHTO T 283 Modified (No Freeze-Thaw cycle required). TSR for Type S 4.75A, Type B 25.0 and Type B 37.5 mixes is 80% minimum.
  - (e) Mix Design Criteria for Type S 4.75A may be modified subject to the approval of the Engineer

WEATHER, TEMPERATURE, AND SEASONAL LIMITATIONS FOR PRODUCING AND PLACING ASPHALT MIXTURES

Page 6-26, Article 610-4, Table 610-3

Delete the title of Table 610-3 and substitute the following title:

**ASPHALT PLACEMENT- MINIMUM TEMPERATURE REQUIREMENTS**

In the first column, third row; delete reference to the ACSC Types S 9.5A and S 12.5B mix.

Add the following minimum placing temperatures for mix types S 4.75A and SF 9.5A.

<b>Asphalt Concrete Mix Type</b>	<b>Minimum Air Temperature</b>	<b>Minimum Road Surface Temperature</b>
ACSC, Type S 4.75A, SF 9.5A	40°F (5°C)	50°F (10°C)

SPREADING AND FINISHING

Page 6-32, Article 610-8

Insert the following after the second sentence within the sixth paragraph.

Take necessary precautions during production, loading of trucks, transportation, truck exchanges with paver, folding of the paver hopper wings, and conveying material in front of the screed to prevent segregation of the asphalt mixtures.

Page 6-32, Article 610-8

Delete the last paragraph beginning on this page and continuing on the next page and substitute the following:

Use pavers equipped with an electronic screed control that will automatically control the longitudinal profile and cross slope of the pavement. Control the longitudinal profile through the use of either a mobile grade reference(s), including mechanical, sonic and laser grade sensing and averaging devices, an erected string line(s) when specified, joint matching shoe(s), slope control devices or the approved methods or combination of methods. Unless otherwise specified, use a mobile grade reference system capable of averaging the existing grade or pavement over a minimum 30 foot (9.1 meter) distance or by non-contacting laser or sonar type ski with at least four referencing stations mounted on the paver at a minimum length of 24 feet. Establish the position of the reference system such that the average profile grade is established at the approximate midpoint of the system. The transverse cross-slope shall be controlled as directed by the Engineer.



Delete the second full paragraph on this page and substitute the following:

Use the 30 foot (9.1 meter) 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 courses, including resurfacing and asphalt in-lays, unless other specified or approved. A joint matching device short (6 inch [152.4 mm] shoes) may be used only when approved.

At the end of the third full paragraph, add the following sentence:

Waiver of the use of automatic screed controls does not relieve the Contractor of achieving plan grades and cross-slopes.

Insert the following at the end of this Article:

Repair any damage caused by hauling equipment across structures at no additional cost to the Department.

Use a Material Transfer Vehicle (MTV) when placing all asphalt concrete plant mix pavements, including open-graded asphalt friction course, which require the use of asphalt binder grade PG 76-22, unless otherwise approved. Utilize the MTV when placing all full width travel lanes, including shoulders, collector lanes, ramps, and loops which require PG 76-22.

Provide an MTV that receives mixture from the hauling equipment and independently delivers the mixture from the hauling equipment to the paving equipment. Provide an MTV capable of transferring the material from the haul vehicle to the paver hopper at a uniform and continuous rate to allow the continuous movement of the paver. Install a paver hopper insert with a minimum capacity of 7 tons in the hopper of conventional paving equipment when utilizing a MTV. Perform remixing of the material prior to discharge into the paver conveyor system by utilizing either a MTV with a remixing system contained within a minimum 7 ton capacity storage bin or a dual pugmill system with two full length transversely mounted paddle mixers located in the paver hopper insert.

Use an MTV that provides to the paver a homogeneous, non-segregated mixture that is of uniform temperature such that there is no more than 20°F difference between the highest and lowest temperatures when measured transversely across the width of the mat in a straight line at a distance of one foot to three feet from the screed while the paver is operating. Obtain the temperature measurements approximately one foot from each edge and at least once in the middle of the mat.

Empty the MTV when crossing a bridge and move across without any other Contractor vehicles or equipment being on the bridge. Move the MTV across a bridge in a travel lane and not on the shoulder. While crossing a bridge move the MTV at a speed no greater than five miles per hour without any abrupt acceleration or deceleration.

In the event the MTV malfunctions during paving operations, immediately discontinue plant operations and do not resume operations until the MTV malfunctions have been remedied, unless otherwise directed due to safety concerns. The Contractor may continue placement of the mix until any additional mix in transit has been placed, provided satisfactory results are achieved. This procedure in no way alleviates the Contractor from meeting contract requirements.

DENSITY REQUIREMENTS

Page 6-34, Article 610-10,

Delete Table 610-4 and substitute the following table and associated notes:

Table 610-4  
MINIMUM DENSITY REQUIREMENTS

MIX TYPE	MINIMUM % of G <sub>mm</sub>
SUPERPAVE MIXES	(Maximum Specific Gravity)
S 4.75A	85.0 <sup>(a,b)</sup>
SF 9.5A	90.0
S 9.5X, S 12.5X, I 19.0X, B 25.0X, B 37.5X	92.0

- (a) All S 4.75A pavement will be accepted for density in accordance with Article 105-3
- (b) Compaction to the above specified density will be required when the S 4.75 A mix is applied at a rate of 100 lbs/sy (55 kg/m<sup>2</sup>)

Page 6-34, Article 610-10

Delete the second paragraph and substitute the following:

Compact base and intermediate mix types (surface mixes not included) utilized for pavement widening of less than 4.0 feet (1.2 meters) and all mix types used in tapers, irregular areas and intersections (excluding full width travel lanes of uniform thickness), using equipment and procedures appropriate for the pavement area width and/or shape. Compaction with equipment other than conventional steel drum rollers may be necessary to achieve adequate compaction. Occasional density sampling and testing to evaluate the compaction process may be required. Densities lower than that specified in Table 610-4 will be accepted, in accordance with Article 105-3, for the specific mix types and areas listed directly above.

## SURFACE REQUIREMENTS AND ACCEPTANCE

Page 6-35, **Article 610-12**

Delete the first paragraph and substitute the following:

Construct pavements using quality paving practices as detailed herein. Construct the pavement surface smooth and true to the plan grade and cross slope. Immediately correct any defective areas with satisfactory material compacted to conform with the surrounding area. Pavement imperfections resulting from unsatisfactory workmanship such as segregation, improper longitudinal joint placement or alignment, non-uniform edge alignment and excessive pavement repairs will be considered unsatisfactory and if allowed to remain in place will be accepted in accordance with Article 105-3.

When directed due to unsatisfactory laydown or workmanship, operate under the limited production procedures. Limited production for unsatisfactory laydown is defined as being restricted to the production, placement, compaction, and final surface testing (if applicable) of a sufficient quantity of mix necessary to construct only 2500 feet (750 meter) of pavement at the laydown width.

Remain on limited production until such time as satisfactory laydown results are obtained or until three consecutive 2500 foot (750 meter) sections have been attempted without achieving satisfactory laydown results. If the Contractor fails to achieve satisfactory laydown results after three consecutive 2500 foot (750 meter) 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.

Mix placed under the limited production procedures for unsatisfactory laydown or workmanship will be evaluated for acceptance in accordance with Article 105-3.

## DENSITY ACCEPTANCE

Page 6-36, **Article 610-13**

Delete the second paragraph and substitute the following:

The pavement will be accepted for density on a lot by lot basis. A lot will consist of one day's production of a given job mix formula on a contract. As an exception, separate lots will be established when the one of the following occurs:

- (1) Portions of pavement are placed in both "New" and "Other" construction categories as defined below. A lot will be established for the portion of the pavement in the "New" construction category and a separate lot for the portion of pavement in the "Other" construction category.

- (2) Pavement is placed on multiple resurfacing maps, unless otherwise approved prior to paving. A lot will be established for each individual resurfacing map or portion thereof.
- (3) Pavement is placed by multiple paving crews. A lot will be established for the pavement placed by each paving crew.
- (4) Pavement is placed in different layers. A lot will be established for each layer.
- (5) Control strips are placed during limited production.

The Engineer will determine the final category and quantity of each lot for acceptance purposes.

**Page 6-36, Article 610-13**

Delete the first sentence in the third paragraph and insert the following:

The “New” construction category will be defined as pavements of uniform thickness, exclusive of irregular areas, meeting all three of the following criteria:

Delete the sixth paragraph and substitute the following:

A failing lot for density acceptance purposes is defined as a lot for which the average of all test sections, and portions thereof, fails to meet the minimum specification requirement. If additional density sampling and testing, beyond the minimum requirement, is performed and additional test sections are thereby created, then all test results shall be included in the lot average. In addition, any lot or portion of a lot that is obviously unacceptable will be rejected for use in the work.

**Page 6-36, Article 610-13**

Delete the last paragraph and substitute the following:

Any density lot not meeting minimum density requirements detailed in Table 610-4 will be evaluated for acceptance by the Engineer. If the lot is determined to be reasonably acceptable, the mix will be paid at an adjusted contract price in accordance with Article 105-3. If the lot is determined not to be acceptable, the mix will be removed and replaced with mix meeting and compacted to the requirement of these specifications.

**BASIS OF PAYMENT, ASPHALT PAVEMENTS**

**Page 6-37, Article 610-16**

Add the following to the second paragraph:

The quantity of hot mix asphalt pavement, measured as provided in Article 610-15, will be paid for at the contract unit prices per ton (metric ton) for “Asphalt Concrete Surface Course, Type S 4.75A, and SF 9.5A”.

Add the following to the payment item description:

Asphalt Concrete Surface Course, Type S 4.75A.....	Ton (Metric Ton)
Asphalt Concrete Surface Course, Type SF 9.5A.....	Ton (Metric Ton)

Delete reference to the Asphalt Concrete Surface Course, Types S 9.5A and S 12.5B in both the second paragraph and in the payment description.

**ASPHALT BINDER FOR PLANT MIX - METHOD OF MEASUREMENT**

Page 6-39, **Article 620-4**

Delete the first sentence of the second paragraph and substitute the following:

Where recycled plant mix is being produced, the grade of asphalt binder to be paid for will be the grade for the specified mix type as required in Table 610-2 unless otherwise approved.

**OPEN-GRADED ASPHALT FRICTION COURSE CONSTRUCTION REQUIREMENTS**

Page 6-43, **Article 650-5**

Add the following paragraph after the first paragraph:

Do not place open-graded asphalt friction course between October 31 and April 1 of the next year, unless otherwise approved. Place friction course, Type FC-1 mixes, only when the road surface temperature is 50°F (10°C) or higher and the air temperature is 50°F (10°C) or higher. The minimum air temperature for Type FC-1 Modified and FC-2 Modified mixes will be 60°F (15°C).

Add the following paragraph after the fifth paragraph of this Article.

Use a Materials Transfer Vehicle in accordance with Article 610-8 of the Standard Specifications as amended herein.

**AGGREGATES FOR ASPHALT PLANT MIXES**

Page 10-34, **Subarticle 1012-1(B)4**

Delete and substitute the following:

(4) Flat and Elongated Pieces:

Use coarse aggregate meeting the requirements of Table 1012-1 for flat and elongated pieces when tested in accordance with ASTM D 4791 (Section 8.4) on the No. 4 (4.75 mm) sieve and larger with a 5:1 aspect ratio (maximum to minimum) for all pavement types, except there is no requirement for Types S 4.75A, SF 9.5A, and S 9.5B.

Page 10-35, Delete **Table 1012-1** and substitute the following:

**Table 1012-1**  
**AGGREGATE CONSENSUS PROPERTIES<sup>(a)</sup>**

Mix Type	Course	Fine	Sand	Flat &
	Aggregate	Aggregate	Equivalent	Elongated
	Angularities <sup>(b)</sup>	Angularity		5 : 1 Ratio
		% Minimum	% Minimum	% Maximum
	ASTM D 5821	AASHTO T 304 Method A	AASHTO T 176	ASTM D 4791 Section 8.4
S 4.75 A		40	40	
SF 9.5 A S 9.5 B I 19.0 B B 25.0 B	75 / -	40	40	10 <sup>(c)</sup>
S 9.5 C S 12.5 C I 19.0 C B 25.0 C B 37.5 C	95 / 90	45	45	10
S 12.5 D S 9.5 D I 19.0 D	100 / 100	45	50	10
OGAFC	100 / 100	N/A	N/A	10

(a) Requirements apply to the course aggregate blend and/or fine aggregate blend

(b) 95/90 denotes that 95% of the course aggregate (+No.4 or + 4.75mm sieve) has one fractured face and 90% has two or more fractured faces

(c) Does not apply to Mix Types SF 9.5 A or S 9.5

FINE AGGREGATE ANGULARITY

Page 10-36, **Subarticle 1012-1(C)6**

Delete reference to AASHTO TP 33 Method A and substitute AASHTO T 304, Method A.

Page 10-37, **Subarticle 1012-1(H)**

Delete this Subarticle. It is a duplicate of Subarticle 1012-1(F) located on Page 10-36.

ASPHALT BINDER

Page 10-46, **Article 1020-2**

Delete the first paragraph and substitute the following:

Use Performance Graded Asphalt Binder meeting the requirements of AASHTO M 320. See Article 610-3 for the specified grades. Submit a Quality Control Plan for asphalt binder production in conformance with the requirements of AASHTO R 26 to the Materials and Tests Unit.

SP6R01

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

**11-21-00<sub>R</sub>**

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 Standard Specifications or Project Special Provisions.

SP6R15

**ASPHALT PLANT MIXTURES:**

**7-1-95<sub>c</sub>**

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.

SP6R20

**PRICE ADJUSTMENT - ASPHALT BINDER FOR PLANT MIX:****11-21-00**

Rev. 9-14-06

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

The base price index for asphalt binder for plant mix is \$339.35 per ton (metric ton).

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on February 1, 2007.

Sub-section 620-5 "Basis of Payment" is amended as follows:

In the third line of the third paragraph and the third and seventh line of the fourth paragraph, delete the words "by more than 5%". In the sixth line of the fourth paragraph, delete the words "plus 5%". Also, in the ninth line of the fourth paragraph delete the words "less 5%".

In the seventh paragraph revise the definition for "C" to read "C = Base Price Index".

SP6R25

**FINAL SURFACE TESTING – ASPHALT PAVEMENTS: (RIDEABILITY)****05-18-04**

Rev. 6-20-06

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 (3 kilometers per hour). For all lanes, take profiles in the right wheel path approximately 3 ft (1 m) from the right edge of pavement in the same direction as the paving operation, unless otherwise approved due to traffic control or safety considerations. 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 in no event 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 300 feet (90 meters) in length, turn lanes less than or equal to 300 feet (90 meters) 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 300 feet (90 meters) in length, ramps, full width turn lanes greater than 300 feet (90 meters) in length, and collector lanes.



At the beginning and end of each day's testing operations, and at such other times as determined necessary 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 ft (30 m) 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 ft per inch (3 m per cm) with the vertical scale plotted at a true scale. Record station numbers and references (bridges, approach slabs, culverts, etc.) on the graphs, and distances between references/stations must not exceed 100 ft (30 m). 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 (5 mm, 7.5 mm, and 10 mm) to evaluate the graph for acceptance. The 0.2 inch and 0.3 inch (5 mm and 7.5 mm) 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 (5 mm and 7.5 mm) bands within a 100 ft (30 m) 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 (10 mm) blanking band is used to further evaluate deviations on an individual basis. The Cumulative Straightedge Index (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 ft (30 m) 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 (750 m) 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 (750 m) 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 (mainline travel lanes and full width -Y- line travel lanes greater than 300 feet in length only) require corrective action, then proceed on limited production for unsatisfactory laydown in accordance with Article 610-12. Proceeding on limited production is based upon the Contractor's initial evaluation of the straightedge test results and must 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 (750 meter) 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 (750 meter) 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 (750 meter) 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 (CSI) 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 ft. (30m) sections)</b>				
*CSI	<b><u>PAY ADJUSTMENT</u></b>			
	<b>ACCEPTANCE</b>	<b>CORRECTIVE</b>	<b>Before</b>	<b>After</b>
	<b>CATEGORY</b>	<b>ACTION</b>	<b>Corrective</b>	<b>Corrective</b>
			<b>Action</b>	<b>Action</b>
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 (10 mm) blanking band such that the deviation is reduced to 0.3 inches (7.5 mm) 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 40 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 should 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 entire lot. No disincentive will apply after corrective action if the CSI is 40 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 (3 m) 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 (3 mm). 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.

SP6R45

**ASPHALT CONCRETE SURFACE COURSE, TYPE S 9.5D**

05-17-05

**DESCRIPTION**

Produce and construct Asphalt Concrete Surface Course, Type S 9.5D in accordance with the applicable requirements of Division 6 and Division 10 of the *Standard Specifications* and the following:

**MATERIALS**

Page 6-21, Article 610-3, add the following:

Composition of Mixtures (Mix Design and Job Mix Formula)

Utilize a mix design prepared in accordance with the requirements of Article 610-3 which meets the requirements of Table 610-1, Table 610-2, and Table 1012-1 of the *Standard Specifications*.

Page 6-24, amend Table 610-1 as follows:

**Table 610-1  
SUPERPAVE AGGREGATE GRADATION DESIGN CRITERIA**

Use the aggregate design criteria in Table 610-1 for 9.5 mm nominal maximum size aggregate.

For the final surface layer of the specified mix type, utilize a mix design with an aggregate blend gradation above the maximum density line on the 2.36 mm and larger sieves.

Page 6-25, replace Table 610-2 with the following:

**Table 610-2  
SUPERPAVE MIX DESIGN CRITERIA FOR MIX TYPE S 9.5D**

Mix Type (f)	Design ESALs (a)	Binder PG (b)	Compaction Levels			Volumetric Properties (c)			
	millions	Grade	No. Gyration @			VMA % Min.	VTM %	VFA Min. - Max.	%Gmm @ N <sub>ini</sub>
			N <sub>ini</sub>	N <sub>des</sub>	N <sub>max</sub>				
S 9.5D	> 30	76 -22	9	125	205	15.0	3.0 - 5.0	65 - 76	≤ 90.0
	Design Parameter					Design Criteria			
All Mix Types	1. %G <sub>mm</sub> @ N <sub>max</sub>					≤ 98.0% (d)			
	2. Dust to Binder Ratio (P <sub>0.075</sub> / P <sub>be</sub> )					0.6 - 1.4			
	3. Retained Tensile Strength (TSR) (AASHTO T 283 Modified)					85 % Min. (e)			

Notes: When a Recycled S 9.5D Mix is used, the percentage of reclaimed asphalt material shall be limited to no more than 15% and shall be produced using virgin asphalt binder grade PG 76-22.

Submit to the Department’s Materials and Tests Unit, in Raleigh, six (6) Superpave Gyrotory Compactor specimens compacted to a height of 75 mm and to a void content (VTM) of 4.0% +/- 0.5% for performance rut testing with the Asphalt Pavement Analyzer.

Page 10-35, replace Table 1012-1 with the following:

**Table 1012-1  
AGGREGATE CONSENSUS PROPERTIES (a)**

Mix Type	Course Aggregate Angularity <sup>(b)</sup>	Fine Aggregate Angularity % Minimum	Sand Equivalent % Minimum	Flat & Elongated 5 : 1 Ratio % Maximum
	ASTM D 5821	AASHTO T 304 Method A	AASHTO T 176	ASTM D 4791 Section 8.4
S 9.5D	100 / 100	45	50	10

Page 6-25, Article 610-4, add the following:

Weather, Temperature, and Seasonal Limitations for Producing and Placing Asphalt Mixtures

Produce and place the asphalt mixture in accordance with Article 610-4 and Table 610-3.

Page 6-26 replace Table 610-3 with the following:

Table 610-3  
**Asphalt Placement – Minimum Temperature Requirements**

Asphalt Concrete Mix Type	Minimum Air Temperature	Minimum Road Surface Temperature
ACSC, Type S 9.5D	50°F (10°C)	50°F (10°C)

Page 6-34, Article 610-10, add the following:

**Density Requirements**

Compact the asphalt plant mix in accordance with Articles 610-9 and Article 610-10 to at least the minimum percentage of the maximum specific gravity listed in Table 610-4.

Page 6-34, replace Table 610-4 with the following:

**Table 610-4**  
**MINIMUM DENSITY REQUIREMENTS**

MIX TYPE	MINIMUM % of G <sub>mm</sub> (AASHTO T 209)
S 9.5D	92.0

**MEASUREMENT AND PAYMENT**

Page 6-37, Article 610-15

Method of Measurement will be in accordance with Article 610-15 of the *Standard Specifications*.

Article 610-16,

Basis of Payment will be in accordance with Article 610-16 and the following:

The quantity of hot mix asphalt pavement, measured as provided in Article 610-15, will be paid for at the contract unit prices per ton (metric ton) for *Asphalt Concrete Surface Course, Type S 9.5D*.

Payment will be made under:

<b>Pay Item</b> Asphalt Concrete Surface Course, Type S 9.5D	<b>Pay Unit</b> Ton (Metric Ton)	SPI
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**MATERIALS TRANSFER VEHICLE:****11-20-01**

Use a Material Transfer Vehicle (MTV) when placing all asphalt concrete plant mix pavements, including open-graded asphalt friction course, which require the use of asphalt binder grade PG 76-22, unless otherwise approved. Utilize the MTV when placing all full width travel lanes, including shoulders, collector lanes, ramps, and loops which require PG 76-22.

Provide an MTV that receives mixture from the hauling equipment and independently delivers the mixture from the hauling equipment to the paving equipment. Provide an MTV capable of transferring the material from the haul vehicle to the paver hopper at a uniform and continuous rate to allow the continuous movement of the paver. Install a paver hopper insert with a minimum capacity of 14 tons (12.7 metric tons) in the hopper of conventional paving equipment when utilizing a MTV. Perform remixing of the material prior to discharge into the paver conveyor system by utilizing either a MTV with a remixing system contained within a minimum 14 ton (12.7 metric ton) capacity storage bin or a dual pugmill system with two full length transversely mounted paddle mixers located in the paver hopper insert.

Use an MTV that provides to the paver a homogeneous, non-segregated mixture that is of uniform temperature such that there is no more than 20°F (11°C) difference between the highest and lowest temperatures when measured transversely across the width of the mat in a straight line at a distance of one foot (0.3 m) to three feet (0.9 m) from the screed while the paver is operating. Obtain the temperature measurements approximately one foot (0.3 m) from each edge and at least once in the middle of the mat.

Empty the MTV when crossing a bridge and move across without any other Contractor vehicles or equipment being on the bridge. Move the MTV across a bridge in a travel lane and not on the shoulder. While crossing a bridge move the MTV at a speed no greater than five miles per hour (8 km per hour) without any abrupt acceleration or deceleration.

In the event the MTV malfunctions during paving operations, immediately discontinue plant operations and do not resume operations until the MTV malfunctions have been remedied, unless otherwise directed due to safety concerns. The Contractor may continue placement of the mix until any additional mix in transit has been placed, provided satisfactory results are achieved. This procedure in no way alleviates the Contractor from meeting contract requirements.

No direct payment will be made for providing and using the materials transfer vehicle or any associated equipment, as the cost of providing same shall be included in the contract unit bid price per ton (metric ton) for the mix type to be placed.

SP6R65

**TYING PROPOSED CONCRETE PAVEMENT TO EXISTING CONCRETE PAVEMENT:****7-1-95**

Tie proposed concrete pavement on this project to existing concrete pavement in accordance with the detail shown in the plans and the following provision:

1. Drill holes in the existing concrete pavement 1/8" (3.2 mm) greater than the diameter of the dowel bar. After drilling, blow the hole out with air and allow to dry.
2. Next, place the cement grout or epoxy resin in the back of the dowel hole. The placement of grout can be achieved by using a flexible tube with a long nose that places the material in the back of the dowel hole; the placement of epoxy-type materials can be achieved by using a cartridge with a long nozzle that dispenses the material to the rear of the dowel hole.
3. Insert the dowel into the hole with a slight twisting motion so that the material in the back of the hole is forced up and around the dowel bar to ensure a uniform coating of the anchoring material over the dowel bar.
4. Place a thin nylon or plastic grout retention disk, (1/16" [1.6 mm] minimum thickness) manufactured to slip tightly over the dowel over the dowel and against the slab face to prevent the anchoring material from flowing out of the hole, and to create an effective face at the entrance of the dowel hole.

No direct payment will be made for this work as such work will be included in the contract unit price for the concrete pavement being constructed.

SP7R05

**CONSTRUCTION SURVEYING:**

**01-20-04**

Add the following after the first sentence of Section 801-1 of the January 2002 Standard Specifications:

Provide a stakeout of areas where an environmental permit is required prior to performing any construction in or adjacent to these areas. Stake out limits of the permitted work areas according to the approved permit drawings. Provide clear delineation by use of pink or other highly visible flagging. Insure construction limits do not exceed approved permitted work areas. Immediately notify the Resident Engineer of any variations of the stakeout limits when compared to the approved permit drawings.

Replace the fifth paragraph of Section 801-4 of the January 2002 Standard Specifications with the following:

Partial payments for the item of "Construction Surveying" will be made on each particular payment estimate based upon the percentage complete of the item of "Construction Surveying" as determined by the Engineer. The Contractor is required to submit a certified statement each month indicating the percentage of "Construction Surveying" work completed. The Resident Engineer will determine if the amount indicated is reasonably correct and the Resident Engineer will pay accordingly on the next partial pay estimate.

SP8R02



**DISPOSAL OF WASTE AND DEBRIS:**

**2-19-02**

Revise the 2002 Standard Specifications as follows:

**Page 8-9, Subarticle 802-2(7. Buffer Zones:)**

At the end of the last sentence in this subarticle, add the words "unless superseded by an environmental permit."

SP8R03

**MODIFIED CONCRETE FLUME WITH CONCRETE OUTLET:**

**3-19-96**

At locations shown in the plans, construct concrete flumes, 6" x 8" (150 mm x 200 mm) concrete curb, and apron in accordance with the details in the plans. Use materials meeting the requirements of Section 825 of the Standard Specifications except that the concrete must be Class "B" or of higher compressive strength.

Each concrete flume, 6" x 8" (150 mm x 200 mm) concrete curb, and apron completed and accepted will be paid for at the contract unit price per each for "Modified Concrete Flume". Such price and payment will be full compensation for all materials, labor, equipment, tools, removing and disposing of the temporary slope drains, and any other incidentals necessary to complete the work satisfactorily.

The concrete curb and ditch outside the pay limits of the apron will be measured and paid for in accordance with Section 846 and 850 of the Standard Specifications.

SP8R10

Payment will be made under:

Modified Concrete Flume.....Each

**ENDWALLS:**

**6-18-02**

Revise the 2002 *Standard Specifications* as follows:

Page 8-24, Article 838-2

Delete the last two paragraphs of this article and insert the following:

"Use either portland concrete, brick masonry, or precast concrete for the endwall unless otherwise specified on the Drainage Summary Sheet of the Plans."

SP8R27

**GUARDRAIL POSTS AND OFFSET BLOCKS:**

06-22-04

Rev 12-20-05

Revise the *2002 Standard Specifications* as follows:

Page 8-45, Subarticle 862-3, 4th paragraph, delete this paragraph and replace with the following:

Where rock interferes with the proper installation of the post, excavate a shaft in the rock not less than 9" wide, parallel to the roadway, by 23" long, perpendicular to the roadway, and 24" deep. Place the post against the roadside edge of the shaft and fill in behind the post with Select Material Class VI up to the top elevation of the rock. Fill the remainder of the hole with earth material. Where timber posts are to be driven in fill slopes 1 1/2:1 or steeper and the fill height is 15 feet or more, auger a 6" diameter pilot hole to the full depth of the post before driving.

Page 8-50, Subarticle 865-3, third paragraph, delete this paragraph and replace with the following:

Where rock interferes with the proper installation of the post, excavate a shaft in the rock not less than 9" wide, parallel to the roadway, by 23" long, perpendicular to the roadway, and 24" deep. Place the post against the roadside edge of the shaft and fill in behind the post with Select Material Class VI up to the top elevation of the rock. Fill the remainder of the hole with earth material. Where timber posts are to be driven in fill slopes 1 1/2:1 or steeper and the fill height is 15 feet or more, auger a 6" diameter pilot hole to the full depth of the post before driving.

Page 10-69, Subarticle 1046-3

Delete this subarticle in its entirety and replace with the following:

**1046-3 POSTS AND OFFSET BLOCKS.****(A) General:**

The Contractor may at his option furnish either of the following types of steel guardrail posts. Only one type of post will be permitted at any one continuous installation. Use structural steel posts throughout the project, unless otherwise directed or detailed in the plans.

1. Steel W6 x 8.5 or W6 x 9.0 posts
2. Steel 4.5" x 6.0" "C" shape posts (C150 x 12.2 kg/m)

The Contractor may at his option furnish either of the following types of treated timber posts if specifically directed or detailed in the plans. Only one type of post will be permitted at any one continuous installation.

1. Timber 6" x 8" (152 mm x 203 mm) posts.
2. Timber 8" x 8" (203 mm x 203 mm) posts.

**(B) Structural Steel Posts:**

Fabricate steel posts for guardrail of the size and weight shown on the plans from structural steel complying with the requirements of Section 1072. Metal from which C shape posts are fabricated shall meet the requirements of ASTM A570 for any grade of steel, except that mechanical requirements shall meet the requirements of ASTM A36. Punch or drill the holes for connecting bolts. Burning will not be permitted. After fabrication, the posts shall be galvanized in accordance with Section 1076.

**(C) Treated Timber Posts:**

Timber guardrail posts shall be of treated southern pine meeting the requirements of Article 1082-2 and 1082-3.

Bore bolt holes to a driving fit for the bolts. A minus tolerance of 1 percent will be allowed in the length of the post. Perform all framing and boring before the posts receive preservative treatment.

**(D) Offset Blocks:**

Provide 8-inch deep recycled plastic or composite offset blocks that have been approved for use with the guardrail shown in the standard drawings and/or plans. Only one type of offset block will be permitted at any one continuous installation. Prior to beginning the installation of recycled offset block, submit the FHWA acceptance letter for each type of block to the Engineer for approval.

Treated timber offset blocks with steel beam guardrail will not be allowed unless required by Specifications, directed by the Engineer or detailed in the plans. Steel offset blocks with steel beam guardrail will not be allowed.

Recycled plastic or composite offset blocks shall be made from no less than 50% recycled plastic or composite, and shall meet the following minimum requirements:

- Specific Gravity: .....0.950
- Compressive Strength in Lateral Direction: .....1600 psi (11 MPa)
- Maximum Water Absorption: .....10% by weight
- Maximum Termite and Ant Infestation: .....10%
- Testing.....Shall pass NCHRP Report 350,  
Test Level 3 by CRASH TESTING

Revise the *2002 Standard Roadway Drawings* as follows:

Sheet 4 of 6, Standard 862.03, delete the note and substitute the following:

Note: The midpost and offset block of the WTR section will require special bolt hole drilling in the thrie beam offset block and line post. SP8R57

**GUARDRAIL ANCHOR UNITS, TYPE M-350:****04-20-04**

Rev. 05-16-06

**DESCRIPTION**

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

**MATERIALS**

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

The guardrail anchor unit (SRT-350) as manufactured by:

TRINITY INDUSTRIES, INC.  
2525 N. Stemmons Freeway  
Dallas, TX 75207  
Telephone: 1-800-644-7976

The guardrail anchor unit (FLEAT) as manufactured by:

ROAD SYSTEMS, INC.  
3616 Old Howard County Airport  
Big Springs, TX 79720  
Telephone: 432-263-2435

The guardrail anchor unit (REGENT) as manufactured by:

ENERGY ABSORPTION SYSTEMS, INC.  
One East Wacker Drive  
Chicago, IL 60601-2076  
Telephone: 888-32-ENERGY

Prior to installation the Contractor shall submit to the Engineer:

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

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 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 862-5 and 862-6 of the Standard Specifications.

Payment will be made under:

Guardrail Anchor Units, Type M-350 .....	Each	SP8R60
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**GUARDRAIL ANCHOR UNITS, TYPE 350:****04-20-04****DESCRIPTION**

Furnish and install guardrail anchor units in accordance with the details in the plans, the applicable requirements of Section 862 of the 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: 1-800-644-7976

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:

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

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 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 862.5 and 862-6 of the Standard Specifications.

Payment will be made under:

Guardrail Anchor Units, Type 350 .....Each

SP8R65

**FENCE**

05-16-06

Revise the 2002 *Standard Specifications* as follows:

Page 8-51, Subarticle 866-3(A), second sentence,

Add *existing fencing* after stumps

SP8R86

**PREFORMED SCOUR HOLE WITH LEVEL SPREADER APRON:**

**10-15-02**

Description:

Construct and maintain preformed scour holes with spreader aprons at the locations shown on the plans and in accordance with the details in the plans. Work includes excavation, shaping and maintaining the hole and apron, furnishing and placing filter fabric, rip rap (class as specified in the plans) and permanent soil reinforcement matting.

Materials:

Materials shall meet the requirements of Division 10 and this provision:

Plain rip rap.....Article 1042

Filter Fabric.....Article 1042-2

The permanent soil reinforcement matting shall be permanent erosion control reinforcement mat and shall be constructed of 100% coconut fiber stitch bonded between a heavy duty UV stabilized cuspated (crimped) netting overlaid with a heavy duty UV stabilized top net. The three nettings shall be stitched together on 1.5 inch (38 mm) centers UV stabilized polyester

thread to form a permanent three dimensional structure. The mat shall have the following physical properties:

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

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

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

- 3) the chemical and physical properties of the mat used, and
- 4) conformance of the mat with this specification will be required.

Soil Preparation:

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

Measurement:

The quantity of "Preformed Scour Holes with Level Spreader Aprons" to be paid for shall be the actual number which have been incorporated into the completed and accepted work.

Basis of Payment:

The quantity of scour holes with spreader aprons, measured as provided above, will be paid for at the contract unit price each for "Preformed Scour Hole with Level Spreader Apron." Such price and payment will be full compensation for all work covered by this provision.

SP8R105



**CONCRETE SIDEWALKS, DRIVEWAYS AND WHEELCHAIR RAMPS 10-21-03**

Revise the 2002 Standard Specifications as follows:

PAGE 8-33, SECTION 848

Section 848-2 Add the following:

Detectable Warnings:

Detectable warnings may be either truncated dome concrete paving blocks or stamped concrete. Use Class "B" concrete.

Detectable warnings shall consist of raised truncated domes. Truncated Domes shall have a base diameter of no less than 0.9 inches (23 mm) to no more than 1.4 inches (36 mm), a top diameter of no less than 50 % to no more than 65% of the base diameter, and a height of 0.2 inches (5 mm). Truncated domes shall have center-to-center spacing of no less than 1.6 inches (41 mm) to no more than 2.4 inches (61 mm), and a base to base spacing of 0.65 inches (16 mm) minimum, measured between the most adjacent domes on square grid.

Section 848-3 Add the following:

Install 24 inches (600 mm) in length of truncated dome paving blocks along the bottom of the curb ramps in accordance the plans and details.

Obtain 70 percent contrast visibility with adjoining surfaces, either light-on-dark, or dark-on-light sequence covering the entire ramp.

Section 848-5

Add the following sentence to the third paragraph:

Such price will include furnishing and installing raised truncated domes.

SP8R120

**STREET SIGNS AND MARKERS AND ROUTE MARKERS:**

7-1-95

Move any existing street signs, markers, and route markers out of the construction limits of the project and install the street signs and markers and route markers so that they will be visible to the traveling public if there is sufficient right of way for these signs and markers outside of the construction limits.

Near the completion of the project and when so directed by the Engineer, move the signs and markers and install them in their proper location in regard to the finished pavement of the project.

Stockpile any signs or markers that cannot be relocated due to lack of right of way, or any signs and markers that will no longer be applicable after the construction of the project, at locations directed by the Engineer for removal by others.

The Contractor will be responsible to the owners for any damage to any street signs and markers or route markers during the above described operations.

No direct payment will be made for relocating, reinstalling, and/or stockpiling the street signs and markers and route markers as such work will be considered incidental to other work being paid for by the various items in the contract.

SP9R01

**HIGH STRENGTH CONCRETE FOR DRIVEWAYS:**

**11-21-00**

Use high early strength concrete for all driveways shown in the plans and as directed by the Engineer. Provide high early strength concrete that meets the requirements of Article 1000-7 of the Standard Specifications.

Measurement and payment will be in accordance with Section 848 of the Standard Specifications.

SP10R01

**AGGREGATE PRODUCTION:**

**11-20-01**  
Rev. 11-21-06

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 *Standard Specifications*. Copies of this procedure are available upon request from the Materials and Test Unit.

SP10R05

**CONCRETE BRICK AND BLOCK PRODUCTION:**

**11-20-01**  
Rev 11-21-06

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 *Standard Specifications*. Copies of this procedure are available upon request from the Materials and Test Unit.

SP10R10

**FINE AGGREGATE:**

11-19-02

Revise the 2002 Standard Specifications as follows:

Page 10-17, Table 1005-2

Make the following change to the table:

For Standard Size 2MS the following gradation change applies.

The minimum percent shown for material passing the No. 8 (2.36mm) sieve has been changed from 84 to **80**.

SP10R15

**PORTLAND CEMENT CONCRETE (ALKALI-SILICA REACTION):**

2-20-07

SP10 R16

Revise the 2002 *Standard Specifications* as follows:

Page 10-48, 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

**BORROW MATERIAL**

02-17-04

Revise the 2002 Standard Specifications as follows:

Page 10-44

Section 1018-2 II (b) Delete the last sentence in its entirety.

SP10R17

**COATED, PAVED AND LINED CORRUGATED STEEL CULVERT PIPE:** 10-21-03

Revise the 2002 Standard Specifications as follows:

**Section 1032-4(E) Optional Coatings for Bituminous Coated Pipe and Pipe Arch:**

Page 10-58. Delete Numbers 2. and 3., and substitute the following;

- 2. Type B: In lieu of Type B, Half Bituminous Coated and Partially Paved galvanized pipe, aluminized pipe or polymeric coated pipe without bituminous coating and paving may be used.
- 3. Type C: In lieu of Type C, Fully Bituminous Coated and Partially Paved galvanized pipe, aluminized pipe or polymeric coated pipe without a bituminous coating and paving may be used.

SP10R25

**TRAFFIC CONTROL**

01-18-05

Rev. 06/21/05

Revise the *2002 Standard Specifications* as follows:

**WORK ZONE SIGNS**

Article 1089-1(A) General is deleted. Substitute the following:

(A) General:

Rigid sign retroreflective sheeting requirements for Types VII, VIII and IX (prismatic) fluorescent are described in Tables 1089-A, 1089-B and 1089-C. Cover the entire sign face of the sign substrate with NCDOT approved Type VII, VIII or IX (prismatic) fluorescent orange reflective sheeting. Apply the reflective sheeting in a workmanlike manner so that there are no bubbles or wrinkles in the material.

Roll-up sign retroreflective requirements are described in Table 1089-D.

1. Work Zones Signs (Stationary)

Use Type VII, VIII or IX (prismatic) fluorescent orange retroreflective sheeting that meets the following reflective requirements in Tables 1089-A, 1089-B or 1089-C respectively. Use approved composite or aluminum for sign backing. Signs and sign supports must meet or exceed NCHRP 350 requirements for Breakaway Devices.

**Table 1089-A**  
Minimum Coefficient of Retroreflection  $R_A$  for  
TYPE VII Fluorescent Orange Sheeting  
(Candelas per lux per square meter)

Observation Angle	Entrance Angle	
	-4°	30°
0.1°	300	170
0.2°	230	130
0.5°	72	41

**Table 1089-B**  
Minimum Coefficient of Retroreflection  $R_A$  for  
TYPE VIII Fluorescent Orange Sheeting  
(Candelas per lux per square meter)

Observation Angle	Entrance Angle	
	-4°	30°
0.1°	300	135
0.2°	210	95
0.5°	75	35

**Table 1089-C**  
Minimum Coefficient of Retroreflection  $R_A$  for  
TYPE IX Fluorescent Orange Sheeting  
(Candelas per lux per square meter)

Observation Angle	Entrance Angle	
	-4°	30°
0.1°	200	110
0.2°	115	65
0.5°	72	41
1.0°	24	14

2. Work Zones Signs (Barricade Mounted)

Use approved composite or roll-up signs for barricade mounted sign substrates. Approved composite barricade mounted warning signs (black on orange) must be Type VII, VIII or IX sheeting which meet the retroreflective requirements of Table 1089-A, 1089-B or 1089-C. Roll-up mounted barricade warning signs (black on orange) must meet the retroreflective requirements in Table 1089-D. Sign and barricade assembly must meet or exceed the requirements of NCHRP 350 for Work Zone Category II Devices.

3. Work Zones Signs (Portable)

Use approved composite or roll-up sign substrates on portable sign stands.

Composite - Use Type VII, VIII or IX (prismatic) fluorescent orange retroreflective sheeting that meets the following reflective requirements in Tables 1089-A, 1089-B or 1089-C. Signs and sign supports must meet or exceed NCHRP 350 requirements for Breakaway Devices.

Roll-up Signs - Use fluorescent orange retroreflective roll-up signs that meet the following reflective requirements:

<b>Table 1089-D</b>		
Minimum Coefficient of Retroreflection $R_A$ for Fluorescent Orange Roll-Up Signs (Candelas per lux per square meter)		
Observation Angle	Entrance Angle	
	-4°	30°
0.1°	300	120
0.2°	200	80
0.5°	90	34

Use roll up signs that have a minimum 3/16” x 1 1/4” horizontal rib and 38” x 1 1/4” vertical rib and has been crash test to meet NCHRP 350 requirements and Traffic Control qualified by the Work Zone Traffic Control Unit.

Add the following after 1089-1(C):

(D) Warranty

Warranty requirements for rigid sign retroreflective sheeting Types VII, VIII and IX are described in Subarticle 1093-2(F). Such sheeting shall maintain 80% (Table 1093-10) of its retroreflectivity as shown in Tables 1089 A, B, and C.

Roll-up fluorescent orange retroreflective signs shall maintain 80% of its retroreflectivity (Table 1089-D) for years 1 – 2 and 50% for year 3.

Rigid and Rollup Fluorescent orange signs shall maintain a Fluorescence Luminance Factor (Y<sub>F</sub>)\* of 13% for three (3) years.

\*Fluorescence Testing Method is described in ASTM E2301 Test Methods for Fluorescent Retro reflective Sheeting.

Rigid and Roll up fluorescent orange signs shall maintain a total Luminance Factor (Y) of 25 for three (3) years and conform to the requirements of Table 1089-E when measured in accordance with ASTM D4956.

**Table 1089-E**  
Fluorescent Orange colorimetric requirements

Color	1		2		3		4		Y
	x	y	x	y	x	y	x	y	
Fluorescent Orange	0.583	0.416	0.535	0.400	0.595	0.351	0.645	0.355	

**BARRICADES**

**Article 1089-3(A) General**, delete both paragraphs and substitute the following:

Type III Barricades shall be constructed of perforated square steel tubing and/or angle iron. Provide Type III barricades that use a cross member or stabilization bar and meet the requirements of NCHRP 350 for Work Zone Category II Devices with composite and roll-up signs attached.

Use approved composite or plastic barricade rails that have a smooth face and have alternating orange and white retroreflective stripes that slope at an angle of 45 degrees.

**Article 1089-3(C) Reflective Sheeting**, delete the first paragraph only and substitute the following:

Use Type VII, VIII or IX (prismatic) retroreflective fluorescent orange sheeting on both sides of the barricade rails. The rail sheeting retroreflectivity values shall meet the retroreflectivity requirements in Table 1089-A, 1089-B or 1089-C and shall be listed on the Department’s approved product list or accepted as traffic qualified by the Traffic Control Unit.

SP10R30

**PORTABLE CONCRETE BARRIER:**

2-20-07

The *2002 Standard Specifications* is revised as follows:

Page 10-202, 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.

SP10R50

**DRUMS:**

**07-16-02**

Revise the 2002 Standard Specifications as follows:

Page 10-195, Subarticle 1089-5(C)

Delete the first (1<sup>st</sup>) sentence of the first (1<sup>st</sup>) paragraph and insert the following:

“Provide a minimum of three orange and two white alternating horizontal circumferential stripes covering the entire outside with each drum.”

SP11R05

**PORTABLE CONCRETE BARRIER:**

**11-19-02<sub>C</sub>**

Portable Concrete Barrier used on this project shall meet one of the following:

- NC Approved NCHRP 350 Portable Concrete Barrier (design can be found at <http://www.doh.dot.state.nc.us/construction/wztc/> or can be obtained by calling the Traffic Control Unit at (919) 250-4159)
- Other NCHRP 350 Portable Concrete Barrier as approved by the Engineer and the Traffic Control Section
- NC Approved NCHRP 230 Portable Concrete Barrier in Roadway Standard Drawing 1170.01 manufactured before October 1, 2002

SP11R10

**WORK ZONE SIGNS**

**01-18-05**

Revise the *Standard Specifications* as follows:

**DESCRIPTION**

Page 11-5, **Article 1110-1 Description**

Replace the second paragraph with the following:

Furnish, install, maintain and relocate portable work zone signs and portable work zone sign stands in accordance with the plans and specifications. When portable work zone signs and



portable work zone sign stands are not in use for periods longer than 30 minutes, collapse sign stand and reinstall once work begins.

Replace the last sentence in the third paragraph with the following:

Use work zone signs (portable) only with portable work zone sign stands specifically designed for one another. Work Zone Signs (portable) may be roll up or approved composite.

MATERIALS

Page 11-5, Article 1110-2 Part (A) General:

Add the following:

Barricade Mounted Signs.....Article 1089-3

MATERIAL QUALIFICATIONS

Page 11-5, Article 1110-2 Part (B) Material Qualifications.

Delete the first sentence in the first paragraph and replace with the following:

Provide portable work zone sign stands, portable signs and sign sheeting which are listed on the North Carolina Department of Transportation’s approved product list or accepted as traffic qualified by the Traffic Control Unit.

Delete “Traffic Control Section” in the second sentence of the first paragraph and insert “Traffic Control Unit”.

CONSTRUCTION METHODS

Page 11-6, Article 1110-3 CONSTRUCTION METHODS.

Replace Article 1110-3 (B) Work Zone Signs (Barricade Mounted) with the following:

Mount approved composite or roll-up signs to barricade rails so that the signs do not cover more than 50 percent of the top two rails or 33 percent of the total area of the three rails. Signs are to be mounted a minimum of 1’ from the ground to the bottom of the sign.

Replace Article 1110-3 (C, 2) Work Zone Signs (Portable) with the following:

Install portable work zone signs to carry roll-up or approved composite at a minimum height of 1’ from the bottom of the sign to the ground on two lane-two way roadways.

Install portable work zone signs to carry roll-up or approved composite at a minimum height of 5’ from the bottom of the sign to the ground on multi-lane roadways.

METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Method of Measurement and Basis of Payment will be in accordance with Section 1110-5 and 1110-6 of the *Standard Specifications*.

SP11R15

**BARRICADES**

01-18-05c

Revise the *2002 Standard Specifications* as follows:

Page 11- 12, **Article 1145-2 Materials**, delete the contents and substitute the following:

(A) General

Refer to Division 10:

Barricades..... Article 1089-3

(B) Material Qualifications

Provide Type III barricades and barricade rails that are listed on the North Carolina Department of Transportation’s approved product list or accepted as traffic qualified by the Traffic Control Unit. For more information on the Traffic Qualification process, contact the Traffic Control Unit at Century Center Building B, 1020 Birch Ridge Drive, Raleigh, NC 27610; (919) 250-4159, or see the approved product list on the NCDOT web site at: <http://www.doh.dot.state.nc.us/construction/wztc/>

(C) Historical Performance:

Historical performance of Type III barricades and barricade rails will be used in determining future use of the material by the NCDOT, even if the Type III Barricade is traffic-qualified. Poor past or poor current performance of Type III Barricades at any site, whether or not related to a specific contract may be grounds for non-acceptance of a product on any project under contract.

MEASUREMENT AND PAYMENT

Method of Measurement and Basis of Payment will be in accordance with Section 1145-5 and 1145-6 of the *Standard Specifications*.

SP11R20

**PAVEMENT MARKING GENERAL REQUIREMENTS:**

**07-16-02<sub>c</sub>**

Revise the 2002 Standard Specifications as follows:

Page 12-10, Subarticle 1205-3(J)

Delete the first (1<sup>st</sup>) sentence of the first (1<sup>st</sup>) paragraph and insert the following:

Have at least one member of every pavement marking crew working on a project certified through the NCDOT Pavement Marking Technician Certification Process. For more information contact the Traffic Control, Marking and Delineation Section of the North Carolina Department of Transportation at 919-250-4151 or <http://www.doh.dot.state.nc.us/construction/wztc/>.

SP12R01

**PERMANENT SEEDING AND MULCHING:**

**07-01-95**

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.

<u>Percentage of Elapsed Contract Time</u>	<u>Percentage Additive</u>
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.

SP16R01