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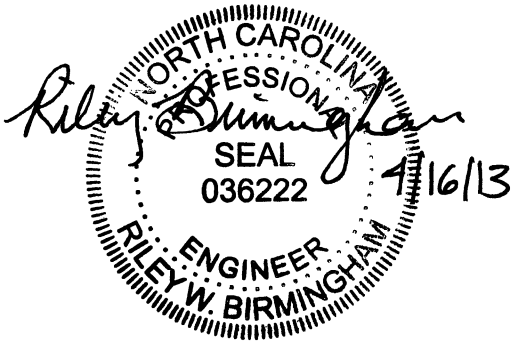
NC DEPARTMENT OF TRANSPORTATION
RAIL DIVISION
PLANNING AND DEVELOPMENT

NCRR/NS MAINLINE RAILROAD ROADBED FROM NORTH OF NEWELL-HICKORY GROVE RD (SR 2853), MP 370.7 TO CP "JUNKER" (MP 372.2)

ROADBED GRADING AND DRAINAGE



NCDOT RAIL DIVISION
MECKLENBURG COUNTY, NC
P-5208H
STA. 10785+30 TO STA. 10872+44 –M1—
NORFOLK SOUTHERN RAILWAY MILEPOST 370.7 TO 372.2

PROJECT SPECIAL PROVISIONS: RAIL ROADBED

AECOM
AECOM TECHNICAL SERVICES OF NORTH CAROLINA, INC.
701 CORPORATE CENTER DRIVE, SUITE 475
RALEIGH, NC 27607
License No. F-0342

102 Revised 5-3-13

RAILROAD SPECIAL PROVISONS FOR ROADBED

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RAILROAD ROADBED

OWNERSHIP OF MATERIALS:

All salvaged material originally furnished by the Department's Contractor shall remain the property of the Contractor, and he shall give consideration to this when making his bid. All salvaged track materials owned by the Department's Contractor shall be disposed of by the Contractor, and the construction area shall be left in a neat and orderly condition.

All salvaged track material either existing or furnished by NSR is and shall remain the property of the NSR except as noted in the track to be removed section of the special provisions.

UNCLASSIFIED EXCAVATION:

Material excavated within the proximities of existing track(s), as defined in the table below, shall be used in embankment within the railroad right of way. Any of this material that is not used in construction of the project shall be disposed of within the railroad right of way within the project limits, and the contractor shall submit, to the Engineer for approval, a plan showing locations and methods of placement for this disposal. The limits where this requirement applies are:

Begin Station	End Station	Left Limit	Right Limit
10785+30	10847+55	20' Left of Centerline Existing Main Track	33' Right of Centerline Existing Main Track
10847+55	10865+56	20' Left of Centerline Existing Main Track	20' Right of Centerline Existing Siding Track
10851+03	10858+76	20' Left of Centerline Existing Spur Track	20' Right of Centerline Existing Spur Track
10857+59	10863+45	20' Left of Centerline Existing Spur Track	20' Right of Centerline Existing Spur Track
10865+56	10867+61	20' Left of Centerline Existing Main Track	33' Right of Centerline Existing Main Track
10867+61	10872+44	20' Left of Centerline Existing Main Track	20' Right of Centerline Existing Main Track 2

WELDED STEEL PIPE UNDER THE TRACKS OF NS RAILWAY:

Description

This work shall consist of furnishing and installing welded steel pipe by trenchless methods as shown in the contract, plans and as directed.

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Revised 5-14-13

Materials

Refer to Division 10 of the *Standard Specifications.*

Item	Section
Welded Steel Pipe	1032-5

Use suppliers of metal pipe culverts, fittings and all other accessories covered by this section that meet the Department's Brand Certification program requirements for metal pipe culverts and are listed on the Materials and Tests Unit's pre-approved list for suppliers of metal pipe culvert. The pre-approved list is available on the Department's website.

Pipe Installation

The pipe shall be installed by dry boring and jacking under the tracks as shown in the plans. The pipe shall be carefully dry bored true to the line and grade given. The bore shall be held to a minimum to insure that there will be no settlement. All voids around the outside of the pipe shall be completely filled to the satisfaction of the Engineer.

The Contractor shall submit to the Railroad Engineer and the NCDOT Engineer a complete plan and schedule for pipe installation 2 weeks prior to the expected commencement of work. The submission shall include complete details of the sheeting, shoring and bracing for the protection of Railroad roadbed, materials and equipment pertinent to the operation. The Contractor shall not proceed with the pipe installation until he has received acceptance of the plan and schedule from the Railroad Engineer and the NCDOT Engineer.

Conduct a pre-construction meeting in the presence of the Railroad Engineer and the Engineer at least 48 hours before the beginning of the pipe installation to discuss the method of installation to assure the pipe is installed true to line and grade. The methods that will be used to insure there is no settlement of the pipe or the railroad roadbed section above the pipe.

All work shall be done with a RWIC/flagman on site and the work shall be performed during allowable work periods. Work shall stop when a train is passing. The Contractor shall have no claim against the Railroad or the Department for any delays caused by NSR's train operations.

The boring operation shall be progressed without stoppage (except for adding lengths of pipe) during daylight hours until the leading edge of the pipe has reached the receiving pit. The contractor shall plan his work to complete the boring within the influence line of the track structure (1:1 projection out from bottom of tie) without stoppage. The contractor shall shore the leading end of the pipe when stopping work and shall continue the boring operation the morning of the next day. The installation shall be carried on without interruption, insofar as practicable, to prevent the pipe from becoming firmly set in the embankment.

The front of the pipe shall be provided with mechanical arrangements or devices that will positively prevent the auger from leading the pipe so that no unsupported excavation is ahead of the pipe.

The auger and cutting head arrangement shall be removable from within the pipe in the event an obstruction is encountered. If the obstruction cannot be removed without excavation in

advance of the pipe, the pipe shall be abandoned in place and immediately filled with grout. A new installation procedure and revised plans must be submitted to, and approved by, the Engineering Representative before work can resume.

The over-cut by the cutting head shall not exceed the outside diameter of the pipe by more than 1/2 inch. If voids should develop or if the bored hole diameter is greater than the outside diameter of the pipe by more than 1 inch, the voids shall be pressure grouted.

When boring and jacking pipe 36 inches and larger in diameter and the boring is halted within a distance less than 20 feet to the centerline of track, the heading shall be shored and braced if the track is active.

Any pipe damaged during the operation shall be removed and replaced by the Contractor at his expense.

The pits or trenches excavated to facilitate the pipe installation shall be backfilled immediately after the installation has been completed.

Measurement and Payment

__" *Welded Steel Pipe,* __" *Thick, Grade B in Soil* will be measured and paid as the actual number of linear feet of pipe measured along the flow line to the nearest foot, which has been installed in soil.

__" *Welded Steel Pipe,* __" *Thick, Grade B Not in Soil* will be measured and paid as the actual number of linear feet of pipe measured along the flow line to the nearest foot which has been installed in non-soil, as observed and confirmed by the Engineer. Non-soil is defined as all material other than soil. The Contractor shall request and obtain the Engineer's observation and confirmation of the limits of the installation not in soil before and during the installation of the pipe or portion of the pipe not in soil.

Failure of the Contractor to request and obtain the Engineer's observation and confirmation of the limits of the pipe not in soil before and during the installation will result in the payment at the unit price for __" *Welded Steel Pipe,* __" *Thick, Grade B in Soil.*

Such payment will include, but is not limited to, furnishing all labor, tools, equipment, materials and incidentals, miscellaneous grading or excavation necessary to complete the work. Installations that become damaged or are abandoned will be replaced at no cost to the Department.

Payment will be made under:

Pay Item	**Pay Unit**
__" Welded Steel Pipe, __" Thick, Grade B in Soil	Linear Foot
__" Welded Steel Pipe, __" Thick, Grade B Not in Soil	Linear Foot

WELDED STEEL PIPE (Open Cut):

Description

This work shall consist of furnishing and installing welded steel pipe in accordance with Section 300 of the *Standard Specifications* as shown in the contract, plans and as directed.

Materials

Refer to Division 10 of the *Standard Specifications.*

Item	Section
Welded Steel Pipe	1032-5

Use suppliers of metal pipe culverts, fittings and all other accessories covered by this section that meet the Department's Brand Certification program requirements for metal pipe culverts and are listed on the Materials and Tests Unit's pre-approved list for suppliers of metal pipe culvert. The pre-approved list is available on the Department's website

Installation

The pipe shall be installed in accordance with Section 300 of the *Standard Specifications.*

Measurement and Payment

__" *Welded Steel Pipe,* __" *Thick, Grade B (Open Cut)* will be measured and paid as the actual number of linear feet of pipe measured along the flow line to the nearest foot.

Such payment will include, but is not limited to, furnishing all labor, tools, equipment, materials and incidentals, miscellaneous grading or excavation necessary to complete the work. Installations that become damaged or are abandoned will be replaced at no cost to the Department.

Payment will be made under:

Pay Item	Pay Unit
__" Welded Steel Pipe, __" Thick, Grade B (Open Cut)	Linear Foot

REMOVAL OF EXISTING HEADWALLS:

Description

The Contractor shall remove existing headwalls at locations shown on the plans.

Construction Methods

The Contractor shall remove and dispose of existing headwalls at locations shown on the plans after the pipes they are attached to are abandoned and filled with flowable fill in accordance with the *Standard Specifications*.

Measurement and Payment

No separate measurement or payment will be made for removal of existing headwalls as such will be considered to be part of the work being paid for as *Grading*.

EMBANKMENT:

This work shall be performed in accordance with Section 235 of the *Standard Specifications* including the following:

All earth fills shall be made in uniform layers of not more than 6 inches thick after compaction. Rock may be placed in compacted layers of not more than 24 inches thick. Each fully compacted layer shall extend the full width of the cross section. Each layer shall be free from mud, snow, ice, or excessive (standing) water before a subsequent layer is placed.

Sandy or rocky material shall be spread in full width layers to form drainage planes from the center through the edge of the embankment. Pockets of open materials surrounded by more impervious material shall be avoided.

The fills shall be formed with suitable materials from on-site cuts and/or necessary suitable material from borrow pits. Organic material such as brush, stumps, roots and trees or other perishable items shall not be placed in embankments. Coal or organic shale shall not be included in the embankment. In fill sections, after stripping the topsoil and organic material, the entire area which the embankment is to be placed shall be plowed and scarified for a minimum depth of 6 inches.

The initial lift and all future fill layers shall be compacted to 95 percent of maximum density per Standard Proctor in accordance with ASTM D698-T and AASHTO T 99, or 90 percent of maximum density per Modified Proctor in accordance with ASTM D-1557 AASHTO T180, except that a minimum of the top 2 feet of fill shall be compacted to 100 percent Standard Proctor.

The top 12 inches of the subgrade in all cut sections that will be cut to subgrade elevation shall be plowed, scarified and compacted to 100 percent Standard Proctor. The Engineer shall determine the AASHTO test method to be used after review of the soil analysis.

The Contractor shall notify the Engineer when fill layers are ready for compaction testing. Successive layers shall not be placed prior to an acceptable density being obtained on each layer. The moisture content of the soil shall be controlled as necessary to obtain the specified densities based upon the optimum moisture content for each material. Water shall be added to the soil

when, in the opinion of the Engineer, additional moisture may be necessary to obtain the specified density. Soil that is too wet shall be allowed to dry or be worked by plowing, discing, harrowing, or other means to dry the material to a workable moisture content.

In the event a specified density is not obtained, the Engineer may order additional rolling, watering, or drying of the soil as necessary to obtain the specified density. Fill layers not meeting a specified density after additional working shall be removed and new material shall be placed and compacted to the specified density at no cost to the Department.

The Contractor may be restricted from using partial or completed roadbed as construction haul roads. Any embankment or roadbed that is damaged by hauling activities shall be repaired by the Contractor at no cost to the Department.

SUB-BALLAST:

Description

The Contractor will furnish and place sub-ballast as shown in the plans. The sub-ballast shall be placed after the subgrade has been graded, compacted and accepted.

Materials

The sub-ballast shall be composed of crusher-run granite, meeting the following requirements and the gradation shown in Table 1:

(A) Sub ballast shall be produced from sound rock meeting the gradations shown in the Table 1 (AASHTO T 27 and T 11, AASHTO T 88 as modified for Base Course and Stabilizer).

(B) The material shall be free from organics and deleterious material (AASHTO T 112).

(C) The material shall not have a Liquid Limit (LL) in excess of 25 (AASHTO T 89) or a Plasticity Index (PI) in excess of 6 (AASHTO T 90).

(D) The material shall have a percentage of wear (LA Abrasion, AASHTO T 96) no greater than 50 percent.

(E) The material shall meet NCDOT's soundness requirements (AASHTO T 104).

Table 1
Sub-ballast

	Percent Passing Standard Sieve Size by Weight					
Sieve Size	2"	1"	3/8"	#10	#40	#200
Sub-ballast	100	90-100	50-84	26-50	12-30	5-12

Construction Methods

After the subgrade has been finished to proper grade and cross-section, the sub-ballast shall be placed on the subgrade with a mechanical spreader capable of placing the material in a uniform loose depth and without segregation, except for areas inaccessible to a mechanical spreader. The aggregate material may be placed by other methods approved by the Engineer. The sub-ballast section shall be constructed in two layers of equal thickness. Each layer of sub-ballast shall be fully compacted in lifts not to exceed 6" in thickness after compaction. Each layer of sub-ballast shall be compacted to a density of 100% of the Standard Proctor determined by AASHTO T 180 and maintained to the required cross-section during compaction. Moisture content shall be maintained within +/- 2% of optimum moisture to obtain the desired density. Water shall be added to the material if necessary to obtain the desired density. If the material is to wet to obtain the desired density, the material shall be worked by discing, harrowing or other means to dry the material to a workable moisture content.

Measurement and Payment

The quantity for *Sub-Ballast* to be paid for will be the actual number of tons of sub-ballast which has been used to construct the track roadbed sections, measured as provided for in Article 520-11 of the *Standard Specifications*. Such price and payment will be full compensation for all furnishing, weighing, hauling, and placing of sub-ballast and for any other work necessary for the construction of the track roadbed section.

Payment will be made under:

Pay Item	**Pay Unit**
Sub-ballast	Ton

MAINTENANCE OF TRACK ROADBED: (Special)

The Contractor shall be responsible for the maintenance of the track roadbed during the construction period. Ditches and temporary pipes shall be provided and maintained as may be necessary to satisfactorily drain the sub-grade. Where previously approved sub-grade is damaged by natural causes, by hauling equipment or other traffic the Contractor shall restore the sub-grade to the required lines, grades and typical sections and to the required density at no additional cost to the Department.

RIGHT OF WAY GATE:
(Special)

Description

Furnish and erect right of way gates in conformity with the details shown in the plans and at the locations shown in the plans.

Materials

Use the following:

3 ½" OD steel pipe, schedule 80
3/8" Galvanized Guy Wire
2" OD PVC Pipe (orange), schedule 80
Fittings and Accessories as shown

Use Class B concrete for anchors. Instead of Class B concrete, pre-mixed commercially bagged dry concrete mix may be used if the concrete meets the minimum strength requirements for Class B concrete when mixed with the quantity of water shown on the instructions printed on the bag.

Construction Methods

Set posts in concrete anchors to maintain the position and alignment of the post as shown in the details in the plans. Forms are not required for the concrete. Trowel the top of the concrete to a smooth finish and slope to drain away from the post. The concrete anchors require at least a 3 day curing period before any load is placed on the post.

Measurement and Payment

Right of Way Gate will be measured and paid as each for the number of gates actually erected and accepted on the project.

The above prices and payments will be full compensation for all work covered by this provision including but not limited to furnishing concrete, steel pipe, hardware and all other materials; fabrication, painting and erection of the right of way gates; and incidentals necessary to complete the work as shown on the plans.

Payment will be made under:

Pay Item	**Pay Unit**
Right of Way Gate	Each

SUBSURFACE DRAIN:

Description

Construct and install subsurface drain pipes, outlet pipes and concrete pads for outlet pipes, in accordance with the detail drawing in the plans and requirements of the contract.

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Materials

Refer to Division 10 of the *Standard Specifications.*

Item	Section
Shoulder Drain Aggregate, No. 57 Stone	1005
6" HDPE AASHTO M294 TYPE S	1044-8
6" HDPE AASHTO M294 TYPE S Outlet Pipe	1044-8
Geotextile for Subsurface Drains, Type 1	1056
Portland Cement Concrete, Class AA	1000

Material for the subsurface drain pipe and fittings shall be 6" HDPE conforming to AASHTO M294 Type S. The 6" HDPE shall be perforated and the perforation size and spacing shall conform to ASTM C 444, Type 1.

Construction Methods

Place and compact the sub-ballast in accordance with the plans and place and compact the 6" asphalt underlayment (where applicable) as shown on the plans. After placing the asphalt underlayment (where applicable), install the subsurface drain/shoulder drain in accordance with the plans.

Excavate the trench to the width shown on the plans, and to the depth, line and grade established by the Engineer.

Place the geotextile in accordance with the detail in the plans. Do not leave fabric uncovered for more than 7 days. Install geotextile such that all splice joints are provided with a minimum overlap of 2 feet. Overlap the closure at the top of the trench at least 6 " and secure with mechanical ties. Where outlet pipe passes through the fabric, wrap a separate piece of fabric around the outlet pipe, flare against the side of the filled drain, and secure with anchor pins.

Anchor field splices of geotextile with anchor pins to ensure that required overlap is maintained.

Place 3" of the subdrain course aggregate as shown in the detail in the plans. Lay perforated pipe with the perforations down. Perform the remainder of the aggregate placement operations to prevent damage to the geotextile and pipe. Replace damaged sections of geotextile and pipe at no cost to the Department.

Outlet pipe shall meet the requirements of Article 1044-6 of the *Standard Specifications.* Use solvent cement to bond the SCH-80 pipe and fittings together. Obtain approval for all pipe fittings from the Engineer prior to delivery. Protect the open end of all outlet pipes with a galvanized rodent screen as shown in plans.

Install outlet fittings and outlet pipes every 500 ft or as otherwise directed by the Engineer. Establish positive drainage within 72 hours of beginning trenching for installation of a given section of aggregate subsurface drain/shoulder drain. Failure to comply with this requirement

may result in the Engineer restricting installation of additional sections of aggregate subsurface drain/shoulder drain until such time as the Contractor completes appropriate outlet installations.

Compact the aggregate to a degree acceptable to the Engineer by the use of a vibratory compactor before making the geotextile closure at the top of the trench.

Carefully place the #57 stone backfill material after the pipe has been laid and the geotextile is closed at the top, so that the pipe will not be disturbed by the backfilling operation. Compact the remainder of the backfill material (#57) stone to a degree acceptable to the Engineer by the use of a vibratory compactor.

Connect the outlet pipes to concrete pads at the outlet end of the subsurface drain. Construct the concrete pad in accordance with Section 825 of the *Standard Specifications* and give an ordinary surface finish. Use Class AA concrete.

Measurement and Payment

Subsurface Drain will be measured and paid as the actual number of linear feet that has been completed and accepted, measured to the nearest foot along the centerline of the completed subsurface drain pipe. No measurement will be made along the outlet pipe.

Such price and payment includes, but is not limited to, furnishing, hauling, and placing all subsurface drain pipe, fittings, aggregate, geotextile, and other materials; making all joint connections and all excavation and backfilling.

Subdrain Pipe Outlet and *6" Outlet Pipe* will be measured and paid for in accordance with Article 815-4 of the *Standard Specifications*.

Payment will be made under:

Pay Item	**Pay Unit**
Subsurface Drain	Linear Foot

ENDWALLS: (Special)

The work shall be performed in accordance with Section 838, "Endwalls", of the *Standard Specifications*, except that the contractor shall not use Class B concrete or masonry to construct endwalls located on the railroad right-of-way. All endwalls located on the railroad right-of-way, cast-in-place or precast, shall be constructed of Class AA concrete.

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CLEARING AND GRUBBING - METHOD III:

(9-17-02) (Rev. 1-17-12) 200 SP2 R02A(Revised)

Perform clearing on this project to the limits established by Method "III" shown on Standard
Drawing No. 200.03 of the *2012 Roadway Standard Drawings*.

The work shall be performed in accordance with Section 200, "Clearing and Grubbing", of the Standard Specifications, except that grubbing will be performed on all cleared roadbed excavation and embankment areas and will include all stumps, roots and other embedded debris.