RAILROAD SPECIAL PROVISONS FOR ROADBED

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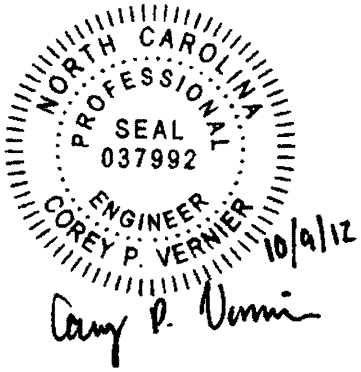
RAILROAD ROADBED



RAILROAD ROADBED

The Standard Specifications for Roads and Structures, January 2012 of the North Carolina Department of Transportation, hereinafter referred to as the Standard Specifications, shall apply to the articles of the Project Special Provisions.

CLEARING AND GRUBBING - METHOD III:

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

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 excavation and embankment areas and will include all stumps, roots and other embedded debris. All debris from the clearing and grubbing operations, including stumps and roots, shall be disposed of at an existing public disposal site currently permitted by NCDENR.

BURNING RESTRICTIONS:

(7-1-95) 200, 210, 215 SP2
R05

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.

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.

EXCAVATION

This work shall be performed in accordance with Section 225, "ROADWAY EXCAVATION" of the Standard Specifications. The applicable typical roadbed template will be maintained throughout the railway portion of the project.

All waste excavated within the Railroad Right of Way, excluding concrete and asphalt materials, shall be placed at locations approved by the Engineer within the existing Railroad Right of Way. The waste material shall not be used inside the 2:1 slope on embankments, but can be placed outside of the 2:1 slope to flatten the slopes.

36" WELDED STEEL PIPE **(Special)**

330-1 DESCRIPTION

This work shall consist of furnishing and installing 36"welded steel pipe by trenchless methods as shown in the contract, plans and as directed. The thickness of the wall shall be 0.532 inches.

330-2 MATERIALS

Refer to Division 10.

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

330-3 PIPE INSTALLATION

Replace section 330-3 of the 2012 Standard Specifications with the following:

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 on a 24-hour basis without stoppage (except for adding lengths of pipe) until the leading edge of the pipe has reached the receiving pit. 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.

330-4 MEASUREMENT AND PAYMENT

36" Welded Steel Pipe, 0.532" 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.

36" Welded Steel Pipe, 0.532" 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 *36" Welded Steel Pipe, 0.532" 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**
36" Welded Steel Pipe, 0.532" Thick, Grade B in Soil	Linear Foot
36" Welded Steel Pipe, 0.532" Thick, Grade B Not in Soil	Linear Foot

36" WELDED STEEL PIPE, OPEN CUT **(Special)**
Station 3391+10

330-1 DESCRIPTION

This work shall consist of furnishing and installing 36"welded steel pipe, grade B, by Open Cut as shown in the contract, plans and as directed by the Engineer. The thickness of the wall shall be 0.532 inches. The pipe shall extend the proposed 36" WSP that is to be installed trenchless in accordance with the plans and specs at this location.

330-2 MATERIALS

Refer to Division 10.

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

Construction Methods

Install the pipe in accordance with the applicable requirements of Section 300 of the *Standard Specifications* and as directed by the Engineer.

Measurement and Payment

36" Welded Steel Pipe, 0.532" Thick, Grade B, Open Cut, will be measured and paid as the actual number of linear feet of pipe that has been incorporated into the completed and accepted work. Measurement of pipe will be made by counting the number of joints used and multiplying by the length of the joint to obtain the number of linear feet of pipe installed and accepted. Measurements of partial joints will be made along the longest length of the partial joint to the nearest 0.1 ft. Select bedding and backfill material will be included in the cost of the installed pipe.

Payment will be made under:

Pay Item	**Pay Unit**
36" Welded Steel Pipe, 0.532" Thick, Grade B, Open Cut	Linear Foot

42" WELDED STEEL PIPE **(Special)**

330-1 DESCRIPTION

This work shall consist of furnishing and installing 42"welded steel pipe by trenchless methods as shown in the contract, plans and as directed. The thickness of the wall shall be 0.625 inches.

330-2 MATERIALS

Refer to Division 10.

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

330-3 PIPE INSTALLATION

Replace section 330-3 of the 2012 Standard Specifications with the following:

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 on a 24-hour basis without stoppage (except for adding lengths of pipe) until the leading edge of the pipe has reached the receiving pit. 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.

330-4 MEASUREMENT AND PAYMENT

42" Welded Steel Pipe, 0.625" 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.

42" Welded Steel Pipe, 0.625" 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 *42" Welded Steel Pipe, 0.625" 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**
42" Welded Steel Pipe, 0.625" Thick, Grade B in Soil	Linear Foot
42" Welded Steel Pipe, 0.625" Thick, Grade B Not in Soil	Linear Foot

48" WELDED STEEL PIPE **(Special)**

330-1 DESCRIPTION

This work shall consist of furnishing and installing 48"welded steel pipe by trenchless methods as shown in the contract, plans and as directed. The thickness of the wall shall be 0.688 inches.

330-2 MATERIALS

Refer to Division 10.

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

330-3 PIPE INSTALLATION

Replace section 330-3 of the 2012 Standard Specifications with the following:

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 on a 24-hour basis without stoppage (except for adding lengths of pipe) until the leading edge of the pipe has reached the receiving pit. 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.

330-4 MEASUREMENT AND PAYMENT

48" Welded Steel Pipe, 0.688" 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.

48" Welded Steel Pipe, 0.688" 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 *48" Welded Steel Pipe, 0.688" 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**
48" Welded Steel Pipe, 0.688" Thick, Grade B in Soil	Linear Foot
48" Welded Steel Pipe, 0.688" Thick, Grade B Not in Soil	Linear Foot

48" WELDED STEEL PIPE, OPEN CUT **(Special)**
Station 3336+62

330-1 DESCRIPTION

This work shall consist of furnishing and installing 48"welded steel pipe, grade B, by Open Cut as shown in the contract, plans and as directed by the Engineer. The thickness of the wall shall be 0.688 inches. The pipe shall extend the proposed 48" WSP that is to be installed trenchless in accordance with the plans and specs at this location.

330-2 MATERIALS

Refer to Division 10.

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

Construction Methods

Install the pipe in accordance with the applicable requirements of Section 300 of the *Standard Specifications* and as directed by the Engineer.

Measurement and Payment

48" Welded Steel Pipe, 0.688" Thick, Grade B, Open Cut, will be measured and paid as the actual number of linear feet of pipe that has been incorporated into the completed and accepted work. Measurement of pipe will be made by counting the number of joints used and multiplying by the length of the joint to obtain the number of linear feet of pipe installed and accepted. Measurements of partial joints will be made along the longest length of the partial joint to the nearest 0.1 ft. Select bedding and backfill material will be included in the cost of the installed pipe.

Payment will be made under:

Pay Item	Pay Unit
48" Welded Steel Pipe, 0.688" Thick, Grade B, Open Cut	Linear Foot

54"WELDED STEEL PIPE **(Special)**

330-1 DESCRIPTION

This work shall consist of furnishing and installing 54"welded steel pipe by trenchless methods as shown in the contract, plans and as directed. The thickness of the wall shall be 0.781 inches.

330-2 MATERIALS

Refer to Division 10.

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

330-3 PIPE INSTALLATION

Replace section 330-3 of the 2012 Standard Specifications with the following:

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 on a 24-hour basis without stoppage (except for adding lengths of pipe) until the leading edge of the pipe has reached the receiving pit. 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.

330-4 MEASUREMENT AND PAYMENT

54" Welded Steel Pipe, 0.781" 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.

54" Welded Steel Pipe, 0.781" 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 *54" Welded Steel Pipe, 0.781" 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**
54" Welded Steel Pipe, 0.781" Thick, Grade B in Soil	Linear Foot
54" Welded Steel Pipe, 0.781" Thick, Grade B Not in Soil	Linear Foot

54" WELDED STEEL PIPE, OPEN CUT **(Special)**
Station 3434+41

330-1 DESCRIPTION

This work shall consist of furnishing and installing 54"welded steel pipe, grade B, by Open Cut as shown in the contract, plans and as directed by the Engineer. The thickness of the wall shall be 0.781 inches. The pipe shall extend the proposed 54" WSP that is to be installed trenchless in accordance with the plans and specs at this location.

330-2 MATERIALS

Refer to Division 10.

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

Construction Methods

Install the pipe in accordance with the applicable requirements of Section 300 of the *Standard Specifications* and as directed by the Engineer.

Measurement and Payment

54" Welded Steel Pipe, 0..781" Thick, Grade B, Open Cut, will be measured and paid as the actual number of linear feet of pipe that has been incorporated into the completed and accepted work. Measurement of pipe will be made by counting the number of joints used and multiplying by the length of the joint to obtain the number of linear feet of pipe installed and accepted. Measurements of partial joints will be made along the longest length of the partial joint to the nearest 0.1 ft. Select bedding and backfill material will be included in the cost of the installed pipe.

Payment will be made under:

Pay Item	Pay Unit
54" Welded Steel Pipe, 0.781" Thick, Grade B, Open Cut	Linear Foot

PIPE COLLARS UNDER RAILROAD **(Special)**

Description

Furnish the materials to construct pipe collars to join pipes of dissimilar materials at locations shown on the plans in accordance with the detail drawing in the plans for Pipe Collars.

Materials

The #5 reinforcing steel shall be grade 60 steel in accordance with section 1070 of the Standard Specifications.

The concrete shall be class AA in accordance with section 1000 of the Standard Specifications.

Construction Methods

The pipe collars shall be used at locations shown on the plans. The collar shall overlap each pipe by 2 feet and shall have a minimum cover of 12 inches at any location around the pipe. The reinforcing steel shall be placed 6 inches from the outside portion of the larger pipe at locations shown on the detail drawing for pipe collars.

Measurement and Payment

Pipe Collars Under RailRoad, will be paid per each for each pipe collar that has been incorporated into the completed work.

The above prices and payments will be full compensation for all work covered by this provision including but not limited to the excavation, constructing and setting forms, furnishing concrete, furnishing and placing reinforcing steel, and any incidentals necessary to complete the work as shown on the plans.

Pay Item	**Pay Unit**
Pipe Collars Under Railroad	EA

REMOVE EXISTING HEADWALLS **(Special)**

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. Car

Measurement and Payment

Remove Existing Headwalls will be paid for in accordance with Section 225, Unclassified Excavation, of the Standard Specifications.

Pay Item	**Pay Unit**
Unclassified Excavation	Cubic Yard (CY)

RAILROAD TRACK TO BE REMOVED **(Special)**

The Department's Contractor shall remove the existing Clegg siding track as shown in the plans and dispose of the materials appropriately in accordance with local regulations.

Description

Furnish the labor, materials, tools and equipment necessary to remove the existing track which includes the rail, crossties, tie plates, anchors, spikes and disposal of the materials.

Ownership of Material

All salvaged material from the removal of the existing Clegg siding track shall remain the property of the Department's Contractor except for the wooden cross ties. The cross ties will remain the property of NSR and shall be removed and neatly stacked at a location directed by the Railroad Engineer. The contractor shall give consideration to the salvage value of the materials when making his bid.

Measurement and Payment

The quantity of "Railroad Track to be Removed", which is to be paid for, will be the actual number of track feet of track which is acceptably removed, measured between the rails along the center line of the track prior to the track being removed.

Payment will be made under:

Pay Item	**Pay Unit**
Railroad Track to be Removed	TF

REGRADE EXISTING RAILROAD ROADBED **(Special)**

Description

The contractor shall remove 4" of the existing sub-ballast on the existing railroad roadbed as shown in the plans and add new sub-ballast as needed to bring the area to finished grade for sub-ballast as shown in the detail drawing in the plans.

The work shall be done in accordance with Section 225 of the Standard Specifications. The contractor shall exercise care in removing the existing sub-ballast so as not to disturb the remaining sub-ballast. Once the 4" of sub-ballast is removed, the contractor will need to wet and roll the existing sub-ballast to seal off the remaining sub-ballast before adding the sub-ballast needed to bring the new sub-ballast to the grade and typical required for this area.

MEASUREMENT AND PAYMENT

Payment for removal of the 4" of existing sub-ballast and wetting and rolling the existing sub-ballast will be measured and paid for as unclassified excavation in accordance with Section 225 of the Standard Specifications. The unit price for unclassified excavation shall be full compensation for removing, disposing or utilization of the existing sub-ballast, wetting the remaining sub-ballast and rolling the remaining sub-ballast to seal it off.

The additional sub-ballast needed to bring the roadbed to final grade will be measured and paid at the contract unit price per ton for sub-ballast in accordance with the Contract Special Provisions for sub-ballast.

Pay Item	**Pay Unit**
Unclassified Excavation	Cubic yards
Sub-ballast	Tons

EMBANKMENT **(Special)**

This work shall be performed in accordance with Section 235,"EMBANKMENTS", 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. Bituminous material shall not be used in railroad 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-1557AASHTO 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 Contractor shall notify the Engineer of when fill layers are ready for compaction testing. Successive layers shall not be placed prior to an acceptable density being obtained on each layer. T h e 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, disking, 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.

DITCHING **(Special)**

Description

The contractor shall clean out the existing ditch from approximate Station 3280+00 +/- and Station 3300+00 +/- Left, as shown on the plans.

Construction Methods

The contractor shall remove all of the silt and vegetation necessary for the ditch to drain properly. Also, any existing rills need to be filled, stabilized and maintained until acceptance of the project.

Measurement and Payment

Ditching Station 3280+00 +/- and Station 3300+00 +/- left will be paid at the contract unit price of per linear foot. The price for ditching will be full compensation for labor, tools, equipment disposing of the material removed from the ditch, and filling any rills in the sidewalls of the ditch.

Payment will be made under:

Pay Item	**Pay Unit**
Ditching	Linear Foot (LF)

BITUMINOUS COATED CORRUGATED METAL PIPE (BCCMP) **(Special)**

DESCRIPTION

Furnish and install drainage pipe at locations and size called for in the contract documents. The work includes construction of joints and connections to other pipes, endwalls and drainage structures.

MATERIALS

Corrugated Steel Pipe

Corrugated steel culvert pipe and pipe arch shall meet ASTM A760, Type 1 pipe.

Corrugations shall be annular riveted with a profile of 2-2/3 inches x ½ inch unless otherwise specified.

Bituminous coating shall be applied to the inner and outer surfaces of the pipe and conform to the requirements of AASHTO M 190, Type A.

Coupling bands shall be one or two piece annular corrugated, made from galvanized steel and fully bituminous coated, with a minimum width of 24 inches. Bands may be one gage lighter that the pipe gage. Bands shall be made of steel sheet conforming to ASTM Specification A 525 and AASHTO Designation M 218. Dimple band couplers shall not be used.

Coupling bands shall be fastened using a minimum of three (3) ½ inch diameter galvanized bolts. Culverts 48 inches and larger require 24 inch wide bands with a minimum of four (4) ½ inch diameter rods and "silo" type lugs.

Acceptance
Acceptance of corrugated steel culvert pipe and its accessories will be based on, but not limited to, visual inspections, classification requirements and check samples taken from material delivered to the project and conformance to the annual Brand Registration. Culvert pipe materials not meeting the above requirements will be rejected, unless written approval is obtained from the State Materials Engineer.

310-3 PIPE INSTALLATION

Install pipe, pipe tees and elbows according to Section 300 of NCDOT Standard Specifications including the following:
BCCMP with a diameter of 42 inches or larger shall be field strutted (if not manufacturer strutted). Ties and struts shall be removed by the Contractor upon completion of the embankment.

Where BCCMP has to be cut to achieve the proper length, such cutting shall be done with an abrasive saw so as to prevent damage to the pipe coating. Flame cutting shall not be permitted. Damage to the shop coating by this or any other work shall be field repaired by the Contractor by using asphalt paint. Repairs shall be at no cost to the Department or the Railroad.

310-6 MEASUREMENT AND PAYMENT

Pipe will be measured and paid as the actual number of linear feet of pipe that has been incorporated into the completed and accepted work. Measurement of pipe will be made by counting the number of joints used and multiplying by the length of the joint to obtain the number of linear feet of pipe installed and accepted. Measurements of partial joints will be made along the longest length of the partial joint to the nearest 0.1 ft. Select bedding and backfill material will be included in the cost of the installed pipe.

Payment will be made under:

Pay Item	**Pay Unit**
__" B.C.C.M.P. Pipe Culverts, __" Thick	Linear Foot

GEOGRID FOR SOIL STABILIZATION **(Special)**

Description. This work shall consist of furnishing and placing geogrid in accordance with these specifications.

Reference Documents. The latest edition of the test standards and specifications mentioned below shall be used. Substitution of standards will require the prior written approval of the Engineer.

Material. Geogrid reinforcement design requirements shall be as described in section 7.0 below. Geogrid reinforcement shall consist of a regular network of integrally connected polymer tensile elements with aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil, aggregate, or other material. The structure of the geogrid reinforcements shall be dimensionally stable and able to retain its geometry under construction stresses and shall have high resistance to damage during construction, to ultraviolet degradation, and to all forms of chemical and biological degradation encountered in the soil being reinforced.

Geogrid Reinforcement. Geogrids shall provide the following Engineering properties.

Property	**Secondary Strength Orientation†**	**Primary Strength Orientation†**
Allowable Long-term Tension Load @ 5% strain, (lb/ft)	191	316

†-Primary and secondary strength orientations of the geogrid will be the orientations in which the strength is highest and lowest, respectively.

Allowable long-term tension load is load at a given strain level divided by a reduction factor (RF) where $RF = RF_{ID} \times RF_{CR} \times RF_{D}$. The allowable long term tension loads at 5% strain shown in the table above are based on the following reduction factors:

RF_{ID}=1.1; RF_{CR}=3.5; RF_{D}=1.1

The individual reduction factors shall be documented in accordance with the site conditions, design calculations, and specifications. The reinforcement manufacturer shall certify and document the individual reduction factors as follows:

Installation Damage Reduction Factor (RF_{ID}): The reduction factor for installation damage, RF_{ID}, shall be documented by field and laboratory test results and literature review, as described in ASTM D 5818 for the reinforced backfill specified or for more severe soils. Samples subjected to installation damage shall be tested for tensile strength and deformation characteristics in accordance with ASTM D 4595 (modified for geogrid testing). Recommended values for reduction factors for installation damage (RF_{ID}) for various soils

shall also be documented. The minimum installation damage reduction factor, RF_{ID}, shall be 1.1, regardless of product specific test results.

Creep Reduction Factor (RF_{CR}): Laboratory test results documenting creep performance over a range of load levels, for a minimum duration of 10,000 hours based on tension creep test (ASTM D 5262) shall be required. Creep test samples shall be of sufficient width to be representative of overall product creep response (fiber creep testing will not be accepted).

The creep-limiting strength, T_I, shall be based on extrapolating the 10,000 hours (or longer duration) tension creep tests to a 75-year design life. The creep extrapolation method shall be based on methods described in FHWA NHI-00-43, *"Mechanically Stabilized Earth Walls and Reinforced Soil Slopes"* - Appendix "B". Laboratory test results and extrapolation methodology shall be documented.

The reduction factor for creep, RF_{CR}, is defined as the ratio of the average lot specific tensile strength @ 5 % strain, T_{ULTLOT}, to the creep-limiting strength, T_I. The average lot specific tensile strength @ 5 % strain, T_{ULTLOT}, for the lot of material used for creep testing, T_{ULTLOT}, shall be determined from wide width tensile test, ASTM D 4595, (modified for geogrid testing). For calculating allowable long-term tensile load at 5% strain, the minimum creep reduction factor, RF_{CR}, shall be 3.5, regardless of the product specific test results.

Durability Reduction Factor (RF_D): The total reduction factor for durability, RF_D, shall be defined as the combined effects of chemical and biological degradation. Laboratory test results, extrapolation techniques, and a comprehensive literature review shall document the reduction factor for durability for all material components in accordance with FHWA NHI-00-044, *"Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes"*. The minimum durability reduction factor, RF_D, shall be 1.1, regardless of product specific test results.

Certification. Prior to construction the Contractor shall submit to the Engineer a Certification Package prepared by the geogrid reinforcement manufacturer. The Contractor shall allow 15 calendar days from the day the submittals are received by the Engineer for review and acceptance. The Certification shall state that the furnished geogrid reinforcement is in full compliance with the design requirements as stated in this document and the design drawings and is fit for use in long-term critical soil reinforcement applications. The submittal shall certify the following value for each geogrid reinforcement used on the project:

1. The allowable long-term tensile load @ 5% strain and @ failure for geogrid reinforcements.

The manufacturer shall also provide written certification that the material is capable of withstanding direct exposure to sunlight for 120 days with no measurable deterioration as measured per ASTM D 4355. The Contractor's submittal package

shall include, but not be limited to, actual test results for tension, creep, durability, construction damage, joint strength, pullout and quality control. A person having the legal authority to bond the manufacturer shall attest to the certificate. Any tests required shall be performed at no additional cost to the Department. If in the opinion of the Engineer, the required documentation is not provided for individual reduction factors (RF), default values for these design parameters shall be used in accordance with this specification.

The submittal shall certify the following values and document for each geogrid soil reinforcement used on the project:

Tensile Strength @ 5% strain: The tensile strength at 5 % strain, shall be determined from wide width tensile tests (ASTM D 4595) or rib tensile test for geogrids (ASTM D 6637). Geogrid samples tested in accordance with ASTM D 4595 shall have at least two geogrid apertures and a minimum gage length of 4 inches. All geogrid strength tests (ASTM D 4595 and ASTM D 6637) shall be conducted at a strain rate of 10% per minute based on actual gage length necessary to meet the testing sample dimension requirements. Laboratory test results documenting the tensile strength at 5% strain in the reinforcement direction shall be based on the minimum average roll values (MARV) for the product.

Manufacturing Quality Control. The Contractor shall provide to the Engineer a manufacturing quality control certificate and conformance testing results for all geosynthetic soil reinforcement delivered to the site. Sampling and conformance testing shall be in accordance with ASTM D 4354. Geosynthetic product acceptance shall be based on ASTM D 4759.

Geogrid samples tested in accordance with ASTM D 4595 shall have at least two geogrid apertures and a minimum gage length of 4 inches. All geogrid strength tests (ASTM D 4595 and ASTM D 6637) shall be conducted at a strain rate of 10% per minute based on actual gage length necessary to meet the testing sample dimension requirements. Conformance testing of the applicable index testing shown in the table below shall be provided for all geogrid reinforcement. The quality control certificate shall include roll numbers and identification, sampling procedures, and results of the conformance testing with a description of test methods used. The geogrid manufacturer shall have a manufacturing quality control program that includes QC testing no less frequently than each 200,000 sf (20,000sm) of production.

Type	Property	Test Method	Criteria
Polypropylene (PP)	UV Oxidation Resistance	ASTM D 4355	Minimum 70% strength retained after 500 hrs. in weatherometer
	Melt Flow Rate	ASTM D 1238	≤ 12 g/10 min
Polyethylene	UV Oxidation Resistance	ASTM D 4355	Minimum 70% strength retained after 500 hrs. in weatherometer

(HPDE)	Melt Flow Rate	ASTM D 1238	< 0.4 g/10 min
	Specific Gravity	ASTM D 792	1.2 Average
Polyester (PET)	Hydrolysis Resistance	Intrinsic Viscosity Method (ASTM D 4603 and GRI Test Method GG8) with Correlationor Determine Directly Using Gel Permeation Chromatography	Miimum Number Average Molecular Weight of 25,000
	Hydrolysis Resistance	Geotechnical Research Institute (GRI) GG7	Maximum Carboxyl End Group (CEG) Content of 30

Delivery, Storage and Handling: The Contractor shall be responsible for storage, handling and installation of all geogrids in accordance with specifications and the manufacturer's recommendations.

Contractor shall deliver sufficient materials to the site to prevent interruption of the work. Contractor shall inspect all materials upon delivery. Contractor shall notify the Engineer, and vice versa, of any damage. Damaged-materials shall be returned and replaced at no cost to the Department. Contractor shall prevent mud, wet cement, epoxy, and similar materials which may affix themselves to the grid, from coming into contact with the geogrid material. Rolled geogrid material shall be laid flat or stood on edge for storage. Geogrid shall be kept covered with protective wrapping until ready for use.

Geogrid shall be handled carefully with approved handling devices in strict conformance with the manufacturer's recommendations. Products shall not be dropped or rolled off trucks, nor shall products be otherwise dragged, rolled, or skidded.

Installation: All areas immediately beneath the installation area for the geogrid shall be properly prepared as specified within these provisions, and/or as directed by the Engineer. Geogrid reinforcement shall be placed to lay flat and pulled tight prior to backfilling. After a layer of geogrid has been placed, suitable means, such as pins or small piles of rocks, shall be used to hold geogrid in position until the subsequent soil layer can be placed. Under no circumstances shall a track-type vehicle be allowed on the geogrid before at least 6 inches of stone has been placed. Turning of tracked vehicles shall be kept to a minimum to prevent tracks from displacing the fill and the geogrid.

Geogrid Placement: The geogrid shall be installed in accordance with the manufacturer's recommendations. The primary strength orientation of the geogrid/geotextile shall be placed perpendicular to the alignment. Horizontal coverage of less than 100 percent shall not be allowed unless specifically detailed on the plans. Minimum geogrid overlap of 3 feet shall be used.

Measurement and Payment: *Geogrid for Soil Stabilization,* will be measured as the actual area that has been stabilized and will be paid at the contract unit price per square yard. Geogrid overlaps and wasted or unusable scraps of geogrid are an incidental item. Such price and payment will be full compensation for all materials, labor, equipment and other incidentals necessary to deliver, properly store, and install the geogrid as required.

Payment will be made under:

Pay Item	**Pay Unit**
Geogrid for Soil Stabilization	square yard

SUB-BALLAST **(Special)**

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, meeting the following requirements and the gradation shown in Table 1:

- 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).
- The material shall be free from organics and deleterious material (AASHTO T 112).
- 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).
- The material shall have a percentage of wear (LA Abrasion, AASHTO T 96) no greater than 50 percent.
- The material shall meet NCDOT's soundness requirements (AASHTO T 104).

	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

Table 1 **Sub-ballast**

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.

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. There will be no direct payment for maintenance of the track roadbed. All cost associated with maintaining the track roadbed will be incidental to other items of work.

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

Item Section

2" OD steel pipe, schedule 80
3 ½" OD steel pipe, schedule 80

4" OD steel pipe, 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

Setting Posts and Braces

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.

Fabrication

The gate shall be fabricated and painted yellow as shown on the details in the plans. The welding will be done by a certified welder.

866-4 MEASUREMENT AND PAYMENT

Right of Way Gate, will be measured and paid each for the number of gates actually erected 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.

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