STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH, N.C.

C204110

CONTRACT AND

CONTRACT BONDS

FOR CONTRACT NO. C204110

WBS 34817.3.14 NHF00100(024)

T.I.P NO. U-2519BA, U-2519BB

COUNTY OF CUMBERLAND
THIS IS THE ROADWAY & STRUCTURE CONTRACT
ROUTE NUMBER I-495 LENGTH 5.293 MILES
LOCATION FAYETTEVILLE OUTER LOOP FROM SOUTH OF SR-1003 (CAMDEN ROAD) TO SOUTH OF US-401.

CONTRACTOR BRANCH CIVIL INC
ADDRESS P.O. BOX 40004
ROANOKE, VA 24022

BIDS OPENED JUNE 21, 2022
CONTRACT EXECUTION 07/15/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH, N.C.

PROPOSAL

INCLUDES ADDENDUM No. 1 DATED 06-14-2022

DATE AND TIME OF BID OPENING: **Jun 21, 2022 AT 02:00 PM**

CONTRACT ID	C204110
WBS	34817.3.14

FEDERAL-AID NO.	NHF00100(024)
COUNTY	CUMBERLAND
T.I.P NO.	U-2519BA, U-2519BB
MILES	5.293
ROUTE NO.	I-495
LOCATION	FAYETTEVILLE OUTER LOOP FROM SOUTH OF SR-1003 (CAMDEN ROAD) TO SOUTH OF US-401.
TYPE OF WORK	GRADING, DRAINAGE, PAVING, SIGNING, SIGNALS, AND STRUCTURES.

NOTICE:

ALL BIDDERS SHALL COMPLY WITH ALL APPLICABLE LAWS REGULATING THE PRACTICE OF GENERAL CONTRACTING AS CONTAINED IN CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA WHICH REQUIRES THE BIDDER TO BE LICENSED BY THE N.C. LICENSING BOARD FOR CONTRACTORS WHEN BIDDING ON ANY NON-FEDERAL AID PROJECT WHERE THE BID IS $30,000 OR MORE, EXCEPT FOR CERTAIN SPECIALTY WORK AS DETERMINED BY THE LICENSING BOARD. BIDDERS SHALL ALSO COMPLY WITH ALL OTHER APPLICABLE LAWS REGULATING THE PRACTICES OF ELECTRICAL, PLUMBING, HEATING AND AIR CONDITIONING AND REFRIGERATION CONTRACTING AS CONTAINED IN CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA. NOTWITHSTANDING THESE LIMITATIONS ON BIDDING, THE BIDDER WHO IS AWARDED ANY FEDERAL - AID FUNDED PROJECT SHALL COMPLY WITH CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA FOR LICENSING REQUIREMENTS WITHIN 60 CALENDAR DAYS OF BID OPENING.

BIDS WILL BE RECEIVED AS SHOWN BELOW:

THIS IS A ROADWAY & STRUCTURE PROPOSAL

5% BID BOND OR BID DEPOSIT REQUIRED

PROPOSAL FOR THE CONSTRUCTION OF

CONTRACT No. C204110 IN CUMBERLAND COUNTY, NORTH CAROLINA

Date_____ 20_____

DEPARTMENT OF TRANSPORTATION,

RALEIGH, NORTH CAROLINA

The Bidder has carefully examined the location of the proposed work to be known as Contract No. **C204110** has carefully examined the plans and specifications, which are acknowledged to be part of the proposal, the special provisions, the proposal, the form of contract, and the forms of contract payment bond and contract performance bond; and thoroughly understands the stipulations, requirements and provisions. The undersigned bidder agrees to bound upon his execution of the bid and subsequent award to him by the Board of Transportation in accordance with this proposal to provide the necessary contract payment bond and contract performance bond within fourteen days after the written notice of award is received by him. The undersigned Bidder further agrees to provide all necessary machinery, tools, labor, and other means of construction; and to do all the work and to furnish all materials, except as otherwise noted, necessary to perform and complete the said contract in accordance with *the 2018 Standard Specifications for Roads and Structures* by the dates(s) specified in the Project Special Provisions and in accordance with the requirements of the Engineer, and at the unit or lump sum prices, as the case may be, for the various items given on the sheets contained herein.

The Bidder shall provide and furnish all the materials, machinery, implements, appliances and tools, and perform the work and required labor to construct and complete State Highway Contract No. **C204110** in **Cumberland County**, for the unit or lump sum prices, as the case may be, bid by the Bidder in his bid and according to the proposal, plans, and specifications prepared by said Department, which proposal, plans, and specifications show the details covering this project, and hereby become a part of this contract.

The published volume entitled *North Carolina Department of Transportation, Raleigh, Standard Specifications for Roads and Structures, January 2018* with all amendments and supplements thereto, is by reference incorporated into and made a part of this contract; that, except as herein modified, all the construction and work included in this contract is to be done in accordance with the specifications contained in said volume, and amendments and supplements thereto, under the direction of the Engineer.

If the proposal is accepted and the award is made, the contract is valid only when signed either by the Contract Officer or such other person as may be designated by the Secretary to sign for the Department of Transportation. The conditions and provisions herein cannot be changed except over the signature of the said Contract Officer.

The quantities shown in the itemized proposal for the project are considered to be approximate only and are given as the basis for comparison of bids. The Department of Transportation may increase or decrease the quantity of any item or portion of the work as may be deemed necessary or expedient.

An increase or decrease in the quantity of an item will not be regarded as sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work, except as provided for the contract.

Accompanying this bid is a bid bond secured by a corporate surety, or certified check payable to the order of the Department of Transportation, for five percent of the total bid price, which deposit is to be forfeited as liquidated damages in case this bid is accepted and the Bidder shall fail to provide the required payment and performance bonds with the Department of Transportation, under the condition of this proposal, within 14 calendar days after the written notice of award is received by him, as provided in the *Standard Specifications*; otherwise said deposit will be returned to the Bidder.

State Contract Officer

DocuSigned by:
Ronald Elton Davenport, Jr.
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06/14/2022

TABLE OF CONTENTS

STANDARD SPECIAL PROVISIONS

UNIT PROJECT SPECIAL PROVISIONS

PROPOSAL ITEM SHEET

ITEM SHEET(S) (TAN SHEETS)

PROJECT SPECIAL PROVISIONS

GENERAL

INTERESTED PARTIES LIST:
(6-21-22) 102 SP1 G02

Revise the *2018 Standard Specifications* as follows:

Page 1-12, Article 102-3 PROPOSALS AND PLAN HOLDER LISTS, lines 45-49, delete and replace with the following:

102-3 PROPOSALS AND INTERESTED PARTIES LIST

On Department projects advertised the prospective bidder shall sign up on the *Interested Parties List* for which he intends to submit a bid. There is no cost for signing up on the *Interested Parties List*.

Page 1-12, Article 102-3 PROPOSALS AND PLAN HOLDER LISTS, lines 1-3, delete and replace the first sentence of the second paragraph with the following:

The proposal will state the location of the contemplated construction and show a schedule of contract items with the approximate quantity of each of these items for which bid prices are invited.

Page 1-14, Article 102-8 PREPARATION AND SUBMISSION OF BIDS, lines 30-31, delete and replace the first paragraph with the following:

Prior to submitting a bid on a project, the bidder shall sign up on the *Interested Parties List* in conformance with Article 102-3. The bidder shall submit a unit or lump sum price for every item in the proposal other than items that are authorized alternates to those items for which a bid price has been submitted.

CONTRACT TIME AND LIQUIDATED DAMAGES:
(8-15-00) (Rev. 12-18-07) 108 SP1 G07 A

The date of availability for this contract is **August 1, 2022**, except that work in jurisdictional waters and wetlands shall not begin until a meeting between the DOT, Regulatory Agencies, and the Contractor is held as stipulated in the permits contained elsewhere in this proposal. This delay in availability has been considered in determining the contract time for this project.

The completion date for this contract is **January 28, 2027**.

Except where otherwise provided by the contract, observation periods required by the contract will not be a part of the work to be completed by the completion date and/or intermediate contract times stated in the contract. The acceptable completion of the observation periods that extend beyond the final completion date shall be a part of the work covered by the performance and payment bonds.

The liquidated damages for this contract are **Two Hundred Dollars ($ 200.00)** per calendar day. These liquidated damages will not be cumulative with any liquidated damages which may become chargeable under Intermediate Contract Time Number 1.

INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES:
(7-1-95) (Rev. 2-21-12) 108 SP1 G13 A

Except for that work required under the Project Special Provisions entitled *Planting, Reforestation* and/or *Permanent Vegetation Establishment*, included elsewhere in this proposal, the Contractor will be required to complete all work included in this contract and shall place and maintain traffic on same.

The date of availability for this intermediate contract time is **August 1. 2022**.

The completion date for this intermediate contract time is **August 1, 2026**.

The liquidated damages for this intermediate contract time are **One Thousand Five Hundred Dollars ($ 1,500.00)** per calendar day.

Upon apparent completion of all the work required to be completed by this intermediate date, a final inspection will be held in accordance with Article 105-17 and upon acceptance, the Department will assume responsibility for the maintenance of all work except *Planting, Reforestation* and/or *Permanent Vegetation Establishment*. The Contractor will be responsible for and shall make corrections of all damages to the completed roadway caused by his planting operations, whether occurring prior to or after placing traffic through the project.

INTERMEDIATE CONTRACT TIME NUMBER 2, INCENTIVE AND DISINCENTIVE:
(6-18-13) 108 SP1 G14 L

The Contractor shall complete **all** work required **to meet the following conditions** and shall place and maintain traffic on same.

1. **The final layers of pavement shall be placed on all lanes and shoulders along the -L- Line and all associated ramps and/or loops. Milled rumble strips shall be placed on shoulders along the -L- Line, as indicated by the plans.**
2. **All signs shall be completed and accepted along the -L- Line and all associated ramps and/or loops.**
3. **All guardrail, drainage devices, ditches, excavation and embankment shall be completed along the -L- Line and all associated ramps and/or loops.**
4. **Traffic shall be placed in the final traffic pattern along -L- Line and all associated ramps and/or loops.**
5. **Traffic shall be placed in the final traffic pattern along all -Y- Lines.**

The date of availability for this intermediate contract time is **August 1, 2022**.

The completion date for this intermediate contract time is **May 15, 2026**.

It is mutually agreed that time is of the essence in completing Intermediate Contract Time Number 2 and opening same to traffic. It is further mutually agreed a delay in completing this work will result in damage due to increased engineering and inspection costs to the Department of

Transportation, great hardship to the general public, public inconvenience, obstruction of traffic, interference with business, and increased cost of maintaining traffic.

By reason of necessity of expeditious completion of work included in Intermediate Contract Time Number 2, and placing and maintaining traffic on same, it is mutually agreed, the Contractor shall receive an incentive payment of **Fifteen Thousand Dollars ($ 15,000.00)** per calendar day for each day prior to the completion date established for Intermediate Contract Time Number 2 that this work is completed. Incentive payment shall be limited to a maximum of **Three Million Dollars ($ 3,000,000.00)**. No incentive payment shall be allowed for any calendar day after the completion date established for Intermediate Contract Time Number 2 that this work remains incomplete. This date shall be utilized in determining incentive payments and it shall not be revised for any reason whatsoever. Incentive payment determined to be due the Contractor shall be paid by the Department within forty-five (45) calendar days after completion of all work. No incentive payment shall be allowed if the contract is terminated under the provisions of Article 108-13 of the 2018 Standard Specifications.

Disincentive of **Fifteen Thousand Dollars ($ 15,000.00)** per calendar day shall be assessed the Contractor for each day beyond the completion date for Intermediate Contract Time Number 2 that the work is not completed.

The Engineer shall withhold the disincentives as they accrue from the amount of monies due on work performed in the contract.

INTERMEDIATE CONTRACT TIME NUMBER 3 AND LIQUIDATED DAMAGES:
(2-20-07) 108 SP1 G14 A

The Contractor shall complete the required work of installing, maintaining, and removing the traffic control devices for lane closures and restoring traffic to the existing traffic pattern. The Contractor shall not close or narrow a lane of traffic on **the following roads** during the following time restrictions:

DAY AND TIME RESTRICTIONS

Camden Road, King Road, Stoney Point Road, Barefoot Road and/or Strickland Road
Monday thru Friday, 6:30 AM to 8:30 AM and 4:00 PM to 6:30 PM

Century Circle
6:30 AM to 8:30 AM (WHEN SCHOOL IS IN SESSION)
2:00 PM to 3:30 PM (WHEN SCHOOL IS IN SESSION)

In addition, the Contractor shall not close or narrow a lane of traffic on **Camden Road, King Road, Stoney Point Road, Barefoot Road, Strickland Road and/or Century Circle**, detain and/or alter the traffic flow on or during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy, including the following schedules:

HOLIDAY AND HOLIDAY WEEKEND LANE CLOSURE RESTRICTIONS

1. For **unexpected occurrence** that creates unusually high traffic volumes, as directed by the Engineer.

2. For **New Year's Day**, between the hours of **6:30 A.M.** December 31st and **6:30 P.M.** January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until **6:30 P.M.** the following Tuesday.

3. For **Easter**, between the hours of **6:30 A.M.** Thursday and **6:30 P.M.** Monday.

4. For **Memorial Day**, between the hours of **6:30 A.M.** Friday and **6:30 P.M.** Tuesday.

5. For **Independence Day**, between the hours of **6:30 A.M.** the day before Independence Day and **6:30 P.M.** the day after Independence Day.

   If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of **6:30 A.M.** the Thursday before Independence Day and **6:30 P.M.** the Tuesday after Independence Day.

6. For **Labor Day**, between the hours of **6:30 A.M.** Friday and **6:30 P.M.** Tuesday.

7. For **Thanksgiving**, between the hours of **6:30 A.M.** Tuesday and **6:30 P.M.** Monday.

8. For **Christmas**, between the hours of **6:30 A.M.** the Friday before the week of Christmas Day and **6:30 P.M.** the following Tuesday after the week of Christmas Day.

Holidays and holiday weekends shall include New Year's, Easter, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas. The Contractor shall schedule his work so that lane closures will not be required during these periods, unless otherwise directed by the Engineer.

The time of availability for this intermediate contract work shall be the time the Contractor begins to install all traffic control devices for lane closures according to the time restrictions listed herein.

The completion time for this intermediate contract work shall be the time the Contractor is required to complete the removal of all traffic control devices for lane closures according to the time restrictions stated above and place traffic in the existing traffic pattern.

The liquidated damages are **Two Hundred Fifty Dollars ($ 250.00)** per hour.

INTERMEDIATE CONTRACT TIME NUMBER 4 AND LIQUIDATED DAMAGES:
(6-18-13) 108 SP1 G14 L

The Contractor shall complete **all** work required of **placing traffic on the -L- Line (from Sta. 320+00 +/- to Sta. 344+00 +/-), on -Y13DET-, and on associated ramps -Y13RPB-/ -Y13RPB_XOVER- and -Y13RPC-/-Y13RPC_XOVER-, as described in Phase I, Step #2** on Sheet **TMP-3 of the U-2519BA Transportation Management Plans** and shall place and maintain traffic on same.

The date of availability for this intermediate contract time is **August 1, 2022**.

The completion date for this intermediate contract time is **June 1, 2024**.

The liquidated damages are **Five Thousand Dollars ($ 5,000.00)** per calendar day.

PERMANENT VEGETATION ESTABLISHMENT:
(2-16-12) (Rev. 10-15-13) 104 SP1 G16

Establish a permanent stand of the vegetation mixture shown in the contract. During the period between initial vegetation planting and final project acceptance, perform all work necessary to establish permanent vegetation on all erodible areas within the project limits, as well as, in borrow and waste pits. This work shall include erosion control device maintenance and installation, repair seeding and mulching, supplemental seeding and mulching, mowing, and fertilizer topdressing, as directed. All work shall be performed in accordance with the applicable section of the *2018 Standard Specifications*. All work required for initial vegetation planting shall be performed as a part of the work necessary for the completion and acceptance of the Intermediate Contract Time (ICT). Between the time of ICT and Final Project acceptance, or otherwise referred to as the vegetation establishment period, the Department will be responsible for preparing the required National Pollutant Discharge Elimination System (NPDES) inspection records.

Once the Engineer has determined that the permanent vegetation establishment requirement has been achieved at an 80% vegetation density (the amount of established vegetation per given area to stabilize the soil) and no erodible areas exist within the project limits, the Contractor will be notified to remove the remaining erosion control devices that are no longer needed. The Contractor will be responsible for, and shall correct any areas disturbed by operations performed in permanent vegetation establishment and the removal of temporary erosion control measures, whether occurring prior to or after placing traffic on the project.

Payment for *Response for Erosion Control*, *Seeding and Mulching, Repair Seeding*, *Supplemental Seeding, Mowing, Fertilizer Topdressing, Silt Excavation,* and *Stone for Erosion Control* will be made at contract unit prices for the affected items. Work required that is not represented by contract line items will be paid in accordance with Articles 104-7 or 104-3 of the *2018 Standard Specifications*. No additional compensation will be made for maintenance and removal of temporary erosion control items.

DELAY IN RIGHT OF ENTRY:
(7-1-95) 108 SP1 G22 A

The Contractor will not be allowed right of entry to the parcels listed below before September 1, 2022 unless otherwise permitted by the Engineer.

Parcel No.	Property Owner
U-2519BA 040	Earnest Barefoot
U-2519BA 121Z	Donna Wienand
U-2519BA 183	Ronyka Stanley (Floyd Properties and Development, Inc.)
U-2519BA 198	Westhaven Homeowners Assoc.
U-2519BA 199	Westhaven Homeowners Assoc.
U-2519BA 200	Floyd Properties and Dev.

MAJOR CONTRACT ITEMS:

(2-19-02) 104 SP1 G28

The following listed items are the major contract items for this contract (see Article 104-5 of the *2018 Standard Specifications*):

Line #	Description
14	Borrow Excavation
74	Aggregate Base Course
77	Asphalt Concrete Base Course, Type B25.0C

SPECIALTY ITEMS:

(7-1-95)(Rev. 7-20-21) 108-6 SP1 G37

Items listed below will be the specialty items for this contract (see Article 108-6 of the *2018 Standard Specifications*).

Line #	Description
124-135	Guardrail
136-139	Fencing
145-170	Signing
186-191, 200-204	Long-Life Pavement Markings
205-206	Permanent Pavement Markers
207-248, 363-364	Utility Construction
249-289	Erosion Control
290-318	Signals/ITS System

FUEL PRICE ADJUSTMENT:

(11-15-05) (Rev. 7-20-21) 109-8 SP1 G43

Revise the *2018 Standard Specifications* as follows:

Page 1-87, Article 109-8, Fuel Price Adjustments, add the following:

The base index price for DIESEL #2 FUEL is **$ 4.3349** per gallon. Where any of the following are included as pay items in the contract, they will be eligible for fuel price adjustment.

The pay items and the fuel factor used in calculating adjustments to be made will be as follows:

Description	Units	Fuel Usage Factor Diesel
Unclassified Excavation	Gal/CY	0.29
Borrow Excavation	Gal/CY	0.29
Class IV Subgrade Stabilization	Gal/Ton	0.55
Aggregate Base Course	Gal/Ton	0.55
Sub-Ballast	Gal/Ton	0.55
Asphalt Concrete Base Course, Type ____	Gal/Ton	0.90 or 2.90
Asphalt Concrete Intermediate Course, Type ____	Gal/Ton	0.90 or 2.90

Asphalt Concrete Surface Course, Type ____	Gal/Ton	0.90 or 2.90
Open-Graded Asphalt Friction Course	Gal/Ton	0.90 or 2.90
Permeable Asphalt Drainage Course, Type ____	Gal/Ton	0.90 or 2.90
Sand Asphalt Surface Course, Type ____	Gal/Ton	0.90 or 2.90
Aggregate for Cement Treated Base Course	Gal/Ton	0.55
Portland Cement for Cement Treated Base Course	Gal/Ton	0.55
__" Portland Cement Concrete Pavement	Gal/SY	0.245
Concrete Shoulders Adjacent to __" Pavement	Gal/SY	0.245

For the asphalt items noted in the chart as eligible for fuel adjustments, the bidder may include the *Fuel Usage Factor Adjustment Form* with their bid submission if they elect to use the fuel usage factor. The *Fuel Usage Factor Adjustment Form* is found at the following link:

https://connect.ncdot.gov/letting/LetCentral/Fuel%20Usage%20Factor%20Adjustment%20Form.pdf

Select either 2.90 Gal/Ton fuel factor or 0.90 Gal/Ton fuel factor for each asphalt line item on the *Fuel Usage Factor Adjustment Form*. The selected fuel factor for each asphalt item will remain in effect for the duration of the contract.

Failure to complete the *Fuel Usage Factor Adjustment Form* will result in using 2.90 gallons per ton as the Fuel Usage Factor for Diesel for the asphalt items noted above. The contractor will not be permitted to change the Fuel Usage Factor after the bids are submitted.

STEEL PRICE ADJUSTMENT:

(4-19-22) SP1 G47

Description and Purpose

Steel price adjustments will be made to the payments due the Contractor for items as defined herein that are permanently incorporated into the work, when the price of raw steel mill products utilized on the contract have fluctuated. The Department will adjust monthly progress payments up or down as appropriate for cost changes in steel according to this provision.

Eligible Items

The list of eligible bid items for steel price adjustment can be found on the Departments website at the following address:

https://connect.ncdot.gov/letting/LetCentral/Eligible%20Bid%20Items%20for%20Steel%20Price%20Adjustment.xlsx

Nuts, bolts, anchor bolts, rebar chairs, connecting bands and other miscellaneous hardware associated with these items shall not be included in the price adjustment.

Adjustments will only be made for fluctuations in the cost of the steel used in the above products as specified in the Product Relationship Table below. The producing mill is defined as the source of steel product before any fabrication has occurred (e.g., coil, plate, rebar, hot rolled

shapes, etc.). No adjustment will be made for changes in the cost of fabrication, coating, shipping, storage, etc.

No steel price adjustments will be made for any products manufactured from steel having an adjustment date, as defined by the Product Relationship Table below, prior to the letting date.

Bid Submittal Requirements

The successful bidder, within 14 calendar days after the notice of award is received by him, shall provide the completed Form SPA-1 to the Department. Form SPA-1 can be found on the Departments website at the following address:

https://connect.ncdot.gov/letting/LetCentral/Form%20SPA-1.xlsm

The Contractor shall provide Form SPA-1 listing the Contract Line Number, (with corresponding Item Number, Item Description, and Category) for the steel products they wish to have an adjustment calculated. Only the contract items corresponding to the list of eligible item numbers for steel price adjustment may be entered on Form SPA-1. The Contractor may choose to have steel price adjustment applied to any, all, or none of the eligible items. However, the Contractor's selection of items for steel price adjustment or non-selection (non-participation) may not be changed once Form SPA-1 has been received by the Department. Items the Bidder chooses for steel price adjustment must be designated by writing the word "Yes" in the column titled "Option" by each Pay Item chosen for adjustment. The Bidder's designations on Form SPA-1 must be written in ink or typed and signed by the Bidder to be considered complete. Items not properly designated, designated with "No", or left blank on the Bidder's Form SPA-1 will automatically be removed from consideration for adjustment. No steel items will be eligible for steel price adjustment on this Project if the Bidder fails to return Form SPA-1 in accordance with this provision.

Establishing the Base Price

The Department will use a blend of monthly average prices as reported from the Fastmarkets platform to calculate the monthly adjustment indices (BI and MI). This data is typically available on the first day of the month for the preceding month. The indices will be calculated by the Department for the different categories found on the Product Relationship Table below. For item numbers that include multiple types of steel products, the category listed for that item number will be used for adjusting each steel component.

The bidding index for Category 1 Steel items is $50.50 per hundredweight.
The bidding index for Category 2 Steel items is $86.16 per hundredweight.
The bidding index for Category 3 Steel items is $68.60 per hundredweight.
The bidding index for Category 4 Steel items is $55.78 per hundredweight.
The bidding index for Category 5 Steel items is $62.81 per hundredweight.
The bidding index for Category 6 Steel items is $90.16 per hundredweight.
The bidding index for Category 7 Steel items is $56.30 per hundredweight.
The bidding index represents a selling price of steel based on Fastmarkets data for the month of February 2022.

MI = Monthly Index. – in Dollars ($) per hundredweight (CWT). Use the adjustment indices from the month the steel was shipped from the producing mill, received on the project, or member cast as defined in the Product Relationship Table.

BI = Bidding Index. - in Dollars ($) per hundredweight (CWT). Use the adjustment indices as listed in the proposal.

Steel Product (Title)	BI, MI*	Adjustment Date for MI	Category
Reinforcing Steel, Bridge Deck, and SIP Forms	Based on one or more Fastmarkets indices	Delivery Date from Producing Mill	1
Structural Steel and Encasement Pipe	Based on one or more Fastmarkets indices	Delivery Date from Producing Mill	2
Steel H-Piles, Soldier Pile Walls	Based on one or more Fastmarkets indices	Delivery Date from Producing Mill	3
Guardrail and Pipe Piles Items	Based on one or more Fastmarkets indices	Material Received Date**	4
Fence Items	Based on one or more Fastmarkets indices	Material Received Date**	5
Overhead Sign Assembly, Signal Poles, High Mount Standards	Based on one or more Fastmarkets indices	Material Received Date**	6
Prestressed Concrete Members	Based on one or more Fastmarkets indices	Cast Date of Member	7

Submit documentation to the Engineer for all items listed in the Contract for which the Contractor is requesting a steel price adjustment.

Submittal Requirements

The items in categories 1,2, and 3, shall be specifically stored, labeled, or tagged, recognizable by color marking, and identifiable by Project for inspection and audit verification immediately upon arrival at the fabricator.

Furnish the following documentation for all steel products to be incorporated into the work and documented on Form SPA-2, found on the Departments website at the following address:

https://connect.ncdot.gov/projects/construction/Construction%20Forms/Form%20SPA-2.xlsx

Submit all documentation to the Engineer prior to incorporation of the steel into the completed work. The Department will withhold progress payments for the affected contract line item if the documentation is not provided and at the discretion of the Engineer the work is allowed to proceed. Progress payments will be made upon receipt of the delinquent documentation.

Step 1 (Form SPA -2)

Utilizing Form SPA-2, submit separate documentation packages for each line item from Form SPA-1 for which the Contractor opted for a steel price adjustment. For line items with multiple

components of steel, each component should be listed separately. Label each SPA-2 documentation package with a unique number as described below.

a. Documentation package number: (Insert the contract line-item) - (Insert sequential package number beginning with "1").
   Example: 412 - 1,
   412 - 2,
   424 – 1,
   424 – 2,
   424 – 3, etc.
b. The steel product quantity in pounds
   i. The following sources should be used, in declining order of precedence, to determine the weight of steel/iron, based on the Engineers decision:
      1. Department established weights of steel/iron by contract pay item per pay unit;
      2. Approved Shop Drawings;
      3. Verified Shipping Documents;
      4. Contract Plans;
      5. Standard Drawing Sheets;
      6. Industry Standards (i.e., AISC Manual of Steel Construction, AWWA Standards, etc.); and
      7. Manufacture's data.
   ii. Any item requiring approved shop drawings shall have the weights of steel calculated and shown on the shop drawings or submitted and certified separately by the fabricator.
c. The date the steel product, subject to adjustment, was shipped from the producing mill (Categories 1-3), received on the project (Categories 4-6), or casting date (Category 7).

Step 2 (Monthly Calculator Spreadsheet)

For each month, upon the incorporation of the steel product into the work, provide the Engineer the following:

1) Completed NCDOT Steel Price Adjustment Calculator Spreadsheet, summarizing all the steel submittal packages (Form SPA-2) actually incorporated into the completed work in the given month.
   a. Contract Number
   b. Bidding Index Reference Month
   c. Contract Completion Date or Revised Completion Date
   d. County, Route, and Project TIP information
   e. Item Number
   f. Line-Item Description
   g. Submittal Number from Form SPA-2
   h. Adjustment date
   i. Pounds of Steel
2) An affidavit signed by the Contractor stating the documentation provided in the NCDOT Steel Price Adjustment Calculator Spreadsheet is true and accurate.

Price Adjustment Conditions

Download the Monthly Steel Adjustment Spreadsheet with the most current reference data from the Department's website each month at the following address:

https://connect.ncdot.gov/projects/construction/Construction%20Forms/Form%20SPA-3%20NCDOT%20Steel%20Price%20Adjustment%20Calculator.xlsx

If the monthly Fastmarkets data is not available, the data for the most recent immediately preceding month will be used as the basis for adjustment.

Price Adjustment Calculations

The price adjustment will be determined by comparing the percentage of change in index value listed in the proposal (BI) to the monthly index value (MI). (See included sample examples). Weights and date of shipment must be documented as required herein. The final price adjustment dollar value will be determined by multiplying this percentage increase or decrease in the index by the represented quantity of steel incorporated into the work, and the established bidding index (BI) subject to the limitations herein.

Price increase/decrease will be computed as follows:

SPA = ((MI/ BI) -1) * BI *(Q/100)

Where;

SPA = Steel price adjustment in dollars

MI = Monthly Shipping Index. – in Dollars ($) per hundredweight (CWT). Use the adjustment indices from the month the steel was shipped from the producing mill, received on the project, or member cast as defined in the Product Relationship Table.

BI = Bidding Index. - in Dollars ($) per hundredweight (CWT). Use the adjustment indices as listed in the proposal.

Q = Quantity of steel, product, pounds actually incorporated into the work as documented by the Contractor, or Design Build Team and verified by the Engineer.

Calculations for price adjustment shall be shown separate from the monthly progress estimate and will not be included in the total cost of work for determination of progress or for extension of Contract time in accordance with Subarticle 108-10(B)(1).

Any apparent attempt to unbalance bids in favor of items subject to price adjustment may result in rejection of the bid proposal.

Adjustments will be paid or charged to the Contractor only. Any Contractor receiving an adjustment under this provision shall distribute the proper proportional part of such adjustments to the subcontractor who performed the applicable work.

Delays to the work caused by steel shortages may be justification for a Contract time extension but will not constitute grounds for claims for standby equipment, extended office overhead, or other costs associated with such delays.

If an increase in the steel material price is anticipated to exceed 50% of the original quoted price, the contractor must notify the Department within 7 days prior to purchasing the material. Upon receipt of such notification, the Department will direct the Contractor to either (1) proceed with the work or (2) suspend the work and explore the use of alternate options.

If the decrease in the steel material exceeds 50% of the original quoted price, the contractor may submit to the Department additional market index information specific to the item in question to dispute the decrease. The Department will review this information and determine if the decrease is warranted.

When the steel product adjustment date, as defined in the Product Relationship Table, is after the approved contract completion date, the steel price adjustments will be based on the lesser value of either the MI for the month of the approved contract completion date or the MI for the actual adjustment date.

If the price adjustment is based on estimated material quantities for that time, and a revision to the total material quantity is made in a subsequent or final estimate, an appropriate adjustment will be made to the price adjustment previously calculated. The adjustment will be based on the same indices used to calculate the price adjustment which is being revised. If the adjustment date of the revised material quantity cannot be determined, the adjustment for the quantity in question, will be based on the indices utilized to calculate the steel price adjustment for the last initial documentation package submission, for the steel product subject to adjustment, that was incorporated into the particular item of work, for which quantities are being finalized.
Example: Structural steel for a particular bridge was provided for in three different shipments with each having a different mill shipping date. The quantity of structural steel actually used for the bridge was calculated and a steel price adjustment was made in a progress payment. At the conclusion of the work an error was found in the plans of the final quantity of structural steel used for the bridge. The quantity to be adjusted cannot be directly related to any one of the three mill shipping dates. The steel price adjustment for the quantity in question would be calculated using the indices that were utilized to calculate the steel price adjustment for the quantity of structural steel represented by the last initial structural steel documentation package submission. The package used will be the one with the greatest sequential number.

Extra Work/Force Account:

When steel products, as specified herein, are added to the contract as extra work, in accordance with the provisions of Article 104-7 or 104-3, the Engineer will determine and specify in the supplemental agreement, the need for application of steel price adjustments on a case-by-case basis. No steel price adjustments will be made for any products manufactured from steel having an adjustment date prior to the supplemental agreement execution date. Price adjustments will be made as provided herein, except the Bidding Index will be based on the month in which the supplemental agreement pricing was executed.

For work performed on force account basis, reimbursement of actual material costs, along with the specified overhead and profit markup, will be considered to include full compensation for the current cost of steel and no steel price adjustments will be made.

Examples **Form SPA-2**

Steel Price Adjustment Submission Form

Contract Number __C203394_____ Bid Reference Month __January 2019__

Submittal Date ___8/31/2019_____

Contract Line Item _____237_____

Line Item Description __APPROX….LBS Structural Steel_____

Sequential Submittal Number _____2_____

Supplier	Description of material	Location information	Quantity in lbs.	Adjustment Date
XYZ mill	Structural Steel	Structure 3, Spans A-C	1,200,000	May 4, 2020
ABC distributing	Various channel & angle shapes	Structure 3 Spans A-C	35,000	July 14, 2020
		Total Pounds of Steel	1,235,000	

Note: Attach the following supporting documentation to this form.

- Bill of Lading to support the shipping dates
- Supporting information for weight documentation (e.g., Pay item reference, Shop drawings, shipping documents, Standards Sheets, industry standards, or manufacturer's data)

By providing this data under my signature, I attest to the accuracy of and validity of the data on this form and certify that no deliberate misrepresentation in any manner has occurred.

Printed Name Signature

_____ _____

Examples **Form SPA-2**

Steel Price Adjustment Submission Form

Contract Number C203394 Bid Reference Month January 2019

Submittal Date August 31, 2019

Contract Line Item 237

Line Item Description SUPPORT, OVRHD SIGN STR -DFEB – STA 36+00

Sequential Submittal Number 2

Supplier	Description of material	Location information	Quantity in lbs.	Adjustment Date
XYZ mill	Tubular Steel (Vertical legs)	-DFEB – STA 36+00	12000	December 11, 2021
PDQ Mill	4" Tubular steel (Horizontal legs)	-DFEB – STA 36+00	5900	December 11, 2021
ABC distributing	Various channel & angle shapes (see quote)	-DFEB – STA 36+00	1300	December 11, 2021
	Catwalk assembly	-DFEB – STA 36+00	2000	December 11, 2021
Nucor	Flat plate	-DFEB – STA 36+00	650	December 11, 2021
		Total Pounds of Steel	21,850	

Note: Attach the following supporting documentation to this form.

- Bill of Lading to support the shipping dates
- Supporting information for weight documentation (e.g., Pay item reference, Shop drawings, shipping documents, Standards Sheets, industry standards, or manufacturer's data)

By providing this data under my signature, I attest to the accuracy of and validity of the data on this form and certify that no deliberate misrepresentation in any manner has occurred.

Printed Name _____ Signature _____

Price Adjustment Sample Calculation (increase)

Project bid on September 17, 2019

Line Item 635 “Structural Steel” has a plan quantity of 2,717,000 lbs.

Bidding Index for Structural Steel (Category 2) in the proposal was $36.12/CWT = BI

450,000 lbs. of Structural Steel for Structure 2 at Station 44+08.60 were shipped to fabricator from the producing mill in same month, May 2021.

Monthly Index for Structural Steel (Category 2) for May 2021 was $64.89/CWT = MI

The Steel Price Adjustment formula is as follows:

SPA = ((MI/ BI) -1) * BI *(Q/100)

Where; SPA = Steel price adjustment in dollars

BI = Bidding Index – in dollars ($) per hundredweight (CWT). Use the adjustment indices as listed in the proposal.

MI = Mill Shipping Index – in dollars ($) per hundredweight (CWT). Use the adjustment indices from the month the steel was shipped from the producing mill, received on the project, or member cast as defined in the Product Relationship Table.

Q = Quantity of steel product, in pounds (lbs.) actually incorporated into the work as documented by the Contractor, or Design Build Team and verified by the Engineer.

BI = $36.12/ CWT

MI = $64.89 / CWT

% change = ((MI/ BI)-1) = ($64.89 / $36.12 – 1) = (1.79651 – 1) = 0.79651162791

Q = 450,000 lbs.

SPA = 0.79651162791x $36.12 x (450,000/100)

SPA = 0.79651162791* $36.12 *4,500

SPA = $129,465 pay adjustment to Contractor for Structural Steel (Structure 2 at Station 44+08.60)

Price Adjustment Sample Calculation (decrease)

Project bid on December 18, 2018

Line Item 635 Structural Steel has a plan quantity of 2,717,000 lbs.

Bidding Index for Structural Steel (Category 2) in the proposal was $46.72/CWT = BI

600,000 lbs. of Structural Steel for Structure 1 at Station 22+57.68 were shipped to fabricator from the producing mill in same month, August 2020.

Monthly Index for Structural Steel (Category 2) for August 2020 was $27.03/CWT = MI

The Steel Price Adjustment formula is as follows:

SPA = ((MI/ BI) -1) * BI *(Q/100)

Where; SPA = Steel price adjustment in dollars

BI = Bidding Index – in dollars ($) per hundredweight (CWT). Use the adjustment indices as listed in the proposal.

MI = Mill Shipping Index – in dollars ($) per hundredweight (CWT). Use the adjustment indices from the month the steel was shipped from the producing mill, received on the project, or member cast as defined in the Product Relationship Table.

Q = Quantity of steel product, in pounds (lbs.) actually incorporated into the work as documented by the Contractor, or Design Build Team and verified by the Engineer.

BI = $46.72/ CWT

MI = $27.03 / CWT

% change = ((MI/ BI)-1) = ($27.03/ $46.72–1) = (0.57855–1) = -0.421446917808

Q = 600,000 lbs.

SPA = -0.421446917808 * $46.72 * (600,000/100)

SPA = -0.421446917808 * $46.72 *6,000

SPA = $ 118,140.00 Credit to the Department for Structural Steel (Structure 1 at Station 22+57.68)

Price Adjustment Sample Calculation (increase)

Project bid on July 16, 2020

Line Item 614 Reinforced Concrete Deck Slab has a plan quantity of 241974 lbs.

Bidding Index Reference Month was May 2020. Bidding Index for Reinforced Concrete Deck Slab (Category 1) in the proposal was $29.21/CWT = BI

51,621 lbs. of reinforcing steel and 52,311 lbs. of epoxy coated reinforcing steel for Structure 2 at Station 107+45.55 -L- was shipped to fabricator from the producing mill in same month, May 2021.

Monthly Index for Reinforced Concrete Deck Slab (Category 1) for May 2021 was $43.13/CWT = MI

The Steel Price Adjustment formula is as follows:

SPA = ((MI/ BI) -1) * BI *(Q/100)

Where; SPA = Steel price adjustment in dollars

BI = Bidding Index – in dollars ($) per hundredweight (CWT). Use the adjustment indices as listed in the proposal.

MI = Mill Shipping Index – in dollars ($) per hundredweight (CWT). Use the adjustment indices from the month the steel was shipped from the producing mill, received on the project, or member cast as defined in the Product Relationship Table.

Q = Quantity of steel product, in pounds (lbs.) actually incorporated into the work as documented by the Contractor, or Design Build Team and verified by the Engineer.

BI = $29.21/ CWT

MI = $43.13 / CWT

% change = ((MI/ BI)-1) = ($43.13 / $29.21 – 1) = (1.47655 – 1) = 0.47654912701

Q = 103932 lbs.

SPA = 0. 47654912701 * $29.21 * (103,932/100)

SPA = 0. 47654912701 * $29.21 *1,039.32

SPA = $14,467.33 Pay Adjustment to Contractor for Reinforced Concrete Deck Slab (Category 1) at Station 107+45.55 -L-

PAYOUT SCHEDULE:

(1-19-10) (Rev. 1-17-12) 108 SP1 G57

Submit an Anticipated Monthly Payout Schedule prior to beginning construction. The Anticipated Monthly Payout Schedule will be used by the Department to monitor funding levels for this project. Include a monthly percentage breakdown (in terms of the total contract amount) of the work anticipated to be completed. The schedule should begin with the date the Contractor plans to begin construction and end with the anticipated completion date. Submit updates of the Anticipated Monthly Payout Schedule on March 15, June 15, September 15, and December 15 of each calendar year until project acceptance. Submit the original Anticipated Monthly Payout Schedule and all subsequent updates to the Resident Engineer with a copy to the State Construction Engineer at 1 South Wilmington Street, 1543 Mail Service Center, Raleigh, NC 27699-1543.

SCHEDULE OF ESTIMATED COMPLETION PROGRESS:

(7-15-08) (Rev. 5-13-19) 108-2 SP1 G58

The Contractor's attention is directed to the Standard Special Provision entitled *Availability of Funds Termination of Contracts* included elsewhere in this proposal. The Department of Transportation's schedule of estimated completion progress for this project as required by that Standard Special Provision is as follows:

	Fiscal Year	**Progress (% of Dollar Value)**
2023	(7/01/22 - 6/30/23)	**34**% of Total Amount Bid
2024	(7/01/23 - 6/30/24)	**32**% of Total Amount Bid
2025	(7/01/24 - 6/30/25)	**20**% of Total Amount Bid
2026	(7/01/25 - 6/30/26)	**13**% of Total Amount Bid
2027	(7/01/26 - 6/30/27)	**1%** of Total Amount Bid

The Contractor shall also furnish his own progress schedule in accordance with Article 108-2 of the *2018 Standard Specifications*. Any acceleration of the progress as shown by the Contractor's progress schedule over the progress as shown above shall be subject to the approval of the Engineer.

DISADVANTAGED BUSINESS ENTERPRISE:

(10-16-07)(Rev. 8-17-21) 102-15(J) SP1 G61

Description

The purpose of this Special Provision is to carry out the U.S. Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts financed in whole or in part with Federal funds. This provision is guided by 49 CFR Part 26.

Definitions

Additional DBE Subcontractors - Any DBE submitted at the time of bid that will not be used to meet the DBE goal. No submittal of a Letter of Intent is required.

Committed DBE Subcontractor - Any DBE submitted at the time of bid that is being used to meet the DBE goal by submission of a Letter of Intent. Or any DBE used as a replacement for a previously committed DBE firm.

Contract Goal Requirement - The approved DBE participation at time of award, but not greater than the advertised contract goal.

DBE Goal - A portion of the total contract, expressed as a percentage, that is to be performed by committed DBE subcontractor(s).

Disadvantaged Business Enterprise (DBE) - A firm certified as a Disadvantaged Business Enterprise through the North Carolina Unified Certification Program.

Goal Confirmation Letter - Written documentation from the Department to the bidder confirming the Contractor's approved, committed DBE participation along with a listing of the committed DBE firms.

Manufacturer - A firm that operates or maintains a factory or establishment that produces on the premises, the materials or supplies obtained by the Contractor.

Regular Dealer - A firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials or supplies required for the performance of the contract are bought, kept in stock, and regularly sold to the public in the usual course of business. A regular dealer engages in, as its principal business and in its own name, the purchase and sale or lease of the products in question. A regular dealer in such bulk items as steel, cement, gravel, stone, and petroleum products need not keep such products in stock, if it owns and operates distribution equipment for the products. Brokers and packagers are not regarded as manufacturers or regular dealers within the meaning of this section.

Replacement / Substitution – A full or partial reduction in the amount of work subcontracted to a committed (or an approved substitute) DBE firm.

North Carolina Unified Certification Program (NCUCP) - A program that provides comprehensive services and information to applicants for DBE certification, such that an applicant is required to apply only once for a DBE certification that will be honored by all recipients of USDOT funds in the state and not limited to the Department of Transportation only. The Certification Program is in accordance with 49 CFR Part 26.

United States Department of Transportation (USDOT) - Federal agency responsible for issuing regulations (49 CFR Part 26) and official guidance for the DBE program.

Forms and Websites Referenced in this Provision

DBE Payment Tracking System - On-line system in which the Contractor enters the payments made to DBE subcontractors who have performed work on the project. https://apps.dot.state.nc.us/Vendor/PaymentTracking/

DBE-IS *Subcontractor Payment Information* - Form for reporting the payments made to all DBE firms working on the project. This form is for paper bid projects only. https://connect.ncdot.gov/business/Turnpike/Documents/Form%20DBE-IS%20Subcontractor%20Payment%20Information.pdf

RF-1 *DBE Replacement Request Form* - Form for replacing a committed DBE. http://connect.ncdot.gov/projects/construction/Construction%20Forms/DBE%20MBE%20WBE%20Replacement%20Request%20Form.pdf

SAF *Subcontract Approval Form* - Form required for approval to sublet the contract. http://connect.ncdot.gov/projects/construction/Construction%20Forms/Subcontract%20Approval%20Form%20Rev.%202012.zip

JC-1 *Joint Check Notification Form* - Form and procedures for joint check notification. The form acts as a written joint check agreement among the parties providing full and prompt disclosure of the expected use of joint checks. http://connect.ncdot.gov/projects/construction/Construction%20Forms/Joint%20Check%20Notification%20Form.pdf

Letter of Intent - Form signed by the Contractor and the DBE subcontractor, manufacturer or regular dealer that affirms that a portion of said contract is going to be performed by the signed DBE for the estimated amount (based on quantities and unit prices) listed at the time of bid. http://connect.ncdot.gov/letting/LetCentral/Letter%20of%20Intent%20to%20Perform%20as%20a%20Subcontractor.pdf

Listing of DBE Subcontractors Form - Form for entering DBE subcontractors on a project that will meet this DBE goal. This form is for paper bids only. http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/08%20DBE%20Subcontractors%20(Federal).docx

Subcontractor Quote Comparison Sheet - Spreadsheet for showing all subcontractor quotes in the work areas where DBEs quoted on the project. This sheet is submitted with good faith effort packages. http://connect.ncdot.gov/business/SmallBusiness/Documents/DBE%20Subcontractor%20Quote%20Comparison%20Example.xls

DBE Goal

The following DBE goal for participation by Disadvantaged Business Enterprises is established for this contract:

Disadvantaged Business Enterprises **5.0** %

(A) *If the DBE goal is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that DBEs participate in at least the percent of the contract as set forth above as the DBE goal.

(B) *If the DBE goal is zero*, the Contractor shall make an effort to recruit and use DBEs during the performance of the contract. Any DBE participation obtained shall be reported to the Department.

Directory of Transportation Firms (Directory)

Real-time information is available about firms doing business with the Department and firms that are certified through NCUCP in the Directory of Transportation Firms. Only firms identified in the Directory as DBE certified shall be used to meet the DBE goal. The Directory can be found at the following link. https:// www.ebs.nc.gov/VendorDirectory/default.html

The listing of an individual firm in the directory shall not be construed as an endorsement of the firm's capability to perform certain work.

Listing of DBE Subcontractors

At the time of bid, bidders shall submit all DBE participation that they anticipate to use during the life of the contract. Only those identified to meet the DBE goal will be considered committed, even though the listing shall include both committed DBE subcontractors and additional DBE subcontractors. Additional DBE subcontractor participation submitted at the time of bid will be used toward the Department's overall race-neutral goal. Only those firms with current DBE certification at the time of bid opening will be acceptable for listing in the bidder's submittal of DBE participation. The Contractor shall indicate the following required information:

(A) Electronic Bids

Bidders shall submit a listing of DBE participation in the appropriate section of the electronic submittal file.

(1) Submit the names and addresses of DBE firms identified to participate in the contract. If the bidder uses the updated listing of DBE firms shown in the electronic submittal file, the bidder may use the dropdown menu to access the name and address of the DBE firm.

(2) Submit the contract line numbers of work to be performed by each DBE firm. When no figures or firms are entered, the bidder will be considered to have no DBE participation.

(3) The bidder shall be responsible for ensuring that the DBE is certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that DBE's participation will not count towards achieving the DBE goal.

(B) Paper Bids

(1) *If the DBE goal is more than zero,*

(a) Bidders, at the time the bid proposal is submitted, shall submit a listing of *DBE* participation, including the names and addresses on *Listing of DBE Subcontractors* contained elsewhere in the contract documents in order for the bid to be considered responsive. Bidders shall indicate the total dollar value of the DBE participation for the contract.

(b) If bidders have no DBE participation, they shall indicate this on the *Listing of DBE Subcontractors* by entering the word "None" or the number "0." This form shall be completed in its entirety. **Blank forms will not be deemed to represent zero participation**. Bids submitted that do not have DBE participation indicated on the appropriate form will not be read publicly during the opening of bids. The Department will not consider these bids for award and the proposal will be rejected.

(c) The bidder shall be responsible for ensuring that the DBE is certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that DBE's participation will not count towards achieving the corresponding goal.

(2) *If the DBE goal is zero,* entries on the *Listing of DBE Subcontractors* are not required for the zero goal, however any DBE participation that is achieved during the project shall be reported in accordance with requirements contained elsewhere in the special provision.

DBE Prime Contractor

When a certified DBE firm bids on a contract that contains a DBE goal, the DBE firm is responsible for meeting the goal or making good faith efforts to meet the goal, just like any other bidder. In most cases, a DBE bidder on a contract will meet the DBE goal by virtue of the work it performs on the contract with its own forces. However, all the work that is performed by the DBE bidder and any other DBE subcontractors will count toward the DBE goal. The DBE bidder shall list itself along with any DBE subcontractors, if any, in order to receive credit toward the DBE goal.

For example, if the DBE goal is 45% and the DBE bidder will only perform 40% of the contract work, the prime will list itself at 40%, and the additional 5% shall be obtained through additional DBE participation with DBE subcontractors or documented through a good faith effort.

DBE prime contractors shall also follow Sections A and B listed under *Listing of DBE Subcontractor* just as a non-DBE bidder would.

Written Documentation – Letter of Intent

The bidder shall submit written documentation for each DBE that will be used to meet the DBE goal of the contract, indicating the bidder's commitment to use the DBE in the contract. This documentation shall be submitted on the Department's form titled *Letter of Intent*.

The documentation shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. of the sixth calendar day following opening of bids, unless the sixth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

If the bidder fails to submit the Letter of Intent from each committed DBE to be used toward the DBE goal, or if the form is incomplete (i.e. both signatures are not present), the DBE participation will not count toward meeting the DBE goal. If the lack of this participation drops the commitment below the DBE goal, the Contractor shall submit evidence of good faith efforts, completed in its entirety, to the State Contractor Utilization Engineer or DBE@ncdot.gov no later than 10:00 a.m. on the eighth calendar day following opening of bids, unless the eighth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

Submission of Good Faith Effort

If the bidder fails to meet or exceed the DBE goal, the apparent lowest responsive bidder shall submit to the Department documentation of adequate good faith efforts made to reach the DBE goal.

A hard copy and an electronic copy of this information shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. on the sixth calendar day following opening of bids unless the sixth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day. If the contractor cannot send the information electronically, then one complete set and 5 copies of this information shall be received under the same time constraints above.

Note: Where the information submitted includes repetitious solicitation letters, it will be acceptable to submit a representative letter along with a distribution list of the firms that were solicited. Documentation of DBE quotations shall be a part of the good faith effort submittal. This documentation may include written subcontractor quotations, telephone log notations of verbal quotations, or other types of quotation documentation.

Consideration of Good Faith Effort for Projects with DBE Goals More Than Zero

Adequate good faith efforts mean that the bidder took all necessary and reasonable steps to achieve the goal which, by their scope, intensity, and appropriateness, could reasonably be expected to obtain sufficient DBE participation. Adequate good faith efforts also mean that the bidder actively and aggressively sought DBE participation. Mere *pro forma* efforts are not considered good faith efforts.

The Department will consider the quality, quantity, and intensity of the different kinds of efforts a bidder has made. Listed below are examples of the types of actions a bidder will take in making a good faith effort to meet the goal and are not intended to be exclusive or exhaustive, nor is it intended to be a mandatory checklist.

(A) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising, written notices, use of verifiable electronic means through the use of the NCDOT Directory of Transportation Firms) the interest of all certified DBEs who have the capability to perform the work of the contract. The bidder must solicit this interest within at least 10 days prior to bid opening to allow the DBEs to respond to the solicitation. Solicitation shall provide the opportunity to DBEs within the Division and surrounding Divisions where the project is located. The bidder must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.

(B) Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved.

(1) Where appropriate, break out contract work items into economically feasible units to facilitate DBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.

(2) Negotiate with subcontractors to assume part of the responsibility to meet the contract DBE goal when the work to be sublet includes potential for DBE participation (2nd and 3rd tier subcontractors).

(C) Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

(D) (1) Negotiating in good faith with interested DBEs. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBEs to perform the work.

(2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidding

contractors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.

(E) Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associates and political or social affiliations (for example, union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.

(F) Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or bidder.

(G) Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.

(H) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; Federal, State, and local minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs. Contact within 7 days from the bid opening the Business Opportunity and Work Force Development Unit at BOWD@ncdot.gov to give notification of the bidder's inability to get DBE quotes.

(I) Any other evidence that the bidder submits which shows that the bidder has made reasonable good faith efforts to meet the DBE goal.

In addition, the Department may take into account the following:

(1) Whether the bidder's documentation reflects a clear and realistic plan for achieving the DBE goal.

(2) The bidders' past performance in meeting the DBE goals.

(3) The performance of other bidders in meeting the DBE goal. For example, when the apparent successful bidder fails to meet the DBE goal, but others meet it, you may reasonably raise the question of whether, with additional reasonable efforts the apparent successful bidder could have met the goal. If the apparent successful bidder fails to meet the DBE goal, but meets or exceeds the average DBE participation obtained by other bidders, the Department may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made a good faith effort.

If the Department does not award the contract to the apparent lowest responsive bidder, the Department reserves the right to award the contract to the next lowest responsive bidder that can satisfy to the Department that the DBE goal can be met or that an adequate good faith effort has been made to meet the DBE goal.

Non-Good Faith Appeal

The State Prequalification Engineer will notify the contractor verbally and in writing of non-good faith. A contractor may appeal a determination of non-good faith made by the Goal Compliance Committee. If a contractor wishes to appeal the determination made by the Committee, they shall provide written notification to the State Prequalification Engineer or at DBE@ncdot.gov. The appeal shall be made within 2 business days of notification of the determination of non-good faith.

Counting DBE Participation Toward Meeting DBE Goal

(A) Participation

The total dollar value of the participation by a committed DBE will be counted toward the contract goal requirement. The total dollar value of participation by a committed DBE will be based upon the value of work actually performed by the DBE and the actual payments to DBE firms by the Contractor.

(B) Joint Checks

Prior notification of joint check use shall be required when counting DBE participation for services or purchases that involves the use of a joint check. Notification shall be through submission of Form JC-1 *(Joint Check Notification Form)* and the use of joint checks shall be in accordance with the Department's Joint Check Procedures.

(C) Subcontracts (Non-Trucking)

A DBE may enter into subcontracts. Work that a DBE subcontracts to another DBE firm may be counted toward the contract goal requirement. Work that a DBE subcontracts to a non-DBE firm does <u>not</u> count toward the contract goal requirement. If a DBE contractor or subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of standard industry practices, it shall be presumed that the DBE is not performing a commercially useful function. The DBE may present evidence to rebut this presumption to the Department. The Department's decision on the rebuttal of this presumption is subject to review by the Federal Highway Administration but is not administratively appealable to USDOT.

(D) Joint Venture

When a DBE performs as a participant in a joint venture, the Contractor may count toward its contract goal requirement a portion of the total value of participation with the DBE in the joint venture, that portion of the total dollar value being a distinct clearly defined portion of work that the DBE performs with its forces.

(E) Suppliers

A contractor may count toward its DBE requirement 60 percent of its expenditures for materials and supplies required to complete the contract and obtained from a DBE regular dealer and 100 percent of such expenditures from a DBE manufacturer.

(F) Manufacturers and Regular Dealers

A contractor may count toward its DBE requirement the following expenditures to DBE firms that are not manufacturers or regular dealers:

(1) The fees or commissions charged by a DBE firm for providing a *bona fide* service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a DOT-assisted contract, provided the fees or commissions are determined to be reasonable and not excessive as compared with fees and commissions customarily allowed for similar services.

(2) With respect to materials or supplies purchased from a DBE, which is neither a manufacturer nor a regular dealer, count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site (but not the cost of the materials and supplies themselves), provided the fees are determined to be reasonable and not excessive as compared with fees customarily allowed for similar services.

Commercially Useful Function

(A) DBE Utilization

The Contractor may count toward its contract goal requirement only expenditures to DBEs that perform a commercially useful function in the work of a contract. A DBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the DBE shall also be responsible with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material and installing (where applicable) and paying for the material itself. To determine whether a DBE is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing and the DBE credit claimed for its performance of the work, and any other relevant factors.

(B) DBE Utilization in Trucking

The following factors will be used to determine if a DBE trucking firm is performing a commercially useful function:

(1) The DBE shall be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there shall not be a contrived arrangement for the purpose of meeting DBE goals.

(2) The DBE shall itself own and operate at least one fully licensed, insured, and operational truck used on the contract.

(3) The DBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.

(4) The DBE may subcontract the work to another DBE firm, including an owner-operator who is certified as a DBE. The DBE who subcontracts work to another DBE receives credit for the total value of the transportation services the subcontracted DBE provides on the contract.

(5) The DBE may also subcontract the work to a non-DBE firm, including from an owner-operator. The DBE who subcontracts the work to a non-DBE is entitled to credit for the total value of transportation services provided by the non-DBE subcontractor not to exceed the value of transportation services provided by DBE-owned trucks on the contract. Additional participation by non-DBE subcontractors receives credit only for the fee or commission it receives as a result of the subcontract arrangement. The value of services performed under subcontract agreements between the DBE and the Contractor will not count towards the DBE contract requirement.

(6) A DBE may lease truck(s) from an established equipment leasing business open to the general public. The lease must indicate that the DBE has exclusive use of and control over the truck. This requirement does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. This type of lease may count toward the DBE's credit as long as the driver is under the DBE's payroll.

(7) Subcontracted/leased trucks shall display clearly on the dashboard the name of the DBE that they are subcontracted/leased to and their own company name if it is not identified on the truck itself. Magnetic door signs are not permitted.

DBE Replacement

When a Contractor has relied on a commitment to a DBE subcontractor (or an approved substitute DBE subcontractor) to meet all or part of a contract goal requirement, the contractor shall not terminate the DBE subcontractor for convenience. This includes, but is not limited to, instances in which the Contractor seeks to perform the work of the terminated subcontractor with another DBE subcontractor, a non-DBE subcontractor, or with the Contractor's own forces or those of an affiliate.

The Contractor must give notice in writing both by certified mail and email to the DBE subcontractor, with a copy to the Engineer of its intent to request to terminate and/or substitute, and the reason for the request. The Contractor must give the DBE subcontractor five (5) business days to respond to the Contractor's Notice of Intent to Request Termination and/or Substitution. If the DBE subcontractor objects to the intended termination/substitution, the DBE, within five (5) business days must advise the Contractor and the Department of the reasons why the action should

not be approved. The five-day notice period shall begin on the next business day after written notice is provided to the DBE subcontractor.

A committed DBE subcontractor may only be terminated after receiving the Department's written approval based upon a finding of good cause for the proposed termination and/or substitution. For purposes of this section, good cause shall include the following circumstances:

(a) The listed DBE subcontractor fails or refuses to execute a written contract;
(b) The listed DBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the DBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the prime contractor;
(c) The listed DBE subcontractor fails or refuses to meet the prime contractor's reasonable, nondiscriminatory bond requirements;
(d) The listed DBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
(e) The listed DBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant to 2 CFR Parts 180, 215 and 1,200 or applicable state law;
(f) The listed DBE subcontractor is not a responsible contractor;
(g) The listed DBE voluntarily withdraws from the project and provides written notice of withdrawal;
(h) The listed DBE is ineligible to receive DBE credit for the type of work required;
(i) A DBE owner dies or becomes disabled with the result that the listed DBE contractor is unable to complete its work on the contract;
(j) Other documented good cause that compels the termination of the DBE subcontractor. Provided, that good cause does not exist if the prime contractor seeks to terminate a DBE it relied upon to obtain the contract so that the prime contractor can self-perform the work for which the DBE contractor was engaged or so that the prime contractor can substitute another DBE or non-DBE contractor after contract award.

The Contractor shall comply with the following for replacement of a committed DBE:

(A) Performance Related Replacement

When a committed DBE is terminated for good cause as stated above, an additional DBE that was submitted at the time of bid may be used to fulfill the DBE commitment. A good faith effort will only be required for removing a committed DBE if there were no additional DBEs submitted at the time of bid to cover the same amount of work as the DBE that was terminated.

If a replacement DBE is not found that can perform at least the same amount of work as the terminated DBE, the Contractor shall submit a good faith effort documenting the steps taken. Such documentation shall include, but not be limited to, the following:

(1) Copies of written notification to DBEs that their interest is solicited in contracting the work defaulted by the previous DBE or in subcontracting other items of work in the contract.

(2) Efforts to negotiate with DBEs for specific subbids including, at a minimum:

(a) The names, addresses, and telephone numbers of DBEs who were contacted.

(b) A description of the information provided to DBEs regarding the plans and specifications for portions of the work to be performed.

(3) A list of reasons why DBE quotes were not accepted.

(4) Efforts made to assist the DBEs contacted, if needed, in obtaining bonding or insurance required by the Contractor.

(B) Decertification Replacement

(1) When a committed DBE is decertified by the Department after the SAF (*Subcontract Approval Form*) has been received by the Department, the Department will not require the Contractor to solicit replacement DBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal requirement.

(2) When a committed DBE is decertified prior to the Department receiving the SAF (*Subcontract Approval Form*) for the named DBE firm, the Contractor shall take all necessary and reasonable steps to replace the DBE subcontractor with another DBE subcontractor to perform at least the same amount of work to meet the DBE goal requirement. If a DBE firm is not found to do the same amount of work, a good faith effort must be submitted to NCDOT (see A herein for required documentation).

(3) Exception: If the DBE's ineligibility is caused solely by its having exceeded the size standard during the performance of the contract, the Department will not require the Contractor to solicit replacement DBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal requirement and overall goal.

All requests for replacement of a committed DBE firm shall be submitted to the Engineer for approval on Form RF-1 *(DBE Replacement Request).* If the Contractor fails to follow this procedure, the Contractor may be disqualified from further bidding for a period of up to 6 months.

Changes in the Work

When the Engineer makes changes that result in the reduction or elimination of work to be performed by a committed DBE, the Contractor will not be required to seek additional participation. When the Engineer makes changes that result in additional work to be performed by a DBE based upon the Contractor’s commitment, the DBE shall participate in additional work to the same extent as the DBE participated in the original contract work.

When the Engineer makes changes that result in extra work, which has more than a minimal impact on the contract amount, the Contractor shall seek additional participation by DBEs unless otherwise approved by the Engineer.

When the Engineer makes changes that result in an alteration of plans or details of construction, and a portion or all of the work had been expected to be performed by a committed DBE, the Contractor shall seek participation by DBEs unless otherwise approved by the Engineer.

When the Contractor requests changes in the work that result in the reduction or elimination of work that the Contractor committed to be performed by a DBE, the Contractor shall seek additional participation by DBEs equal to the reduced DBE participation caused by the changes.

Reports and Documentation

A SAF (*Subcontract Approval Form*) shall be submitted for all work which is to be performed by a DBE subcontractor. The Department reserves the right to require copies of actual subcontract agreements involving DBE subcontractors.

When using transportation services to meet the contract commitment, the Contractor shall submit a proposed trucking plan in addition to the SAF. The plan shall be submitted prior to beginning construction on the project. The plan shall include the names of all trucking firms proposed for use, their certification type(s), the number of trucks owned by the firm, as well as the individual truck identification numbers, and the line item(s) being performed.

Within 30 calendar days of entering into an agreement with a DBE for materials, supplies or services, not otherwise documented by the SAF as specified above, the Contractor shall furnish the Engineer a copy of the agreement. The documentation shall also indicate the percentage (60% or 100%) of expenditures claimed for DBE credit.

Reporting Disadvantaged Business Enterprise Participation

The Contractor shall provide the Engineer with an accounting of payments made to all DBE firms, including material suppliers and contractors at all levels (prime, subcontractor, or second tier subcontractor). This accounting shall be furnished to the Engineer for any given month by the end of the following month. Failure to submit this information accordingly may result in the following action:

(A) Withholding of money due in the next partial pay estimate; or

(B) Removal of an approved contractor from the prequalified bidders' list or the removal of other entities from the approved subcontractors list.

While each contractor (prime, subcontractor, 2nd tier subcontractor) is responsible for accurate accounting of payments to DBEs, it shall be the prime contractor's responsibility to report all monthly and final payment information in the correct reporting manner.

Failure on the part of the Contractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from further bidding until the required information is submitted.

Failure on the part of any subcontractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from being approved for work on future DOT projects until the required information is submitted.

Contractors reporting transportation services provided by non-DBE lessees shall evaluate the value of services provided during the month of the reporting period only.

At any time, the Engineer can request written verification of subcontractor payments.

The Contractor shall report the accounting of payments through the Department's DBE Payment Tracking System.

Failure to Meet Contract Requirements

Failure to meet contract requirements in accordance with Subarticle 102-15(J) of the *2018 Standard Specifications* may be cause to disqualify the Contractor.

CERTIFICATION FOR FEDERAL-AID CONTRACTS:

(3-21-90) SP1 G85

The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

(A) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(B) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, *Disclosure Form to Report Lobbying*, in accordance with its instructions.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by *Section 1352, Title 31, U.S. Code*. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such subrecipients shall certify and disclose accordingly.

CONTRACTOR'S LICENSE REQUIREMENTS:
(7-1-95) 102-14 SP1 G88

If the successful bidder does not hold the proper license to perform any plumbing, heating, air conditioning, or electrical work in this contract, he will be required to sublet such work to a contractor properly licensed in accordance with *Article 2 of Chapter 87 of the General Statutes* (licensing of heating, plumbing, and air conditioning contractors) and *Article 4 of Chapter 87* of the *General Statutes* (licensing of electrical contractors).

RESTRICTIONS ON ITS EQUIPMENT AND SERVICES:
(11-17-20) SP01 G090

All telecommunications, video or other ITS equipment or services installed or utilized on this project must be in conformance with UNIFORM ADMINISTRATIVE REQUIREMENTS, COST PRINCIPLES, AND AUDIT REQUIREMENTS FOR FEDERAL AWARDS **2 CFR, § 200.216 Prohibition on certain telecommunications and video surveillance services or equipment.**

USE OF UNMANNED AIRCRAFT SYSTEM (UAS):
(8-20-19) SP1 G092

The Contractor shall adhere to all Federal, State and Local regulations and guidelines for the use of Unmanned Aircraft Systems (UAS). This includes but is not limited to US 14 CFR Part 107 *Small UAS Rule*, NC GS 15A-300.2 *Regulation of launch and recovery sites,* NC GS 63-95 *Training required for the operation of unmanned aircraft systems*, NC GS 63-96 *Permit required for commercial operation of unmanned aircraft system,* and NCDOT UAS Policy. The required operator certifications include possessing a current Federal Aviation Administration (FAA) Remote Pilot Certificate, a NC UAS Operator Permit as well as operating a UAS registered with the FAA.

Prior to beginning operations, the Contractor shall complete the NCDOT UAS – Flight Operation Approval Form and submit it to the Engineer for approval. All UAS operations shall be approved by the Engineer prior to beginning the operations.

All contractors or subcontractors operating UAS shall have UAS specific general liability insurance to cover all operations under this contract.

The use of UAS is at the Contractor's discretion. No measurement or payment will be made for the use of UAS. In the event that the Department directs the Contractor to utilize UAS, payment will be in accordance with Article 104-7 Extra Work.

EQUIPMENT IDLING GUIDELINES:
(1-19-21) 107 SP1 G096

Exercise reduced fuel consumption and reduced equipment emissions during the construction of all work associated with this contract. Employees engaged in the construction of this project

should turn off vehicles when stopped for more than thirty (30) minutes and off-highway equipment should idle no longer than fifteen (15) consecutive minutes.

These guidelines for turning off vehicles and equipment when idling do not apply to:

1. Idling when queuing.
2. Idling to verify the vehicle is in safe operating condition.
3. Idling for testing, servicing, repairing or diagnostic purposes.
4. Idling necessary to accomplish work for which the vehicle was designed (such as operating a crane, mixing concrete, etc.).
5. Idling required to bring the machine system to operating temperature.
6. Emergency vehicles, utility company, construction, and maintenance vehicles where the engines must run to perform needed work.
7. Idling to ensure safe operation of the vehicle.
8. Idling when the propulsion engine is providing auxiliary power for other than heating or air conditioning. (such as hydraulic systems for pavers)
9. When specific traffic, safety, or emergency situations arise.
10. If the ambient temperature is less than 32 degrees Fahrenheit. Limited idling to provide for the safety of vehicle occupants (e.g. to run the heater).
11. If the ambient temperature is greater than 90 degrees Fahrenheit. Limited idling to provide for the safety of vehicle occupants of off-highway equipment (e.g. to run the air conditioning) no more than 30 minutes.
12. Diesel powered vehicles may idle for up to 30 minutes to minimize restart problems.

Any vehicle, truck, or equipment in which the primary source of fuel is natural gas or electricity is exempt from the idling limitations set forth in this special provision.

U.S. DEPARTMENT OF TRANSPORTATION HOTLINE:

(11-22-94) 108-5 SP1 G100

To report bid rigging activities call: **1-800-424-9071**

The U.S. Department of Transportation (DOT) operates the above toll-free hotline Monday through Friday, 8:00 a.m. to 5:00 p.m. eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the hotline to report such activities.

The hotline is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

CARGO PREFERENCE ACT:
(2-16-16)

Privately owned United States-flag commercial vessels transporting cargoes are subject to the Cargo Preference Act (CPA) of 1954 requirements and regulations found in 46 CFR 381.7. Contractors are directed to clause (b) of 46 CFR 381.7 as follows:

(b) Contractor and Subcontractor Clauses. "Use of United States-flag vessels: The contractor agrees-

" (1) To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.

(2) To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b) (1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

(3) To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract."

SUBSURFACE INFORMATION:
(7-1-95) 450 SP1 G112 C

Subsurface information is available on the roadway and structure portions of this project.

MAINTENANCE OF THE PROJECT:
(11-20-07) (Rev. 1-17-12) 104-10 SP1 G125

Revise the *2018 Standard Specifications* as follows:

Page 1-39, Article 104-10 Maintenance of the Project, line 25, add the following after the first sentence of the first paragraph:

All guardrail/guiderail within the project limits shall be included in this maintenance.

Page 1-39, Article 104-10 Maintenance of the Project, line 30, add the following as the last sentence of the first paragraph:

The Contractor shall perform weekly inspections of guardrail and guiderail and shall report damages to the Engineer on the same day of the weekly inspection. *Where damaged guardrail or guiderail is repaired or replaced as a result of maintaining the project in* accordance with this article, such repair or replacement shall be performed within 7 consecutive calendar days of such inspection report.

Page 1-39, Article 104-10 Maintenance of the Project, lines 42-44, replace the last sentence of the last paragraph with the following:

The Contractor will not be directly compensated for any maintenance operations necessary, except for maintenance of guardrail/guiderail, as this work will be considered incidental to the work covered by the various contract items. The provisions of Article 104-7, Extra Work, and Article 104-8, Compensation and Record Keeping will apply to authorized maintenance of guardrail/guiderail. Performance of weekly inspections of guardrail/guiderail, and the damage reports required as described above, will be considered to be an incidental part of the work being paid for by the various contract items.

COOPERATION BETWEEN CONTRACTORS:

(7-1-95) 105-7 SP1 G133

The Contractor's attention is directed to Article 105-7 of the *2018 Standard Specifications*.

U-2519F (Cumberland County) is the Fayetteville Outer Loop ITS project. U-2519F is located throughout the project limits and is anticipated for November 19, 2024 Letting.

U-2519AA, U-2519AB (C204043) is located adjacent to this project. U-2519AA, U-2519AB is currently under construction and is not anticipated to be complete prior to the letting of this project.

The Contractor on this project shall cooperate with the Contractor working within or adjacent to the limits of this project to the extent that the work can be carried out to the best advantage of all concerned.

ELECTRONIC BIDDING:

(2-19-19) 101, 102, 103 SP1 G140

Revise the *2018 Standard Specifications* as follows:

Page 1-4, Article 101-3, DEFINITIONS, BID (OR PROPOSAL) *Electronic Bid,* line 1, replace “Bid Express®” with “the approved electronic bidding provider”.

Page 1-15, Subarticle 102-8(B), Electronic Bids, lines 39-40, replace “to Bid Express®” with “via the approved electronic bidding provider”.

Page 1-15, Subarticle 102-8(B)(1), Electronic Bids, line 41, delete “from Bid Express®”

Page 1-17, Subarticle 102-9(C)(2), Electronic Bids, line 21, replace “Bid Express® miscellaneous folder within the .ebs” with “electronic submittal”.

Page 1-29, Subarticle 103-4(C)(2), Electronic Bids, line 32, replace “.ebs miscellaneous data file of Expedite” with “electronic submittal file”

AWARD LIMITS:

(4-19-22) 103 SP1 G141

Revise the *2018 Standard Specifications* as follows:

Page 1-29, Subarticle 103-4(C), Award Limits, line 4-8, delete and replace the first sentence in the first paragraph with the following:

A bidder who desires to bid on more than one project on which bids are to be opened in the same letting and who desires to avoid receiving an award of more projects than he is equipped to handle, may bid on any number of projects but may limit the total amount of work awarded to him on selected projects by completing the form Award Limits on Multiple Projects for each project subject to the award limit.

BID DOCUMENTATION:

(1-1-02) (Rev.8-18-15) 103 SP1 G142

General

The successful Bidder (Contractor) shall submit the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation used to prepare the bid for this contract to the Department within 10 days after receipt of notice of award of contract. Such documentation shall be placed in escrow with a banking institution or other bonded document storage facility selected by the Department.

The Department will not execute the contract until the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation has been received by the Department.

Terms

Bid Documentation - Bid Documentation shall mean all written information, working papers, computer printouts, electronic media, charts, and all other data compilations which contain or reflect information, data, and calculations used by the Bidder in the preparation of the bid. The term *bid documentation* includes, but is not limited to, contractor equipment rates, contractor overhead rates, labor rates, efficiency or productivity factors, arithmetical calculations, and quotations from subcontractors and material suppliers to the extent that such rates and quotations were used by the Bidder in formulating and determining the bid. The term *bid documentation* also includes any manuals, which are standard to the industry used by the Bidder in determining the bid. Such manuals may be included in the bid documentation by reference. Such reference shall include the name and date of the publication and the publisher. *Bid Documentation* does not include bid documents provided by the Department for use by the Bidder in bidding on this project. The Bid Documentation can be in the form of electronic submittal (i.e. thumb drive) or paper. If the Bidder elects to submit the Bid Documentation in electronic format, the Department requires a backup submittal (i.e. a second thumb drive) in case one is corrupted.

Contractor's Representative - Officer of the Contractor's company; if not an officer, the Contractor shall supply a letter signed and notarized by an officer of the Contractor's company, granting permission for the representative to sign the escrow agreement on behalf of the Contractor.

Escrow Agent - Officer of the select banking institution or other bonded document storage facility authorized to receive and release bid documentation.

Escrow Agreement Information
A draft copy of the Escrow Agreement will be mailed to the Bidder after the notice of award for informational purposes. The Bidder and Department will sign the actual Escrow Agreement at the time the bid documentation is delivered to the Escrow Agent.

Failure to Provide Bid Documentation

The Bidder's failure to provide the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation within 10 days after the notice of award is received may be just cause for rescinding the award of the contract and may result in the removal of the Bidder from the Department's list of qualified bidders for a period of up to 180 days. Award may then be made to the next lowest responsible bidder or the work may be readvertised and constructed under the contract or otherwise, as the Department may decide.

Submittal of Bid Documentation

(A) Appointment – Email specs@ncdot.gov or call 919.707.6900 to schedule an appointment.

(B) Delivery - A representative of the Bidder shall deliver the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation to the Department, in a container suitable for sealing, within 10 days after the notice of award is received.

(C) Packaging – The container shall be no larger than 15.5 inches in length by 12 inches wide by 11 inches high and shall be water resistant. The container shall be clearly marked on the face and the back of the container with the following information: Bid Documentation, Bidder's Name, Bidder's Address, Date of Escrow Submittal, Contract Number, TIP Number if applicable, and County.

Affidavit

Bid documentation will be considered a certified copy if the Bidder includes an affidavit stating that the enclosed documentation is an EXACT copy of the original documentation used by the Bidder to determine the bid for this project. The affidavit shall also list each bid document with sufficient specificity so a comparison may be made between the list and the bid documentation to ensure that all of the bid documentation listed in the affidavit has been enclosed for escrow. The affidavit shall attest that the affiant has personally examined the bid documentation, that the affidavit lists all of the documents used by the Bidder to determine the bid for this project, and that all bid documentation has been included. The affidavit shall be signed by a chief officer of the

company, have the person's name and title typed below the signature, and the signature shall be notarized at the bottom of the affidavit.

Verification

Upon delivery of the bid documentation, the Department's Contract Officer and the Bidder's representative will verify the accuracy and completeness of the bid documentation compared to the affidavit. Should a discrepancy exist, the Bidder's representative shall immediately furnish the Department's Contract Officer with any other needed bid documentation. The Department's Contract Officer upon determining that the bid documentation is complete will, in the presence of the Bidder's representative, immediately place the complete bid documentation and affidavit in the container and seal it. Both parties will deliver the sealed container to the Escrow Agent for placement in a safety deposit box, vault, or other secure accommodation.

Confidentiality of Bid Documentation

The bid documentation and affidavit in escrow are, and will remain, the property of the Bidder. The Department has no interest in, or right to, the bid documentation and affidavit other than to verify the contents and legibility of the bid documentation unless the Contractor gives written notice of intent to file a claim, files a written claim, files a written and verified claim, or initiates litigation against the Department. In the event of such written notice of intent to file a claim, filing of a written claim, filing a written and verified claim, or initiation of litigation against the Department, or receipt of a letter from the Contractor authorizing release, the bid documentation and affidavit may become the property of the Department for use in considering any claim or in litigation as the Department may deem appropriate.

Any portion or portions of the bid documentation designated by the Bidder as a *trade secret* at the time the bid documentation is delivered to the Department's Contract Officer shall be protected from disclosure as provided by *G.S. 132-1.2*.

Duration and Use

The bid documentation and affidavit shall remain in escrow until 60 calendar days from the time the Contractor receives the final estimate; or until such time as the Contractor:

(A) Gives written notice of intent to file a claim,
(B) Files a written claim,
(C) Files a written and verified claim,
(D) Initiates litigation against the Department related to the contract; or
(E) Authorizes in writing its release.

Upon the giving of written notice of intent to file a claim, filing a written claim, filing a written and verified claim, or the initiation of litigation by the Contractor against the Department, or receipt of a letter from the Contractor authorizing release, the Department may obtain the release and custody of the bid documentation.

The Bidder certifies and agrees that the sealed container placed in escrow contains all of the bid documentation used to determine the bid and that no other bid documentation shall be relevant or material in litigation over claims brought by the Contractor arising out of this contract.

Release of Bid Documentation to the Contractor

If the bid documentation remains in escrow 60 calendar days after the time the Contractor receives the final estimate and the Contractor has not filed a written claim, filed a written and verified claim, or has not initiated litigation against the Department related to the contract, the Department will instruct the Escrow Agent to release the sealed container to the Contractor.

The Contractor will be notified by certified letter from the Escrow Agent that the bid documentation will be released to the Contractor. The Contractor or his representative shall retrieve the bid documentation from the Escrow Agent within 30 days of the receipt of the certified letter. If the Contractor does not receive the documents within 30 days of the receipt of the certified letter, the Department will contact the Contractor to determine final dispersion of the bid documentation.

Payment

The cost of the escrow will be borne by the Department. There will be no separate payment for all costs of compilation of the data, container, or verification of the bid documentation. Payment at the various contract unit or lump sum prices in the contract will be full compensation for all such costs.

TWELVE MONTH GUARANTEE:

(7-15-03) 108 SP1 G145

(A) The Contractor shall guarantee materials and workmanship against latent and patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve months following the date of final acceptance of the work for maintenance and shall replace such defective materials and workmanship without cost to the Department. The Contractor will not be responsible for damage due to faulty design, normal wear and tear, for negligence on the part of the Department, and/or for use in excess of the design.

(B) Where items of equipment or material carry a manufacturer's guarantee for any period in excess of twelve months, then the manufacturer's guarantee shall apply for that particular piece of equipment or material. The Department's first remedy shall be through the manufacturer although the Contractor is responsible for invoking the warranted repair work with the manufacturer. The Contractor's responsibility shall be limited to the term of the manufacturer's guarantee. NCDOT would be afforded the same warranty as provided by the Manufacturer.

This guarantee provision shall be invoked only for major components of work in which the Contractor would be wholly responsible for under the terms of the contract. Examples would include pavement structures, bridge components, and sign structures. This provision will not be used as a mechanism to force the Contractor to return to the project to make repairs or perform additional work that the Department would normally compensate the Contractor for. In addition,

routine maintenance activities (i.e. mowing grass, debris removal, ruts in earth shoulders,) are not parts of this guarantee.

Appropriate provisions of the payment and/or performance bonds shall cover this guarantee for the project.

To ensure uniform application statewide the Division Engineer will forward details regarding the circumstances surrounding any proposed guarantee repairs to the Chief Engineer for review and approval prior to the work being performed.

EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:

(1-16-07) (Rev 12-15-20) 105-16, 225-2, 16 SP1 G180

General

Schedule and conduct construction activities in a manner that will minimize soil erosion and the resulting sedimentation and turbidity of surface waters. Comply with the requirements herein regardless of whether or not a National Pollution discharge Elimination System (NPDES) permit for the work is required.

Establish a chain of responsibility for operations and subcontractors' operations to ensure that the *Erosion and Sediment Control/Stormwater Pollution Prevention Plan* is implemented and maintained over the life of the contract.

(A) *Certified Supervisor* - Provide a certified Erosion and Sediment Control/Stormwater Supervisor to manage the Contractor and subcontractor operations, insure compliance with Federal, State and Local ordinances and regulations, and manage the Quality Control Program.

(B) *Certified Foreman* - Provide a certified, trained foreman for each construction operation that increases the potential for soil erosion or the possible sedimentation and turbidity of surface waters.

(C) *Certified Installer* - Provide a certified installer to install or direct the installation for erosion or sediment/stormwater control practices.

(D) *Certified Designer* - Provide a certified designer for the design of the erosion and sediment control/stormwater component of reclamation plans and, if applicable, for the design of the project erosion and sediment control/stormwater plan.

Roles and Responsibilities

(A) *Certified Erosion and Sediment Control/Stormwater Supervisor* - The Certified Supervisor shall be Level II and responsible for ensuring the erosion and sediment control/stormwater plan is adequately implemented and maintained on the project and for conducting the quality control program. The Certified Supervisor shall be on the project within 24 hours notice from initial exposure of an erodible surface to the project's final acceptance. Perform the following duties:

(1) Manage Operations - Coordinate and schedule the work of subcontractors so that erosion and sediment control/stormwater measures are fully executed for each operation and in a timely manner over the duration of the contract.

(a) Oversee the work of subcontractors so that appropriate erosion and sediment control/stormwater preventive measures are conformed to at each stage of the work.
(b) Prepare the required National Pollutant Discharge Elimination System (NPDES) Inspection Record and submit to the Engineer.
(c) Attend all weekly or monthly construction meetings to discuss the findings of the NPDES inspection and other related issues.
(d) Implement the erosion and sediment control/stormwater site plans requested.
(e) Provide any needed erosion and sediment control/stormwater practices for the Contractor's temporary work not shown on the plans, such as, but not limited to work platforms, temporary construction, pumping operations, plant and storage yards, and cofferdams.
(f) Acquire applicable permits and comply with requirements for borrow pits, dewatering, and any temporary work conducted by the Contractor in jurisdictional areas.
(g) Conduct all erosion and sediment control/stormwater work in a timely and workmanlike manner.
(h) Fully perform and install erosion and sediment control/stormwater work prior to any suspension of the work.
(i) Coordinate with Department, Federal, State and Local Regulatory agencies on resolution of erosion and sediment control/stormwater issues due to the Contractor's operations.
(j) Ensure that proper cleanup occurs from vehicle tracking on paved surfaces or any location where sediment leaves the Right-of-Way.
(k) Have available a set of erosion and sediment control/stormwater plans that are initialed and include the installation date of Best Management Practices. These practices shall include temporary and permanent groundcover and be properly updated to reflect necessary plan and field changes for use and review by Department personnel as well as regulatory agencies.

(2) Requirements set forth under the NPDES Permit - The Department's NPDES Stormwater permit (NCS000250) outlines certain objectives and management measures pertaining to construction activities. The permit references *NCG010000, General Permit to Discharge Stormwater* under the NPDES, and states that the Department shall incorporate the applicable requirements into its delegated Erosion and Sediment Control Program for construction activities disturbing one or more acres of land. The Department further incorporates these requirements on all contracted bridge and culvert work at jurisdictional waters, regardless of size. Some of the requirements are, but are not limited to:

(a) Control project site waste to prevent contamination of surface or ground waters of the state, i.e. from equipment operation/maintenance, construction

materials, concrete washout, chemicals, litter, fuels, lubricants, coolants, hydraulic fluids, any other petroleum products, and sanitary waste.

(b) Inspect erosion and sediment control/stormwater devices and stormwater discharge outfalls at least once every 7 calendar days and within 24 hours after a rainfall event equal to or greater than 1.0 inch that occurs within a 24 hour period. Additional monitoring may be required at the discretion of Division of Water Resources personnel if the receiving stream is 303(d) listed for turbidity and the project has had documented problems managing turbidity.

(c) Maintain an onsite rain gauge or use the Department's Multi-Sensor Precipitation Estimate website to maintain a daily record of rainfall amounts and dates.

(d) Maintain erosion and sediment control/stormwater inspection records for review by Department and Regulatory personnel upon request.

(e) Implement approved reclamation plans on all borrow pits, waste sites and staging areas.

(f) Maintain a log of turbidity test results as outlined in the Department's Procedure for Monitoring Borrow Pit Discharge.

(g) Provide secondary containment for bulk storage of liquid materials.

(h) Provide training for employees concerning general erosion and sediment control/stormwater awareness, the Department's NPDES Stormwater Permit NCS000250 requirements, and the applicable requirements of the *General Permit, NCG010000*.

(i) Report violations of the NPDES permit to the Engineer immediately who will notify the Division of Water Quality Regional Office within 24 hours of becoming aware of the violation.

(3) Quality Control Program - Maintain a quality control program to control erosion, prevent sedimentation and follow provisions/conditions of permits. The quality control program shall:

(a) Follow permit requirements related to the Contractor and subcontractors' construction activities.

(b) Ensure that all operators and subcontractors on site have the proper erosion and sediment control/stormwater certification.

(c) Notify the Engineer when the required certified erosion and sediment control/stormwater personnel are not available on the job site when needed.

(d) Conduct the inspections required by the NPDES permit.

(e) Take corrective actions in the proper timeframe as required by the NPDES permit for problem areas identified during the NPDES inspections.

(f) Incorporate erosion control into the work in a timely manner and stabilize disturbed areas with mulch/seed or vegetative cover on a section-by-section basis.

(g) Use flocculants approved by state regulatory authorities where appropriate and where required for turbidity and sedimentation reduction.

(h) Ensure proper installation and maintenance of temporary erosion and sediment control devices.

(i) Remove temporary erosion or sediment control devices when they are no longer necessary as agreed upon by the Engineer.

(j) The Contractor's quality control and inspection procedures shall be subject to review by the Engineer. Maintain NPDES inspection records and make records available at all times for verification by the Engineer.

(B) *Certified Foreman* - At least one Certified Foreman shall be onsite for each type of work listed herein during the respective construction activities to control erosion, prevent sedimentation and follow permit provisions:

(1) Foreman in charge of grading activities
(2) Foreman in charge of bridge or culvert construction over jurisdictional areas
(3) Foreman in charge of utility activities

The Contractor may request to use the same person as the Level II Supervisor and Level II Foreman. This person shall be onsite whenever construction activities as described above are taking place. This request shall be approved by the Engineer prior to work beginning.

The Contractor may request to name a single Level II Foreman to oversee multiple construction activities on small bridge or culvert replacement projects. This request shall be approved by the Engineer prior to work beginning.

(C) *Certified Installers* - Provide at least one onsite, Level I Certified Installer for each of the following erosion and sediment control/stormwater crew:

(1) Seeding and Mulching
(2) Temporary Seeding
(3) Temporary Mulching
(4) Sodding
(5) Silt fence or other perimeter erosion/sediment control device installations
(6) Erosion control blanket installation
(7) Hydraulic tackifier installation
(8) Turbidity curtain installation
(9) Rock ditch check/sediment dam installation
(10) Ditch liner/matting installation
(11) Inlet protection
(12) Riprap placement
(13) Stormwater BMP installations (such as but not limited to level spreaders, retention/detention devices)
(14) Pipe installations within jurisdictional areas

If a Level I *Certified Installer* is not onsite, the Contractor may substitute a Level II Foreman for a Level I Installer, provided the Level II Foreman is not tasked to another crew requiring Level II Foreman oversight.

(D) *Certified Designer* - Include the certification number of the Level III Certified Designer on the erosion and sediment control/stormwater component of all reclamation plans and if

applicable, the certification number of the Level III Certified Designer on the design of the project erosion and sediment control/stormwater plan.

Preconstruction Meeting

Furnish the names of the *Certified Erosion and Sediment Control/Stormwater Supervisor, Certified Foremen, Certified Installers* and *Certified Designer* and notify the Engineer of changes in certified personnel over the life of the contract within 2 days of change.

Ethical Responsibility

Any company performing work for the North Carolina Department of Transportation has the ethical responsibility to fully disclose any reprimand or dismissal of an employee resulting from improper testing or falsification of records.

Revocation or Suspension of Certification

Upon recommendation of the Chief Engineer to the certification entity, certification for *Supervisor*, *Certified Foremen*, *Certified Installers* and *Certified Designer* may be revoked or suspended with the issuance of an *Immediate Corrective Action (ICA), Notice of Violation (NOV),* or C*ease and Desist Order* for erosion and sediment control/stormwater related issues.

The Chief Engineer may recommend suspension or permanent revocation of certification due to the following:

(A) Failure to adequately perform the duties as defined within this certification provision.
(B) Issuance of an ICA, NOV, or Cease and Desist Order.
(C) Failure to fully perform environmental commitments as detailed within the permit conditions and specifications.
(D) Demonstration of erroneous documentation or reporting techniques.
(E) Cheating or copying another candidate's work on an examination.
(F) Intentional falsification of records.
(G) Directing a subordinate under direct or indirect supervision to perform any of the above actions.
(H) Dismissal from a company for any of the above reasons.
(I) Suspension or revocation of one's certification by another entity.

Suspension or revocation of a certification will be sent by certified mail to the certificant and the Corporate Head of the company that employs the certificant.

A certificant has the right to appeal any adverse action which results in suspension or permanent revocation of certification by responding, in writing, to the Chief Engineer within 10 calendar days after receiving notice of the proposed adverse action.

Chief Engineer
1536 Mail Service Center
Raleigh, NC 27699-1536

Failure to appeal within 10 calendar days will result in the proposed adverse action becoming effective on the date specified on the certified notice. Failure to appeal within the time specified will result in a waiver of all future appeal rights regarding the adverse action taken. The certificant will not be allowed to perform duties associated with the certification during the appeal process.

The Chief Engineer will hear the appeal and make a decision within 7 days of hearing the appeal. Decision of the Chief Engineer will be final and will be made in writing to the certificant.

If a certification is temporarily suspended, the certificant shall pass any applicable written examination and any proficiency examination, at the conclusion of the specified suspension period, prior to having the certification reinstated.

Measurement and Payment

Certified Erosion and Sediment Control/Stormwater Supervisor, Certified Foremen, Certified Installers and *Certified Designer* will be incidental to the project for which no direct compensation will be made.

PROCEDURE FOR MONITORING BORROW PIT DISCHARGE:

(2-20-07) (Rev. 4-5-19) 105-16, 230, 801 SP1 G181

Water discharge from borrow pit sites shall not cause surface waters to exceed 50 NTUs (nephelometric turbidity unit) in streams not designated as trout waters and 10 NTUs in streams, lakes or reservoirs designated as trout waters. For lakes and reservoirs not designated as trout waters, the turbidity shall not exceed 25 NTUs. If the turbidity exceeds these levels due to natural background conditions, the existing turbidity level shall not be increased.

If during any operating day, the downstream water quality exceeds the standard, the Contractor shall do all of the following:

(A) Either cease discharge or modify the discharge volume or turbidity levels to bring the downstream turbidity levels into compliance, or

(B) Evaluate the upstream conditions to determine if the exceedance of the standard is due to natural background conditions. If the background turbidity measurements exceed the standard, operation of the pit and discharge can continue as long as the stream turbidity levels are not increased due to the discharge.

(C) Measure and record the turbidity test results (time, date and sampler) at all defined sampling locations 30 minutes after startup and at a minimum, one additional sampling of all sampling locations during that 24-hour period in which the borrow pit is discharging.

(D) Notify DWQ within 24 hours of any stream turbidity standard exceedances that are not brought into compliance.

During the Environmental Assessment required by Article 230-4 of the *2018 Standard Specifications*, the Contractor shall define the point at which the discharge enters into the State's surface waters and the appropriate sampling locations. Sampling locations shall include points upstream and downstream from the point at which the discharge enters these waters. Upstream

sampling location shall be located so that it is not influenced by backwater conditions and represents natural background conditions. Downstream sampling location shall be located at the point where complete mixing of the discharge and receiving water has occurred.

The discharge shall be closely monitored when water from the dewatering activities is introduced into jurisdictional wetlands. Any time visible sedimentation (deposition of sediment) on the wetland surface is observed, the dewatering activity will be suspended until turbidity levels in the stilling basin can be reduced to a level where sediment deposition does not occur. Staining of wetland surfaces from suspended clay particles, occurring after evaporation or infiltration, does not constitute sedimentation. No activities shall occur in wetlands that adversely affect the functioning of a wetland. Visible sedimentation will be considered an indication of possible adverse impacts on wetland use.

The Engineer will perform independent turbidity tests on a random basis. These results will be maintained in a log within the project records. Records will include, at a minimum, turbidity test results, time, date and name of sampler. Should the Department's test results exceed those of the Contractor's test results, an immediate test shall be performed jointly with the results superseding the previous test results of both the Department and the Contractor.

The Contractor shall use the *NCDOT Turbidity Reduction Options for Borrow Pits Matrix,* available at https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/TurbidityReductionOptionSheet.pdf to plan, design, construct, and maintain BMPs to address water quality standards. Tier I Methods include stilling basins which are standard compensatory BMPs. Other Tier I methods are noncompensatory and shall be used when needed to meet the stream turbidity standards. Tier II Methods are also noncompensatory and are options that may be needed for protection of rare or unique resources or where special environmental conditions exist at the site which have led to additional requirements being placed in the DWQ's 401 Certifications and approval letters, Isolated Wetland Permits, Riparian Buffer Authorization or a DOT Reclamation Plan's Environmental Assessment for the specific site. Should the Contractor exhaust all Tier I Methods on a site exclusive of rare or unique resources or special environmental conditions, Tier II Methods may be required by regulators on a case by case basis per supplemental agreement.

The Contractor may use cation exchange capacity (CEC) values from proposed site borings to plan and develop the bid for the project. CEC values exceeding 15 milliequivalents per 100 grams of soil may indicate a high potential for turbidity and should be avoided when dewatering into surface water is proposed.

No additional compensation for monitoring borrow pit discharge will be paid.

PROJECT SPECIAL PROVISIONS

ROADWAY

CLEARING AND GRUBBING - METHOD III:

(4-6-06) (Rev.8-18-15) 200 SP2 R02B

Perform clearing on this project to the limits established by Method "III" shown on Standard Drawing No. 200.03 of the *2018 Roadway Standard Drawings*. Conventional clearing methods may be used except where permit drawings or conditions have been included in the proposal which require certain areas to be cleared by hand methods.

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.

BUILDING REMOVAL:

(1-1-02) (Rev. 11-15-16) 215 SP2 R15 C

Remove the buildings and appurtenances listed below in accordance with Section 215 of the *2018 Standard Specifications*:

Parcel 083 511+00 RT -L-
1SFD

Parcel 084 512+00 RT -L-
1SFD

Parcel 116 61+00 RT -Y13-
House Trailer

Parcel 130 70+00 LT -Y13-
1SFD

When the description of the work for an item indicates a building partially inside and partially outside the right of way and/or construction area, but does not require the building to be cut off, the entire building shall be removed.

TEMPORARY PAVEMENT:

(7-1-95) (Rev. 11-19-13) 1101 SP2 R30B (Rev)

Construct temporary pavement required on this project in accordance with the plans or as directed by the Engineer.

After the pavement has served its purpose, remove the portions deemed unsuitable for use as a permanent part of the project as directed by the Engineer. Place pavement and earth material removed in embankments or dispose of in waste areas furnished by the Contractor.

Earth material and aggregate base course that is removed will be measured and will be paid at the contract unit price per cubic yard for *Unclassified Excavation*. Pavement that is removed will be measured and will be paid at the contract unit price per square yard for *Removal of Existing Asphalt Pavement*. Pipe culverts removed from the pavement remain the property of the Contractor. Pipe culverts that are removed will be measured and will be paid at the contract unit price per linear foot for *Pipe Removal*. Payment for the construction of the pavement will be made at the contract unit prices for the various items involved.

Such prices and payments will be full compensation for removing earth material, aggregate base course, and asphalt pavement; removing pipe culverts; and for placing earth material and pavement in embankments or disposing of earth material and pavement in waste areas.

SHOULDER AND FILL SLOPE MATERIAL:

(5-21-02) 235, 560 SP2 R45 B

Description

Perform the required shoulder and slope construction for this project in accordance with the applicable requirements of Section 560 and Section 235 of the *2018 Standard Specifications*.

Measurement and Payment

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 Borrow* in the contract, this work will be considered incidental to *Unclassified Excavation*. Stockpile the excavated material in a manner to facilitate measurement by the Engineer. Fill the void created by the excavation of the shoulder and fill slope material with suitable material. Payment for material used from the stockpile will be made at the contract unit price for *Borrow Excavation* or *Shoulder Borrow*. If there is no pay item for *Borrow Excavation* or *Shoulder Borrow*, then the material will be paid for at the contract unit price for *Unclassified Excavation*. The material used to fill the void created by the excavation of the shoulder and fill slope material will be made at the contract unit price for *Unclassified Excavation*, *Borrow Excavation*, or *Shoulder Borrow*, depending on the source of the material.

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

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

When shoulder material is obtained from borrow sources or from stockpiled material, payment for the work of shoulder construction will be made at the contract unit price per cubic yard for *Borrow Excavation* or *Shoulder Borrow* in accordance with the applicable provisions of Section 230 or Section 560 of the *2018 Standard Specifications*.

COAL COMBUSTION PRODUCTS IN EMBANKMENTS:

(4-16-02) (Rev. 12-15-20) 235 SP02 R70

Description

This specification allows the Contractor an option, with the approval of the Engineer, to use coal combustion products (CCPs) in embankments as a substitute for conventional borrow material. The amount of CCPs allowed to be used for this project will be less than 80,000 tons total and less than 8,000 tons per acre.

Materials

Supply coal combustion products from the Department list of potential suppliers maintained by the Materials and Tests Unit. Site specific approval of CCP material will be required prior to beginning construction.

The following CCPs are unacceptable:

(A) Frozen material,
(B) Ash from boilers fired with both coal and petroleum coke, and
(C) Material with a maximum dry unit weight of less than 65 pounds per cubic foot when tested in accordance with AASHTO T-99 Method A or C.

Collect and transport CCPs in a manner that will prevent nuisances and hazards to public health and safety. Moisture condition the CCPs as needed and transport in covered trucks to prevent dusting.

Preconstruction Requirements

When CCPs are to be used as a substitute for earth borrow material, request written approval from the Engineer at least ninety (90) days in advance of the intent to use CCPs and include the following details using the NCDOT Form CCP-2015 in accordance with NCGS § 130A-309.219(b)(1):

(A) Description, purpose and location of project.
(B) Estimated start and completion dates of project.
(C) Estimated volume of CCPs to be used on project with specific locations and construction details of the placement.

(D) Toxicity Characteristic Leaching Procedure analysis from a representative sample of each different CCP source to be used in the project for, at minimum, all of the following constituents: arsenic, barium, cadmium, lead, chromium, mercury, selenium, and silver.
(E) The names, address, and contact information for the generator of the CCPs.
(F) Physical location of the project at which the CCPs were generated.

Submit the form to the Engineer and the Resource Conservation Program (RCP) Engineer at ResourceConservation@ncdot.gov for review. The Engineer and the RCP Engineer will coordinate the requirements of NCGS § 130A-309.219(a)(1) and notify the Contractor that all the necessary requirements have been met before the placement of structural fill using coal combustion products is allowed.

Construction Methods

In accordance with the detail in the plans, place CCPs in the core of the embankment section with at least 4 feet of earth cover to the outside limits of the embankments or subgrade and at least 5 feet above the seasonal high ground-water table. CCPs used in embankments shall not be placed as follows:

(A) Within 50 feet of any property boundary.
(B) Within 300 horizontal feet of a private dwelling or well.
(C) Within 50 horizontal feet of the top of the bank of a perennial stream or other surface water body.
(D) Within a 100-year floodplain except as authorized under NCGS § 143-215.54A(b). A site located in a floodplain shall not restrict the flow of the 100-year floodplain or result in washout of solid waste so as to pose a hazard to human life, wildlife or land and water resources.
(E) Within 50 horizontal feet of a wetland, unless, after consideration of the chemical and physical impact on the wetland, the United States Army Corps of Engineers issues a permit or waiver for the fill.

Construct embankments by placing CCPs in level uniform lifts with no more than a lift of 10 inches and compacted to at least a density of 95 percent as determined by test methods in AASHTO T-99, Determination of Maximum Dry Density and Optimum Moisture Content, Method A or C depending upon particle size of the product. Provide a moisture content at the time of compaction of within 4 percent of optimum but not greater than one percent above optimum as determined by AASHTO T-99, Method A or C.

Divert surface waters resulting from precipitation from the CCPs placement area during filling and construction activities. Construct embankments such that rainfall will not run directly off of the CCPs. Provide dust control to minimize airborne emissions. Construct fill in a manner that prevents water from accumulating and ponding and do not pump nor discharge waters from CCP's filling and construction areas.

Measurement and Payment

Borrow Excavation will be measured by truck volume and paid in cubic yards in accordance with Article 230-5 of the *2018 Standard Specifications*.

ALUMINUM ALLOY STRUCTURAL PLATE PIPE AND PIPE ARCH:

(1-17-17) SPI 3-08

Description

Furnish and install aluminum alloy structural plate pipe and pipe arch of the size and gauge called for on the plans at locations indicated in the contract. The work includes the construction of joints and connections to other pipes, endwalls, and other drainage structures.

Materials

The plate and fasteners for corrugated aluminum alloy structural plate pipe and pipe arch shall meet the requirements of AASHTO M219.

When elongated pipe is called for by the contract, shop form the pipe to provide for a 5 percent elongation.

Unless otherwise required by the contract, bolt holes along the plate edges that will form longitudinal seams in the finished structure in 2 rows spaced 1 3/4 inches apart and located in the valley end in the crest of each corrugation.

The minimum distance from the center of bolt holes to edge of plates shall not be less than 1 3/4 times the diameter of the bolt. Space bolt holes along those edges of the plates that form circumferential seams in the finished structure a maximum of 10 inches apart.

The diameter of bot holes in longitudinal seams, excepting those at plate corners, shall not exceed the bolt diameter by more than 1/8 inch. The diameter of holes in circumferential seams, including those at plate corners, shall not exceed the bolt diameter by more than 1/2 and the average of the diameters on the major and minor axes shall not exceed the bolt diameter by more than 1/4 inch.

Accurately cut plates for forming skewed or beveled ends of structures to form the required final shape. Plates shall be saw cut, not burned, to present a competent finish free from notches or gouges.

Furnish an erection drawing for each installation. Mark each plate as necessary to insure proper placement in the structure.

Suppliers that provide metal pipe culverts, fittings, and all other accessories covered by this section shall meet the requirements of the Department's Brand Certification program for metal pipe culverts, and be listed on the Department's pre-approved list for suppliers of metal pipe culvert.

Provide for review, design and detail drawings for all structural plate elbows, wyes, and tees. All designs and details shall meet the requirements of AASHTO Section 12 and be sealed by a North Carolina Licensed Professional Engineer. Provide seven copies of the plans and one copy of the

design calculations to the Engineer for review and acceptance prior to beginning fabrication. Include the cost of any required reinforcement (stiffeners, miscellaneous fabricated steel, heavier gauge plates, etc.) in the unit bid prices for the items involved.
Provide elbows, wyes, and tees of at least the same gauge as the connecting pipe culvert.

Acceptance

Acceptance of corrugated aluminum alloy structural plate pipe and pipe arches, and its accessories will be based on, but not limited to, visual inspections, classification requirements, 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.

Construction Methods

(A) Excavation, Foundation Preparation, and Backfilling

Install the pipe and pipe arch in accordance with Section 300 of the *2018 Standard Specifications* except place a minimum of 6 inch thickness of foundation conditioning material in accordance with the details shown in the plans.

(B) Erection

Erect in accordance with the manufacturer's assembly diagrams and instruction sheets. All erection procedures and methods shall meet industry standards. Handle structural plate with reasonable care. Do not drag or skid plate. The plate or the assembled pipe or pipe arch will be rejected, if the spelter coating is broken beyond repair prior to acceptance.

Assemble the entire pipe culvert completely before placing any backfill. Maintain correct position of pipe during assembly, correct for spiraling.

Install all bolts in accordance with the procedures specified by the manufacturer before backfill is placed. Tighten all nuts to a minimum of 100 foot-pounds and a maximum of 200 foot-pounds of torque. Check nut tightness with a properly calibrated torque wrench before, during, and after placing backfill.

Camber the invert grade by an amount sufficient to prevent the development of sag or back slope in the flow line after the backfill is placed. The Contractor shall determine the amount of camber required and submit to the Engineer for approval.

(C) Workmanship

Provide quality workmanship when installing the pipe and pipe arch. Evidence of poor or inadequate workmanship includes but is not limited to the following:

(1) Uneven laps.
(2) Improper shaping.
(3) Variation from a straight center line.
(4) Ragged edges.

(5) Loose, unevenly lined or spaced bolts.
(6) Illegible identification stamp on any plate.
(7) Bruised, scaled or broken spelter coating.
(8) Dents or bends in the metal itself.

Poor or inadequate workmanship may constitute sufficient cause for rejection of the completed or partially completed work, or of any materials proposed for use in the work.

(D) Elbows, Wyes, and Tees

Shop fabricate all structural plate elbows, wyes, and tees with the angle between the branch and main line of the lateral as noted on the plans. Provide joint connections in accordance with the manufacturer's instructions.

Measurement and Payment

Corrugated Aluminum Alloy Structural Plate Pipe or Pipe Arch will be measured and paid for as the actual number of linear feet of pipe or pipe arch, measured along the flow line of the pipe or pipe arch, not including elbows, wyes, and tees, to the nearest foot, that has been completed and accepted.

Corrugated Aluminum Alloy Structural Steel Plate Elbows, Wyes, and Tees will be measured and paid for as the actual number of these items that have been incorporated into the completed and accepted work.

Payment will be made under:

Pay Item	**Pay Unit**
___"CAA Structural Plate Pipe, ___" Thick	Linear Foot
___"CAA Structural Plate Pipe, ___" Thick, Elongated	Linear Foot
___" x ___", CAA Structural Plate Pipe Arch, ___" Thick	Linear Foot
___"CAA Structural Plate Pipe Elbow, Elongated, ___Gauge (___" x ___" Corrugation)	Each
___"CAA Structural Plate Pipe Elbow, Elongated, ___Gauge with ___ Bolts, ___" x ___" Corrugation	Each
___"CAA Structural Plate Pipe Wye, Elongated, ___Gauge ___" x ___" Corrugation	Each
___"CAA Structural Plate Pipe Wye, Elongated, ___Gauge with ___ Bolts, "___ x ___" Corrugation	Each
___"CAA Structural Plate Pipe Tee, Elongated, ___Gauge, ___" x ___" Corrugation	Each
___"CAA Structural Plate Pipe Tee, Elongated, ___Gauge with ___ Bolts, "___ x ___" Corrugation	Each

MANUFACTURED QUARRY FINES IN EMBANKMENTS:

(01-17-17) 235 SP02 R72

Description

This specification addresses the use of manufactured quarry fines that are not classified as select materials. The specification allows the Contractor an option, with the approval of the Engineer, to use manufactured quarry fines (MQFs) in embankments as a substitute for conventional borrow material. Furnish and place geotextile for pavement stabilization in accordance with the Geotextile for Pavement Stabilization special provision and detail. Geotextile for pavement stabilization is required to prevent pavement cracking and provide separation between the subgrade and pavement section at embankment locations where manufactured quarry fines are utilized and as directed by the Engineer.

Materials

Manufactured Quarry Fines.

Site specific approval of MQFs material will be required prior to beginning construction as detailed in the preconstruction requirements of this provision.

The following MQFs are unacceptable:

(A) Frozen material,

(B) Material with a maximum dry unit weight of less than 90 pounds per cubic foot when tested in accordance with AASHTO T-99 Method A or C.

(C) Material with greater than 80% by weight Passing the #200 sieve

Collect and transport MQFs in a manner that will prevent nuisances and hazards to public health and safety. Moisture condition the MQFs as needed and transport in covered trucks to prevent dusting. If MQFs are blended with natural earth material, follow Borrow Criteria in Section 1018 of the *Standard Specifications.*

Geotextiles

Areas of embankment where MQFs are incorporated, Geotextile for Pavement Stabilization shall be used. If the Geotextile for Pavement Stabilization special provision is not included elsewhere in this contract, then it along with a detail will be incorporated as part of the contractors request to use. Notification of subgrade elevation, sampling and waiting period as required in the Construction Methods section of the Geotextile for Pavement Stabilization special provision are not required.

Preconstruction Requirements

When MQFs are to be used as a substitute for earth borrow material, request written approval from the Engineer at least ninety (90) days in advance of the intent to use MQFs and include the following details:

(A) Description, purpose and location of project.

(B) Estimated start and completion dates of project.

(C) Estimated volume of MQFs to be used on project with specific locations and construction details of the placement.

(D) The names, address, and contact information for the generator of the MQFs.

(E) Physical location of the site at which the MQFs were generated.

The Engineer will forward this information to the State Materials Engineer for review and material approval.

Construction Methods
Place MQFs in the core of the embankment section with at least 4 feet of earth cover to the outside limits of the embankments or subgrade.

Construct embankments by placing MQFs in level uniform lifts with no more than a lift of 10 inches and compacted to at least a density of 95 percent as determined by test methods in AASHTO T-99, Determination of Maximum Dry Density and Optimum Moisture Content, Method A or C depending upon particle size of the product. Provide a moisture content at the time of compaction of within 4 percent of optimum but not greater than one percent above optimum as determined by AASHTO T-99, Method A or C.

Areas of embankment where MQFs are incorporated, Geotextile for Pavement Stabilization shall be used. See Geotextile for Pavement Stabilization special provision for geotextile type and construction method.

Measurement and Payment
Borrow Excavation will be measured by truck volume and paid in cubic yards in accordance with Article 230-5 of the *2018 Standard Specifications*. As an alternate weigh tickets can be provided and payment made by converting weight to cubic yards based on the verifiable unit weight.
Where the pay item of *Geotextile for Pavement Stabilization* is included in the original contract the material will be measured and paid in square yards (see Geotextile for Pavement Stabilization special provision). Where the pay item of *Geotextile for Pavement Stabilization* is not included in the original contract then no payment will be made for this item and will be considered incidental to the use of MQFs in embankment.

FLOWABLE FILL:

(9-17-02) (Rev 1-17-12) 300, 340, 1000, 1530, 1540, 1550 SP3 R30

Description

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

Materials

Refer to Division 10 of the *2018 Standard Specifications*.

Item	Section
Flowable Fill	1000-6

Construction Methods

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

Measurement and Payment

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

Payment will be made under:

Pay Item	**Pay Unit**
Flowable Fill	Cubic Yard

CORRUGATED ALUMINUM ALLOY CULVERT PIPE:

(9-21-21) 305, 310 SP3 R34

Revise the *Standard Specifications* as follows:

Page 3-5, Article 305-2, MATERIALS, add the following after line 16:

Item	**Section**
Waterborne Paint	1080-9
Hot Bitumen	1081-3

Page 3-5, Article 305-3, CONSTRUCTION METHODS, add the following after line 24:

Coating must be applied to the aluminum when in contact with concrete. Immediately prior to coating, aluminum surfaces to be coated shall be cleaned by a method that will remove all dirt, oil, grease, chips, and other foreign substances. Aluminum to be coated shall be given one coat of suitable quality coating such as:

Approved waterborne paint (Section 1080-9)
Approved Hot Bitumen (Section 1081-3)

Other coating materials may be submitted to the Engineer for approval.

Page 3-7, Article 310-6, MEASUREMENT AND PAYMENT, lines 6-11, delete the fourth sentence and replace with the following:

Select bedding and backfill material and coating will be included in the cost of the installed pipe. Such price and payment will be full compensation for all materials, labor, equipment, and other incidentals necessary to complete the work.

CULVERT PIPE:

(8-20-19)(Rev. 5-17-22) 305,310 SP3 R35

Revise the *2018 Standard Specifications* as follows:

Page 3-5, Article 305-1 DESCRIPTION, lines 12-14, replace with the following:

Where shown in the plans, the Contractor may use reinforced concrete pipe, aluminum alloy pipe, aluminized corrugated steel pipe, galvanized corrugated steel pipe, HDPE pipe, Polypropylene pipe or PVC pipe in accordance with the following requirements.

Page 3-5, Article 305-2 MATERIALS, add the following after line 16:

Item	**Section**
Polypropylene Pipe	1032-9
Galvanized Corrugated Steel Pipe	1032-3

Page 3-6, Article 310-2 MATERIALS, add the following after line 9:

Item	**Section**
Polypropylene Pipe	1032-9
Galvanized Corrugated Steel Pipe	1032-3

Page 3-6, Article 310-4 SIDE DRAIN PIPE, lines 24-25, replace the first sentence of the second paragraph with the following:

Where shown in the plans, side drain pipe may be Class II reinforced concrete pipe, aluminized corrugated steel pipe, galvanized corrugated steel pipe, corrugated aluminum alloy pipe, Polypropylene pipe, HDPE pipe or PVC pipe.

Page 3-7, Article 310-5 PIPE END SECTIONS, lines 2-4, replace the second sentence with the following:

Both corrugated steel and concrete pipe end sections will work on concrete pipe, corrugated steel pipe, Polypropylene pipe and HDPE smooth lined corrugated plastic pipe.

Page 3-7, Article 310-6 MEASUREMENT AND PAYMENT, add the following after line 14:

Pay Item	**Pay Unit**
__″ Polypropylene Pipe	Linear Foot

Page 10-60, add Article 1032-9:

(A) General

Use polypropylene pipe from sources participating in the Department's Polypropylene Pipe QA/QC Program. A list of participating sources is available from the Materials and Tests Unit. The Department will remove a manufacturer of polypropylene pipe from this program if the monitoring efforts indicated that non-specification material is being

provided or test procedures are not being followed.

Use polypropylene culvert pipe that meets AASHTO M 330 for Type S or Type D, or ASTM F2881 or ASTM F2764 Double or Triple wall; and has been evaluated by NTPEP.

(B) End Treatments, Pipe Tees and Elbows

End treatments, pipe tees and elbows shall meet AASHTO M 330, Section 7.7, or ASTM F2764, Section 6.6.

(C) Marking

Clearly mark each section of pipe, end section, tee and elbow and other accessories according to the Department's Polypropylene Pipe QC/QA Program:

(1) AASHTO or ASTM Designation
(2) The date of manufacture
(3) Name or trademark of the manufacturer

When polypropylene pipe, end sections, tees and elbows have been inspected and accepted a sticker will be applied to the inside of the pipe. Do no use pipe sections, flared end sections, tees or elbows which do not have this seal of approval.

BRIDGE APPROACH FILLS:

(10-19-10) (Rev. 1-16-18) 422 SP4 R02A

Description

Bridge approach fills consist of backfilling behind bridge end bents with select material or aggregate to support all or portions of bridge approach slabs. Install drains to drain water from bridge approach fills and geotextiles to separate approach fills from embankment fills, ABC and natural ground as required. For bridge approach fills behind end bents with mechanically stabilized earth (MSE) abutment walls, reinforce bridge approach fills with MSE wall reinforcement connected to end bent caps. Construct bridge approach fills in accordance with the contract, accepted submittals and 2018 Roadway Standard Drawing Nos. 422.01 or 422.02 or Roadway Detail Drawing No. 422D10.

Define bridge approach fill types as follows:

Approach Fills – Bridge approach fills in accordance with 2018 Roadway Standard Drawing Nos. 422.01 or 422.02 or Roadway Detail Drawing No. 422D10;

Standard Approach Fill – Type I Standard Bridge Approach Fill in accordance with 2018 Roadway Standard Drawing No. 422.01;

Modified Approach Fill – Type II Modified Bridge Approach Fill in accordance with 2018 Roadway Standard Drawing No. 422.02 and

Reinforced Approach Fill – Type III Reinforced Bridge Approach Fill in accordance with

Roadway Detail Drawing No. 422D10.

Materials

Refer to Division 10 of the *2018 Standard Specifications*.

Item	Section
Geotextiles, Type 1	1056
Portland Cement Concrete	1000
Select Materials	1016
Subsurface Drainage Materials	1044

Provide Type 1 geotextile for separation geotextiles and Class B concrete for outlet pads. Use Class V or Class VI select material for standard and modified approach fills. For an approach fill behind a bridge end bent with an MSE abutment wall, backfill the reinforced approach fill with the same aggregate type approved for the reinforced zone in the accepted MSE wall submittal. For MSE wall aggregate, reinforcement and connector materials, see the *Mechanically Stabilized Earth Retaining Walls* provision. Provide PVC pipes, fittings and outlet pipes for subsurface drainage materials. For PVC drain pipes, use pipes with perforations that meet AASHTO M 278.

Construction Methods

Excavate as necessary for approach fills in accordance with the contract. Notify the Engineer when foundation excavation is complete. Do not place separation geotextiles or aggregate until approach fill dimensions and foundation material are approved.

For reinforced approach fills, cast MSE wall reinforcement or connectors into end bent cap backwalls within 3" of locations shown in the accepted MSE wall submittals. Install MSE wall reinforcement with the orientation, dimensions and number of layers shown in the accepted MSE wall submittals. If a reinforced approach fill is designed with geogrid reinforcement embedded in an end bent cap, cut geogrids to the required lengths and after securing ends of geogrids in place, reroll and rewrap portions of geogrids not embedded in the cap to protect geogrids from damage. Before placing aggregate, pull geosynthetic reinforcement taut so that it is in tension and free of kinks, folds, wrinkles or creases.

Attach separation geotextiles to end bent cap backwalls and wing walls with adhesives, tapes or other approved methods. Overlap adjacent separation geotextiles at least 18" with seams oriented parallel to the roadway centerline. Hold geotextiles in place with wire staples or anchor pins as needed. Contact the Engineer when existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with separation geotextiles or MSE wall reinforcement.

Install continuous perforated PVC drain pipes with perforations pointing down in accordance with 2018 Roadway Standard Drawing Nos. 422.01 or 422.02. Connect drain pipes to outlet pipes just beyond wing walls. Connect PVC pipes, fittings and outlet pipes with solvent cement in accordance with Article 815-3 of the *2018 Standard Specifications* and place outlet pads in accordance with 2018 Roadway Standard Drawing No. 815.03.

Install drain pipes so water drains towards outlets. If the groundwater elevation is above drain pipe elevations, raise drains up to maintain positive drainage towards outlets. Place pipe sleeves in or under wing walls so water drains towards outlets. Use sleeves that can withstand wing wall loads.

Place select material or aggregate in 8" to 10" thick lifts. Compact fine aggregate for reinforced approach fills in accordance with Subarticle 235-3(C) of the *2018 Standard Specifications* except compact fine aggregate to a density of at least 98%. Compact select material for standard or modified approach fills and coarse aggregate for reinforced approach fills with a vibratory compactor to the satisfaction of the Engineer. Do not displace or damage geosynthetics, MSE wall reinforcement or drains when placing and compacting select material or aggregate. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on geosynthetics or drain pipes until they are covered with at least 8" of select material or aggregate. Replace any damaged geosynthetics or drains to the satisfaction of the Engineer. When approach fills extend beyond bridge approach slabs, wrap separation geotextiles over select material or aggregate as shown in 2018 Roadway Standard Drawing No. 422.01 or 2018 Roadway Detail Drawing No. 422D10.

Measurement and Payment

Type I Standard Approach Fill, Station ____, *Type II Modified Approach Fill, Station ____* and *Type III Reinforced Approach Fill, Station ____* will be paid at the contract lump sum price. The lump sum price for each approach fill will be full compensation for providing labor, tools, equipment and approach fill materials, excavating, backfilling, hauling and removing excavated materials, installing geotextiles and drains, compacting backfill and supplying select material, aggregate, separation geotextiles, drain pipes, pipe sleeves, outlet pipes and pads and any incidentals necessary to construct approach fills behind bridge end bents.

The contract lump sum price for *Type III Reinforced Approach Fill, Station ____* will also be full compensation for supplying and connecting MSE wall reinforcement to end bent caps but not designing MSE wall reinforcement and connectors. The cost of designing reinforcement and connectors for reinforced approach fills behind bridge end bents with MSE abutment walls will be incidental to the contract unit price for *MSE Retaining Wall No. __*.

Payment will be made under:

Pay Item	**Pay Unit**
Type I Standard Approach Fill, Station ____	Lump Sum
Type II Modified Approach Fill, Station ____	Lump Sum
Type III Reinforced Approach Fill, Station ____	Lump Sum

ALTERNATE BRIDGE APPROACH FILLS FOR INTEGRAL ABUTMENTS:

(1-16-18) 422 SP4 R02B

Description

At the Contractors option, use Type A Alternate Bridge Approach Fills instead of Type I or II Bridge Approach Fills to support bridge approach slabs for integral bridge abutments. An alternate bridge approach fill consists of constructing an approach fill with a temporary geotextile wall

before placing all or a portion of the concrete for the backwall and wing walls of the integral end bent cap. The temporary geotextile wall is designed for a crane surcharge, remains in place and aligned so the wall face functions as a form for the end bent cap backwall and wing walls. Install drains, welded wire facing and geotextiles and backfill approach fills and temporary walls with select material as required. Define "geotextiles" as separation or reinforcement geotextiles, "temporary wall" as a temporary geotextile wall and "alternate approach fill" as a Type A Alternate Bridge Approach Fill in accordance with 2018 Roadway Standard Drawing No. 422.03.

Materials

Refer to Division 10 of the *2018 Standard Specifications*.

Item	**Section**
Geotextiles	1056
Portland Cement Concrete	1000
Select Materials	1016
Subsurface Drainage Materials	1044
Welded Wire Reinforcement	1070-3

For temporary walls, use welded wire reinforcement for welded wire facing and Type 5 geotextile for reinforcement geotextiles. Use Type 5 geotextile with lengths and an ultimate tensile strength as shown in 2018 Roadway Standard Drawing No. 422.03. Provide Type 1 geotextile for separation geotextiles and Class B concrete for outlet pads. Use Class V or Class VI select material for alternate approach fills and temporary walls. Provide PVC pipes, fittings and outlet pipes for subsurface drainage materials. For PVC drain pipes, use pipes with perforations that meet AASHTO M 278.

Construction Methods

Excavate as necessary for alternate approach fills and temporary walls in accordance with the contract. Notify the Engineer when foundation excavation is complete. Do not place geotextiles until approach fill dimensions and foundation material are approved.

Install geotextiles as shown in 2018 Roadway Standard Drawing No. 422.03. Attach separation geotextiles to end bent cap backwalls and wing walls as needed with adhesives, tapes or other approved methods. Overlap adjacent geotextiles at least 18" with seams oriented parallel to the roadway centerline. Hold geotextiles in place with wire staples or anchor pins as needed. Contact the Engineer when existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with geotextiles.

Install continuous perforated PVC drain pipes with perforations pointing down in accordance with 2018 Roadway Standard Drawing No. 422.03. Connect drain pipes to outlet pipes just beyond wing walls. Connect PVC pipes, fittings and outlet pipes with solvent cement in accordance with Article 815-3 of the *2018 Standard Specifications* and place outlet pads in accordance with 2018 Roadway Standard Drawing No. 815.03.

Install drain pipes so water drains towards outlets. If the groundwater elevation is above drain pipe elevations, raise drains up to maintain positive drainage towards outlets. Place pipe sleeves in or under wing walls so water drains towards outlets. Use sleeves that can withstand wing wall

loads.

At the Contractor's option, construct bottom portion of integral end bents before temporary walls as shown in 2018 Roadway Standard Drawings No. 422.03. Erect and set welded wire facing so facing functions as a form for the end bent cap backwall. Place welded wire facing adjacent to each other in the horizontal and vertical directions to completely cover the temporary wall face. Stagger welded wire facing to create a running bond by centering facing over joints in the row below.

Wrap reinforcement geotextiles at the temporary wall face in accordance with 2018 Roadway Standard Drawing No. 422.03 and cover geotextiles with at least 3" of select material. Place layers of reinforcement geotextiles within 3" of locations shown in 2018 Roadway Standard Drawing No. 422.03. Before placing select material, pull reinforcement geotextiles taut so they are in tension and free of kinks, folds, wrinkles or creases. Install reinforcement geotextiles with the direction shown in 2018 Roadway Standard Drawing No. 422.03. Do not splice or overlap reinforcement geotextiles so seams are parallel to the temporary wall face.

Place select material in 8" to 10" thick lifts and compact select material with a vibratory compactor to the satisfaction of the Engineer. Do not displace or damage geotextiles or drains when placing and compacting select material. End dumping directly on geotextiles is not permitted. Do not operate heavy equipment on geotextiles or drain pipes until they are covered with at least 8" of select material. Replace any damaged geotextiles or drains to the satisfaction of the Engineer. When alternate approach fills extend beyond bridge approach slabs, wrap separation geotextiles over select material as shown in 2018 Roadway Standard Drawing No. 422.03.

Temporary walls are designed for a surcharge pressure in accordance with 2018 Roadway Standard Drawing No. 422.03. If the crane surcharge will exceed the wall design, contact the Engineer before positioning the crane over reinforcement geotextiles.

Measurement and Payment

Alternate approach fills will be paid at the contract lump sum for either *Type I Standard Approach Fill, Station* ____ or *Type II Modified Approach Fill, Station* ____ based on the approach fill type that the alternate approach fill is replacing. The lump sum price for each approach fill will be full compensation for providing labor, tools, equipment and alternate approach fill materials, excavating, backfilling, hauling and removing excavated materials, constructing temporary walls, installing wall facing, geotextiles and drains, compacting backfill and supplying select material, separation and reinforcement geotextiles, welded wire facing, drain pipes, pipe sleeves, outlet pipes and pads and any incidentals necessary to construct alternate approach fills for integral abutments.

BRIDGE APPROACH FILLS – GEOTEXTILE:

(5-17-22) SP4 R03

Place a single layer of Type 5 Geotextile one foot below the approach slab for the full width and length of the approach fill. Type 5 Geotextile shall meet the requirements of Section 1056 of the *Standard Specifications*. This revision applies to Roadway Standard 422.01, 422.02, 422.03 and Detail in Lieu of Standard 422DO10.

No separate measurement or payment will be made for the work required by this provision as the cost of such work shall be included in the lump sum price bid for *Type I Standard Approach Fill Station _____, Type III Reinforced Approach Fill, Station _____* or *Type II Modified Approach Fill, Station _____*.

AUTOMATED FINE GRADING:

(1-16-96) 610 SP5 R05

On mainline portions and ramps of this project, prepare the subgrade and base beneath the pavement structure in accordance with the applicable sections of the *2018 Standard Specifications* except use an automatically controlled fine grading machine using string lines, laser controls or other approved methods to produce final subgrade and base surfaces meeting the lines, grades and cross sections required by the plans or established by the Engineer.

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

AGGREGATE SUBGRADE:

(5-15-18) 505 SP5 R8

Revise the *2018 Standard Specifications* as follows:

Page 5-8, Article 505-1 DESCRIPTION, lines 4-6, replace the paragraph with the following:

Construct aggregate subgrades in accordance with the contract. Install geotextile for soil stabilization and place Class IV subgrade stabilization at locations shown in the plans and as directed.

Undercut natural soil materials if necessary to construct aggregate subgrades. Define "subbase" as the portion of the roadbed below the Class IV subgrade stabilization. For Type 2 aggregate subgrades, undercut subbases as needed. The types of aggregate subgrade with thickness and compaction requirements for each are as shown below.

Type 1 – A 6 to 24 inch thick aggregate subgrade with Class IV subgrade stabilization compacted to 92% of AASHTO T 180 as modified by the Department or to the highest density that can be reasonably obtained.

Type 2 – An 8 inch thick aggregate subgrade on a proof rolled subbase with Class IV subgrade stabilization compacted to 97% of AASHTO T 180 as modified by the Department.

Page 5-8, Article 505-3 CONSTRUCTION METHODS, line 12, insert the following after the first sentence of the first paragraph:

For Type 2 aggregate subgrades, proof roll subbases in accordance with Section 260 before installing geotextile for soil stabilization.

Page 5-8, Article 505-3 CONSTRUCTION METHODS, lines 16-17, replace the last sentence of the first paragraph with the following:

Compact ABC as required for the type of aggregate subgrade constructed.

Page 5-8, Article 505-4 MEASUREMENT AND PAYMENT, line 26, insert the following after the last sentence of the first paragraph:

Undercut Excavation of natural soil materials from subbases for Type 2 aggregate subgrades will be measured and paid in accordance with Article 225-7 or 226-3. No measurement will be made for any undercut excavation of fill materials from subbases.

PRICE ADJUSTMENT - ASPHALT BINDER FOR PLANT MIX:
(11-21-00) 620 SP6 R25

Price adjustments for asphalt binder for plant mix will be made in accordance with Section 620 of the *2018 Standard Specifications.*

The base price index for asphalt binder for plant mix is **$ 667.22** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **April 1, 2022**.

ASPHALT CONCRETE PLANT MIX PAVEMENTS:
(2-20-18) (Rev.1-15-19) 610, 1012 SP6 R65

Revise the *2018 Standard Specifications* as follows:

Page 6-14, Table 609-3, LIMITS OF PRECISION FOR TEST RESULTS, replace with the following:

TABLE 609-3
LIMITS OF PRECISION FOR TEST RESULTS

Mix Property	Limits of Precision
25.0 mm sieve (Base Mix)	± 10.0%
19.0 mm sieve (Base Mix)	± 10.0%
12.5 mm sieve (Intermediate & Type P-57)	± 6.0%
9.5 mm sieve (Surface Mix)	± 5.0%
4.75 mm sieve (Surface Mix)	± 5.0%
2.36 mm sieve (All Mixes, except S4.75A)	± 5.0%
1.18 mm sieve (S4.75A)	± 5.0%
0.075 mm sieve (All Mixes)	± 2.0%
Asphalt Binder Content	± 0.5%
Maximum Specific Gravity (G_{mm})	± 0.020
Bulk Specific Gravity (G_{mb})	± 0.030
TSR	± 15.0%
QA retest of prepared QC Gyratory Compacted Volumetric Specimens	± 0.015
Retest of QC Core Sample	± 1.2% (% Compaction)
Comparison QA Core Sample	± 2.0% (% Compaction)
QA Verification Core Sample	± 2.0% (% Compaction)
Density Gauge Comparison of QC Test	± 2.0% (% Compaction)
QA Density Gauge Verification Test	± 2.0% (% Compaction)

Page 6-17, Table 610-1, MIXING TEMPERATURE AT THE ASPHALT PLANT, replace with the following:

TABLE 610-1
MIXING TEMPERATURE AT THE ASPHALT PLANT

Binder Grade	JMF Temperature
PG 58-28; PG 64-22	250 - 290°F
PG 76-22	300 - 325°F

Page 6-17, Subarticle 610-3(C), Job Mix Formula (JMF), lines 38-39, delete the fourth paragraph.

Page 6-18, Subarticle 610-3(C), Job Mix Formula (JMF), line 12, replace "SF9.5A" with "S9.5B".

Page 6-18, Table 610-3, MIX DESIGN CRITERIA, replace with the following:

TABLE 610-3
MIX DESIGN CRITERIA

Mix Type	Design ESALs millions [A]	Binder PG Grade	Compaction Levels G_{mm} @ N_{ini}	Compaction Levels G_{mm} @ N_{des}	Max. Rut Depth (mm)	Volumetric Properties [B] VMA % Min.	VTM %	VFA Min.-Max.	$\%G_{mm}$ @ N_{ini}
S4.75A	< 1	64 - 22	6	50	11.5	16.0	4.0 - 6.0	65 - 80	≤ 91.5
S9.5B	0 - 3	64 - 22	6	50	9.5	16.0	3.0 - 5.0	70 - 80	≤ 91.5
S9.5C	3 - 30	64 - 22	7	65	6.5	15.5	3.0 - 5.0	65 - 78	≤ 90.5
S9.5D	> 30	76 - 22	8	100	4.5	15.5	3.0 - 5.0	65 - 78	≤ 90.0
I19.0C	ALL	64 - 22	7	65	-	13.5	3.0 - 5.0	65 - 78	≤ 90.5
B25.0C	ALL	64 - 22	7	65	-	12.5	3.0 - 5.0	65 - 78	≤ 90.5
	Design Parameter					**Design Criteria**			
All Mix Types	Dust to Binder Ratio ($P_{0.075}$ / P_{be})					0.6 - 1.4 [C]			
	Tensile Strength Ratio (TSR) [D]					85% Min. [E]			

A. Based on 20 year design traffic.
B. Volumetric Properties based on specimens compacted to N_{des} as modified by the Department.
C. Dust to Binder Ratio ($P_{0.075}$ / P_{be}) for Type S4.75A is 1.0 - 2.0.
D. NCDOT-T-283 (No Freeze-Thaw cycle required).
E. TSR for Type S4.75A & B25.0C mixes is 80% minimum.

Page 6-19, Table 610-5, BINDER GRADE REQUIREMENTS (BASED ON RBR%), replace with the following:

TABLE 610-5
BINDER GRADE REQUIREMENTS (BASED ON RBR%)

Mix Type	%RBR ≤ 20%	21% ≤ %RBR ≤ 30%	%RBR ≥ 30%
S4.75A, S9.5B, S9.5C, I19.0C, B25.0C	PG 64-22	PG 64-22[A]	PG-58-28
S9.5D, OGFC	PG 76-22[B]	n/a	n/a

A. If the mix contains any amount of RAS, the virgin binder shall be PG 58-28.
B. Maximum Recycled Binder Replacement (%RBR) is 18% for mixes using PG 76-22 binder.

Page 6-20, Table 610-6, PLACEMENT TEMPERATURES FOR ASPHALT, replace with the following:

TABLE 610-6 PLACEMENT TEMPERATURES FOR ASPHALT	
Asphalt Concrete Mix Type	**Minimum Surface and Air Temperature**
B25.0C	35°F
I19.0C	35°F
S4.75A, S9.5B, S9.5C	40°F [A]
S9.5D	50°F

A. For the final layer of surface mixes containing recycled asphalt shingles (RAS), the minimum surface and air temperature shall be 50°F.

Page 6-21, Article 610-8, SPREADING AND FINISHING, lines 34-35, delete the second sentence and replace with the following:

Use an MTV for all surface mix regardless of binder grade on Interstate, US Routes, and NC Routes (primary routes) that have 4 or more lanes and median divided.

Page 6-21, Article 610-8, SPREADING AND FINISHING, lines 36-38, delete the fourth sentence and replace with the following:

Use MTV for all ramps, loops, Y-line that have 4 or more lanes and are median divided, full width acceleration lanes, full width deceleration lanes, and full width turn lanes that are greater than 1000 feet in length.

Page 6-23, Table 610-7, DENSITY REQUIREMENTS, replace with the following:

TABLE 610-7 DENSITY REQUIREMENTS	
Mix Type	**Minimum % G_{mm} (Maximum Specific Gravity)**
S4.75A	85.0 [A]
S9.5B	90.0
S9.5C, S9.5D, I19.0C, B25.0C	92.0

A. Compaction to the above specified density will be required when the S4.75A mix is applied at a rate of 100 lbs/sy or higher.

Page 6-24, Article 610-13, FINAL SURFACE TESTING, lines 35-36, delete the second sentence and replace with the following:

Final surface testing is not required on ramps, loops and turn lanes.

Page 6-26, Subarticle 610-13(A)(1), Acceptance for New Construction, lines 29-30, delete the second sentence and replace with the following:

Areas excluded from testing by the profiler may be tested using a 10-foot straightedge in accordance with Article 610-12.

Page 6-27, Subarticle 610-13(B), Option 2- North Carolina Hearne Straightedge, lines 41-46, delete the eighth and ninth sentence of this paragraph and replace with the following:

Take profiles over the entire length of the final surface travel lane pavement exclusive of structures, approach slabs, paved shoulders, 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 and collector lanes.

Page 6-28, Subarticle 610-13(B), Option 2- North Carolina Hearne Straightedge, lines 1-2, delete these two lines.

Page 6-32, Article 610-16 MEASUREMENT AND PAYMENT, replace with the following:

Pay Item	**Pay Unit**
Asphalt Concrete Base Course, Type B25.0C	Ton
Asphalt Concrete Intermediate Course, Type I19.0C	Ton
Asphalt Concrete Surface Course, Type S4.75A	Ton
Asphalt Concrete Surface Course, Type S9.5B	Ton
Asphalt Concrete Surface Course, Type S9.5C	Ton
Asphalt Concrete Surface Course, Type S9.5D	Ton

Page 10-30, Table 1012-1, AGGREGATE CONSENSUS PROPERTIES, replace with the following:

TABLE 1012-1
AGGREGATE CONSENSUS PROPERTIES[A]

Mix Type	**Coarse Aggregate Angularity[B] % Minimum**	**Fine Aggregate Angularity % Minimum**	**Sand Equivalent % Minimum**	**Flat and Elongated 5 : 1 Ratio % Maximum**
Test Method	*ASTM D5821*	*AASHTO T 304*	*AASHTO T 176*	*ASTM D4791*
S4.75A; S9.5B	75 / -	40	40	-
S9.5C; I19.0C; B25.0C	95 / 90	45	45	10
S9.5D	100 / 100	45	50	10
OGFC	100 / 100	45	45	10
UBWC	100 / 85	45	45	10

A. Requirements apply to the design aggregate blend.
B. 95 / 90 denotes that 95% of the coarse aggregate has one fractured face and 90% has 2 or more fractured faces.

AUTOMATED MACHINE GUIDANCE:
(1-2-11) 801 SP8 R01

General

This Special Provision contains requirements to be followed if the Contractor elects to use Global Positioning System (GPS) machine control grading and shall be used in conjunction with Section 801 of the *Standard Specifications*. The use of this technology is referenced as Automated Machine Guidance (AMG).

All equipment using AMG shall be able to generate end results that meet the *Standard Specifications*. Perform test sections for each type of work to be completed with AMG to demonstrate that the system has the capability to achieve acceptable results. If acceptable results cannot be achieved, conform to the requirements for conventional stakeout.

The Contractor shall be responsible for all errors resulting from the use of AMG and shall correct deficiencies to the satisfaction of the Engineer at no cost to the Department.

Submittals

If the Contractor elects to use AMG, a Digital Terrain Model (DTM) of the design surface and all intermediate surfaces shall be developed and submitted to the Engineer for review.

At least 90 days prior to beginning grading operations, the Contractor shall submit to the Engineer an AMG work plan to include, but not limited to, proposed equipment, control software manufacturer and version, types of work to be completed using AMG, project site calibration report, repetitive calibration methods for construction equipment and rover units to be used for the duration of the project, and local GPS base station to be used for broadcasting differential correction data to rover units (this may include the NC Network RTK). All surveys must be tied to existing project control as established by NCDOT.

Inspection

The Engineer will perform quality assurance checks of all work associated with AMG. If it is determined that work is not being performed in a manner that will assure accurate results, the Engineer may require corrective action at no cost to the Department.

The Contractor shall provide the Engineer with two GPS rover units for use during the duration of the contract. The rovers will be loaded with the same model that is used with the AMG and have the same capability as rover units used by the Contractor. The rovers will be kept in the possession of the Engineer and will be returned to the Contractor upon completion of the contract. Any maintenance or repairs required for the rover will be the responsibility of the Contractor. Formal training of at least 8 hours shall be provided to the Engineer by the Contractor on the use of the proposed AMG system.

Subgrade and Base Controls

If the Contractor elects to use AMG for fine grading and placement of base or other roadway materials, the GPS shall be supplemented with a laser or robotic total station. Include details of

the proposed system in the AMG work plan. In addition, the following requirements apply for the use of AMG for subgrade and base construction.

Provide control points at intervals along the project not to exceed 1,000 feet. The horizontal position of these points shall be determined by static GPS sessions or by traverse connection from the original base line control points. The elevation of these control points shall be established using differential leveling from project benchmarks, forming closed loops where practical. A copy of all new control point information shall be provided to the Engineer prior to construction activities.

Provide control points and conventional survey grade stakes at 500 foot intervals and at critical points such as, but not limited to, PCs, PTs, superelevation transition points, and other critical points as requested by the Engineer.

Provide hubs at the top of the finished subgrade at all hinge points on the cross section at 500 foot intervals. These hubs shall be established using conventional survey methods for use by the Engineer to check the accuracy of construction.

Measurement and Payment

No direct payment will be made for work required to utilize this provision. All work will be considered incidental to various grading operations.

SUPPLEMENTAL SURVEYING:
(4-20-21) 801 SP8 R03

Revise the *2018 Standard Specifications* as follows:

Page 8-7, Article 801-3 MEASUREMENT AND PAYMENT, lines 10-11, replace with the following:

Supplemental Surveying Office Calculations will be paid at the stated price of $85.00 per hour. *Supplemental Field Surveying* will be paid at the stated price of $145.00 per hour. The

GUARDRAIL END UNITS, TYPE - TL-3:
(4-20-04) (Rev. 7-1-17) 862 SP8 R65

Description

Furnish and install guardrail end units in accordance with the details in the plans, the applicable requirements of Section 862 of the *2018 Standard Specifications*, and at locations shown in the plans.

Materials

Furnish guardrail end units listed on the NCDOT Approved Products List at https://apps.dot.state.nc.us/vendor/approvedproducts/ or approved equal.

Prior to installation the Contractor shall submit to the Engineer:

(A) FHWA acceptance letter for each guardrail end unit certifying it meets the requirements of the AASHTO Manual for Assessing Safety Hardware, Test Level 3, in accordance with Article 106-2 of the *2018 Standard Specifications*.

(B) Certified working drawings and assembling instructions from the manufacturer for each guardrail end unit in accordance with Article 105-2 of the *2018 Standard Specifications*.

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

Construction Methods

Guardrail end delineation is required on all approach and trailing end sections for both temporary and permanent installations. Guardrail end delineation consists of yellow reflective sheeting applied to the entire end section of the guardrail in accordance with Article 1088-3 of the *2018 Standard Specifications* and is incidental to the cost of the guardrail end unit.

Measurement and Payment

Measurement and payment will be made in accordance with Article 862-6 of the *2018 Standard Specifications*.

Payment will be made under:

Pay Item	**Pay Unit**
Guardrail End Units, Type TL-3	Each

GUARDRAIL ANCHOR UNITS AND TEMPORARY GUARDRAIL ANCHOR UNITS:

(1-16-2018) 862 SP8 R70

Guardrail anchor units will be in accordance with the details in the plans and the applicable requirements of Section 862 of the *2018 Standard Specifications*.

Revise the *2018 Standard Specifications* as follows:

Page 8-42, Article 862-6 MEASUREMENT AND PAYMENT, add the following:

Guardrail Anchor Units, Type ___ and Temporary Guardrail Anchor Units Type ___ will be measured and paid as units of each completed and accepted. No separate measurement will be made of any rail, terminal sections, posts, offset blocks, concrete, hardware or any other components of the completed unit that are within the pay limits shown in the plans for the unit as all such components will be considered to be part of the unit.

Payment will be made under:

Pay Item	**Pay Unit**
Guardrail Anchor Units, Type ____	Each
Temporary Guardrail Anchor Units, Type ___	Each

IMPACT ATTENUATOR UNITS, TYPE TL-3:

(4-20-04) (Rev. 12-18-18) SP8 R75

Description

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

Materials

Furnish impact attenuator units listed on the Approved Products List at https://apps.dot.state.nc.us/vendor/approvedproducts/ or approved equal. Prior to installation the Contractor shall submit to the Engineer:

(A) FHWA acceptance letter for each impact attenuator unit certifying it meets the requirements of the Manual for Assessing Safety Hardware (MASH-16), Test Level 3, in accordance with Article 106-2 of the *2018 Standard Specifications*.

(B) Certified working drawings and assembling instructions from the manufacturer for each impact attenuator unit in accordance with Article 105-2 of the *2018 Standard Specifications*.

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

Construction Methods

If the median width is 40 feet or less, the Contractor shall supply NON-GATING Impact Attenuator Units.

If the median width is greater than 40 feet, the Contractor may use GATING or NON-GATING Impact Attenuator Units.

Measurement and Payment

Impact Attenuator Unit, Type TL-3 will be measured and paid at the contract unit price per each. Such prices and payment will be full compensation for all work covered by this provision including, but not limited to, furnishing, installing and all incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Impact Attenuator Units, Type TL-3	Each

MODIFIED SHOULDER BERM GUTTER:

Description

The Contractor shall construct Modified Shoulder Berm Gutter as shown on the plans and details, in accordance with the applicable requirements of Section 846 of the *Standards Specifications*, and as directed by the Engineer.

Measurement and Payment

Modified Shoulder Berm Gutter will be measured and paid for in Linear Feet. Such price and payment will include all materials, tools, labor, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
5.5" Modified Shoulder Berm Gutter	LF
6" Modified Shoulder Berm Gutter	LF

FOUNDATIONS AND ANCHOR ROD ASSEMBLIES FOR METAL POLES:

(1-17-12) (Rev. 1-16-18) 9, 14, 17 SP9 R05

Description

Foundations for metal poles include foundations for signals, cameras, overhead and dynamic message signs (DMS) and high mount and light standards supported by metal poles or upright trusses. Foundations consist of footings with pedestals and drilled piers with or without grade beams or wings. Anchor rod assemblies consist of anchor rods (also called anchor bolts) with nuts and washers on the exposed ends of rods and nuts and a plate or washers on the other ends of rods embedded in the foundation.

Construct concrete foundations with the required resistances and dimensions and install anchor rod assemblies in accordance with the contract and accepted submittals. Construct drilled piers consisting of cast-in-place reinforced concrete cylindrical sections in excavated holes. Provide temporary casings or polymer slurry as needed to stabilize drilled pier excavations. Use a prequalified Drilled Pier Contractor to construct drilled piers for metal poles. Define "excavation" and "hole" as a drilled pier excavation and "pier" as a drilled pier.

This provision does not apply to foundations for signal pedestals; see Section 1743 of the *2018 Standard Specifications* and 2018 Roadway Standard Drawing No. 1743.01.

Materials

Refer to the *2018 Standard Specifications*.

Item	Section
Conduit	1091-3
Grout, Type 2	1003

Item	Section
Polymer Slurry	411-2(B)(2)
Portland Cement Concrete	1000
Reinforcing Steel	1070
Rollers and Chairs	411-2(C)
Temporary Casings	411-2(A)

Provide Type 3 material certifications in accordance with Article 106-3 of the *2018 Standard Specifications* for conduit, rollers, chairs and anchor rod assemblies. Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store foundation and anchor rod assembly materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

Use conduit type in accordance with the contract. Use Class A concrete for footings and pedestals, Class Drilled Pier concrete for drilled piers and Class AA concrete for grade beams and wings including portions of drilled piers above bottom of wings elevations. Corrugated temporary casings may be accepted at the discretion of the Engineer. A list of approved polymer slurry products is available from:
connect.ncdot.gov/resources/Geological/Pages/Products.aspx

Provide anchor rod assemblies in accordance with the contract consisting of the following:

(A) Straight anchor rods,

(B) Heavy hex top and leveling nuts and flat washers on exposed ends of rods, and

(C) Nuts and either flat plates or washers on the other ends of anchor rods embedded in foundations.

Do not use lock washers. Use steel anchor rods, nuts and washers that meet ASTM F1554 for Grade 55 rods and Grade A nuts. Use steel plates and washers embedded in concrete with a thickness of at least 1/4". Galvanize anchor rods and exposed nuts and washers in accordance with Article 1076-4 of the *2018 Standard Specifications*. It is not necessary to galvanize nuts, plates and washers embedded in concrete.

Construction Methods

Install the required size and number of conduits in foundations in accordance with the plans and accepted submittals. Construct top of piers, footings, pedestals, grade beams and wings flat, level and within 1" of elevations shown in the plans or approved by the Engineer. Provide an Ordinary Surface finish in accordance with Subarticle 825-6(B) of the *2018 Standard Specifications* for portions of foundations exposed above finished grade. Do not remove anchor bolt templates or pedestal or grade beam forms or erect metal poles or upright trusses onto foundations until concrete attains a compressive strength of at least 3,000 psi.

(A) Drilled Piers

Before starting drilled pier construction, hold a predrill meeting to discuss the installation, monitoring and inspection of the drilled piers. Schedule this meeting after the Drilled Pier Contractor has mobilized to the site. The Resident or Division Traffic Engineer, Contractor and Drilled Pier Contractor Superintendent will attend this predrill meeting.

Do not excavate holes, install piles or allow equipment wheel loads or vibrations within 20 ft of completed piers until 16 hours after Drilled Pier concrete reaches initial set.

Check for correct drilled pier alignment and location before beginning drilling. Check plumbness of holes frequently during drilling.

Construct drilled piers with the minimum required diameters shown in the plans. Install piers with tip elevations no higher than shown in the plans or approved by the Engineer.

Excavate holes with equipment of the sizes required to construct drilled piers. Depending on the subsurface conditions encountered, drilling through rock and boulders may be required. Do not use blasting for drilled pier excavations.

Contain and dispose of drilling spoils and waste concrete as directed and in accordance with Section 802 of the *2018 Standard Specifications*. Drilling spoils consist of all materials and fluids removed from excavations.

If unstable, caving or sloughing materials are anticipated or encountered, stabilize holes with temporary casings and/or polymer slurry. Do not use telescoping temporary casings. If it becomes necessary to replace a temporary casing during drilling, backfill the excavation, insert a larger casing around the casing to be replaced or stabilize the excavation with polymer slurry before removing the temporary casing.

If temporary casings become stuck or the Contractor proposes leaving casings in place, temporary casings should be installed against undisturbed material. Unless otherwise approved, do not leave temporary casings in place for mast arm poles and cantilever signs. The Engineer will determine if casings may remain in place. If the Contractor proposes leaving temporary casings in place, do not begin drilling until a casing installation method is approved.

Use polymer slurry and additives to stabilize holes in accordance with the slurry manufacturer's recommendations. Provide mixing water and equipment suitable for polymer slurry. Maintain the required slurry properties at all times except for sand content.

Define a "sample set" as slurry samples collected from mid-height and within 2 ft of the bottom of holes. Take sample sets from excavations to test polymer slurry immediately after filling holes with slurry, at least every 4 hours thereafter and immediately before placing concrete. Do not place Drilled Pier concrete until both slurry samples from an excavation meet the required polymer slurry properties. If any slurry test results do not meet the requirements, the Engineer may suspend drilling until both samples from a sample set meet the required polymer slurry properties.

Remove soft and loose material from bottom of holes using augers to the satisfaction of the Engineer. Assemble rebar cages and place cages and Drilled Pier concrete in accordance with Subarticle 411-4(E) of the *2018 Standard Specifications* except for the following:

(1) Inspections for tip resistance and bottom cleanliness are not required,
(2) Temporary casings may remain in place if approved, and
(3) Concrete placement may be paused near the top of pier elevations for anchor rod assembly installation and conduit placement or
(4) If applicable, concrete placement may be stopped at bottom of grade beam or wings elevations for grade beam or wing construction.

If wet placement of concrete is anticipated or encountered, do not place Drilled Pier concrete until a concrete placement procedure is approved. If applicable, temporary casings and fluids may be removed when concrete placement is paused or stopped in accordance with the exceptions above provided holes are stable. Remove contaminated concrete from exposed Drilled Pier concrete after removing casings and fluids. If holes are unstable, do not remove temporary casings until a procedure for placing anchor rod assemblies and conduit or constructing grade beams or wings is approved.

Use collars to extend drilled piers above finished grade. Remove collars after Drilled Pier concrete sets and round top edges of piers.

If drilled piers are questionable, pile integrity testing (PIT) and further investigation may be required in accordance with Article 411-5 of the *2018 Standard Specifications*. A drilled pier will be considered defective in accordance with Subarticle 411-5(D) of the *2018 Standard Specifications* and drilled pier acceptance is based in part on the criteria in Article 411-6 of the *2018 Standard Specifications* except for the top of pier tolerances in Subarticle 411-6(C) of the *2018 Standard Specifications*.

If a drilled pier is under further investigation, do not grout core holes, backfill around the pier or perform any work on the drilled pier until the Engineer accepts the pier. If the drilled pier is accepted, dewater and grout core holes and backfill around the pier with approved material to finished grade. If the Engineer determines a pier is unacceptable, remediation is required in accordance with Article 411-6 of the *2018 Standard Specifications*. No extension of completion date or time will be allowed for remediation of unacceptable drilled piers or post repair testing.

Permanently embed a plate in or mark top of piers with the pier diameter and depth, size and number of vertical reinforcing bars and the minimum compressive strength of the concrete mix at 28 days.

(B) Footings, Pedestals, Grade Beams and Wings

Excavate as necessary for footings, grade beams and wings in accordance with the plans, accepted submittals and Section 410 of the *2018 Standard Specifications*. If unstable, caving or sloughing materials are anticipated or encountered, shore foundation excavations

as needed with an approved method. Notify the Engineer when foundation excavation is complete. Do not place concrete or reinforcing steel until excavation dimensions and foundation material are approved.

Construct cast-in-place reinforced concrete footings, pedestals, grade beams and wings with the dimensions shown in the plans and in accordance with Section 825 of the *2018 Standard Specifications*. Use forms to construct portions of pedestals and grade beams protruding above finished grade. Provide a chamfer with a 3/4" horizontal width for pedestal and grade beam edges exposed above finished grade. Place concrete against undisturbed soil or backfill and fill in accordance with Article 410-8 of the *2018 Standard Specifications*. Proper compaction around footings and wings is critical for foundations to resist uplift and torsion forces.

(C) Anchor Rod Assemblies

Size anchor rods for design and the required projection above top of foundations. Determine required anchor rod projections from nut, washer and base plate thicknesses, the protrusion of 3 to 5 anchor rod threads above top nuts after tightening and the distance of one nut thickness between top of foundations and bottom of leveling nuts.

Protect anchor rod threads from damage during storage and installation of anchor rod assemblies. Before placing anchor rods in foundations, turn nuts onto and off rods past leveling nut locations. Turn nuts with the effort of one workman using an ordinary wrench without a cheater bar. Report any thread damage to the Engineer that requires extra effort to turn nuts.

Arrange anchor rods symmetrically about center of base plate locations as shown in the plans. Set anchor rod elevations based on required projections above top of foundations. Securely brace and hold rods in the correct position, orientation and alignment with a steel template. Do not weld to reinforcing steel, temporary casings or anchor rods.

Install top and leveling (bottom) nuts, washers and the base plate for each anchor rod assembly in accordance with the following procedure:

(1) Turn leveling nuts onto anchor rods to a distance of one nut thickness between the top of foundation and bottom of leveling nuts. Place washers over anchor rods on top of leveling nuts.
(2) Determine if nuts are level using a flat rigid template on top of washers. If necessary, lower leveling nuts to level the template in all directions or if applicable, lower nuts to tilt the template so the metal pole or upright truss will lean as shown in the plans. If leveling nuts and washers are not in full contact with the template, replace washers with galvanized beveled washers.
(3) Verify the distance between the foundation and leveling nuts is no more than one nut thickness.
(4) Place base plate with metal pole or upright truss over anchor rods on top of washers. High mount luminaires may be attached before erecting metal poles but do not attach cables, mast arms or trusses to metal poles or upright trusses at this time.

(5) Place washers over anchor rods on top of base plate. Lubricate top nut bearing surfaces and exposed anchor rod threads above washers with beeswax, paraffin or other approved lubricant.

(6) Turn top nuts onto anchor rods. If nuts are not in full contact with washers or washers are not in full contact with the base plate, replace washers with galvanized beveled washers.

(7) Tighten top nuts to snug-tight with the full effort of one workman using a 12" wrench. Do not tighten any nut all at once. Turn top nuts in increments. Follow a star pattern cycling through each nut at least twice.

(8) Repeat (7) for leveling nuts.

(9) Replace washers above and below the base plate with galvanized beveled washers if the slope of any base plate face exceeds 1:20 (5%), any washer is not in firm contact with the base plate or any nut is not in firm contact with a washer. If any washers are replaced, repeat (7) and (8).

(10) With top and leveling nuts snug-tight, mark each top nut on a corner at the intersection of 2 flats and a corresponding reference mark on the base plate. Mark top nuts and base plate with ink or paint that is not water-soluble. Use the turn-of-nut method for pretensioning. Do not pretension any nut all at once. Turn top nuts in increments for a total turn that meets the following nut rotation requirements:

NUT ROTATION REQUIREMENTS (Turn-of-Nut Pretensioning Method)	
Anchor Rod Diameter, inch	**Requirement**
≤ 1 1/2	1/3 turn (2 flats)
> 1 1/2	1/6 turn (1 flat)

Follow a star pattern cycling through each top nut at least twice.

(11) Ensure nuts, washers and base plate are in firm contact with each other for each anchor rod. Cables, mast arms and trusses may now be attached to metal poles and upright trusses.

(12) Between 4 and 14 days after pretensioning top nuts, use a torque wrench calibrated within the last 12 months to check nuts in the presence of the Engineer. Completely erect mast arm poles and cantilever signs and attach any hardware before checking top nuts for these structures. Check that top nuts meet the following torque requirements:

TORQUE REQUIREMENTS	
Anchor Rod Diameter, inch	**Requirement, ft-lb**
7/8	180
1	270
1 1/8	380
1 1/4	420
≥ 1 1/2	600

If necessary, retighten top nuts in the presence of the Engineer with a calibrated torque wrench to within ± 10 ft-lb of the required torque. Do not overtighten top nuts.

(13) Do not grout under base plate.

Measurement and Payment

Foundations and anchor rod assemblies for metal poles and upright trusses will be measured and paid for elsewhere in the contract.

No payment will be made for temporary casings that remain in drilled pier excavations. No payment will be made for PIT. No payment will be made for further investigation of defective piers. Further investigation of piers that are not defective will be paid as extra work in accordance with Article 104-7 of the *2018 Standard Specifications*. No payment will be made for remediation of unacceptable drilled piers or post repair testing.

OVERHEAD AND DYNAMIC MESSAGE SIGN FOUNDATIONS:

(1-16-18) SP9 R07

Description

Sign foundations include foundations for overhead and dynamic message signs (DMS) supported by metal poles or upright trusses. Sign foundations consist of footings with pedestals or drilled piers with or without grade beams or wings, conduit and anchor rod assemblies. Construct sign foundations in accordance with the contract and accepted submittals. Define "cantilever sign" as an overhead cantilever sign support in accordance with Figure 1-1 of the *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*.

Materials

Use sign foundation materials that meet the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

Subsurface Conditions

Assume the following soil parameters and groundwater elevation for sign foundations unless these subsurface conditions are not applicable to sign locations:

(A) Unit weight (γ) = 120 pcf,
(B) Friction angle (ϕ) = 30°,
(C) Cohesion (c) = 0 psf and
(D) Groundwater 7 feet below finished grade.

A subsurface investigation is required if the Engineer determines these assumed subsurface conditions do not apply to a sign location and the sign cannot be moved. Subsurface conditions requiring a subsurface investigation include but are not limited to weathered or hard rock, boulders, very soft or loose soil, muck or shallow groundwater. No extension of completion date or time will be allowed for subsurface investigations.

Subsurface Investigations

Use a prequalified geotechnical consultant to perform one standard penetration test (SPT) boring in accordance with ASTM D1586 at each sign location requiring a subsurface investigation. Rough grade sign locations to within 2 feet of finished grade before beginning drilling. Drill

borings to 2 drilled pier diameters below anticipated pier tip elevations or refusal, whichever is higher.
Use the computer software gINT version V8i or later manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs. Provide boring logs sealed by a geologist or engineer licensed in the state of North Carolina.

Sign Foundation Designs

Design sign foundations for the wind zone and clearances shown in the plans and the slope of finished grade at each sign location. Use the assumed soil parameters and groundwater elevation above for sign foundation designs unless a subsurface investigation is required. For sign locations requiring a subsurface investigation, design sign foundations for the subsurface conditions at each sign location. Design footings, pedestals, drilled piers, grade beams and wings in accordance with the *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*. In some instances, conflicts with drainage structures may dictate sign foundation types.

Design footings in accordance with Section 4.4 of the *AASHTO Standard Specifications for Highway Bridges*. Do not use an allowable bearing pressure of more than 3,000 psf for footings. Design drilled piers for side resistance only in accordance with Section 4.6 of the *AASHTO Standard Specifications for Highway Bridges* except reduce ultimate side resistance by 25% for uplift. Use the computer software LPILE version 2016 or later manufactured by Ensoft, Inc. to analyze drilled piers. Provide drilled pier designs with a horizontal deflection of less than 1" at top of piers. For cantilever signs with single drilled pier foundations supporting metal poles, use wings to resist torsion forces. Provide drilled pier designs with a factor of safety of at least 2.0 for torsion.

For drilled pier sign foundations supporting upright trusses, use dual drilled piers connected with a grade beam having a moment of inertia approximately equal to that of either pier. The Broms' method is acceptable to analyze drilled piers with grade beams instead of LPILE. Use a safety factor of at least 3.5 for the Broms' design method in accordance with C13.6.1.1 of the *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*.

Submit boring logs, if any, working drawings and design calculations for acceptance in accordance with Article 105-2 of the *2018 Standard Specifications*. Submit working drawings showing plan views, required foundation dimensions and elevations and typical sections with reinforcement, conduit and anchor rod assembly details. Include all boring logs, design calculations and LPILE output for sign foundation design submittals. Have sign foundations designed, detailed and sealed by an engineer licensed in the state of North Carolina.

Construction Methods

Construct footings, pedestals, drilled piers, grade beams and wings and install anchor rod assemblies for sign foundations in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

Measurement and Payment

Overhead Footings will be measured and paid in cubic yards. Sign foundations will be measured as the cubic yards of foundation concrete for footings, pedestals, drilled piers, grade beams and wings shown in the accepted submittals. The contract unit price for *Overhead Footings* will be full compensation for providing labor, tools, equipment and foundation materials, stabilizing or shoring excavations, supplying and placing concrete, reinforcing steel, conduit, anchor rod assemblies and any incidentals necessary to construct sign foundations. Subsurface investigations required by the Engineer will be paid as extra work in accordance with Article 104-7 of the *2018 Standard Specifications*.

Payment will be made under:

Pay Item	**Pay Unit**
Overhead Footings	Cubic Yard

PORTLAND CEMENT CONCRETE PRODUCTION AND DELIVERY:

(9-15-20) 1000, 1014, 1024 SP10 R01

Revise the *2018 Standard Specifications* as follows:

Page 10-6, Table 1000-1, REQUIREMENTS FOR CONCRETE, replace with the following:

TABLE 1000-1
REQUIREMENTS FOR CONCRETE

Class of Concrete	Min. Compressive Strength at 28 days	Maximum Water-Cement Ratio				Consistency Maximum Slump		Cement Content			
		Air-Entrained Concrete		Non-Air-Entrained Concrete		Vibrated	Non-Vibrated	Vibrated		Non-Vibrated	
		Rounded Aggregate	Angular Aggregate	Rounded Aggregate	Angular Aggregate			Min.	Max.	Min.	Max.
Units	*psi*					*inch*	*inch*	*lb/cy*	*lb/cy*	*lb/cy*	*lb/cy*
AA	4500	0.381	0.426	---	---	3.5[A]	---	639	715	---	---
AA Slip Form	4500	0.381	0.426	---	---	1.5	---	639	715	---	---
Drilled Pier	4500	---	---	0.450	0.450	---	5 – 7 dry 7 - 9 wet	---	---	640	800
A	3000	0.488	0.532	0.550	0.594	3.5[A]	4.0	564	---	602	---
B	2500	0.488	0.567	0.559	0.630	1.5 machine placed 2.5[A] hand placed	4.0	508	---	545	---
Sand Light-weight	4500	---	0.420	---	---	4.0[A]	---	715	---	---	---

Latex Modified	3000 (at 7 days)	0.400	0.400	---	---	6.0	---	658	---	---	---
Flowable Fill excavatable	150 max. (at 56 days)	as needed	as needed	as needed	as needed	---	Flowable	---	---	40	100
Flowable Fill non-excavatable	125	as needed	as needed	as needed	as needed	---	Flowable	---	---	100	as needed
Pavement	4500 Design, field 650 flexural, design only	0.559	0.559	---	---	1.5 slip form 3.0 hand placed	---	526	---	---	---
Precast	See Table 1077-1	as needed	as needed	---	---	6.0	as needed	as needed	as needed	as needed	as needed
Prestressed	per contract	See Table 1078-1	See Table 1078-1	---	---	8.0	---	564	as needed	---	---

A. The slump may be increased to 6 inches, provided the increase in slump is achieved by adding a chemical admixture conforming to Section 1024-3. In no case shall the water-cement ratio on the approved design be exceeded. Concrete exhibiting segregation and/or excessive bleeding will be rejected. Utilizing an Admixture to modify slump does not relinquish the contractor's responsibility to ensure the final product quality and overall configuration meets design specifications. Caution should be taken when placing these modified mixes on steep grades to prevent unintended changes to the set slope.

HIGH STRENGTH CONCRETE FOR DRIVEWAYS:

(11-21-00) (Rev. 1-17-12) 848 SP10 R02

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 1000-5 of the *2018 Standard Specifications*.

Measurement and payment will be in accordance with Section 848 of the *2018 Standard Specifications*.

THERMOPLASTIC PAVEMENT MARKING MATERIAL – COLOR TESTING:

3-19-19 1087 SP10 R05

Revise the *2018 Standard Specifications* as follows:

Pages 10-183 and 10-184, Subarticle 1087-7(D)(1)(b) Yellow, lines 9-11, delete and replace with the following:

Obtain Color Values Y,x,y per ASTM E1349 using C/2° illuminant/observer.
Results shall be Y ≥ 45%, and x,y shall fall within PR#1 chart chromaticity limits.

POLYUREA PAVEMENT MARKING MATERIAL – TYPE 2 TYPICAL CERTIFIED MILL TEST REPORT:

3-19-19 1087 SP10 R06

Amend the *2018 Standard Specifications* as follows:

Page 10-184, Subarticle 1087-8 Material Certification, in accordance with Subarticle 106-3 provide a Type 2 Typical Certified Mill Test Report and a Type 3 Manufacturer's Certification for Polyurea pavement marking material.

When tested, the material shall meet the physical and chemical characteristics provided by the manufacturer. NCDOT reserves the right to compare these test results to baseline test results gathered by the NCDOT Materials and Test Unit.

NON-CAST IRON SNOWPLOWABLE PAVEMENT MARKERS:

10-19-21 (Rev. 11-16-21) 1086, 1250, 1253 SP10 R08

Revise the *2018 Standard Specifications* as follows:

Pages 10-177 and 10-178, Subarticle 1086-3 SNOWPLOWABLE PAVEMENT MARKERS, delete items (A), (B) and (C)(1) and replace with the following:

(A) General

Use non-cast iron snowplowable pavement markers evaluated by NTPEP. The non-cast iron snowplowable pavement marker shall consist of a housing with one or more glass or plastic face lens type reflective lenses to provide the required color designation. The marker shall be designed or installed in a manner that minimizes damage from snowplow blades. Plastic lens faces shall use an abrasion resistant coating.

(B) Housings

(1) Dimensions

The dimension, slope and minimum area of reflecting surface shall conform to dimensions as shown in the plans. The minimum area of each reflecting surface shall be 1.44 sq.in.

(2) Materials

Use non-cast iron snowplowable pavement markers that are on the NCDOT Approved Products List.

(3) Surface

The surface of the housing shall be free of scale, dirt, rust, oil, grease or any other contaminant which might reduce its bond to the epoxy adhesive.

(4) Identification

Mark the housing with the manufacturer's name and model number of marker.

(C) Reflectors

(1) General

Laminate the reflector to an elastomeric pad and attach with adhesive to the housing. The thickness of the elastomeric pad shall be 0.04".

Pages 12-14, Subarticle 1250-3(C) Removal of Existing Pavement Markers, lines 19-29, delete and replace with the following:

Remove the existing raised pavement markers or the snowplowable pavement markers including the housings, before overlaying an existing roadway with pavement. Repair the pavement by filling holes as directed by the Engineer.

When traffic patterns are changed in work zones due to construction or reconstruction, remove all raised pavement markers or snowplowable markers including housings that conflict with the new traffic pattern before switching traffic to the new traffic pattern. Lens removal in lieu of total housing removal is not an acceptable practice for snowplowable markers.

Properly dispose of the removed pavement markers. No direct payment will be made for removal or disposal of existing pavement markers or repair of pavement, as such work will be incidental to other items in the contract.

Pages 12-16, Subarticle 1253-1 DESCRIPTION, lines 4-5, delete and replace with the following:

Furnish, install and maintain non-cast iron snowplowable pavement markers in accordance with the contract.

Pages 12-16 and 12-17, Subarticle 1253-3 CONSTRUCTION METHODS, delete items (A), (B) and (C) and replace with the following:

(A) General

Bond marker housings to the pavement with epoxy adhesive. Mechanically mix and dispense epoxy adhesives as required by the manufacturer's specifications. Place the markers immediately after the adhesive has been mixed and dispensed.

If saw cutting, milling, or grooving operations are used, promptly remove all resulting debris from the pavement surface. Install the marker housings within 7 calendar days after saw cutting, milling, or grooving the pavement. Remove and dispose of loose material from the slots by brushing, blow cleaning, or vacuuming. Dry the slots before applying the epoxy adhesive. Install non-cast iron snowplowable pavement markers according to the manufacturer’s recommendations.

Protect the non-cast iron snowplowable pavement markers until the epoxy has initially cured and is track free.

(B) Reflector Replacement

In the event that a reflector is damaged, replace the damaged reflector by using adhesives and methods recommended by the manufacturer of the markers and approved by the Engineer. This work is considered incidental if damage occurs during the initial installation of the marker housings and maintenance of initial non-cast iron snowplowable markers specified in this section. This work will be paid for under the pay item for the type of reflector replacement if the damage occurred after the initial installation of the non-cast iron snowplowable pavement marker.

Missing housings shall be replaced. Broken housings shall be removed and replaced. In both cases the slot for the housings shall be properly prepared prior to installing the new housing; patch the existing marker slots as directed by the Engineer and install the new marker approximately one foot before or after the patch. Removal of broken housings and preparation of slots will be considered incidental to the work of replacing housings.

Pages 12-17, Subarticle 1253-4 MAINTENANCE, lines 5, delete and replace with the following:

Maintain all installed non-cast iron snowplowable pavement markers until acceptance.

Pages 12-17, Subarticle 1253-5 MEASUREMENT AND PAYMENT, lines 7-8, delete and replace with the following:

Non-Cast Iron Snowplowable Pavement Markers will be measured and paid as the actual number of non-cast iron snowplowable pavement markers satisfactorily placed and accepted by the Engineer.

Pages 12-17, Subarticle 1253-5 MEASUREMENT AND PAYMENT, lines 11, delete and replace with the following:

Payment will be made under:

Pay Item	**Pay Unit**
Non-Cast Iron Snowplowable Pavement Marker	Each
Replace Snowplowable Pavement Marker Reflector	Each

MATERIALS FOR PORTLAND CEMENT CONCRETE:

(9-15-20) 1000, 1024 SP10 R24

Revise the *2018 Standard Specifications* as follows:

Page 10-52, Article 1024-4, WATER, lines 3-6, delete and replace with the following:

Test water from wells at all locations. Test public water supplies from all out of state locations and in the following counties: Beaufort, Bertie, Brunswick, Camden, Carteret, Chowan, Craven, Currituck, Dare, Gates, Hyde, New Hanover, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Tyrell and Washington unless the Engineer waives the testing requirements.

Page 10-52, Table 1024-2, PHYSICAL PROPERTIES OF WATER, replace with the following:

Property	Requirement	Test Method
Compression Strength, minimum percent of control at 3 and 7 days	90%	ASTM C1602
Time of set, deviation from control	From 1:00 hr. earlier to 1:30 hr. later	ASTM C1602

pH	4.5 to 8.5	ASTM D1293 *
Chloride Ion Content, Max.	250 ppm	ASTM D512 *
Total Solids Content (Residue), Max.	1,000 ppm	SM 2540B *
Resistivity, Min.	0.500 kohm-cm	ASTM D1125 *

*Denotes an alternate method is acceptable. Test method used shall be referenced in the test report.

TEMPORARY SHORING:

(2-20-07) (Rev. 10-19-21) SP11 R02

Description

Temporary shoring includes cantilever, braced and anchored shoring and temporary mechanically stabilized earth (MSE) walls. Temporary shoring does not include trench boxes. At the Contractor's option, use any type of temporary shoring unless noted otherwise in the plans or as directed. Design and construct temporary shoring based on actual elevations and shoring dimensions in accordance with the contract and accepted submittals. Construct temporary shoring at locations shown in the plans and as directed. Temporary shoring is required to maintain traffic when a 2:1 (H:V) slope from the top of an embankment or bottom of an excavation will intersect the existing ground line less than 5 feet from the edge of pavement of an open travelway. This provision does not apply to pipe, inlet or utility installation unless noted otherwise in the plans.

Positive protection includes concrete barrier and temporary guardrail. Provide positive protection for temporary shoring at locations shown in the plans and as directed. Positive protection is required if temporary shoring is located in the clear zone in accordance with the *AASHTO Roadside Design Guide.*

(A) Cantilever and Braced Shoring

Cantilever shoring consists of steel sheet piles or H-piles with timber lagging. Braced shoring consists of sheet piles or H-piles with timber lagging and bracing such as beams, plates, walers, struts, rakers, etc. Define "piles" as sheet piles or H-piles.

(B) Anchored Shoring

Anchored shoring consists of sheet piles with walers or H-piles with timber lagging anchored with ground or helical anchors. Driven anchors may be accepted at the discretion of the Engineer. A ground anchor consists of a grouted steel bar or multi-strand tendon with an anchorage. A helical anchor consists of a lead section with a central steel shaft and at least one helix steel plate followed by extensions with only central shafts (no helixes) and an anchorage. Anchorages consist of steel bearing plates with washers and hex nuts for bars or steel wedge plates and wedges for strands. Use a prequalified Anchored Wall Contractor to install ground anchors. Define "anchors" as ground, helical or driven anchors.

(C) Temporary MSE Walls

Temporary MSE walls include temporary geosynthetic and wire walls. Define "temporary wall" as a temporary MSE wall and "Temporary Wall Vendor" as the vendor supplying the temporary MSE wall. Define "reinforcement" as geotextile, geogrid, geostrip, welded wire grid or metallic strip reinforcement.

Temporary geosynthetic walls consist of geotextiles or geogrids wrapped behind welded wire facing or geostrips connected to welded wire facing. Define "temporary geotextile wall" as a temporary geosynthetic wall with geotextile reinforcement, "temporary geogrid wall" as a temporary geosynthetic wall with geogrid reinforcement and "temporary geostrip wall" as a temporary geosynthetic wall with geostrip reinforcement.

Temporary wire walls consist of welded wire grid or metallic strip reinforcement connected to welded wire facing. Define "Wire Wall Vendor" as the vendor supplying the temporary wire wall.

(D) Embedment

Define "embedment" for cantilever, braced and anchored shoring as the pile depth below the grade in front of shoring. Define "embedment" for temporary walls as the wall embedment below the grade at the wall face.

(E) Positive Protection

Define "unanchored or anchored portable concrete barrier" as portable concrete barrier (PCB) that meets 2018 Roadway Standard Drawing No. 1170.01. Define "concrete barrier" as unanchored or anchored PCB or an approved equal. Define "temporary guardrail" as temporary steel beam guardrail that meets 2018 Roadway Standard Drawing No. 862.02.

Materials

Refer to the *2018 Standard Specifications*.

Item	**Section**
Concrete Barrier Materials	1170-2
Flowable Fill, Excavatable	1000-6
Geosynthetics	1056
Grout, Type 1	1003
Portland Cement	1024-1
Portland Cement Concrete	1000
Select Materials	1016
Steel Beam Guardrail Materials	862-2
Steel Plates	1072-2
Steel Sheet Piles and H-Piles	1084
Untreated Timber	1082-2
Water	1024-4
Welded Wire Reinforcement	1070-3

Provide Type 6 material certifications for shoring materials in accordance with Article 106-3 of the *2018 Standard Specifications*. Use Class IV select material for temporary guardrail and Class A concrete that meets Article 450-2 of the *2018 Standard Specifications* or Type 1 grout for drilled-in piles. Provide untreated timber with a thickness of at least 3 inches and a bending stress of at least 1,000 pounds per square inch for timber lagging. Provide steel bracing that meets ASTM A36.

(A) Shoring Backfill

Use Class II, Type 1, Class III, Class V or Class VI select material or material that meets AASHTO M 145 for soil classification A-2-4 with a maximum PI of 6 for shoring backfill except do not use A-2-4 soil for backfill around culverts.

(B) Anchors

Store anchor materials on blocking a minimum of 12 inches above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store anchor materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

(1) Ground Anchors

Use high-strength deformed steel bars that meet AASHTO M 275 or seven-wire strands that meet ASTM A886 or Article 1070-5 of the *2018 Standard Specifications*. Splice bars in accordance with Article 1070-9 of the *2018 Standard Specifications*. Do not splice strands. Use bondbreakers, spacers and centralizers that meet Article 6.3.5 of the *AASHTO LRFD Bridge Construction Specifications*.

Use neat cement grout that only contains cement and water with a water cement ratio of 0.4 to 0.5 which is approximately 5.5 gallons of water per 94 pounds of Portland cement. Provide grout with a compressive strength at 3 and 28 days of at least 1,500 and 4,000 psi, respectively.

(2) Helical Anchors

Use helical anchors with an ICC Evaluation Service, Inc. (ICC-ES) report. Provide couplers, thread bar adapters and bolts recommended by the Anchor Manufacturer to connect helical anchors together and to piles.

(3) Anchorages

Provide steel plates for bearing plates and steel washers, hex nuts, wedge plates and wedges recommended by the Anchor Manufacturer.

(C) Temporary Walls

(1) Welded Wire Facing

Use welded wire reinforcement for welded wire facing, struts and wires. For temporary wire walls, provide welded wire facing supplied by the Wire Wall Vendor or a manufacturer approved or licensed by the vendor. For temporary wire walls with separate reinforcement and facing components, provide connectors (e.g., bars, clamps, plates, etc.) and fasteners (e.g., bolts, nuts, washers, etc.) required by the Wire Wall Vendor.

(2) Geotextiles

Provide Type 2 geotextile for separation and retention geotextiles. Provide Type 5 geotextile for geotextile reinforcement with ultimate tensile strengths in accordance with the accepted submittals.

(3) Geogrid and Geostrip Reinforcement

Use geogrids with a roll width of at least 4 feet. Use geogrids for geogrid reinforcement and geostrips for geostrip reinforcement with an "approved" status code in accordance with the NCDOT Geosynthetic Reinforcement Evaluation Program. The list of approved geogrids and geostrips is available from: connect.ncdot.gov/resources/Geological/Pages/Products.aspx

Provide geogrids and geostrips with design strengths in accordance with the accepted submittals. Geogrids and geostrips are approved for short-term design strengths (3-year design life) in the machine direction (MD) and cross-machine direction (CD) based on material type. Define material type from the website above for shoring backfill as follows:

Material Type	Shoring Backfill
Borrow	A-2-4 Soil
Fine Aggregate	Class II, Type 1 or Class III Select Material
Coarse Aggregate	Class V or VI Select Material

(4) Welded Wire Grid and Metallic Strip Reinforcement

Provide welded wire grid and metallic strip reinforcement supplied by the Wire Wall Vendor or a manufacturer approved or licensed by the vendor. Use welded wire grid reinforcement ("mesh", "mats" and "ladders") that meet Article 1070-3 of the *2018 Standard Specifications* and metallic strip reinforcement ("straps") that meet ASTM A572 or A1011.

Preconstruction Requirements

(A) Concrete Barrier

Define "clear distance" behind concrete barrier as the horizontal distance between the barrier and edge of pavement. The minimum required clear distance for concrete barrier is shown in the plans. At the Contractor's option or if the minimum required clear distance

is not available, set concrete barrier next to and up against traffic side of temporary shoring except for barrier above temporary walls. Concrete barrier with the minimum required clear distance is required above temporary walls.

(B) Temporary Guardrail

Define "clear distance" behind temporary guardrail as the horizontal distance between guardrail posts and temporary shoring. At the Contractor's option or if clear distance for cantilever, braced and anchored shoring is less than 4 feet, attach guardrail to traffic side of shoring as shown in the plans. Place ABC in clear distance and around guardrail posts instead of pavement. Do not use temporary guardrail above temporary walls.

(C) Temporary Shoring Designs

Before beginning temporary shoring design, survey existing ground elevations in the vicinity of shoring locations to determine actual design heights (H). Submit PDF files of working drawings and design calculations for temporary shoring designs in accordance with Article 105-2 of the *2018 Standard Specifications*. Submit working drawings showing plan views, shoring profiles, typical sections and details of temporary shoring design and construction sequence. Do not begin shoring construction until a design submittal is accepted.

Have cantilever and braced shoring designed, detailed and sealed by an engineer licensed in the state of North Carolina. Use a prequalified Anchored Wall Design Consultant to design anchored shoring. Provide anchored shoring designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for an Anchored Wall Design Consultant. Include details in anchored shoring working drawings of anchor locations and lock-off loads, unit grout/ground bond strengths for ground anchors or minimum installation torque and torsional strength rating for helical anchors and if necessary, obstructions extending through shoring or interfering with anchors. Include details in the anchored shoring construction sequence of pile and anchor installation, excavation and anchor testing.

Provide temporary wall designs sealed by a Design Engineer licensed in the state of North Carolina and employed or contracted by the Temporary Wall Vendor. Include details in temporary wall working drawings of geotextile and reinforcement types, locations and directions and obstructions extending through walls or interfering with reinforcement.

(1) Soil Parameters

Design temporary shoring for the assumed soil parameters and groundwater or flood elevations shown in the plans. Assume the following soil parameters for shoring backfill:

(a) Unit weight (γ) = 120 pcf,

(b)

Friction Angle (ϕ)	**Shoring Backfill**
30°	A-2-4 Soil

34°	Class II, Type 1 or Class III Select Material
38°	Class V or VI Select Material

(c) Cohesion (c) = 0 psf.

(2) Traffic Surcharge

Design temporary shoring for a traffic surcharge of 250 pounds per square foot if traffic will be above and within H of shoring. This traffic surcharge does not apply to construction traffic. Design temporary shoring for any construction surcharge if construction traffic will be above and within H of shoring. Design temporary shoring for a traffic (live load) surcharge in accordance with Article 11.5.6 of the *AASHTO LRFD Bridge Design Specifications*.

(3) Cantilever, Braced and Anchored Shoring Designs

Use shoring backfill for fill sections and voids between cantilever, braced and anchored shoring and the critical failure surface. Use concrete or Type 1 grout for embedded portions of drilled-in H-piles. Do not use drilled-in sheet piles.

Define "top of shoring" for cantilever, braced and anchored shoring as where the grade intersects the back of sheet piles or H-piles and timber lagging. Design cantilever, braced and anchored shoring for a traffic impact load of 2,000 pounds per foot applied 18 inches above top of shoring if concrete barrier is above and next to shoring or temporary guardrail is above and attached to shoring. Extend cantilever, braced and anchored shoring at least 32 inches above top of shoring if shoring is designed for traffic impact. Otherwise, extend shoring at least 6 inches above top of shoring.

Design cantilever, braced and anchored shoring for a maximum deflection of 3 inches if the horizontal distance to the closest edge of pavement or structure is less than H. Otherwise, design shoring for a maximum deflection of 6 inches. Design cantilever and braced shoring in accordance with the plans and *AASHTO Guide Design Specifications for Bridge Temporary Works*.

Design anchored shoring in accordance with the plans and Article 11.9 of the *AASHTO LRFD Bridge Design Specifications*. Use a resistance factor of 0.80 for tensile resistance of anchors with bars, strands or shafts. Extend the unbonded length for ground anchors and the shallowest helix for helical anchors at least 5 feet behind the critical failure surface. Do not extend anchors beyond right-of-way or easement limits. If existing or future obstructions such as foundations, guardrail posts, pavements, pipes, inlets or utilities will interfere with anchors, maintain a clearance of at least 6 inches between obstructions and anchors.

(4) Temporary Wall Designs

Use shoring backfill in the reinforced zone of temporary walls. Separation geotextiles are required between shoring backfill and backfill, natural ground or

culverts along the sides of the reinforced zone perpendicular to the wall face. For Class V or VI select material in the reinforced zone, separation geotextiles are also required between shoring backfill and backfill or natural ground on top of and at the back of the reinforced zone.

Design temporary walls in accordance with the plans and Article 11.10 of the *AASHTO LRFD Bridge Design Specifications*. Embed temporary walls at least 18 inches except for walls on structures or rock as determined by the Engineer. Use a uniform reinforcement length throughout the wall height of at least 0.7H or 6 feet, whichever is longer. Extend the reinforced zone at least 6 inches beyond end of reinforcement. Do not locate the reinforced zone outside right-of-way or easement limits.

Use the simplified method for determining maximum reinforcement loads in accordance with the AASHTO LRFD specifications. For geotextile reinforcement, use geotextile properties approved by the Department or default values in accordance with the AASHTO LRFD specifications. For geogrid and geostrip reinforcement, use approved geosynthetic reinforcement properties available from the website shown elsewhere in this provision. Use geosynthetic properties for the direction reinforcement will be installed, a 3-year design life and shoring backfill to be used in the reinforced zone.

Do not use more than 4 different reinforcement strengths for each temporary geosynthetic wall. Design temporary geotextile walls for a reinforcement coverage ratio (R_c) of 1.0. For temporary geogrid walls with an R_c of less than 1.0, use a maximum horizontal clearance between geogrids of 3 feet and stagger reinforcement so geogrids are centered over gaps in the reinforcement layer below.

For temporary geosynthetic walls, use “L” shaped welded wire facing with 18 to 24 inch long legs. Locate geosynthetic reinforcement so reinforcement layers are at the same level as the horizontal legs of welded wire facing. Use vertical reinforcement spacing equal to facing height. Wrap geotextile or geogrid reinforcement behind welded wire facing and extend reinforcement at least 3 feet back behind facing into shoring backfill. Attach geostrip reinforcement to welded wire facing with a connection approved by the Department.

For temporary wire walls with separate reinforcement and facing components, attach welded wire grid or metallic strip reinforcement to welded wire facing with a connection approved by the Department. For temporary geogrid, geostrip and wire walls, retain shoring backfill at welded wire facing with retention geotextiles and extend geotextiles at least 3 feet back behind facing into backfill.

(D) Preconstruction Meeting

The Engineer may require a shoring preconstruction meeting to discuss the construction, inspection and testing of the temporary shoring. If required and if this meeting occurs before all shoring submittals have been accepted, additional preconstruction meetings may be required before beginning construction of temporary shoring without accepted

submittals. The Resident, District or Bridge Maintenance Engineer, Area Construction Engineer, Geotechnical Operations Engineer, Contractor and Shoring Contractor Superintendent will attend preconstruction meetings.

Construction Methods

Control drainage during construction in the vicinity of shoring. Direct run off away from shoring and shoring backfill. Contain and maintain backfill and protect material from erosion.

Install positive protection in accordance with the contract and accepted submittals. Use PCB in accordance with Section 1170 of the *2018 Standard Specifications* and 2018 Roadway Standard Drawing No. 1170.01. Use temporary guardrail in accordance with Section 862 of the *2018 Standard Specifications* and 2018 Roadway Standard Drawing Nos. 862.01, 862.02 and 862.03.

(A) Tolerances

Construct shoring with the following tolerances:

(1) Horizontal wires of welded wire facing are level in all directions,

(2) Shoring location is within 6 inches of horizontal and vertical alignment shown in the accepted submittals, and

(3) Shoring plumbness (batter) is not negative and within 2 degrees of vertical.

(B) Cantilever, Braced and Anchored Shoring Installation

If overexcavation behind cantilever, braced or anchored shoring is shown in the accepted submittals, excavate before installing piles. Otherwise, install piles before excavating for shoring. Install cantilever, braced or anchored shoring in accordance with the construction sequence shown in the accepted submittals. Remove piles and if applicable, timber lagging when shoring is no longer needed.

(1) Pile Installation

Install piles with the minimum required embedment and extension in accordance with Subarticles 450-3(D) and 450-3(E) of the *2018 Standard Specifications* except that a pile driving equipment data form is not required. Piles may be installed with a vibratory hammer as approved by the Engineer.

Do not splice sheet piles. Use pile excavation to install drilled-in H-piles. After filling holes with concrete or Type 1 grout to the elevations shown in the accepted submittals, remove any fluids and fill remaining portions of holes with flowable fill. Cure concrete or grout at least 7 days before excavating.

Notify the Engineer if refusal is reached before pile excavation or driven piles attain the minimum required embedment. When this occurs, a revised design submittal

may be required.

(2) Excavation

Excavate in front of piles from the top down in accordance with the accepted submittals. For H-piles with timber lagging and braced and anchored shoring, excavate in staged horizontal lifts with a maximum height of 5 feet. Remove flowable fill and material in between H-piles as needed to install timber lagging. Position lagging with at least 3 inches of contact in the horizontal direction between the lagging and pile flanges. Do not excavate the next lift until timber lagging for the current lift is installed and if applicable, bracing and anchors for the current lift are accepted. Backfill behind cantilever, braced or anchored shoring with shoring backfill.

(3) Anchor Installation

If applicable, install foundations located behind anchored shoring before installing anchors. Fabricate and install ground anchors in accordance with the accepted submittals, Articles 6.4 and 6.5 of the *AASHTO LRFD Bridge Construction Specifications* and the following unless otherwise approved:

(a) Materials in accordance with this provision are required instead of materials conforming to Articles 6.4 and 6.5.3 of the AASHTO LRFD Specifications,

(b) Encapsulation-protected ground anchors in accordance with Article 6.4.1.2 of the AASHTO LRFD specifications are not required, and

(c) Corrosion protection for unbonded lengths of ground anchors and anchorage covers are not required.

(d) Mix and place neat cement grout in accordance with Subarticles 1003-5, 1003-6 and 1003-7 of the *2018 Standard Specifications*. Measure grout temperature, density and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform density and flow field tests in the presence of the Engineer in accordance with American National Standards Institute/American Petroleum Institute Recommended Practice 13B-1 (Section 4, Mud Balance) and ASTM C939 (Flow Cone), respectively.

Install helical anchors in accordance with the accepted submittals and Anchor Manufacturer's instructions. Measure torque during installation and do not exceed the torsional strength rating of the helical anchor. Attain the minimum required installation torque and penetration before terminating anchor installation. When replacing a helical anchor, embed last helix of the replacement anchor at least 3 helix plate diameters past the location of the first helix of the previous anchor.

(4) Anchor Testing

Proof test and lock-off anchors in accordance with the accepted submittals and Article 6.5.5 of the *AASHTO LRFD Bridge Construction Specifications* except for the acceptance criteria in Article 6.5.5.5. For the AASHTO LRFD specifications, "ground anchor" refers to a ground or helical anchor and "tendon" refers to a bar, strand or shaft.

(a) Anchor Acceptance

Anchor acceptance is based in part on the following criteria.

(i) For ground and helical anchors, total movement is less than 0.04 inches between the 1 and 10 minute readings or less than 0.08 inches between the 6 and 60 minute readings.
(ii) For ground anchors, total movement at maximum test load exceeds 80% of the theoretical elastic elongation of the unbonded length.

(b) Anchor Test Results

Submit PDF files of anchor test records including movement versus load plots for each load increment within 24 hours of completing each row of anchors. The Engineer will review the test records to determine if the anchors are acceptable.

If the Engineer determines an anchor is unacceptable, revise the anchor design or installation methods. Submit a revised anchored shoring design for acceptance and provide an acceptable anchor with the revised design or installation methods. If required, replace the anchor or provide additional anchors with the revised design or installation methods.

(C) Temporary Wall Installation

Excavate as necessary for temporary walls in accordance with the plans and accepted submittals. If applicable, install foundations located in the reinforced zone before placing shoring backfill or reinforcement unless otherwise approved. Notify the Engineer when foundation excavation is complete. Do not place shoring backfill or reinforcement until excavation dimensions and foundation material are approved.

Erect welded wire facing so the wall position is as shown in the plans and accepted submittals. Set welded wire facing adjacent to each other in the horizontal and vertical direction to completely cover the wall face with facing. Stagger welded wire facing to create a running bond by centering facing over joints in the row below.

Attach geostrip reinforcement to welded wire facing and wrap geotextile reinforcement and retention geotextiles behind welded wire facing as shown in the plans and accepted submittals. Cover geotextiles with at least 3" of shoring backfill. Overlap adjacent geotextile reinforcement and retention and separation geotextiles at least 18 inches with seams oriented perpendicular to the wall face. Hold geotextiles in place with wire staples or anchor pins as needed.

Place reinforcement within 3 inches of locations shown in the plans and accepted submittals. Before placing shoring backfill, pull geosynthetic reinforcement taut so it is in tension and free of kinks, folds, wrinkles or creases. Install reinforcement with the direction shown in the plans and accepted submittals. For temporary wire walls with separate reinforcement and facing components, attach welded wire grid or metallic strip reinforcement to welded wire facing as shown in the accepted submittals. Do not splice or overlap reinforcement so seams are parallel to the wall face. Contact the Engineer when unanticipated existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with reinforcement.

Place shoring backfill in the reinforced zone in 8 to 10 inch thick lifts. Compact A-2-4 soil and Class II, Type 1 and Class III select material in accordance with Subarticle 235-3(C) of the *2018 Standard Specifications*. Use only hand operated compaction equipment to compact backfill within 3 feet of welded wire facing. At a distance greater than 3 feet, compact shoring backfill with at least 4 passes of an 8 to 10 ton vibratory roller in a direction parallel to the wall face. Smooth wheeled or rubber tired rollers are also acceptable for compacting backfill. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage reinforcement when placing and compacting shoring backfill. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on reinforcement until it is covered with at least 8 inches of shoring backfill. Replace any damaged reinforcement to the satisfaction of the Engineer.

Backfill for temporary walls outside the reinforced zone in accordance with Article 410-8 of the *2018 Standard Specifications*. Bench temporary walls into the sides of excavations where applicable. For temporary geosynthetic walls with top of wall within 5 feet of finished grade, remove top facing and incorporate top reinforcement layer into fill when placing fill in front of wall. Temporary walls remain in place permanently unless otherwise required.

Measurement and Payment

Temporary Shoring will be measured and paid in square feet. Temporary walls will be measured as the square feet of exposed wall face area. Cantilever, braced or anchored shoring will be measured as the square feet of exposed shoring face area with the shoring height equal to the difference between the top and bottom of shoring elevations. Define “top of shoring” as where the grade intersects the back of sheet piles or H-piles and timber lagging. Define “bottom of shoring” as where the grade intersects front of sheet piles or H-piles and timber lagging. No measurement will be made for any embedment, shoring extension above top of shoring or pavement thickness above temporary walls.

The contract unit price for *Temporary Shoring* will be full compensation for providing shoring designs, submittals and materials, excavating, backfilling, hauling and removing excavated materials and supplying all labor, tools, equipment and incidentals necessary to construct temporary shoring.

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

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

PCB will be measured and paid in accordance with Section 1170 of the *2018 Standard Specifications*. No additional payment will be made for anchoring PCB for temporary shoring. Costs for anchoring PCB will be incidental to temporary shoring.

Temporary guardrail will be measured and paid for in accordance with Section 862 of the *2018 Standard Specifications*.

Payment will be made under:

Pay Item	**Pay Unit**
Temporary Shoring	Square Foot

MATERIAL AND EQUIPMENT STORAGE & PARKING OF PERSONAL VEHICLES:

11-17-21 1101 SP11 R03

Revise the *2018 Standard Specifications* as follows:

Page 11-2, Article 1101-8 MATERIAL AND EQUIPMENT STORAGE, line 35-38, delete and replace with the following:

When work is not in progress, keep all personnel, equipment, machinery, tools, construction debris, materials and supplies away from active travel lanes that meets Table 1101-1.

TABLE 1101-1
MATERIAL AND EQUIPMENT STORAGE FROM ACTIVE TRAVEL LANES

Posted Speed Limit (mph)	Distance (ft)
40 or less	≥ 18
45-50	≥ 28
55	≥ 32
60 or higher	≥ 40

When vehicles, equipment and materials are protected by concrete barrier or guardrail, they shall be offset at least 5 feet from the barrier or guardrail.

Page 11-2, Article 1101-9 PARKING OF PERSONAL VEHICLES, line 40-41, delete and replace with the following:

Provide staging areas for personal vehicle parking in accordance with section 1101-8 or as directed by the Engineer before use.

WORK ZONE INSTALLER:

(7-20-21) 1101, 1150 SP11 R04

Provide the service of at least one qualified work zone installer during the setup, installation, and removal of temporary traffic control within the highway right of way. The qualified work zone installer shall serve as crew leader and shall be on site and directing the installation and removal of temporary traffic control. If multiple temporary traffic control installations or removals are occurring simultaneously, then each shall have a qualified work zone installer.

The work zone installer shall be qualified by an NCDOT approved training agency in the safe and competent set up of temporary traffic control. For a complete listing of approved training agencies, see the Work Zone Safety Training webpage.

A work zone supervisor, in accordance with Article 1101-13 of the *Standard Specifications*, may fulfill the role of the work zone installer during the setup, installation, and removal of temporary traffic control within the highway right of way provided they are on site and directing the installation and removal of temporary traffic control.

All other individuals participating in the setup, installation, and removal of temporary traffic control within the highway right of way shall be certified as a qualified flagger in accordance with Article 1150-3 of the *Standard Specifications*, even if flagging is not being performed as part of the traffic control.

Provide the name and contact information of all qualified work zone installers to the Engineer prior to or at the preconstruction conference. Additionally, provide a qualification statement that all other individuals participating in the setup, installation, and removal of temporary traffic control are qualified flaggers that have been properly trained through an NCDOT approved training agency.

LAW ENFORCEMENT:

(6-21-22) 1190 SP11 R30

Revise the *2018 Standard Specifications* as follows:

Page 11-19, Article 1190-1 DESCRIPTION, lines 4-5, replace the paragraph with the following:

Furnish Law Enforcement Officers and official Law Enforcement vehicles to direct traffic in accordance with the contract.

Page 11-19, Article 1190-2 CONSTRUCTION METHODS, lines 7-9, replace the first paragraph with the following:

Use off duty uniformed Law Enforcement Officers and official Law Enforcement vehicles equipped with blue lights to direct or control traffic as required by the plans or by the Engineer.

Page 11-19, Article 1190-3 MEASUREMENT AND PAYMENT, lines 14-15, replace the second sentence of the first paragraph with the following:

There will be no direct payment for official Law Enforcement vehicles as they are considered incidental to the pay item.

EXTRUDED THERMOPLASTIC PAVEMENT MARKING THICKNESS:

3-19-19 (Rev. 6-21-22) 1205 SP12 R05

Revise the *2018 Standard Specifications* as follows:

Page 12-6, Subarticle 1205-4(A)(1) General, lines 5-8, delete the second sentence and replace with the following:

Use application equipment that provides multiple width settings ranging from 4 inches to 12 inches and multiple thickness settings to achieve the required thickness above the surface of the pavement as shown in Table 1205-3.

Page 12-7, Table 1205-3, THICKNESS REQUIREMENTS FOR THERMOPLASTIC, replace with the following:

TABLE 1205-3
MINIMUM THICKNESS REQUIREMENTS FOR THERMOPLASTIC

Thickness	Location
240 mils	In-lane and shoulder-transverse pavement markings (rumble strips). May be placed in 2 passes.
90 mils	Center lines, skip lines, transverse bands, mini-skip lines, characters, bike lane symbols, crosswalk lines, edge lines, gore lines, diagonals, and arrow symbols

PERMANENT SEEDING AND MULCHING:

(7-1-95) 1660 SP16 R02

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 in the *2018 Standard Specifications* 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.

Percentage of Elapsed Contract Time	Percentage Additive
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.

STANDARD SPECIAL PROVISION
AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS

(5-20-08) Z-2

General Statute 143C-6-11. (h) Highway Appropriation is hereby incorporated verbatim in this contract as follows:

(h) Amounts Encumbered. – Transportation project appropriations may be encumbered in the amount of allotments made to the Department of Transportation by the Director for the estimated payments for transportation project contract work to be performed in the appropriation fiscal year. The allotments shall be multiyear allotments and shall be based on estimated revenues and shall be subject to the maximum contract authority contained in *General Statute 143C-6-11(c)*. Payment for transportation project work performed pursuant to contract in any fiscal year other than the current fiscal year is subject to appropriations by the General Assembly. Transportation project contracts shall contain a schedule of estimated completion progress, and any acceleration of this progress shall be subject to the approval of the Department of Transportation provided funds are available. The State reserves the right to terminate or suspend any transportation project contract, and any transportation project contract shall be so terminated or suspended if funds will not be available for payment of the work to be performed during that fiscal year pursuant to the contract. In the event of termination of any contract, the contractor shall be given a written notice of termination at least 60 days before completion of scheduled work for which funds are available. In the event of termination, the contractor shall be paid for the work already performed in accordance with the contract specifications.

Payment will be made on any contract terminated pursuant to the special provision in accordance with Subarticle 108-13(D) of the *2018 Standard Specifications*.

STANDARD SPECIAL PROVISION
NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY

(5-17-11) Z-3

Seed shall be sampled and tested by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory. When said samples are collected, the vendor shall supply an independent laboratory report for each lot to be tested. Results from seed so sampled shall be final. Seed not meeting the specifications shall be rejected by the Department of Transportation and shall not be delivered to North Carolina Department of Transportation warehouses. If seed has been delivered it shall be available for pickup and replacement at the supplier's expense.

Any re-labeling required by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory, that would cause the label to reflect as otherwise specified herein shall be rejected by the North Carolina Department of Transportation.

Seed shall be free from seeds of the noxious weeds Johnsongrass, Balloonvine, Jimsonweed, Witchweed, Itchgrass, Serrated Tussock, Showy Crotalaria, Smooth Crotalaria, Sicklepod, Sandbur, Wild Onion, and Wild Garlic. Seed shall not be labeled with the above weed species on the seed analysis label. Tolerances as applied by the Association of Official Seed Analysts will NOT be allowed for the above noxious weeds except for Wild Onion and Wild Garlic.

Tolerances established by the Association of Official Seed Analysts will generally be recognized. However, for the purpose of figuring pure live seed, the found pure seed and found germination percentages as reported by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory will be used. Allowances, as established by the NCDOT, will be recognized for minimum pure live seed as listed on the following pages.

The specifications for restricted noxious weed seed refers to the number per pound as follows:

Restricted Noxious **Weed**	Limitations per Lb. Of Seed	Restricted Noxious **Weed**	Limitations per Lb. of Seed
Blessed Thistle	4 seeds	Cornflower (Ragged Robin)	27 seeds
Cocklebur	4 seeds	Texas Panicum	27 seeds
Spurred Anoda	4 seeds	Bracted Plantain	54 seeds
Velvetleaf	4 seeds	Buckhorn Plantain	54 seeds
Morning-glory	8 seeds	Broadleaf Dock	54 seeds
Corn Cockle	10 seeds	Curly Dock	54 seeds
Wild Radish	12 seeds	Dodder	54 seeds
Purple Nutsedge	27 seeds	Giant Foxtail	54 seeds
Yellow Nutsedge	27 seeds	Horsenettle	54 seeds
Canada Thistle	27 seeds	Quackgrass	54 seeds
Field Bindweed	27 seeds	Wild Mustard	54 seeds
Hedge Bindweed	27 seeds		

Seed of Pensacola Bahiagrass shall not contain more than 7% inert matter, Kentucky Bluegrass, Centipede and Fine or Hard Fescue shall not contain more than 5% inert matter whereas a maximum of 2% inert matter will be allowed on all other kinds of seed. In addition, all seed shall

not contain more than 2% other crop seed nor more than 1% total weed seed. The germination rate as tested by the North Carolina Department of Agriculture shall not fall below 70%, which includes both dormant and hard seed. Seed shall be labeled with not more than 7%, 5% or 2% inert matter (according to above specifications), 2% other crop seed and 1% total weed seed.

Exceptions may be made for minimum pure live seed allowances when cases of seed variety shortages are verified. Pure live seed percentages will be applied in a verified shortage situation. Those purchase orders of deficient seed lots will be credited with the percentage that the seed is deficient.

FURTHER SPECIFICATIONS FOR EACH SEED GROUP ARE GIVEN BELOW:

Minimum 85% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 83% pure live seed will not be approved.

Sericea Lespedeza
Oats (seeds)

Minimum 80% pure live seed; maximum 1% total weed seed; maximum 2% total other crop; maximum 144 restricted noxious weed seed per pound. Seed less than 78% pure live seed will not be approved.

Tall Fescue (all approved varieties)
Kobe Lespedeza
Korean Lespedeza
Weeping Lovegrass
Carpetgrass
Bermudagrass
Browntop Millet
German Millet – Strain R
Clover – Red/White/Crimson

Minimum 78% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 76% pure live seed will not be approved.

Common or Sweet Sundangrass

Minimum 76% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 74% pure live seed will not be approved.

Rye (grain; all varieties)
Kentucky Bluegrass (all approved varieties)
Hard Fescue (all approved varieties)
Shrub (bicolor) Lespedeza

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 noxious weed seed per pound. Seed less than 70% pure live seed will not be approved.

Centipedegrass
Crownvetch
Pensacola Bahiagrass
Creeping Red Fescue
Japanese Millet
Reed Canary Grass
Zoysia

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 5% inert matter; maximum 144 restricted noxious weed seed per pound.

Barnyard Grass
Big Bluestem
Little Bluestem
Bristly Locust
Birdsfoot Trefoil
Indiangrass
Orchardgrass
Switchgrass
Yellow Blossom Sweet Clover

STANDARD SPECIAL PROVISION

ERRATA

(10-16-18) (Rev.1-18-22) Z-4

Revise the *2018 Standard Specifications* as follows:

Division 6

Page 6-7, Article 609-1 DESCRIPTION, line 29, replace article number "609-10" with "609-9".

Division 7

Page 7-27, Article 725-1 MEASUREMENT AND PAYMENT, line 4, replace article number "725-1" with "724-4".

Page 7-28, Article 725-1 MEASUREMENT AND PAYMENT, line 10, replace article number "725-1" with "725-3".

Division 10

Page 10-78, Article 1056-4 GEOTEXTILES, TABLE 1056-1, Permittivity, Type 2, replace "Table 6[D]" with "Table 7[D]" and **Permittivity, Type 3[B],** replace "Table 7[D]" with "Table 8[D]".

Page 10-121, Article 1076-7, REPAIR OF GALVANIZING, line 8, replace article number "1080-9" with "1080-7".

Page 10-162, Article 1080-50 PAINT FOR VERTICAL MARKERS, line 1, replace article number "1080-50" with "1080-10".

Page 10-162, Article 1080-61 EPOXY RESIN FOR REINFORCING STEEL, line 5, replace article number "1080-61" with "1080-11".

Page 10-162, Article 1080-72 ABRASIVE MATERIALS FOR BLAST CLEANING STEEL, line 22, replace article number "1080-72" with "1080-12".

Page 10-163, Article 1080-83 FIELD PERFORMANCE AND SERVICES, line 25, replace article number "1080-83" with "1080-13".

Division 17

Page 17-15, Article 1715-4 MEASUREMENT AND PAYMENT, lines 42-44, replace the second sentence with the following:

An example is an installation of a single 1.25 inch HDPE conduit would be paid as:

Directional Drill (1)(1.25″) Linear Foot

Page 17-15, Subarticle 1715-3(E) Bore and Jack, line 5, replace article number "1540-4" with "1550-4".

Page 17-15, Subarticle 1715-3(E) Bore and Jack, lines 10 & 11, replace "*NCDOT Policies and Procedures for Accommodating Utilities on Highway Rights of Way*" with "*NCDOT Utilities Accommodations Manual*".

STANDARD SPECIAL PROVISION

PLANT AND PEST QUARANTINES
(Imported Fire Ant, Gypsy Moth, Witchweed, Emerald Ash Borer, Guava Root Knot Nematode, And Other Noxious Weeds)

(3-18-03) (Rev. 5-21-19) Z-04a

Within Quarantined Area

This project may be within a county regulated for plant and/or pests. If the project or any part of the Contractor's operations is located within a quarantined area, thoroughly clean all equipment prior to moving out of the quarantined area. Comply with federal/state regulations by obtaining a certificate or limited permit for any regulated article moving from the quarantined area.

Originating in a Quarantined County

Obtain a certificate or limited permit issued by the N.C. Department of Agriculture/United States Department of Agriculture. Have the certificate or limited permit accompany the article when it arrives at the project site.

Contact

Contact the N.C. Department of Agriculture/United States Department of Agriculture at 1-800-206-9333, 919-707-3730, or *https://www.ncagr.gov/plantindustry/Plant/quaran/table2.htm* to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

Regulated Articles Include

1. Soil, sand, gravel, compost, peat, humus, muck, and decomposed manure, separately or with other articles. This includes movement of articles listed above that may be associated with cut/waste, ditch pulling, and shoulder cutting.
2. Plants with roots including grass sod.
3. Plant crowns and roots.
4. Bulbs, corms, rhizomes, and tubers of ornamental plants.
5. Hay, straw, fodder, and plant litter of any kind.
6. Clearing and grubbing debris.
7. Used agricultural cultivating and harvesting equipment.
8. Used earth-moving equipment.
9. Any other products, articles, or means of conveyance, of any character, if determined by an inspector to present a hazard of spreading imported fire ant, gypsy moth, witchweed, emerald ash borer, guava root knot nematode, or other noxious weeds.

STANDARD SPECIAL PROVISION

TITLE VI AND NONDISCRIMINATION:

(6-28-77)(Rev 6/19/2018) Z-6

Revise the *2018 Standard Specifications* as follows:

Replace Article 103-4(B) with the following:

The North Carolina Department of Transportation is committed to carrying out the U.S. Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts.

The provisions of this section related to United States Department of Transportation (US DOT) Order 1050.2A, Title 49 Code of Federal Regulations (CFR) part 21, 23 United States Code (U.S.C.) 140 and 23 CFR part 200 (or 49 CFR 303, 49 U.S.C. 5332 or 49 U.S.C. 47123) are applicable to all North Carolina Department of Transportation (NCDOT) contracts and to all related subcontracts, material supply, engineering, architectural and other service contracts, regardless of dollar amount. Any Federal provision that is specifically required not specifically set forth is hereby incorporated by reference.

(1) **Title VI Assurances (USDOT Order 1050.2A, Appendix A)**

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

(a) Compliance with Regulations

The contractor (hereinafter includes consultants) shall comply with the Acts and the Regulations relative to Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation, Federal Highway Administration (FHWA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

(b) Nondiscrimination

The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

(c) Solicitations for Subcontractors, Including Procurements of Materials and Equipment

In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Nondiscrimination on the grounds of race, color, or national origin.

(d) Information and Reports

The contractor shall provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the FHWA to be pertinent to ascertain compliance with such Acts,

Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor shall so certify to the Recipient or the FHWA, as appropriate, and shall set forth what efforts it has made to obtain the information.

(e) Sanctions for Noncompliance:
In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it and/or the FHWA may determine to be appropriate, including, but not limited to:
(i) Withholding payments to the contractor under the contract until the contractor complies; and/or
(ii) Cancelling, terminating, or suspending a contract, in whole or in part.

(f) Incorporation of Provisions
The contractor shall include the provisions of paragraphs (a) through (f) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor shall take action with respect to any subcontract or procurement as the Recipient or the FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

(2) **Title VI Nondiscrimination Program (23 CFR 200.5(p))**
The North Carolina Department of Transportation (NCDOT) has assured the USDOT that, as a condition to receiving federal financial assistance, NCDOT will comply with Title VI of the Civil Rights Act of 1964 and all requirements imposed by Title 49 CFR part 21 and related nondiscrimination authorities to ensure that no person shall, on the ground of race, color, national origin, limited English proficiency, sex, age, or disability (including religion/creed or income-level, where applicable), be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any programs, activities, or services conducted or funded by NCDOT. Contractors and other organizations under contract or agreement with NCDOT must also comply with Title VI and related authorities, therefore:

(a) During the performance of this contract or agreement, contractors (e.g., subcontractors, consultants, vendors, prime contractors) are responsible for complying with NCDOT's Title VI Program. Contractors are not required to prepare or submit Title VI Programs. To comply with this section, the prime contractor shall:
1. Post NCDOT's Notice of Nondiscrimination and the Contractor's own Equal Employment Opportunity (EEO) Policy in conspicuous locations accessible to all employees, applicants and subcontractors on the jobsite.
2. Physically incorporate the required Title VI clauses into all subcontracts on federally-assisted and state-funded NCDOT projects, and ensure inclusion by subcontractors into all lower-tier subcontracts.
3. Required Solicitation Language. The Contractor shall include the following notification in all solicitations for bids and requests for work or material, regardless of funding source:
"The North Carolina Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 US.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract

entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award. In accordance with other related nondiscrimination authorities, bidders and contractors will also not be discriminated against on the grounds of sex, age, disability, low-income level, creed/religion, or limited English proficiency in consideration for an award."

4. Physically incorporate the FHWA-1273, in its entirety, into all subcontracts and subsequent lower tier subcontracts on Federal-aid highway construction contracts only.
5. Provide language assistance services (i.e., written translation and oral interpretation), free of charge, to LEP employees and applicants. Contact NCDOT OCR for further assistance, if needed.
6. For assistance with these Title VI requirements, contact the NCDOT Title VI Nondiscrimination Program at 1-800-522-0453.

(b) Subrecipients (e.g. cities, counties, LGAs, planning organizations) may be required to prepare and submit a Title VI Plan to NCDOT, including Title VI Assurances and/or agreements. Subrecipients must also ensure compliance by their contractors and subrecipients with Title VI. (23 CFR 200.9(b)(7))

(c) If reviewed or investigated by NCDOT, the contractor or subrecipient agrees to take affirmative action to correct any deficiencies found within a reasonable time period, not to exceed 90 calendar days, unless additional time is granted by NCDOT. (23 CFR 200.9(b)(15))

(d) The Contractor is responsible for notifying subcontractors of NCDOT's External Discrimination Complaints Process.

1. Applicability
   Title VI and related laws protect participants and beneficiaries (e.g., members of the public and contractors) from discrimination by NCDOT employees, subrecipients and contractors, regardless of funding source.
2. Eligibility
   Any person—or class of persons—who believes he/she has been subjected to discrimination based on race, color, national origin, Limited English Proficiency (LEP), sex, age, or disability (and religion in the context of employment, aviation, or transit) may file a written complaint. The law also prohibits intimidation or retaliation of any sort.
3. Time Limits and Filing Options
   Complaints may be filed by the affected individual(s) or a representative and must be filed no later than 180 calendar days after the following:
   (i) The date of the alleged act of discrimination; or
   (ii) The date when the person(s) became aware of the alleged discrimination; or
   (iii) Where there has been a continuing course of conduct, the date on which that conduct was discontinued or the latest instance of the conduct.

   Title VI and related discrimination complaints may be submitted to the following entities:
   - North Carolina Department of Transportation, Office of Civil Rights, Title VI Program, 1511 Mail Service Center, Raleigh, NC 27699-1511; toll free 1-800-522-0453
   - Federal Highway Administration, North Carolina Division Office, 310 New Bern Avenue, Suite 410, Raleigh, NC 27601, 919-747-7010

- US Department of Transportation, Departmental Office of Civil Rights, External Civil Rights Programs Division, 1200 New Jersey Avenue, SE, Washington, DC 20590; 202-366-4070

4. Format for Complaints
   Complaints must be in writing and signed by the complainant(s) or a representative, and include the complainant's name, address, and telephone number. Complaints received by fax or e-mail will be acknowledged and processed. Allegations received by telephone will be reduced to writing and provided to the complainant for confirmation or revision before processing. Complaints will be accepted in other languages, including Braille.
5. Discrimination Complaint Form
   Contact NCDOT Civil Rights to receive a full copy of the Discrimination Complaint Form and procedures.
6. Complaint Basis
   Allegations must be based on issues involving race, color, national origin (LEP), sex, age, disability, or religion (in the context of employment, aviation or transit). "Basis" refers to the complainant's membership in a protected group category.

TABLE 103-1
COMPLAINT BASIS

Protected Categories	Definition	Examples	Applicable Nondiscrimination Authorities
Race and Ethnicity	An individual belonging to one of the accepted racial groups; or the perception, based usually on physical characteristics that a person is a member of a racial group	Black/African American, Hispanic/Latino, Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, White	Title VI of the Civil Rights Act of 1964; 49 CFR Part 21; 23 CFR 200; 49 U.S.C. 5332(b); 49 U.S.C. 47123. *(Executive Order 13166)*
Color	Color of skin, including shade of skin within a racial group	Black, White, brown, yellow, etc.	
National Origin *(Limited English Proficiency)*	Place of birth. Citizenship is not a factor. (*Discrimination based on language or a person's accent is also covered)*	Mexican, Cuban, Japanese, Vietnamese, Chinese	
Sex	Gender. The sex of an individual. *Note:* Sex under this program does not include sexual orientation.	Women and Men	1973 Federal-Aid Highway Act; 49 U.S.C. 5332(b); 49 U.S.C. 47123.
Age	Persons of any age	21-year-old person	Age Discrimination Act of 1975 49 U.S.C. 5332(b); 49 U.S.C. 47123.
Disability	Physical or mental impairment, permanent or temporary, or perceived.	Blind, alcoholic, para-amputee, epileptic, diabetic, arthritic	Section 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act of 1990

Religion (in the context of employment) *(Religion/ Creed in all aspects of any aviation or transit-related construction)*	An individual belonging to a religious group; or the perception, based on distinguishable characteristics that a person is a member of a religious group. In practice, actions taken as a result of the moral and ethical beliefs as to what is right and wrong, which are sincerely held with the strength of traditional religious views. ***Note:*** Does not have to be associated with a recognized religious group or church; if an individual sincerely holds to the belief, it is a protected religious practice.	Muslim, Christian, Sikh, Hindu, etc.	Title VII of the Civil Rights Act of 1964; 23 CFR 230; FHWA-1273 Required Contract Provisions. *(49 U.S.C. 5332(b);* *49 U.S.C. 47123)*

(3) **Pertinent Nondiscrimination Authorities**

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest agrees to comply with the following non-discrimination statutes and authorities, including, but not limited to:

(a) Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.

(b) The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);

(c) Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);

(d) Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability) and 49 CFR Part 27;

(e) The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);

(f) Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);

(g) The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

(h) Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;

(i) The Federal Aviation Administration's Nondiscrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);

(j) Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures Nondiscrimination against minority populations by discouraging programs, policies, and activities with

disproportionately high and adverse human health or environmental effects on minority and low-income populations;

(k) Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of Limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);

(l) Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

(m) Title VII of the Civil Rights Act of 1964 (42 U.S.C. § 2000e et seq., Pub. L. 88-352), (prohibits employment discrimination on the basis of race, color, religion, sex, or national origin).

(4) **Additional Title VI Assurances**

***The following Title VI Assurances (Appendices B, C and D) shall apply, as applicable*

(a) Clauses for Deeds Transferring United States Property (1050.2A, Appendix B)

The following clauses will be included in deeds effecting or recording the transfer of real property, structures, or improvements thereon, or granting interest therein from the United States pursuant to the provisions of Assurance 4.

NOW, THEREFORE, the U.S. Department of Transportation as authorized by law and upon the condition that the North Carolina Department of Transportation (NCDOT) will accept title to the lands and maintain the project constructed thereon in accordance with the North Carolina General Assembly, the Regulations for the Administration of the Federal-Aid Highway Program, and the policies and procedures prescribed by the Federal Highway Administration of the U.S. Department of Transportation in accordance and in compliance with all requirements imposed by Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-assisted programs of the U.S Department of Transportation pertaining to and effectuating the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252; 42 U.S.C. § 2000d to 2000d-4), does hereby remise, release, quitclaim and convey unto the NCDOT all the right, title and interest of the U.S. Department of Transportation in and to said lands described in Exhibit A attached hereto and made a part hereof.

(HABENDUM CLAUSE)

TO HAVE AND TO HOLD said lands and interests therein unto the North Carolina Department of Transportation (NCDOT) and its successors forever, subject, however, to the covenants, conditions, restrictions and reservations herein contained as follows, which will remain in effect for the period during which the real property or structures are used for a purpose for which Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits and will be binding on the NCDOT, its successors and assigns.

The NCDOT, in consideration of the conveyance of said lands and interests in lands, does hereby covenant and agree as a covenant running with the land for itself, its successors and assigns, that (1) no person will on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination with regard to any facility located wholly or in part on, over, or under such lands hereby conveyed [,] [and]* (2) that the NCDOT will use the lands and interests in lands and interests in lands so conveyed, in compliance with all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Effectuation of Title VI of the Civil Rights Act of 1964, and as said Regulations and Acts may be amended [, and (3) that in the event of breach of any of the above-mentioned nondiscrimination conditions, the Department will have a right to enter or re-enter said lands and facilities on said land, and that above described land and facilities will thereon revert to and vest in and become the absolute property of the U.S. Department of Transportation and its assigns as such interest existed prior to this instruction].*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary in order to make clear the purpose of Title VI.)

(b) Clauses for Transfer of Real Property Acquired or Improved Under the Activity, Facility, or Program (1050.2A, Appendix C)

The following clauses will be included in deeds, licenses, leases, permits, or similar instruments entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(a):

1. The (grantee, lessee, permittee, etc. as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree [in the case of deeds and leases add "as a covenant running with the land"] that:
   (i.) In the event facilities are constructed, maintained, or otherwise operated on the property described in this (deed, license, lease, permit, etc.) for a purpose for which a U.S. Department of Transportation activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permittee, etc.) will maintain and operate such facilities and services in compliance with all requirements imposed by the Acts and Regulations (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.
2. With respect to licenses, leases, permits, etc., in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to terminate the (lease, license, permit, etc.) and to enter, re-enter, and repossess said lands and facilities thereon, and hold the same as if the (lease, license, permit, etc.) had never been made or issued. *
3. With respect to a deed, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to enter or re-enter the lands and facilities thereon, and the above described lands and facilities will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

(c) Clauses for Construction/Use/Access to Real Property Acquired Under the Activity, Facility or Program (1050.2A, Appendix D)

The following clauses will be included in deeds, licenses, permits, or similar instruments/ agreements entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(b):

1. The (grantee, licensee, permittee, etc., as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add, "as a covenant running with the land") that (1) no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities, (2) that in the construction of any improvements on, over, or under such land, and the furnishing of services thereon, no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination, (3) that the (grantee, licensee, lessee, permittee, etc.) will use the premises in compliance with all other requirements imposed by or pursuant to the Acts and Regulations, as amended, set forth in this Assurance.
2. With respect to (licenses, leases, permits, etc.), in the event of breach of any of the above Non¬ discrimination covenants, the NCDOT will have the right to terminate the (license, permit, etc., as appropriate) and to enter or re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, permit, etc., as appropriate) had never been made or issued. *
3. With respect to deeds, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

STANDARD SPECIAL PROVISION

MINORITY AND FEMALE EMPLOYMENT REQUIREMENTS

Z-7

NOTICE OF REQUIREMENTS FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (*EXECUTIVE NUMBER 11246*)

1. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, see as shown on the attached sheet entitled "Employment Goals for Minority and Female participation".

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with the Executive Order and the regulations in *41 CFR Part 60-4* shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in *41 CFR 60-4.3(a)*, and its effort to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the executive Order and the regulations *in 41 CFR Part 60-4*. Compliance with the goals will be measured against the total work hours performed.

2. As used in this Notice and in the contract resulting from this solicitation, the "covered area" is the county or counties shown on the cover sheet of the proposal form and contract.

EMPLOYMENT GOALS FOR MINORITY AND FEMALE PARTICIPATION

Economic Areas

Area 023 29.7%
Bertie County
Camden County
Chowan County
Gates County
Hertford County
Pasquotank County
Perquimans County

Area 024 31.7%
Beaufort County
Carteret County
Craven County
Dare County
Edgecombe County
Green County
Halifax County
Hyde County
Jones County
Lenoir County
Martin County
Nash County
Northampton County
Pamlico County
Pitt County
Tyrrell County
Washington County
Wayne County
Wilson County

Area 025 23.5%
Columbus County
Duplin County
Onslow County
Pender County

Area 026 33.5%
Bladen County
Hoke County
Richmond County
Robeson County
Sampson County
Scotland County

Area 027 24.7%
Chatham County
Franklin County
Granville County
Harnett County
Johnston County
Lee County
Person County
Vance County
Warren County

Area 028 15.5%
Alleghany County
Ashe County
Caswell County
Davie County
Montgomery County
Moore County
Rockingham County
Surry County
Watauga County
Wilkes County

Area 029 15.7%
Alexander County
Anson County
Burke County
Cabarrus County
Caldwell County
Catawba County
Cleveland County
Iredell County
Lincoln County
Polk County
Rowan County
Rutherford County
Stanly County

Area 0480 8.5%
Buncombe County
Madison County

Area 030 6.3%
Avery County
Cherokee County
Clay County
Graham County
Haywood County
Henderson County
Jackson County
McDowell County
Macon County
Mitchell County
Swain County
Transylvania County
Yancey County

SMSA Areas

Area 5720 26.6%
Currituck County

Area 9200 20.7%
Brunswick County
New Hanover County

Area 2560 24.2%
Cumberland County

Area 6640 22.8%
Durham County
Orange County
Wake County

Area 1300 16.2%
Alamance County

Area 3120 16.4%
Davidson County
Forsyth County
Guilford County
Randolph County
Stokes County
Yadkin County

Area 1520 18.3%
Gaston County
Mecklenburg County
Union County

Goals for Female

Participation in Each Trade

(Statewide) 6.9%

STANDARD SPECIAL PROVISION

REQUIRED CONTRACT PROVISIONS FEDERAL - AID CONSTRUCTION CONTRACTS

FHWA - 1273 Electronic Version - May 1, 2012 Z-8

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

   The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

   Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

   Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).
2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.
3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.
4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding $10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. **Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:
   a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.
   b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. **EEO Officer:** The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.
3. **Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:
   a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.
   b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.
   c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.
   d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.
   e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.
4. **Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.
   a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.
   b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.
   c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.
5. **Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:
   a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.
   b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.
   c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.
   d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.
6. **Training and Promotion:**
   a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.
   b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).
   c The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.
   d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.
7. **Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:
   a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.
   b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.
   c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. **Reasonable Accommodation for Applicants / Employees with Disabilities:** The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.
9. **Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.
   a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.
   b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.
10. **Assurance Required by 49 CFR 26.13(b):**
   a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.
   b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.
11. **Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.
   a. The records kept by the contractor shall document the following:
      (1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;
      (2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and
      (3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;
   b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding $2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. **Minimum wages**
   a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

      Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:
(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
(ii) The classification is utilized in the area by the construction industry; and
(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. **Withholding.** The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. **Payrolls and basic records**

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/ wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency.

(2) Each payroll submitted shall be accompanied by a “Statement of Compliance,” signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;
(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;
(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. **Apprentices and trainees**

a. Apprentices (programs of the USDOL). Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL). Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT). Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. **Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. **Subcontracts.** The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. **Contract termination:** debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. **Compliance with Davis-Bacon and Related Act requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. **Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. **Certification of eligibility.**

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. **Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
2. **Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.
3. **Withholding for unpaid wages and liquidated damages.** The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.
4. **Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).
   a. The term “perform work with its own organization” refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees

from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:
(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
(2) the prime contractor remains responsible for the quality of the work of the leased employees;
(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.
3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.
4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.
5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.
2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).
3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost $25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. **Instructions for Certification – First Tier Participants:**
   a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.
   b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.
   c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.
   d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
   e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).
   f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.
   g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.
   h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.
   i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
   j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

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2. **Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:**
   a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:
      (1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;
      (2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
      (3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and
      (4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
   b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. **Instructions for Certification - Lower Tier Participants:**
   (Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost $25,000 or more - 2 CFR Parts 180 and 1200)
   a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.
   b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
   c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.
   d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of

Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.
2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:
   a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
   b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.
3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

STANDARD SPECIAL PROVISION

ON-THE-JOB TRAINING

(10-16-07) (Rev. 4-21-15) Z-10

Description

The North Carolina Department of Transportation will administer a custom version of the Federal On-the-Job Training (OJT) Program, commonly referred to as the Alternate OJT Program. All contractors (existing and newcomers) will be automatically placed in the Alternate Program. Standard OJT requirements typically associated with individual projects will no longer be applied at the project level. Instead, these requirements will be applicable on an annual basis for each contractor administered by the OJT Program Manager.

On the Job Training shall meet the requirements of 23 CFR 230.107 (b), 23 USC – Section 140, this provision and the On-the-Job Training Program Manual.

The Alternate OJT Program will allow a contractor to train employees on Federal, State and privately funded projects located in North Carolina. However, priority shall be given to training employees on NCDOT Federal-Aid funded projects.

Minorities and Women

Developing, training and upgrading of minorities and women toward journeyman level status is a primary objective of this special training provision. Accordingly, the Contractor shall make every effort to enroll minority and women as trainees to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

Assigning Training Goals

The Department, through the OJT Program Manager, will assign training goals for a calendar year based on the contractors' past three years' activity and the contractors' anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from 1 to 15 per contractor per calendar year. The Contractor shall sign an agreement to fulfill their annual goal for the year.\

Training Classifications

The Contractor shall provide on-the-job training aimed at developing full journeyman level workers in the construction craft/operator positions. Preference shall be given to providing training in the following skilled work classifications:

Equipment Operators	Office Engineers
Truck Drivers	Estimators
Carpenters	Iron / Reinforcing Steel Workers
Concrete Finishers	Mechanics
Pipe Layers	Welders

The Department has established common training classifications and their respective training requirements that may be used by the contractors. However, the classifications established are not all-inclusive. Where the training is oriented toward construction applications, training will be allowed in lower-level management positions such as office engineers and estimators. Contractors shall submit new classifications for specific job functions that their employees are performing. The Department will review and recommend for acceptance to FHWA the new classifications proposed by contractors, if applicable. New classifications shall meet the following requirements:

Proposed training classifications are reasonable and realistic based on the job skill classification needs, and

The number of training hours specified in the training classification is consistent with common practices and provides enough time for the trainee to obtain journeyman level status.

The Contractor may allow trainees to be trained by a subcontractor provided that the Contractor retains primary responsibility for meeting the training and this provision is made applicable to the subcontract. However, only the Contractor will receive credit towards the annual goal for the trainee.

Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman level status or in which they have been employed as a journeyman.

Records and Reports

The Contractor shall maintain enrollment, monthly and completion reports documenting company compliance under these contract documents. These documents and any other information as requested shall be submitted to the OJT Program Manager.

Upon completion and graduation of the program, the Contractor shall provide each trainee with a certification Certificate showing the type and length of training satisfactorily completed.

Trainee Interviews

All trainees enrolled in the program will receive an initial and Trainee/Post graduate interview conducted by the OJT program staff.

Trainee Wages

Contractors shall compensate trainees on a graduating pay scale based upon a percentage of the prevailing minimum journeyman wages (Davis-Bacon Act). Minimum pay shall be as follows:

60 percent	of the journeyman wage for the first half of the training period
75 percent	of the journeyman wage for the third quarter of the training period
90 percent	of the journeyman wage for the last quarter of the training period

In no instance shall a trainee be paid less than the local minimum wage. The Contractor shall adhere to the minimum hourly wage rate that will satisfy both the NC Department of Labor (NCDOL) and the Department.

Achieving or Failing to Meet Training Goals

The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and who receives training for at least 50 percent of the specific program requirement. Trainees will be allowed to be transferred between projects if required by the Contractor's scheduled workload to meet training goals.

If a contractor fails to attain their training assignments for the calendar year, they may be taken off the NCDOT's Bidders List.

Measurement and Payment

No compensation will be made for providing required training in accordance with these contract documents.

STANDARD SPECIAL PROVISION
MINIMUM WAGES
GENERAL DECISION NC20220090 02/25/2022 NC90

Z-090

Date: February 25, 2022

General Decision Number: NC20220090 02/25/2022 NC90

Superseded General Decision Numbers: NC20210090

State: North Carolina

Construction Type: HIGHWAY

COUNTIES:

Brunswick	Greene	Onslow
Cumberland	Hoke	Pender
Currituck	Johnston	Pitt
Edgecombe	Nash	Wake
Franklin	New Hanover	Wayne

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	Executive Order 14026 generally applies to the contract. The contractor must pay all covered workers at least $15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	Executive Order 13658 generally applies to the contract. The contractor must pay all covered workers at least $11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at https://www.dol.gov/agencies/whd/government-contracts.

Modification Number	Publication Date
0	01/07/2022
1	02/25/2022

SUNC2014-005 11/17/2014

	Rates	Fringes
BLASTER	21.04	
CARPENTER	13.72 **	
CEMENT MASON/CONCRETE FINISHER	14.48 **	
ELECTRICIAN		
Electrician	17.97	
Telecommunications Technician	16.79	.63
IRONWORKER	16.02	
LABORER		
Asphalt Raker and Spreader	12.46 **	
Asphalt Screed/Jackman	14.33 **	
Carpenter Tender	12.88 **	
Cement Mason/Concrete Finisher Tender	12.54 **	
Common or General	10.20 **	
Guardrail/Fence Installer	12.87 **	
Pipelayer	12.17 **	
Traffic Signal/Lighting Installer	14.89 **	
PAINTER		
Bridge	24.57	
POWER EQUIPMENT OPERATORS		
Asphalt Broom Tractor	11.85 **	
Bulldozer Fine	17.04	
Bulldozer Rough	14.34 **	
Concrete Grinder/Groover	20.34	2.30
Crane Boom Trucks	20.54	
Crane Other	20.08	
Crane Rough/All-Terrain	20.67	
Drill Operator Rock	14.38 **	
Drill Operator Structure	21.14	
Excavator Fine	16.60	
Excavator Rough	14.00 **	
Grader/Blade Fine	18.47	
Grader/Blade Rough	14.62 **	
Loader 2 Cubic Yards or Less	13.76 **	
Loader Greater Than 2 Cubic Yards	14.14 **	
Material Transfer Vehicle (Shuttle Buggy)	15.18	
Mechanic	17.55	
Milling Machine	15.36	
Off-Road Hauler/Water Tanker	11.36 **	
Oiler/Greaser	13.55 **	
Pavement Marking Equipment	12.11 **	
Paver Asphalt	15.59	
Paver Concrete	18.20	
Roller Asphalt Breakdown	12.45 **	
Roller Asphalt Finish	13.85 **	

	Rates	Fringes
Roller Other	11.36 **	
Scraper Finish	12.71 **	
Scraper Rough	11.35 **	
Slip Form Machine	16.50	
Tack Truck/Distributor Operator	14.52 **	
TRUCK DRIVER		
GVWR of 26,000 Lbs or Less	11.12 **	
GVWR of 26,001 Lbs or Greater	12.37 **	

Welders – Receive rate prescribed for craft performing operation to which welding is incidental.

** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 ($15.00) or 13658 ($11.25). Please see the Note at the top of the wage determination for more information.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the David-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

GT-0.1

PROJECT SPECIAL PROVISIONS

GEOTECHNICAL

U-2519BA

U-2519BB

DocuSigned by:
Geotechnical Engineering Unit
E06538624A11498...
06/13/2022

SUBSURFACE DRAINAGE **(SPECIAL)**

1.0 SUBDRAIN COARSE AGGREGATE - LIMESTONE

All subsurface drainage constructed on the project is required to utilize **limestone** meeting the criteria in 2.0 for the rock type for subdrain coarse aggregate in lieu of standard subdrain coarse aggregate.

2.0 MATERIALS

Revise the 2018 Standard Specifications as follows:

Article 815-2 MATERIALS, first paragraph, replace the third sentence with the following:

Provide subdrain coarse aggregate (standard size No. 78M) for subsurface drains consisting of **limestone** meeting the following criteria: Limestone shall contain not less than 90% calcium carbonate equivalents and dolomitic limestone shall contain not less than 10% of magnesium.

12/6/2017

RIP RAP **(SPECIAL)**

1.0 RIP RAP CLASS B LIMESTONE

All ditches collecting runoff from cut slopes in formational soils where it is found acidic groundwater is present in areas shown on Roadway Plan Sheet 3G-1 shall use Rip Rap, Class B Limestone consisting exclusively of limestone materials meeting the criteria in Section 2.0 for lining ditches. Plating of roadway cut slopes with leaching acid groundwater may also require Rip Rap, Class B Limestone. Rip Rap, Class B Limestone shall follow Section 876 of the Standard Specifications except for the following additions:

2.0 MATERIALS

Revise Section 876 of the 2018 Standard Specification as follows:

Article 876-2 MATERIALS, first paragraph, include the following after the first sentence:

The Engineer will handle testing any groundwater leaching out of the cut slopes to determine if the pH value of the water is less than 5.5. Rip Rap, Class B Limestone will not be needed if pH is 5.5 or above. If the pH of the water is less than 5.5, then provide Type 2 geotextile for filtration geotextiles and line ditch with Rip Rap, Class B Limestone meeting the following criteria: Limestone shall have not less than 90% calcium carbonate equivalent and dolomitic limestone shall have not less than 10% of magnesium. If pH of water is less than 4.5, then additionally plate the cut slope from the ditch line up to the level where groundwater is leaching out of the face of the cut with 1' thick Rip Rap, Class B Limestone. Line ditches downstream of the presence of leaching acid groundwater cut slopes with Rip Rap, Class B Limestone as directed by the Engineer.

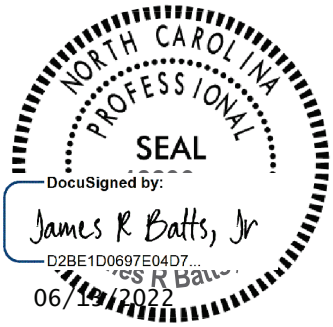
ARTICLE 876-4 MEASUREMENT AND PAYMENT

Rip Rap, Class B, Limestone will be measured and paid in tons. Plain rip rap will be measured by weighing rip rap in trucks in accordance with 106-7.

The contract unit prices for Rip Rap, Class B, Limestone will be full compensation for providing, transporting, and placing rip rap, filtration geotextiles, wire staples and anchor pins.

Payment will be made under:

Pay Item	Pay Unit
Rip Rap, Class B Limestone	Tons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06/15/2022

CONTINUOUS FLIGHT AUGER PILES FOR SOUND BARRIER WALLS (SPECIAL)

1.0 GENERAL

Continuous flight auger (CFA) piles are constructed by drilling a borehole with a continuous flight hollow stem auger and filling the borehole by pumping grout through the auger as it is withdrawn. After completing grout placement, reinforcement is inserted into the column of fluid grout. At the Contractor's option, construct CFA piles for sound barrier walls instead of pile excavation. Install CFA piles with the required depth in accordance with the contract and accepted submittals. Use a prequalified CFA Pile Subcontractor for CFA pile work. Define "pile" as a CFA pile and "reinforcement" as pile extending out of CFA pile.

2.0 INSTALLATION PLAN SUBMITTAL

Provide 4 copies and a PDF copy of the CFA pile installation plan submittal. Submit the installation plan at least 15 days before starting CFA pile construction. Do not begin pile construction until the CFA pile installation plan is accepted.

Provide detailed project specific information in the installation plan that includes the following:

1. List and sizes of proposed equipment including CFA drilling rigs, augers and other drilling tools and grouting equipment;
2. Step-by-step description of CFA pile installation and sequence of pile construction;
3. Methods for placing reinforcement with procedures for supporting and positioning the reinforcement;
4. Minimum grout volume factor;
5. Equipment and procedures for monitoring and recording grout volume;
6. Examples of construction records to be provided that meet Section 6.0 of this provision;
7. Procedures for containment and disposal of drilling spoils and waste grout;
8. Approved packaged grout or grout mix design that meets Section 1003 of the *Standard Specifications*; and
9. Other information shown in the plans or requested by the Engineer.

If alternate installation procedures are proposed or necessary, a revised CFA pile installation plan submittal may be required. If the work deviates from the accepted submittal without prior approval, the Engineer may suspend CFA pile construction until a revised plan is accepted.

3.0 MATERIALS

Use Type 2 grout that meets Section 1003 of the *Standard Specifications*.

Use piles extending out of CFA piles that meet the *Sound Barrier Wall* provision.

4.0 PRECONSTRUCTION MEETING

Before starting CFA pile construction, hold a preconstruction meeting to discuss the installation and monitoring of the piles. Schedule this meeting after the CFA Pile Subcontractor mobilizes to the site. If this meeting occurs before all CFA pile submittals have been accepted, additional preconstruction meetings may be required before beginning construction of CFA piles without accepted submittals. The Resident or Bridge Maintenance Engineer, Bridge Construction Engineer, Geotechnical Operations Engineer, Contractor and CFA Pile Subcontractor Superintendent and Project Manager will attend preconstruction meetings.

5.0 CONSTRUCTION METHODS

Use equipment and methods accepted in the CFA pile installation plan or approved by the Engineer. Inform the Engineer of any deviations from the accepted plan.

Dispose of drilling spoils and waste grout as directed and in accordance with Section 802 of the *Standard Specifications*. Drilling spoils consist of all excavated material and fluids removed from boreholes.

A. Drilling

Use CFA piling rigs capable of drilling to the dimensions and depths shown in the plans or required otherwise by the Engineer. Install CFA piles with tip elevations no higher than shown in the plans or approved by the Engineer.

Use single helix hollow stem augers with uniform diameters and continuous flights from the top of the auger to the bottom tip of the cutting face. Provide augers with flights and teeth that cut the bottom of the borehole flat. Augers with outside diameters at least 97% of the pile design diameter are required. Augers capable of installing piles to a depth 20% greater than plan depth are also required.

Unless piles are installed with a hydraulic fixed mast installation platform and the stem to which the auger is fixed has an outside diameter 10" or greater, at least one guide connected to the leads of the CFA piling rig is required. Prevent the leads from rotating during drilling and grouting.

Seal the grout injection port to prevent entry during drilling. Keep the hollow stem of augers clean when drilling. Clearly mark augers or leads every foot along their length with markings visible to the unaided eye from the ground. Check for correct pile location and alignment before beginning drilling. Do not begin drilling until enough grout to complete the pile is on the project site.

Advance the auger into the ground at a continuous rate. Do not raise the auger until beginning grout placement. Control the auger rotation speed to prevent excess spoil from being transported to the ground surface and surrounding soil being drawn laterally into the borehole.

If muck, organics, soft soil or other unsuitable materials are encountered within 5 ft of the ground surface, contact the Engineer as these materials can cause problems with top of pile construction. If auger refusal is encountered before reaching plan depth, stop the auger rotation and inform the Engineer. Unless it is determined otherwise, define refusal as less than 1 ft of auger penetration per minute.

B. Grouting

Remove oil, rust inhibitors, residual drilling slurries and similar foreign materials from holding tanks/hoppers, stirring devices, pumps and lines and all other equipment in contact with grout before use.

Place a screen between the ready mix truck and the grout pump to remove large particles or cement balls using a mesh that has openings no larger than ¾".

Use a positive displacement piston type pump with a known volume per stroke that can develop peak pressures at the pump of at least 350 psi. Size the pump to maintain a smooth continuous delivery of grout while limiting pressure variations (particularly pressure drops) due to pump strokes. At the beginning of construction, provide the grout volume delivered by each pump stroke and verify this value is within 3% of the actual volume. Recalibrate the grout volume per pump stroke during construction as necessary or directed.

Measure grout temperature and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform flow field tests in the presence of the Engineer in accordance with ASTM C939 (Flow Cone).

Place grout in accordance with the contract and accepted submittals. Pump grout without difficulty to fill any soft or porous zones and with sufficient pressure to ensure a continuous monolithic pile with at least the plan cross section from the maximum borehole depth to the top of the grout column. Provide grout free of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing).

Begin placing grout within 5 minutes after the auger has reached plan depth. At the beginning of grout placement, lift the auger 6" to 12" and remove the sealing device by applying grout pressure or with a steel bar. Do not lift the auger beyond this range in order to minimize soil movement. After initiating grout flow, reinsert the auger to the original depth.

Pump grout continuously while extracting the auger at a smooth steady rate. Maintain a positive grout pressure at the auger injection point at all times. If rotation occurs while removing the auger, rotate the auger in the same direction as during drilling. If grout placement is suspended for any reason, inform the Engineer and redrill the CFA pile.

Monitor the depth of the auger injection point while counting pump strokes during grouting. Record the grout volume and factor versus depth of the auger injection point in increments of 5 ft or less. The grout volume factor is the grout volume placed

divided by the theoretical grout volume for each depth increment. A grout volume factor of at least 1.15 is required.

C. Top of Pile Finishing and Protection

After placing grout, remove all excess grout and spoil from and place a temporary form within the top of the grout column. Use a form 3 ft to 5 ft long with a diameter equal to or larger than the pile diameter. Place the form with equal lengths above and below the ground surface. Recheck the top of the grout and remove any foreign material. After the Engineer determines that grout reaches initial set, remove the form without disturbing the ground surface around the pile.

After inserting reinforcement, square the top of the CFA pile with the pile axis while grout is still fluid or by cutting off hardened grout. Construct the top of CFA pile to the elevation shown in the plans.

D. Reinforcement

Provide reinforcement for CFA piles consisting of piles shown in the plans and accepted submittals. Insert reinforcement as a unit while the grout is still fluid. Lower or gently push reinforcement into the grout. Do not vibrate or drive the reinforcement. Support the reinforcement at the ground surface until the grout strength reaches 2,500 psi. Contact the Engineer if reinforcement cannot be properly inserted to the required depth.

6.0 CONSTRUCTION RECORDS

Provide 2 copies of CFA pile construction records after completing each pile. Include the following in construction records:

1. Names of CFA Pile Subcontractor, Superintendent, Drill Rig Operator and Project Manager;
2. Project description, county, Department's contract, TIP and WBS element number;
3. Wall station and number and pile location and identifier;
4. The grout volume and factor versus depth of the auger injection point in increments of 5 ft or less;
5. CFA pile diameter, length and tip elevation, top of pile and ground surface elevations;
6. Auger diameter and theoretical volume of the borehole;
7. Grout temperature and flow records;
8. Size, length, top elevation and grade of reinforcement;
9. Date and time drilling begins and ends, grout is mixed and arrives on-site, pumping grout begins and ends and reinforcement is placed;
10. Weather conditions including air temperature at time of grout placement; and
11. All other pertinent details related to CFA pile construction.

After completing CFA piles for each sound barrier wall, provide a PDF copy of all corresponding construction records.

7.0 CFA Pile Acceptance

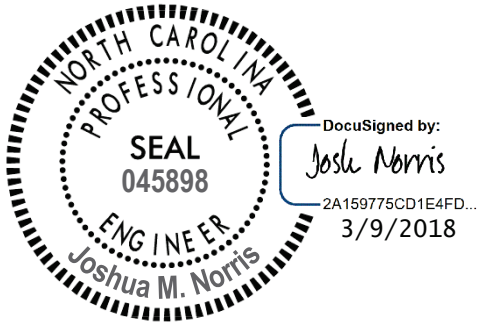
CFA pile acceptance is based in part on the following criteria.

1. Grout volume factor is greater than the minimum required for any 5 ft depth increment.
2. Grout is properly placed and does not have any evidence of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing).
3. CFA pile and reinforcement location, alignment and elevations are within tolerances for sound barrier walls for pile excavation and reinforcement is in accordance with the contract and accepted submittals.

If the Engineer determines a CFA pile is unacceptable, additional testing, remedial measures or replacement piles are required at no additional cost to the Department. Do not being remediation work until remediation plans are approved.

8.0 Measurement And Payment

CFA piles for sound barrier walls will be paid at the contract unit price for *Sound Barrier Wall*. No separate payment will be made for CFA piles. The contract unit price for *Sound Barrier Wall* will be full compensation for all costs for submittals, monitoring and recording, labor, tools, equipment, reinforcement and grout complete and in place and all incidentals necessary to drill and construct CFA piles in accordance with this provision. No payment will be made for any costs associated with unacceptable CFA piles.



REINFORCED SOIL SLOPES: **(12-17-19)**

Description

Construct reinforced soil slopes (RSS) consisting of select material and geogrid reinforcement in the reinforced zone with erosion control products on slope faces. Slope erosion control includes matting with shoulder and slope borrow or geocells with compost blankets. Construct RSS in accordance with the contract and if included in the plans, Geotechnical Standard Detail No. 1802.01 or 1802.02. RSS are required to reinforce embankments and stabilize slopes at locations shown in the plans and as directed. Define "geogrids" as primary or secondary geogrids and "matting" as coir fiber mats or matting for erosion control. Define "standard RSS" as an RSS that meets either of the standard reinforced soil slope drawings (Geotechnical Standard Detail No. 1802.01 or 1802.02).

Materials

Refer to Division 10 of the *Standard Specifications*.

Item	Section
Geogrids	1056
Matting for Erosion Control	1060-8
Select Materials	1016
Shoulder and Slope Borrow	1019-2

Unless required otherwise in the plans, use Class I, II or III select material in the reinforced zone of RSS. Use geocells that meet the *Cellular Confinement Systems* provision, seeded compost blankets that meet the *Compost Blanket* provision and coir fiber mats that meet the *Coir Fiber Mat* provision.

Handle and store geogrids in accordance with Article 1056-2 of the *Standard Specifications*. Define "machine direction" (MD) and "cross-machine direction" (CD) for geogrids per Article 1056-3 of the *Standard Specifications*. Provide Type 1 material certifications and identify geogrids in accordance with Article 1056-3 of the *Standard Specifications*.

Use primary geogrids with a roll width of at least 4 ft and an "approved" status code in accordance with the NCDOT Geosynthetic Reinforcement Evaluation Program. The list of approved geogrids is available from:
connect.ncdot.gov/resources/Geological/Pages/Products.aspx

Provide primary geogrids with design strengths in accordance with the plans. For standard RSS and based on actual RSS angle and height and select material to be used in the reinforced zone at each standard RSS location, provide primary geogrids with long-term design strengths in accordance with Geotechnical Standard Detail No. 1802.01 or 1802.02. Primary geogrids are approved for long-term design strengths for a 75-year design life in the MD based on material type. Define material type from the website above for select material as follows:

Material Type	Select Material
Borrow	Class I Select Material
Fine Aggregate	Class II or III Select Material

For secondary geogrids, provide extruded geogrids produced in the United States and manufactured from punched and drawn polypropylene sheets. Use secondary geogrids with a roll

width of at least 6 ft that meet the following:

Property	Requirement[1]	Test Method
Aperture Dimensions[2]	1" x 1.3"	Direct Measure
Minimum Rib Thickness[2]	0.03" x 0.03"	Direct Measure
Tensile Strength @ 2% Strain[2]	280 lb/ft x 450 lb/ft	ASTM D6637, Method B
Tensile Strength @ 5% Strain[2]	580 lb/ft x 920 lb/ft	
Ultimate Tensile Strength[2]	850 lb/ft x 1,300 lb/ft	
Junction Efficiency[3] (MD)	93%	ASTM D7737
Flexural Rigidity[4]	250,000 mg–cm	ASTM D7748
Aperture Stability Modulus[5]	0.32 lb–ft/degrees	ASTM D7864
UV Resistance (500 hr exposure)	100% retained	ASTM D4355

1. MARV per Article 1056-3 of the *Standard Specifications* except dimensions and thickness are nominal.
2. Requirement for MD x CD.
3. Junction Efficiency (%) = (Average Junction Strength (Xj_{ave}) / Ultimate Tensile Strength in the MD from ASTM D6637, Method A) × 100.
4. Test specimens two ribs wide, with transverse ribs cut flush with exterior edges of longitudinal ribs, and sufficiently long to enable measurement of the overhang dimension.
5. Applied moment of 17.7 lb–inch (torque increment).

Construction Methods

Before starting RSS construction, the Engineer may require a preconstruction meeting to discuss the construction and inspection of the RSS. If this meeting is required and occurs before all RSS submittals and material certifications have been accepted, additional preconstruction meetings may be required before beginning construction of RSS without accepted submittals. The Resident or District Engineer, Area Construction Engineer, Geotechnical Operations Engineer, Contractor and RSS Contractor Superintendent will attend preconstruction meetings.

Control drainage during construction in the vicinity of RSS. Direct run off away from RSS, select material and backfill. Contain and maintain select material and backfill and protect material from erosion.

Excavate as necessary for RSS in accordance with the contract. Maintain a horizontal clearance of at least 12" between the ends of primary geogrids and limits of reinforced zone as shown in the plans. When excavating existing slopes, bench slopes in accordance with Subarticle 235-3(A) of the *Standard Specifications*. Notify the Engineer when excavation is complete. Do not place primary geogrids until excavation dimensions and in-situ material are approved.

Place geogrids within 3" of locations shown in the plans. Install geogrids with the orientation, dimensions and number of layers shown in the plans. Before placing select material, pull geogrids taut so they are in tension and free of kinks, folds, wrinkles or creases. Contact the Engineer when existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with geogrids. If necessary, the top geogrid layer may be lowered up to 9" to avoid

obstructions. Extend geogrids to slope faces.

Install primary geogrids with the MD perpendicular to the embankment centerline. The MD is the direction of the length or long dimension of the geogrid roll. Do not splice or overlap primary geogrids in the MD so splices or overlaps are parallel to toe of RSS. Unless shown otherwise in the plans and except for clearances at the ends of primary geogrids, completely cover select material at each primary geogrid layer with geogrid so primary geogrids are adjacent to each other in the CD, i.e., perpendicular to the MD. The CD is the direction of the width or short dimension of the geogrid roll.

Install secondary geogrids with MD parallel to toe of RSS. Secondary geogrids should be continuous for each secondary geogrid layer. If secondary geogrid roll length is too short, overlap ends of secondary geogrid rolls at least 12" in the direction that select material will be placed to prevent lifting the edge of the top geogrid.

Place select material in the reinforced zone in 8" to 10" thick lifts and compact material in accordance with Subarticle 235-3(C) of the *Standard Specifications*. For RSS steeper than 1.5:1 (H:V), compact slope faces with an approved method. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage geogrids when placing and compacting select material. End dumping directly on geogrids is not permitted. Do not operate heavy equipment on geogrids until they are covered with at least 8" of select material. To prevent damaging geogrids, minimize turning and avoid sudden braking and sharp turns with compaction equipment. Replace any damaged geogrids to the satisfaction of the Engineer. Construct remaining portions of embankments outside the reinforced zone in accordance with Section 235 of the *Standard Specifications*.

Plate slope faces of RSS with at least 6" of shoulder and slope borrow except when using geocells for slope erosion control. Install slope erosion control as shown in the plans and as soon as possible to prevent damage to slope faces of RSS. If damage occurs, repair RSS and slope faces to the satisfaction of the Engineer before seeding or installing erosion control products. For matting, seed slope faces and cover shoulder and slope borrow with coir fiber mat or matting for erosion control as shown in the plans in accordance with the *Coir Fiber Mat* provision or Section 1631 of the *Standard Specifications*, respectively. Install geocells filled with seeded compost in accordance with the accepted submittals and the *Cellular Confinement Systems* and *Compost Blanket* provisions. Maintain slope erosion control until vegetation is established.

Measurement and Payment

Reinforced Soil Slopes will be measured and paid in square yards. RSS will be measured along the slope faces of RSS before installing slope erosion control as the square yards of RSS. No payment will be made for repairing damaged RSS or slope faces.

The contract unit price for *Reinforced Soil Slopes* will be full compensation for providing labor, tools, equipment and RSS materials, compacting select materials and supplying and placing geogrids, select material, shoulder and slope borrow and any incidentals necessary to construct RSS except for erosion control products. The contract unit price for *Reinforced Soil Slopes* will also be full compensation for excavating and hauling and removing excavated materials to install RSS.

Coir fiber mat and matting for erosion control will be measured and paid in accordance with the *Coir Fiber Mat* provision and Article 1631-4 of the *Standard Specifications*, respectively.

Geocells and seeded compost blankets will be measured and paid in accordance with the *Cellular Confinement Systems* and *Compost Blanket* provisions, respectively.

Payment will be made under:

Pay Item	**Pay Unit**
Reinforced Soil Slopes	Square Yard

DocuSigned by:
Scott A. Hidden
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Dec 17, 2021

ROCK EMBANKMENTS: **(SPECIAL)**

Description

Construct rock embankments in accordance with the contract. Use core material as necessary or required where piles will be driven through rock embankments and as shown in the plans. Rock embankments are required to construct embankments in water at locations shown in the plans and as directed.

Materials

Refer to Division 10 of the *Standard Specifications*.

Item	Section
Geotextile for Rock Embankments, Type 2	1056
Rip Rap Materials	1042
Select Materials	1016

Provide Type 2 geotextile for filtration geotextiles. Use Class I select material for rock embankments. Use Class VI select material (standard size No. 57) for core material and Class A rip rap and No. 57 stone to fill voids in rock embankments. Obtain aggregates from sources participating in the Department's Aggregate QC/QA Program in accordance with Section 1006 of the *Standard Specifications* or use similar size onsite material approved by the engineer.

Construction Methods

Construct rock embankments in accordance with the slopes, dimensions and elevations shown in the plans and Section 235 of the *Standard Specifications*. Place Class I so smaller rocks are uniformly distributed throughout rock embankments. Provide a uniform surface free of obstructions, debris and groups of large rocks that could cause voids in embankments. When placing Class I in lifts, place core material to top of the current lift before placing the next lift of Class I.

Before placing embankment fill material or filtration geotextiles over rock embankments, fill voids in the top of rock embankments with rip rap and No. 57 stone. Place and compact Class A rip rap. Then, fill any remaining voids with No. 57 stone so geotextiles are not torn, ripped or otherwise damaged when installed and covered. Compact rip rap and No. 57 stone with tracked equipment or other approved methods. Install filtration geotextiles on top of Class I, rip rap and No. 57 stone in accordance with Article 270-3 of the *Standard Specifications* before placing embankment fill material.

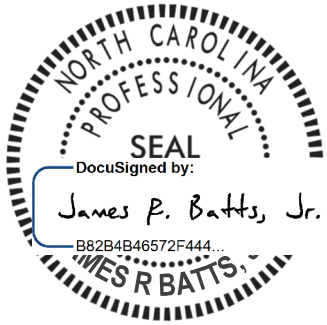
Measurement and Payment

Rock Embankments, *Rip Rap, Class A* and *#57 Stone* will be measured and paid in tons. Select material and rip rap will be measured by weighing material and rip rap in trucks in accordance with Article 106-7 of the *Standard Specifications*. The contract unit prices for *Rock Embankments*, *Rip Rap, Class A* and *#57 Stone* will be full compensation for providing, hauling, handling, placing, compacting and maintaining select material and rip rap.

Geotextile for Rock Embankments will be measured and paid in square yards. Geotextiles will be measured along the top of rock embankments as the square yards of exposed geotextiles before placing embankment fill material. No measurement will be made for overlapping geotextiles. The contract unit price for *Geotextile for Rock Embankments* will be full compensation for providing, transporting and installing geotextiles.

Payment will be made under:

Pay Item	**Pay Unit**
Rock Embankments	Ton
Rip Rap, Class A	Ton
#57 Stone	Ton
Geotextile for Rock Embankments	Square Yard



5/3/2018

MECHANICALLY STABILIZED EARTH RETAINING WALLS (10-19-21)

1.0 GENERAL

Construct mechanically stabilized earth (MSE) retaining walls consisting of steel or geosynthetic reinforcement in the reinforced zone connected to vertical facing elements. Use precast concrete panels for vertical facing elements and coarse aggregate in the reinforced zone unless noted otherwise in the plans. Provide reinforced concrete coping and pile sleeves as required. Design and construct MSE retaining walls based on actual elevations and wall dimensions in accordance with the contract and accepted submittals. Use a prequalified MSE Wall Installer to construct MSE retaining walls.

Define MSE wall terms as follows:
Geosynthetic Reinforcement – Polyester Type (PET), HDPE or Polypropylene (PP) geosynthetic grids, i.e., geogrid reinforcement or polymer straps, i.e., geostrip reinforcement,
Geogrid – PET, HDPE or PP geogrid,
Reinforcement – Steel or geosynthetic reinforcement,
Aggregate – Coarse or fine aggregate,
Panel – Precast concrete panel,
Coping – Precast or CIP concrete coping,
Design Height (H) – Wall height + wall embedment as shown in the plans,
MSE Wall – Mechanically stabilized earth retaining wall,
MSE Wall Vendor – Vendor supplying the chosen MSE wall system,
MSE Panel Wall – MSE wall with panels,
MSE Segmental Wall – MSE wall with segmental retaining wall (SRW) units and
Abutment Wall – MSE wall with bridge foundations in any portion of the reinforced zone or an MSE wall connected to an abutment wall (even if bridge foundations only penetrate a small part of the reinforced zone, the entire MSE wall is considered an abutment wall).

For bridge approach fills behind end bents with MSE abutment walls, design reinforcement connected to end bent caps in accordance with the plans and this provision. Construct Type III Reinforced Bridge Approach Fills in accordance with the *Bridge Approach Fills* provision and Roadway Detail Drawing No. 422D10.

Use an approved MSE wall system in accordance with the plans and any NCDOT restrictions or exceptions for the chosen system. Value engineering proposals for other MSE wall systems will not be considered. Do not use MSE wall systems with an "approved for provisional use" status for MSE walls with design heights greater than 35 ft or walls supporting or adjacent to railroads or interstate highways. The list of approved MSE wall systems with approval status is available from:
connect.ncdot.gov/resources/Geological/Pages/Products.aspx

2.0 MATERIALS

Refer to the *Standard Specifications*.

Item	Section

Aggregate	1014
Asphalt Concrete Base Course, Type B25.0C	620
Corrugated Steel Pipe	1032-3
Epoxy, Type 3A	1081
Geosynthetics	1056
Grout, Type 3	1003
Joint Materials	1028
Portland Cement Concrete, Class A	1000
Precast Retaining Wall Coping	1077
Reinforcing Steel	1070
Retaining Wall Panels	1077
Segmental Retaining Wall Units	1040-4
Select Material, Class V	1016
Shoulder Drain Materials	816-2
Steel Pipe	1036-4(A)

Use galvanized corrugated steel pipe with a zinc coating weight of 2 oz/sf (G200) for pile sleeves. Provide Type 2 geotextile for filtration and separation geotextiles. Use Class A concrete for CIP coping, leveling concrete and pads. Use galvanized steel pipe, threaded rods and nuts for the PET geogrid reinforcement vertical obstruction detail. Provide galvanized Grade 36 anchor rods and Grade A hex nuts that meet AASHTO M 314 for threaded rods and nuts.

Use panels and SRW units from producers approved by the Department and licensed by the MSE Wall Vendor. Provide steel strip connectors embedded in panels fabricated from structural steel that meets the requirements for steel strip reinforcement. Unless required otherwise in the contract, produce panels with a smooth flat final finish that meets Article 1077-11 of the *Standard Specifications*. Accurately locate and secure reinforcement connectors in panels and maintain required concrete cover. Produce panels within 1/4" of the panel dimensions shown in the accepted submittals.

Damaged panels or SRW units with excessive discoloration, chips or cracks as determined by the Engineer will be rejected. Do not damage reinforcement connection devices or mechanisms in handling or storing panels and SRW units.

Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Handle and store geosynthetics in accordance with Article 1056-2 of the *Standard Specifications*. Load, transport, unload and store MSE wall materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

A. Aggregate

Use standard size No. 57, 57M, 67 or 78M that meets Table 1005-1 of the *Standard Specifications* for coarse aggregate and the following for fine aggregate:

1. Standard size No. 1S, 2S, 2MS or 4S that meets Table 1005-2 of the *Standard*

Specifications or

2. Gradation that meets Class III, Type 3 select material in accordance with Article 1016-3 of the *Standard Specifications*.

Fine aggregate is exempt from mortar strength in Subarticle 1014-1(E) of the *Standard Specifications*. Use fine aggregate with a maximum organic content of 1.0%. Provide aggregate with chemical properties that meet the following requirements:

AGGREGATE pH REQUIREMENTS		
Aggregate Type (in reinforced zone)	**Reinforcement or Connector Material**	**pH**
Coarse or Fine	Steel	5 – 10
Coarse or Fine	Geosynthetic	4.5 – 9

AGGREGATE ELECTROCHEMICAL REQUIREMENTS (Steel Reinforcement/Connector Materials Only)			
Aggregate Type (in reinforced zone)	**Resistivity**	**Chlorides**	**Sulfates**
Coarse	≥ 5,000 Ω · cm	≤ 100 ppm	≤ 200 ppm
Fine	≥ 3,000 Ω · cm		

Use aggregate from sources participating in the Department's Aggregate QC/QA Program as described in Section 1006 of the *Standard Specifications*. Sample and test aggregate in accordance with the *Mechanically Stabilized Earth Wall Aggregate Sampling and Testing Procedures*.

B. Reinforcement

Provide steel or geosynthetic reinforcement supplied by the MSE Wall Vendor or a manufacturer approved or licensed by the vendor. Use reinforcement approved for the chosen MSE wall system. The list of approved reinforcement for each MSE wall system is available from the website shown elsewhere in this provision.

1. Steel Reinforcement

Provide Type 1 material certifications in accordance with Article 106-3 of the *Standard Specifications* for steel reinforcement. Use welded wire grid reinforcement ("mesh", "mats" and "ladders") that meet Article 1070-3 of the *Standard Specifications* and steel strip reinforcement ("straps") that meet ASTM A572, A1011 or A463. Use 10 gauge or heavier structural steel Grade 50 or higher for steel strip reinforcement. Galvanize steel reinforcement in accordance with Section 1076 of the *Standard Specifications* or provide aluminized steel strip reinforcement that meet ASTM A463, Type 2-100.

2. Geosynthetic Reinforcement

Provide Type 1 material certifications and identify geosynthetic reinforcement in accordance with Article 1056-3 of the *Standard Specifications*. Define machine direction (MD) and cross-machine direction (CD) for geogrids per Article 1056-3 of the *Standard Specifications*.

Use HDPE or PP geogrid for geogrid reinforcement cast into backwalls of end bent caps. Use PET or HDPE geogrid for geogrid reinforcement connected directly to SRW units and only HDPE geogrid for geogrid reinforcement cast into panels.

Provide extruded geogrids produced in the United States and manufactured from punched and drawn polypropylene sheets for PP geogrids that meet the following:

PP GEOGRID REQUIREMENTS		
Property	**Requirement[1]**	**Test Method**
Aperture Dimensions[2]	1" x 1.2"	N/A
Minimum Rib Thickness[2]	0.07" x 0.07"	N/A
Tensile Strength @ 2% Strain[2]	580 lb/ft x 690 lb/ft	ASTM D6637, Method B
Tensile Strength @ 5% Strain[2]	1,200 lb/ft x 1,370 lb/ft	
Ultimate Tensile Strength[2]	1,850 lb/ft x 2,050 lb/ft	
Junction Efficiency[3] (MD)	93%	ASTM D7737
Flexural Rigidity[4]	2,000,000 mg–cm	ASTM D7748
Aperture Stability Modulus[5]	0.55 lb–ft/degrees	ASTM D7864
UV Stability (Retained Strength)	100% (after 500 hr of exposure)	ASTM D4355

1. MARV per Article 1056-3 of the *Standard Specifications* except dimensions and thickness are nominal.
2. Requirement for MD x CD.
3. Junction Efficiency (%) = (Average Junction Strength ($X_{j_{ave}}$) / Ultimate Tensile Strength in the MD from ASTM D6637, Method A) × 100.
4. Test specimens two ribs wide, with transverse ribs cut flush with exterior edges of longitudinal ribs, and sufficiently long to enable measurement of the overhang dimension.
5. Applied moment of 17.7 lb–inch (torque increment).

C. Bearing Pads

For MSE panel walls, use preformed ethylene propylene diene monomer rubber bearing pads that meet ASTM D2000 Grade 2, Type A, Class A with a durometer hardness of 60 or 80 ± 5. Provide bearing pads with thicknesses that meet the following:

BEARING PAD THICKNESS	
Facing Area per Panel (A)	**Minimum Pad Thickness After Compression (based on 2 times panel weight above pads)**
$A \leq 30$ sf	1/2"
30 sf $< A \leq 75$ sf	3/4"

D. Miscellaneous Components

Miscellaneous components may include connectors (e.g., anchors, bars, clamps, pins, plates, ties, etc.), fasteners (e.g., bolts, nuts, washers, etc.) and any other MSE wall components not included above. Use 10 gauge or heavier structural steel Grade 50 or higher for steel strip panel anchors and connectors. Galvanize steel components in accordance with Section 1076 of the *Standard Specifications*. Provide miscellaneous components approved for the chosen MSE wall system. The list of approved miscellaneous components for each MSE wall system is available from the website shown elsewhere in this provision.

3.0 PRECONSTRUCTION REQUIREMENTS

A. MSE Wall Surveys

The Retaining Wall Plans show a plan view, typical sections, details, notes and an elevation or profile view (wall envelope) for each MSE wall. Before beginning MSE wall design, survey existing ground elevations shown in the plans and other elevations in the vicinity of MSE wall locations as needed. For proposed slopes above or below MSE walls, survey existing ground elevations to at least 10 ft beyond slope stake points. Based on these elevations, finished grades and actual MSE wall dimensions and details, submit revised wall envelopes for acceptance. Use accepted wall envelopes for design.

B. MSE Wall Designs

For MSE wall designs, submit PDF files of working drawings and design calculations at least 30 days before the preconstruction meeting. Note name and NCDOT ID number of the panel or SRW unit production facility on working drawings. Do not begin MSE wall construction until a design submittal is accepted.

Use a prequalified MSE Segmental Wall Design Consultant to design MSE segmental walls. Provide MSE segmental wall designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for the MSE Segmental Wall Design Consultant. Provide MSE panel wall designs sealed by a Design Engineer licensed in the state of North Carolina and employed or contracted by the MSE Wall Vendor.

Design MSE walls in accordance with the plans, *AASHTO LRFD Bridge Design Specifications* and any NCDOT restrictions for the chosen MSE wall system unless otherwise required. For abutment walls only, design MSE walls for seismic if wall sites meet either or both of the following:

- Wall site is in seismic zone 2 based on Figure 2-1 of the *Structure Design Manual*,
- Wall site is classified as AASHTO Site Class E, as noted in the plans, and is in or west of Pender, Duplin, Wayne, Johnston, Wake, Durham or Person County.

Connect reinforcement to panels or SRW units with methods or devices approved for the chosen system. Use a uniform reinforcement length throughout the height of the

wall of at least 0.7H or 6 ft, whichever is longer, unless noted otherwise in the plans. Extend the reinforced zone at least 6" beyond end of reinforcement. Do not locate drains, the reinforced zone or leveling pads outside right-of-way or easement limits.

Use the simplified method for determining maximum reinforcement loads and design parameters approved for the chosen MSE wall system or default values in accordance with the AASHTO LRFD specifications. Design steel components including reinforcement and connectors for the design life noted in the plans and aggregate type in the reinforced zone. If an MSE wall system with geosynthetic reinforcement includes any steel parts for obstructions, bin walls, connections or other components, design steel exposed to aggregate for the design life noted in the plans and aggregate type in the reinforced zone. Use "loss of galvanizing" metal loss rates for nonaggressive backfill in accordance with the AASHTO LRFD specifications for galvanized and aluminized steel and metal loss rates for carbon steel in accordance with the following:

CARBON STEEL CORROSION RATES	
Aggregate Type (in reinforced zone)	**Carbon Steel Loss Rate (after coating depletion)**
Coarse	0.47 mil/year
Fine (except abutment walls)	0.58 mil/year
Fine (abutment walls)	0.70 mil/year

For PET or HDPE geogrid and geostrip reinforcement and geosynthetic connectors, use approved geosynthetic properties for the design life noted in the plans and aggregate type in the reinforced zone. For geogrid reinforcement connected to end bent caps, embed reinforcement or connectors in caps as shown in the plans. For PP geogrid reinforcement connected to end bent caps, use the following design parameters for the aggregate type in the reinforced approach fill.

PP GEOGRID REINFORCEMENT DESIGN PARAMETERS				
Aggregate Type (in reinforced zone)	**T_{al} (MD)**	**F***	**α**	**ρ**
Coarse	400 lb/ft	0.70	0.8	32.0°
Fine	428 lb/ft	0.54	0.8	28.35°

Where,

T_{al} = long-term design strength (LTDS),
F* = pullout resistance factor,
α = scale effect correction factor and
ρ = soil-geogrid friction angle.

When noted in the plans, design MSE walls for a live load (traffic) surcharge of 250 psf in accordance with Figure C11.5.6-3(b) of the AASHTO LRFD specifications. For steel beam guardrail with 8 ft posts or concrete barrier rail above MSE walls, analyze top 2 reinforcement layers for traffic impact loads in accordance with Section 7.2 of *FHWA Design and Construction of Mechanically Stabilized Earth Walls and*

Reinforced Soil Slopes – Volume I (Publication No. FHWA-NHI-10-024) except use the following for geosynthetic reinforcement rupture:

$$\phi\, T_{al}\, R_c \geq T_{max} + (T_I / RF_{CR})$$

Where,

ϕ = resistance factor for tensile resistance in accordance with Section 7.2.1 of the FHWA MSE wall manual,

T_{al} = long-term geosynthetic design strength approved for chosen MSE wall system,

R_c = reinforcement coverage ratio = 1 for continuous geosynthetic reinforcement,

T_{max} = factored static load in accordance with Section 7.2 of the FHWA MSE wall manual,

T_I = factored impact load in accordance with Section 7.2 of the FHWA MSE wall manual and

RF_{CR} = creep reduction factor approved for chosen MSE wall system.

When shown in the plans for abutment walls, use pile sleeves to segregate piles from aggregate in the reinforced zone. If existing or future obstructions such as foundations, guardrail, fence or handrail posts, moment slabs, pavements, pipes, inlets or utilities will interfere with reinforcement, maintain a clearance of at least 3" between obstructions and reinforcement unless otherwise approved. Design reinforcement for obstructions and locate reinforcement layers so all of reinforcement length is within 3" of corresponding connection elevations. Modify PET geogrid reinforcement for obstructions as shown in the plans.

Use 6" thick CIP unreinforced concrete leveling pads beneath panels and SRW units that are continuous at steps and extend at least 6" in front of and behind bottom row of panels or SRW units. Unless required otherwise in the plans, embed top of leveling pads in accordance with the following requirements:

WALL EMBEDMENT REQUIREMENTS		
Front Slope[1] (H:V)	**Minimum Embedment Depth[2] (whichever is greater)**	
6:1 or flatter (except abutment walls)	H/20	1 ft for H ≤ 10 ft 2 ft for H > 10 ft
6:1 or flatter (abutment walls)	H/10	2 ft
> 6:1 to < 3:1	H/10	2 ft
3:1 to 2:1	H/7	2 ft

1. Front slope is as shown in the plans.
2. H is the maximum design height per wall.

When noted in the plans, locate a continuous aggregate shoulder drain along the base of the reinforced zone behind the aggregate. Provide wall drainage systems consisting of drains and outlet components in accordance with Roadway Standard Drawing No. 816.02.

For MSE panel walls, cover joints at back of panels with filtration geotextiles at least 12" wide. If the approval of the chosen MSE wall system does not require a minimum number of bearing pads, provide the number of pads in accordance with the following:

NUMBER OF BEARING PADS		
Facing Area per Panel (A)	**Maximum Height of Wall Above Horizontal Panel Joint**	**Minimum Number of Pads per Horizontal Panel Joint**
A ≤ 30 sf	25 ft	2
	35 ft[1]	3
30 sf < A ≤ 75 sf	25 ft	3
	35 ft[1]	4

1. Additional bearing pads per horizontal panel joint may be required for wall heights above joints greater than 35 ft.

For MSE segmental walls, coarse aggregate is required in any SRW unit core spaces and between and behind SRW units for a horizontal distance of at least 18".

Separation geotextiles are required between the aggregate and overlying fill sections. When noted in the plans, separation geotextiles are also required at the back of the reinforced zone between the aggregate and backfill or natural ground. When placing pavement sections directly on the reinforced zone, cap aggregate with 4" of asphalt concrete base course. Unless required otherwise in the plans, use reinforced concrete coping at top of walls that meets the following requirements:

1. Coping dimensions as shown in the plans,
2. At the Contractor's option, coping that is precast or CIP concrete for MSE panel walls unless CIP coping is required as shown in the plans,
3. CIP concrete coping for MSE segmental walls and
4. At the Contractor's option and when shown in the plans, CIP concrete coping that extends down back of panels or SRW units or connects to panels or SRW units with dowels.

For MSE segmental walls with dowels, attach dowels to top courses of SRW units in accordance with the following:

1. Set dowels in core spaces of SRW units filled with grout instead of coarse aggregate or
2. Embed adhesively anchored dowels in holes of solid SRW units with epoxy.

For MSE panel walls with coping, connect CIP concrete coping or leveling concrete for precast concrete coping to top row of panels with dowels cast into panels. When concrete barrier rail is required above MSE walls, use concrete barrier rail with moment slab as shown in the plans.

Submit working drawings and design calculations for acceptance in accordance with

Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, wall profiles with foundation pressures, typical sections with reinforcement and connection details, aggregate locations and types, geotextile locations and details of leveling pads, panels or SRW units, coping, bin walls, slip joints, pile sleeves, etc. If necessary, include details on working drawings for concrete barrier rail with moment slab, reinforcement splices if allowed for the chosen MSE wall system, reinforcement connected to end bent caps, curved MSE walls with tight (short) radii and obstructions extending through walls or interfering with reinforcement, leveling pads, barriers or moment slabs. Submit design calculations for each wall section with different surcharge loads, geometry or material parameters. At least one analysis is required for each wall section with different reinforcement lengths. When designing MSE walls with computer software other than MSEW, use MSEW manufactured by ADAMA Engineering, Inc. to verify the design. At least one MSEW analysis is required per 100 ft of wall length with at least one analysis for the wall section with the longest reinforcement. Submit electronic MSEW input files and PDF output files with design calculations.

C. Preconstruction Meeting

Before starting MSE wall construction, hold a preconstruction meeting to discuss the construction and inspection of the MSE walls. If this meeting occurs before all MSE wall submittals have been accepted, additional preconstruction meetings may be required before beginning construction of MSE walls without accepted submittals. The Resident or Bridge Maintenance Engineer, Area Construction Engineer, Geotechnical Operations Engineer, Contractor and MSE Wall Installer Superintendent will attend preconstruction meetings.

4.0 CORROSION MONITORING

Corrosion monitoring is required for MSE walls with steel reinforcement. The Engineer will determine the number of monitoring locations and where to install the instrumentation. Contact M&T before beginning wall construction. M&T will provide the corrosion monitoring instrumentation kits and if necessary, assistance with installation.

5.0 SITE ASSISTANCE

Unless otherwise approved, an MSE Wall Vendor representative is required to assist and guide the MSE Wall Installer on-site for at least 8 hours when the first panels or SRW units and reinforcement layer are placed. If problems are encountered during construction, the Engineer may require the vendor representative to return to the site for a time period determined by the Engineer.

6.0 CONSTRUCTION METHODS

Control drainage during construction in the vicinity of MSE walls. Direct run off away from MSE walls, aggregate and backfill. Contain and maintain aggregate and backfill and protect material from erosion.

Excavate as necessary for MSE walls in accordance with the accepted submittals. If applicable and at the Contractor's option, use temporary shoring for wall construction instead of temporary slopes to construct MSE walls. Define "temporary shoring for wall construction" as temporary shoring not shown in the plans or required by the Engineer including shoring for OSHA reasons or the Contractor's convenience.

Unless required otherwise in the plans, install foundations and if required, pile sleeves located in the reinforced zone before placing aggregate or reinforcement. Brace piles in the reinforced zone to maintain alignment when placing and compacting aggregate. Secure piles together with steel members near top of piles. Clamp members to piles instead of welding if bracing is at or below pile cut-off elevations.

Notify the Engineer when foundation excavation is complete. Do not place leveling pad concrete, aggregate or reinforcement until excavation dimensions and foundation material are approved.

Construct CIP concrete leveling pads at elevations and with dimensions shown in the accepted submittals and in accordance with Section 420 of the *Standard Specifications*. Cure leveling pads at least 24 hours before placing panels or SRW units.

Erect and support panels and stack SRW units so the final wall position is as shown in the accepted submittals. Stagger SRW units to create a running bond by centering SRW units over joints in the row below as shown in the accepted submittals. Space bearing pads in horizontal panel joints as shown in the accepted submittals and cover all panel joints with filtration geotextiles as shown in the accepted submittals. Attach filtration geotextiles to back of panels with adhesives, tapes or other approved methods.

Construct MSE walls with the following tolerances:

A. SRW units are level from front to back and between units when checked with a 4 ft long level,

B. Vertical joint widths are 1/4" maximum for SRW units and 3/4", ±1/4" for panels,

C. Final wall face is within 3/4" of horizontal and vertical alignment shown in the accepted submittals when measured along a 10 ft straightedge and

D. Final wall plumbness (batter) is not negative (wall face leaning forward) and within 0.5° of vertical unless otherwise approved.

Place reinforcement at locations and elevations shown in the accepted submittals and within 3" of corresponding connection elevations. Install reinforcement with the direction shown in the accepted submittals. Before placing aggregate, pull geosynthetic reinforcement taut so it is in tension and free of kinks, folds, wrinkles or creases. Reinforcement may be spliced once per reinforcement length if shown in the accepted submittals. Use reinforcement pieces at least 6 ft long. Contact the Engineer when unanticipated existing or future obstructions such as foundations, guardrail, fence or handrail posts, pavements, pipes, inlets or utilities will interfere with reinforcement. To avoid obstructions, deflect, skew or modify reinforcement as shown in the accepted submittals.

Place aggregate in the reinforced zone in 8" to 10" thick lifts. Compact fine aggregate in accordance with Subarticle 235-3(C) of the *Standard Specifications*. Use only hand operated compaction equipment to compact aggregate within 3 ft of panels or SRW units. At a distance greater than 3 ft, compact aggregate with at least 4 passes of an 8 ton to 10 ton vibratory roller in a direction parallel to the wall face. Smooth wheeled or rubber tired rollers are also acceptable for compacting aggregate. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage reinforcement when placing and compacting aggregate. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on reinforcement until it is covered with at least 8" of aggregate. Replace any damaged reinforcement to the satisfaction of the Engineer.

Backfill for MSE walls outside the reinforced zone in accordance with Article 410-8 of the *Standard Specifications*. If a drain is required, install wall drainage systems as shown in the accepted submittals and in accordance with Section 816 of the *Standard Specifications*. If pile sleeves are required, fill sleeves with loose uncompacted sand before constructing end bent caps.

Install dowels as necessary for SRW units and place and construct coping and leveling concrete as shown in the accepted submittals. Construct leveling concrete in accordance with Section 420 of the *Standard Specifications*. Construct CIP concrete coping in accordance with Subarticle 452-4(B) of the *Standard Specifications*. When single faced precast concrete barrier is required in front of and against MSE walls, stop coping just above barrier so coping does not interfere with placing barrier up against wall faces. If the gap between a single faced barrier and wall face is wider than 2", fill gap with Class V select material (standard size No. 78M stone). Otherwise, fill gap with backer rod and seal joint between barrier and MSE wall with silicone sealant.

When separation geotextiles are required, overlap adjacent geotextiles at least 18" and hold geotextiles in place with wire staples or anchor pins as needed. Seal joints above and behind MSE walls between coping and concrete slope protection with silicone sealant.

7.0 MEASUREMENT AND PAYMENT

MSE Retaining Wall No. __ will be measured and paid in square feet. MSE walls will be measured as the square feet of wall face area with the pay height equal to the difference between top of wall and top of leveling pad elevations. Define “top of wall” as top of coping or top of panels or SRW units for MSE walls without coping.

The contract unit price for *MSE Retaining Wall No. __* will be full compensation for providing designs, submittals, labor, tools, equipment and MSE wall materials, excavating, hauling and removing excavated materials, placing and compacting aggregate and backfill material and supplying site assistance, leveling pads, panels, SRW units, reinforcement, aggregate, wall drainage systems, geotextiles, aggregate concrete base course, bearing pads, coping, miscellaneous components and any incidentals necessary to construct MSE walls. The contract unit price for *MSE Retaining Wall No. __* will also be full compensation for reinforcement and connector design for reinforcement connected to end

bent caps, wall modifications for obstructions, pile sleeves filled with sand, joints sealed with silicone sealant and gaps between barriers and MSE walls filled with backer rod or No. 78M stone, if required.

No separate payment will be made for temporary shoring for wall construction. Temporary shoring for wall construction will be incidental to the contract unit price for *MSE Retaining Wall No. __*.

The contract unit price for *MSE Retaining Wall No. __* does not include the cost for ditches, fences, handrails, barrier or guardrail associated with MSE walls as these items will be paid for elsewhere in the contract. The contract unit price for *MSE Retaining Wall No. __* also does not include the cost for constructing bridge approach fills behind end bents with MSE abutment walls. See *Bridge Approach Fills* provision for measurement and payment of Type III Reinforced Bridge Approach Fills.

Where it is necessary to provide backfill material behind the reinforced zone from sources other than excavated areas or borrow sources used in connection with other work in the contract, payment for furnishing and hauling such backfill material will be paid as extra work in accordance with Article 104-7 of the *Standard Specifications*. Placing and compacting such backfill material is not considered extra work but is incidental to the work being performed.

Payment will be made under:

Pay Item	**Pay Unit**
MSE Retaining Wall No. __	Square Foot

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STANDARD SHORING: **(10-19-21)**

Description

Standard shoring includes standard temporary shoring and standard temporary mechanically stabilized earth (MSE) walls. At the Contractor's option, use standard shoring as noted in the plans or as directed. When using standard shoring, a temporary shoring design submittal is not required. Construct standard shoring based on actual elevations and shoring dimensions in accordance with the contract and Geotechnical Standard Detail No. 1801.01 or 1801.02.

Define "standard temporary shoring" as cantilever shoring that meets the standard temporary shoring detail (Geotechnical Standard Detail No. 1801.01). Define "standard temporary wall" as a temporary MSE wall with geotextile or geogrid reinforcement that meets the standard temporary wall detail (Geotechnical Standard Detail No. 1801.02). Define "standard temporary geotextile wall" as a standard temporary wall with geotextile reinforcement and "standard temporary geogrid wall" as a standard temporary wall with geogrid reinforcement.

Provide positive protection for standard shoring at locations shown in the plans and as directed. See *Temporary Shoring* provision for positive protection types and definitions.

Materials

Refer to the *Standard Specifications*.

Item	Section
Concrete Barrier Materials	1170-2
Flowable Fill, Excavatable	1000-6
Geosynthetics	1056
Grout, Type 1	1003
Portland Cement Concrete, Class A	1000
Select Materials	1016
Steel Beam Guardrail Materials	862-2
Steel Sheet Piles and H-Piles	1084
Untreated Timber	1082-2
Welded Wire Reinforcement	1070-3

Provide Type 6 material certifications for shoring materials. Use Class IV select material for temporary guardrail. Use Class A concrete that meets Article 450-2 of the *Standard Specifications* or Type 1 grout for drilled-in piles.

Based on actual shoring height, positive protection, groundwater elevation, slope or surcharge case and traffic impact at each standard temporary shoring location, use sheet piles with the minimum required section modulus or H-piles with the sizes shown in Geotechnical Standard Detail No. 1801.01. Use untreated timber with a thickness of at least 3" and a bending stress of at least 1,000 psi for timber lagging.

(A) Shoring Backfill

Use Class II, Type 1, Class III, Class V or Class VI select material or material that meets AASHTO M 145 for soil classification A-2-4 with a maximum PI of 6 for shoring backfill except do not use the following:

(1) A-2-4 soil for backfill around culverts,

(2) A-2-4 soil in the reinforced zone of standard temporary walls with a back slope and

(3) Class VI select material in the reinforced zone of standard temporary geotextile walls.

(B) Standard Temporary Walls

Use welded wire reinforcement for welded wire facing, struts and wires with the dimensions and minimum wire sizes shown in Geotechnical Standard Detail No. 1801.02. Provide Type 2 geotextile for separation and retention geotextiles. Do not use more than 4 different reinforcement strengths for each standard temporary wall.

(1) Geotextile Reinforcement

Provide Type 5 geotextile for geotextile reinforcement with a mass per unit area of at least 8 oz/sy in accordance with ASTM D5261. Based on actual wall height, groundwater elevation, slope or surcharge case and shoring backfill to be used in the reinforced zone at each standard temporary geotextile wall location, provide geotextiles with ultimate tensile strengths as shown in Geotechnical Standard Detail No. 1801.02.

(2) Geogrid Reinforcement

Use geogrids for geogrid reinforcement with a roll width of at least 4 ft and an "approved" status code in accordance with the NCDOT Geosynthetic Reinforcement Evaluation Program. The list of approved geogrids is available from:
connect.ncdot.gov/resources/Geological/Pages/Products.aspx

Based on actual wall height, groundwater or flood elevation, slope or surcharge case and shoring backfill to be used in the reinforced zone at each standard temporary geogrid wall location, provide geogrids for geogrid reinforcement with short-term design strengths as shown in Geotechnical Standard Detail No. 1801.02. Geogrids are approved for short-term design strengths (3-year design life) in the machine direction (MD) and cross-machine direction (CD) based on material type. Define material type from the website above for shoring backfill as follows:

Material Type	Shoring Backfill
Borrow	A-2-4 Soil
Fine Aggregate	Class II, Type 1 or Class III Select Material
Coarse Aggregate	Class V or VI Select Material

Preconstruction Requirements

(A) Concrete Barrier

Define "clear distance" behind concrete barrier as the horizontal distance between the barrier and edge of pavement. The minimum required clear distance for concrete barrier is shown in the plans. At the Contractor's option or if the minimum required clear distance is not available, set concrete barrier next to and up against traffic side of standard shoring except for barrier above standard temporary walls. Concrete barrier with the minimum required clear distance is required above standard temporary walls.

(B) Temporary Guardrail

Define "clear distance" behind temporary guardrail as the horizontal distance between guardrail posts and standard shoring. At the Contractor's option or if clear distance for standard temporary shoring is less than 4 ft, attach guardrail to traffic side of shoring as shown in the plans. Place ABC in clear distance and around guardrail posts instead of pavement. Do not use temporary guardrail above standard temporary walls.

(C) Standard Shoring Selection Forms

Before beginning standard shoring construction, survey existing ground elevations in the vicinity of standard shoring locations to determine actual shoring or wall heights (H). Submit a standard shoring selection form for each location at least 7 days before starting standard shoring construction. Standard shoring selection forms are available from: connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx

Construction Methods

Construct standard shoring in accordance with the *Temporary Shoring* provision.

(A) Standard Temporary Shoring Installation

Based on actual shoring height, positive protection, groundwater elevation, slope or surcharge case and traffic impact at each standard temporary shoring location, install piles with the minimum required embedment and extension for each shoring section in accordance with Geotechnical Standard Detail No. 1801.01. For concrete barrier above and next to standard temporary shoring and temporary guardrail above and attached to standard temporary shoring, use "surcharge case with traffic impact" in accordance with Geotechnical Standard Detail No. 1801.01. Otherwise, use "slope or surcharge case with no traffic impact" in accordance with Geotechnical Standard Detail No. 1801.01. If refusal is reached before driven piles attain the minimum required embedment, use drilled-in H-piles with timber lagging for standard temporary shoring.

(B) Standard Temporary Walls Installation

Based on actual wall height, groundwater elevation, slope or surcharge case, geotextile or geogrid reinforcement and shoring backfill in the reinforced zone at each standard temporary wall location, construct walls with the minimum required reinforcement length and number of reinforcement layers for each wall section in accordance with Geotechnical Standard Detail No. 1801.02. For standard temporary walls with pile foundations in the reinforced zone, drive piles through reinforcement after constructing temporary walls.

For standard temporary walls with interior angles less than 90°, wrap geosynthetics at acute corners as directed by the Engineer. Place geosynthetics as shown in Geotechnical Standard Detail No. 1801.02. Place separation geotextiles between shoring backfill and backfill, natural ground or culverts along the sides of the reinforced zone perpendicular to the wall face. For Class V or VI select material in the reinforced zone, place separation geotextiles between shoring backfill and backfill or natural ground on top of and at the back of the reinforced zone.

Measurement and Payment

Standard shoring will be measured and paid in accordance with the *Temporary Shoring* provision.

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Dec 17, 2021

MECHANICALLY STABILIZED EARTH RETAINING WALLS (10-19-21)

1.0 GENERAL

Construct mechanically stabilized earth (MSE) retaining walls consisting of steel or geosynthetic reinforcement in the reinforced zone connected to vertical facing elements. Use precast concrete panels for vertical facing elements and coarse aggregate in the reinforced zone unless noted otherwise in the plans. Provide reinforced concrete coping and pile sleeves as required. Design and construct MSE retaining walls based on actual elevations and wall dimensions in accordance with the contract and accepted submittals. Use a prequalified MSE Wall Installer to construct MSE retaining walls.

Define MSE wall terms as follows:
Geosynthetic Reinforcement – Polyester Type (PET), HDPE or Polypropylene (PP) geosynthetic grids, i.e., geogrid reinforcement or polymer straps, i.e., geostrip reinforcement,
Geogrid – PET, HDPE or PP geogrid,
Reinforcement – Steel or geosynthetic reinforcement,
Aggregate – Coarse or fine aggregate,
Panel – Precast concrete panel,
Coping – Precast or CIP concrete coping,
Design Height (H) – Wall height + wall embedment as shown in the plans,
MSE Wall – Mechanically stabilized earth retaining wall,
MSE Wall Vendor – Vendor supplying the chosen MSE wall system,
MSE Panel Wall – MSE wall with panels,
MSE Segmental Wall – MSE wall with segmental retaining wall (SRW) units and
Abutment Wall – MSE wall with bridge foundations in any portion of the reinforced zone or an MSE wall connected to an abutment wall (even if bridge foundations only penetrate a small part of the reinforced zone, the entire MSE wall is considered an abutment wall).

For bridge approach fills behind end bents with MSE abutment walls, design reinforcement connected to end bent caps in accordance with the plans and this provision. Construct Type III Reinforced Bridge Approach Fills in accordance with the *Bridge Approach Fills* provision and Roadway Detail Drawing No. 422D10.

Use an approved MSE wall system in accordance with the plans and any NCDOT restrictions or exceptions for the chosen system. Value engineering proposals for other MSE wall systems will not be considered. Do not use MSE wall systems with an "approved for provisional use" status for MSE walls with design heights greater than 35 ft or walls supporting or adjacent to railroads or interstate highways. The list of approved MSE wall systems with approval status is available from:
connect.ncdot.gov/resources/Geological/Pages/Products.aspx

2.0 MATERIALS

Refer to the *Standard Specifications*.

Item	Section

Aggregate	1014
Asphalt Concrete Base Course, Type B25.0C	620
Corrugated Steel Pipe	1032-3
Epoxy, Type 3A	1081
Geosynthetics	1056
Grout, Type 3	1003
Joint Materials	1028
Portland Cement Concrete, Class A	1000
Precast Retaining Wall Coping	1077
Reinforcing Steel	1070
Retaining Wall Panels	1077
Segmental Retaining Wall Units	1040-4
Select Material, Class V	1016
Shoulder Drain Materials	816-2
Steel Pipe	1036-4(A)

Use galvanized corrugated steel pipe with a zinc coating weight of 2 oz/sf (G200) for pile sleeves. Provide Type 2 geotextile for filtration and separation geotextiles. Use Class A concrete for CIP coping, leveling concrete and pads. Use galvanized steel pipe, threaded rods and nuts for the PET geogrid reinforcement vertical obstruction detail. Provide galvanized Grade 36 anchor rods and Grade A hex nuts that meet AASHTO M 314 for threaded rods and nuts.

Use panels and SRW units from producers approved by the Department and licensed by the MSE Wall Vendor. Provide steel strip connectors embedded in panels fabricated from structural steel that meets the requirements for steel strip reinforcement. Unless required otherwise in the contract, produce panels with a smooth flat final finish that meets Article 1077-11 of the *Standard Specifications*. Accurately locate and secure reinforcement connectors in panels and maintain required concrete cover. Produce panels within 1/4" of the panel dimensions shown in the accepted submittals.

Damaged panels or SRW units with excessive discoloration, chips or cracks as determined by the Engineer will be rejected. Do not damage reinforcement connection devices or mechanisms in handling or storing panels and SRW units.

Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Handle and store geosynthetics in accordance with Article 1056-2 of the *Standard Specifications*. Load, transport, unload and store MSE wall materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

A. Aggregate

Use standard size No. 57, 57M, 67 or 78M that meets Table 1005-1 of the *Standard Specifications* for coarse aggregate and the following for fine aggregate:

1. Standard size No. 1S, 2S, 2MS or 4S that meets Table 1005-2 of the *Standard*

Specifications or

2. Gradation that meets Class III, Type 3 select material in accordance with Article 1016-3 of the *Standard Specifications*.

Fine aggregate is exempt from mortar strength in Subarticle 1014-1(E) of the *Standard Specifications*. Use fine aggregate with a maximum organic content of 1.0%. Provide aggregate with chemical properties that meet the following requirements:

AGGREGATE pH REQUIREMENTS		
Aggregate Type (in reinforced zone)	**Reinforcement or Connector Material**	**pH**
Coarse or Fine	Steel	5 – 10
Coarse or Fine	Geosynthetic	4.5 – 9

AGGREGATE ELECTROCHEMICAL REQUIREMENTS (Steel Reinforcement/Connector Materials Only)			
Aggregate Type (in reinforced zone)	**Resistivity**	**Chlorides**	**Sulfates**
Coarse	≥ 5,000 Ω · cm	≤ 100 ppm	≤ 200 ppm
Fine	≥ 3,000 Ω · cm		

Use aggregate from sources participating in the Department's Aggregate QC/QA Program as described in Section 1006 of the *Standard Specifications*. Sample and test aggregate in accordance with the *Mechanically Stabilized Earth Wall Aggregate Sampling and Testing Procedures*.

B. Reinforcement

Provide steel or geosynthetic reinforcement supplied by the MSE Wall Vendor or a manufacturer approved or licensed by the vendor. Use reinforcement approved for the chosen MSE wall system. The list of approved reinforcement for each MSE wall system is available from the website shown elsewhere in this provision.

1. Steel Reinforcement

   Provide Type 1 material certifications in accordance with Article 106-3 of the *Standard Specifications* for steel reinforcement. Use welded wire grid reinforcement ("mesh", "mats" and "ladders") that meet Article 1070-3 of the *Standard Specifications* and steel strip reinforcement ("straps") that meet ASTM A572, A1011 or A463. Use 10 gauge or heavier structural steel Grade 50 or higher for steel strip reinforcement. Galvanize steel reinforcement in accordance with Section 1076 of the *Standard Specifications* or provide aluminized steel strip reinforcement that meet ASTM A463, Type 2-100.

2. Geosynthetic Reinforcement

Provide Type 1 material certifications and identify geosynthetic reinforcement in accordance with Article 1056-3 of the *Standard Specifications*. Define machine direction (MD) and cross-machine direction (CD) for geogrids per Article 1056-3 of the *Standard Specifications*.

Use HDPE or PP geogrid for geogrid reinforcement cast into backwalls of end bent caps. Use PET or HDPE geogrid for geogrid reinforcement connected directly to SRW units and only HDPE geogrid for geogrid reinforcement cast into panels.

Provide extruded geogrids produced in the United States and manufactured from punched and drawn polypropylene sheets for PP geogrids that meet the following:

PP GEOGRID REQUIREMENTS		
Property	**Requirement[1]**	**Test Method**
Aperture Dimensions[2]	1" x 1.2"	N/A
Minimum Rib Thickness[2]	0.07" x 0.07"	N/A
Tensile Strength @ 2% Strain[2]	580 lb/ft x 690 lb/ft	ASTM D6637, Method B
Tensile Strength @ 5% Strain[2]	1,200 lb/ft x 1,370 lb/ft	
Ultimate Tensile Strength[2]	1,850 lb/ft x 2,050 lb/ft	
Junction Efficiency[3] (MD)	93%	ASTM D7737
Flexural Rigidity[4]	2,000,000 mg–cm	ASTM D7748
Aperture Stability Modulus[5]	0.55 lb–ft/degrees	ASTM D7864
UV Stability (Retained Strength)	100% (after 500 hr of exposure)	ASTM D4355

1. MARV per Article 1056-3 of the *Standard Specifications* except dimensions and thickness are nominal.
2. Requirement for MD x CD.
3. Junction Efficiency (%) = (Average Junction Strength ($X_{j_{ave}}$) / Ultimate Tensile Strength in the MD from ASTM D6637, Method A) × 100.
4. Test specimens two ribs wide, with transverse ribs cut flush with exterior edges of longitudinal ribs, and sufficiently long to enable measurement of the overhang dimension.
5. Applied moment of 17.7 lb–inch (torque increment).

C. Bearing Pads

For MSE panel walls, use preformed ethylene propylene diene monomer rubber bearing pads that meet ASTM D2000 Grade 2, Type A, Class A with a durometer hardness of 60 or 80 ± 5. Provide bearing pads with thicknesses that meet the following:

BEARING PAD THICKNESS	
Facing Area per Panel (A)	**Minimum Pad Thickness After Compression (based on 2 times panel weight above pads)**
$A \leq 30$ sf	1/2"
30 sf $< A \leq 75$ sf	3/4"

D. Miscellaneous Components

Miscellaneous components may include connectors (e.g., anchors, bars, clamps, pins, plates, ties, etc.), fasteners (e.g., bolts, nuts, washers, etc.) and any other MSE wall components not included above. Use 10 gauge or heavier structural steel Grade 50 or higher for steel strip panel anchors and connectors. Galvanize steel components in accordance with Section 1076 of the *Standard Specifications*. Provide miscellaneous components approved for the chosen MSE wall system. The list of approved miscellaneous components for each MSE wall system is available from the website shown elsewhere in this provision.

3.0 PRECONSTRUCTION REQUIREMENTS

A. MSE Wall Surveys

The Retaining Wall Plans show a plan view, typical sections, details, notes and an elevation or profile view (wall envelope) for each MSE wall. Before beginning MSE wall design, survey existing ground elevations shown in the plans and other elevations in the vicinity of MSE wall locations as needed. For proposed slopes above or below MSE walls, survey existing ground elevations to at least 10 ft beyond slope stake points. Based on these elevations, finished grades and actual MSE wall dimensions and details, submit revised wall envelopes for acceptance. Use accepted wall envelopes for design.

B. MSE Wall Designs

For MSE wall designs, submit PDF files of working drawings and design calculations at least 30 days before the preconstruction meeting. Note name and NCDOT ID number of the panel or SRW unit production facility on working drawings. Do not begin MSE wall construction until a design submittal is accepted.

Use a prequalified MSE Segmental Wall Design Consultant to design MSE segmental walls. Provide MSE segmental wall designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for the MSE Segmental Wall Design Consultant. Provide MSE panel wall designs sealed by a Design Engineer licensed in the state of North Carolina and employed or contracted by the MSE Wall Vendor.

Design MSE walls in accordance with the plans, *AASHTO LRFD Bridge Design Specifications* and any NCDOT restrictions for the chosen MSE wall system unless otherwise required. For abutment walls only, design MSE walls for seismic if wall sites meet either or both of the following:

- Wall site is in seismic zone 2 based on Figure 2-1 of the *Structure Design Manual*,
- Wall site is classified as AASHTO Site Class E, as noted in the plans, and is in or west of Pender, Duplin, Wayne, Johnston, Wake, Durham or Person County.

Connect reinforcement to panels or SRW units with methods or devices approved for the chosen system. Use a uniform reinforcement length throughout the height of the

wall of at least 0.7H or 6 ft, whichever is longer, unless noted otherwise in the plans. Extend the reinforced zone at least 6" beyond end of reinforcement. Do not locate drains, the reinforced zone or leveling pads outside right-of-way or easement limits.

Use the simplified method for determining maximum reinforcement loads and design parameters approved for the chosen MSE wall system or default values in accordance with the AASHTO LRFD specifications. Design steel components including reinforcement and connectors for the design life noted in the plans and aggregate type in the reinforced zone. If an MSE wall system with geosynthetic reinforcement includes any steel parts for obstructions, bin walls, connections or other components, design steel exposed to aggregate for the design life noted in the plans and aggregate type in the reinforced zone. Use "loss of galvanizing" metal loss rates for nonaggressive backfill in accordance with the AASHTO LRFD specifications for galvanized and aluminized steel and metal loss rates for carbon steel in accordance with the following:

CARBON STEEL CORROSION RATES	
Aggregate Type (in reinforced zone)	**Carbon Steel Loss Rate (after coating depletion)**
Coarse	0.47 mil/year
Fine (except abutment walls)	0.58 mil/year
Fine (abutment walls)	0.70 mil/year

For PET or HDPE geogrid and geostrip reinforcement and geosynthetic connectors, use approved geosynthetic properties for the design life noted in the plans and aggregate type in the reinforced zone. For geogrid reinforcement connected to end bent caps, embed reinforcement or connectors in caps as shown in the plans. For PP geogrid reinforcement connected to end bent caps, use the following design parameters for the aggregate type in the reinforced approach fill.

PP GEOGRID REINFORCEMENT DESIGN PARAMETERS				
Aggregate Type (in reinforced zone)	**T_{al} (MD)**	**F***	**α**	**ρ**
Coarse	400 lb/ft	0.70	0.8	32.0°
Fine	428 lb/ft	0.54	0.8	28.35°

Where,

T_{al} = long-term design strength (LTDS),
F* = pullout resistance factor,
α = scale effect correction factor and
ρ = soil-geogrid friction angle.

When noted in the plans, design MSE walls for a live load (traffic) surcharge of 250 psf in accordance with Figure C11.5.6-3(b) of the AASHTO LRFD specifications. For steel beam guardrail with 8 ft posts or concrete barrier rail above MSE walls, analyze top 2 reinforcement layers for traffic impact loads in accordance with Section 7.2 of *FHWA Design and Construction of Mechanically Stabilized Earth Walls and*

Reinforced Soil Slopes – Volume I (Publication No. FHWA-NHI-10-024) except use the following for geosynthetic reinforcement rupture:

$$\phi\, T_{al}\, R_c \geq T_{max} + (T_I / RF_{CR})$$

Where,

ϕ = resistance factor for tensile resistance in accordance with Section 7.2.1 of the FHWA MSE wall manual,

T_{al} = long-term geosynthetic design strength approved for chosen MSE wall system,

R_c = reinforcement coverage ratio = 1 for continuous geosynthetic reinforcement,

T_{max} = factored static load in accordance with Section 7.2 of the FHWA MSE wall manual,

T_I = factored impact load in accordance with Section 7.2 of the FHWA MSE wall manual and

RF_{CR} = creep reduction factor approved for chosen MSE wall system.

When shown in the plans for abutment walls, use pile sleeves to segregate piles from aggregate in the reinforced zone. If existing or future obstructions such as foundations, guardrail, fence or handrail posts, moment slabs, pavements, pipes, inlets or utilities will interfere with reinforcement, maintain a clearance of at least 3" between obstructions and reinforcement unless otherwise approved. Design reinforcement for obstructions and locate reinforcement layers so all of reinforcement length is within 3" of corresponding connection elevations. Modify PET geogrid reinforcement for obstructions as shown in the plans.

Use 6" thick CIP unreinforced concrete leveling pads beneath panels and SRW units that are continuous at steps and extend at least 6" in front of and behind bottom row of panels or SRW units. Unless required otherwise in the plans, embed top of leveling pads in accordance with the following requirements:

WALL EMBEDMENT REQUIREMENTS		
Front Slope[1] (H:V)	**Minimum Embedment Depth[2] (whichever is greater)**	
6:1 or flatter (except abutment walls)	H/20	1 ft for H ≤ 10 ft 2 ft for H > 10 ft
6:1 or flatter (abutment walls)	H/10	2 ft
> 6:1 to < 3:1	H/10	2 ft
3:1 to 2:1	H/7	2 ft

1. Front slope is as shown in the plans.
2. H is the maximum design height per wall.

When noted in the plans, locate a continuous aggregate shoulder drain along the base of the reinforced zone behind the aggregate. Provide wall drainage systems consisting of drains and outlet components in accordance with Roadway Standard Drawing No. 816.02.

For MSE panel walls, cover joints at back of panels with filtration geotextiles at least 12" wide. If the approval of the chosen MSE wall system does not require a minimum number of bearing pads, provide the number of pads in accordance with the following:

NUMBER OF BEARING PADS		
Facing Area per Panel (A)	**Maximum Height of Wall Above Horizontal Panel Joint**	**Minimum Number of Pads per Horizontal Panel Joint**
A ≤ 30 sf	25 ft	2
	35 ft[1]	3
30 sf < A ≤ 75 sf	25 ft	3
	35 ft[1]	4

1. Additional bearing pads per horizontal panel joint may be required for wall heights above joints greater than 35 ft.

For MSE segmental walls, coarse aggregate is required in any SRW unit core spaces and between and behind SRW units for a horizontal distance of at least 18".

Separation geotextiles are required between the aggregate and overlying fill sections. When noted in the plans, separation geotextiles are also required at the back of the reinforced zone between the aggregate and backfill or natural ground. When placing pavement sections directly on the reinforced zone, cap aggregate with 4" of asphalt concrete base course. Unless required otherwise in the plans, use reinforced concrete coping at top of walls that meets the following requirements:

1. Coping dimensions as shown in the plans,
2. At the Contractor's option, coping that is precast or CIP concrete for MSE panel walls unless CIP coping is required as shown in the plans,
3. CIP concrete coping for MSE segmental walls and
4. At the Contractor's option and when shown in the plans, CIP concrete coping that extends down back of panels or SRW units or connects to panels or SRW units with dowels.

For MSE segmental walls with dowels, attach dowels to top courses of SRW units in accordance with the following:

1. Set dowels in core spaces of SRW units filled with grout instead of coarse aggregate or
2. Embed adhesively anchored dowels in holes of solid SRW units with epoxy.

For MSE panel walls with coping, connect CIP concrete coping or leveling concrete for precast concrete coping to top row of panels with dowels cast into panels. When concrete barrier rail is required above MSE walls, use concrete barrier rail with moment slab as shown in the plans.

Submit working drawings and design calculations for acceptance in accordance with

Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, wall profiles with foundation pressures, typical sections with reinforcement and connection details, aggregate locations and types, geotextile locations and details of leveling pads, panels or SRW units, coping, bin walls, slip joints, pile sleeves, etc. If necessary, include details on working drawings for concrete barrier rail with moment slab, reinforcement splices if allowed for the chosen MSE wall system, reinforcement connected to end bent caps, curved MSE walls with tight (short) radii and obstructions extending through walls or interfering with reinforcement, leveling pads, barriers or moment slabs. Submit design calculations for each wall section with different surcharge loads, geometry or material parameters. At least one analysis is required for each wall section with different reinforcement lengths. When designing MSE walls with computer software other than MSEW, use MSEW manufactured by ADAMA Engineering, Inc. to verify the design. At least one MSEW analysis is required per 100 ft of wall length with at least one analysis for the wall section with the longest reinforcement. Submit electronic MSEW input files and PDF output files with design calculations.

C. Preconstruction Meeting

Before starting MSE wall construction, hold a preconstruction meeting to discuss the construction and inspection of the MSE walls. If this meeting occurs before all MSE wall submittals have been accepted, additional preconstruction meetings may be required before beginning construction of MSE walls without accepted submittals. The Resident or Bridge Maintenance Engineer, Area Construction Engineer, Geotechnical Operations Engineer, Contractor and MSE Wall Installer Superintendent will attend preconstruction meetings.

4.0 CORROSION MONITORING

Corrosion monitoring is required for MSE walls with steel reinforcement. The Engineer will determine the number of monitoring locations and where to install the instrumentation. Contact M&T before beginning wall construction. M&T will provide the corrosion monitoring instrumentation kits and if necessary, assistance with installation.

5.0 SITE ASSISTANCE

Unless otherwise approved, an MSE Wall Vendor representative is required to assist and guide the MSE Wall Installer on-site for at least 8 hours when the first panels or SRW units and reinforcement layer are placed. If problems are encountered during construction, the Engineer may require the vendor representative to return to the site for a time period determined by the Engineer.

6.0 CONSTRUCTION METHODS

Control drainage during construction in the vicinity of MSE walls. Direct run off away from MSE walls, aggregate and backfill. Contain and maintain aggregate and backfill and protect material from erosion.

Excavate as necessary for MSE walls in accordance with the accepted submittals. If applicable and at the Contractor's option, use temporary shoring for wall construction instead of temporary slopes to construct MSE walls. Define "temporary shoring for wall construction" as temporary shoring not shown in the plans or required by the Engineer including shoring for OSHA reasons or the Contractor's convenience.

Unless required otherwise in the plans, install foundations and if required, pile sleeves located in the reinforced zone before placing aggregate or reinforcement. Brace piles in the reinforced zone to maintain alignment when placing and compacting aggregate. Secure piles together with steel members near top of piles. Clamp members to piles instead of welding if bracing is at or below pile cut-off elevations.

Notify the Engineer when foundation excavation is complete. Do not place leveling pad concrete, aggregate or reinforcement until excavation dimensions and foundation material are approved.

Construct CIP concrete leveling pads at elevations and with dimensions shown in the accepted submittals and in accordance with Section 420 of the *Standard Specifications*. Cure leveling pads at least 24 hours before placing panels or SRW units.

Erect and support panels and stack SRW units so the final wall position is as shown in the accepted submittals. Stagger SRW units to create a running bond by centering SRW units over joints in the row below as shown in the accepted submittals. Space bearing pads in horizontal panel joints as shown in the accepted submittals and cover all panel joints with filtration geotextiles as shown in the accepted submittals. Attach filtration geotextiles to back of panels with adhesives, tapes or other approved methods.

Construct MSE walls with the following tolerances:

A. SRW units are level from front to back and between units when checked with a 4 ft long level,

B. Vertical joint widths are 1/4" maximum for SRW units and 3/4", ±1/4" for panels,

C. Final wall face is within 3/4" of horizontal and vertical alignment shown in the accepted submittals when measured along a 10 ft straightedge and

D. Final wall plumbness (batter) is not negative (wall face leaning forward) and within 0.5° of vertical unless otherwise approved.

Place reinforcement at locations and elevations shown in the accepted submittals and within 3" of corresponding connection elevations. Install reinforcement with the direction shown in the accepted submittals. Before placing aggregate, pull geosynthetic reinforcement taut so it is in tension and free of kinks, folds, wrinkles or creases. Reinforcement may be spliced once per reinforcement length if shown in the accepted submittals. Use reinforcement pieces at least 6 ft long. Contact the Engineer when unanticipated existing or future obstructions such as foundations, guardrail, fence or handrail posts, pavements, pipes, inlets or utilities will interfere with reinforcement. To avoid obstructions, deflect, skew or modify reinforcement as shown in the accepted submittals.

Place aggregate in the reinforced zone in 8" to 10" thick lifts. Compact fine aggregate in accordance with Subarticle 235-3(C) of the *Standard Specifications*. Use only hand operated compaction equipment to compact aggregate within 3 ft of panels or SRW units. At a distance greater than 3 ft, compact aggregate with at least 4 passes of an 8 ton to 10 ton vibratory roller in a direction parallel to the wall face. Smooth wheeled or rubber tired rollers are also acceptable for compacting aggregate. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage reinforcement when placing and compacting aggregate. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on reinforcement until it is covered with at least 8" of aggregate. Replace any damaged reinforcement to the satisfaction of the Engineer.

Backfill for MSE walls outside the reinforced zone in accordance with Article 410-8 of the *Standard Specifications*. If a drain is required, install wall drainage systems as shown in the accepted submittals and in accordance with Section 816 of the *Standard Specifications*. If pile sleeves are required, fill sleeves with loose uncompacted sand before constructing end bent caps.

Install dowels as necessary for SRW units and place and construct coping and leveling concrete as shown in the accepted submittals. Construct leveling concrete in accordance with Section 420 of the *Standard Specifications*. Construct CIP concrete coping in accordance with Subarticle 452-4(B) of the *Standard Specifications*. When single faced precast concrete barrier is required in front of and against MSE walls, stop coping just above barrier so coping does not interfere with placing barrier up against wall faces. If the gap between a single faced barrier and wall face is wider than 2", fill gap with Class V select material (standard size No. 78M stone). Otherwise, fill gap with backer rod and seal joint between barrier and MSE wall with silicone sealant.

When separation geotextiles are required, overlap adjacent geotextiles at least 18" and hold geotextiles in place with wire staples or anchor pins as needed. Seal joints above and behind MSE walls between coping and concrete slope protection with silicone sealant.

7.0 MEASUREMENT AND PAYMENT

MSE Retaining Wall No. __ will be measured and paid in square feet. MSE walls will be measured as the square feet of wall face area with the pay height equal to the difference between top of wall and top of leveling pad elevations. Define “top of wall” as top of coping or top of panels or SRW units for MSE walls without coping.

The contract unit price for *MSE Retaining Wall No. __* will be full compensation for providing designs, submittals, labor, tools, equipment and MSE wall materials, excavating, hauling and removing excavated materials, placing and compacting aggregate and backfill material and supplying site assistance, leveling pads, panels, SRW units, reinforcement, aggregate, wall drainage systems, geotextiles, aggregate concrete base course, bearing pads, coping, miscellaneous components and any incidentals necessary to construct MSE walls. The contract unit price for *MSE Retaining Wall No. __* will also be full compensation for reinforcement and connector design for reinforcement connected to end

bent caps, wall modifications for obstructions, pile sleeves filled with sand, joints sealed with silicone sealant and gaps between barriers and MSE walls filled with backer rod or No. 78M stone, if required.

No separate payment will be made for temporary shoring for wall construction. Temporary shoring for wall construction will be incidental to the contract unit price for *MSE Retaining Wall No. __*.

The contract unit price for *MSE Retaining Wall No. __* does not include the cost for ditches, fences, handrails, barrier or guardrail associated with MSE walls as these items will be paid for elsewhere in the contract. The contract unit price for *MSE Retaining Wall No. __* also does not include the cost for constructing bridge approach fills behind end bents with MSE abutment walls. See *Bridge Approach Fills* provision for measurement and payment of Type III Reinforced Bridge Approach Fills.

Where it is necessary to provide backfill material behind the reinforced zone from sources other than excavated areas or borrow sources used in connection with other work in the contract, payment for furnishing and hauling such backfill material will be paid as extra work in accordance with Article 104-7 of the *Standard Specifications*. Placing and compacting such backfill material is not considered extra work but is incidental to the work being performed.

Payment will be made under:

Pay Item	**Pay Unit**
MSE Retaining Wall No. __	Square Foot

DocuSigned by:
Scott A. Hidden
F760CAEB96FC4D3...
03/11/2022

DocuSigned by:
Matthew V. Springer
BC60F6E8B584403...
8/27/2020

POLYUREA PAVEMENT MARKING MEDIA AND THICKNESS:
(08-27-20)

Amend the *NCDOT 2018 Standard Specifications* as follows:

Page 12-8, Subarticle 1205-5(B), lines 14-16, replace with the following:

Produce polyurea pavement marking lines that have a minimum dry thickness of 20 mils above the pavement surface when placed on concrete and asphalt pavements. Produce polyurea pavement marking lines that have a minimum dry thickness of 30 mils above the pavement surface on textured surfaces such as OGFC and on surfaces where the polyurea will be placed over a previously removed pavement marking.

Page 12-9, replace **Table 1205-4 Minimum Reflectometer Requirement for Polyurea** with the following:

TABLE 1205-4
MINIMUM REFLECTOMETER REQUIREMENTS
FOR POLYUREA

Item	Color	Reflectivity
Standard Glass Beads	White	375 mcd/lux/m^2
	Yellow	250 mcd/lux/m^2

The installer may choose to use an AASHTO Type 4/Type 1 or AASHTO Type 3/Type 1 double drop system, but no price adjustment will be made, and these systems will be incidental to the polyurea pavement marking.

Pay Item	Pay Unit
Polyurea Pavement Marking Lines,___",_____mils (Standard Glass Beads)	Linear Foot

PROJECT SPECIAL PROVISIONS
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NORTH CAROLINA
DocuSigned by:
Timothy J. Ritacco
BDC26629663C4FB...
ENGINEER
TIMOTHY J. RITACCO
4/11/2022

Revise the 2018 Standard Specifications as follows:

Page 10-61, Sub-article 1034-2 Plastic Pipe (A) PVC Gravity Flow Sewer
Replace with the following:

PVC sewer pipe and fittings 4 inches thru 15 inches shall be in accordance with ASTM D-3034 with a standard dimension ratio (SDR) of 26 for sewer mains and laterals. Both pipe and fittings shall be made of PVC plastic having a cell classification of 12454 as specified in ASTM D-1784. Larger diameter pipe (16 inches and larger) shall be in accordance with C900, with a SDR of 18.

Pipe joining shall be push on elastomeric gasket joints only and the joints shall be manufactured and assembled in accordance with ASTM D-3212. Elastomeric seals shall meet the requirements of ASTM F-477. The pipe shall be furnished with integral bells and with gaskets that are permanently installed at the factory and in accordance with ASTM D-3212 and contain a steel reinforcing ring. PVC sewer pipe shall be made by continuous extrusion of prime green unplasticized PVC and contain identification markings as required by the applicable ASTM standard.

The use of restrained joint C900 PVC (DR 18) shall be used for all gravity sewer mains installations (4 inches through 24 inches) within encasements. The restraint system shall provide uniform circumferential contact thereby eliminating any concerns over point loading. It shall be manufactured with compounds meeting a 12454 designation according to ASTM D1784 and shall have Rieber style joints meeting the requirements of ASTM D3139 with gaskets meeting the requirements of ASTM F477 The PVC restrained joint shall utilize a Rieber gasket per ASTM F477 to seal the integral bell socket to the spigot of the next joint (which conforms to the requirements of ASTM D3139). Each male end is beveled to facilitate joint assembly, and the spigot is reference marked to ensure proper insertion depth.

Ductile Iron Push-on Fittings: Ductile iron sewer fittings on PVC mains shall be deep bell, gasketed joint, and air test rated. Gasket groves shall be machined in the factory. Material shall be ductile iron, in accordance with ASTM A536, Grade 65-45-12 and ASTM F1336. Wall thickness shall meet the requirements of AWWA C153. Gaskets shall have a minimum cross

sectional area of 0.20 square inches, and conform to ASTM F477. All ductile iron fittings shall be lined with two (2) coats of ceramic epoxy to produce a total minimum dry film thickness of 40 mils. All ductile iron fittings on PVC pipe shall provide a flow line that provides a smooth transition between the materials.

Mechanical Joint Fittings: Joints shall be installed in accordance with AWWA C-600 and shall conform to AWWA Standard C-111. Mechanical joints shall be of the stuffing box type and shall conform to ANSI A21.11 for four inch (4") pipe and larger. Fittings and specials shall be ductile iron and shall be manufactured in accordance with AWWA Standard C-110 (ANSI A21.11). Compact fittings shall be ductile iron in accordance with ANSI A 21.53 (AWWA C-153) for 4" thru 24" sizes only. Note: mechanical joint wyes are not included in the AWWA C-153 specification. Pressure rating shall be not less than 200 psi unless otherwise specified. All ductile iron fittings shall be lined with two (2) coats of ceramic epoxy to produce a total minimum dry film thickness of 40 mils. Mechanical joint fittings shall be utilized on ductile iron mains and ductile iron laterals. Mechanical joint fittings shall not be utilized on PVC mains, unless otherwise approved by PWC.

PVC Fittings: PVC fittings shall be manufactured in accordance with ASTM D-3034, F-1336, and F-679. Molded fittings shall be use in sizes from 4” to 8” (or larger, if available). Fabricated fittings shall only be use with prior approval from PWC. Fabricated fittings are defined as those fittings that are made from pipe or a combination of pipe and molded components. All PVC fittings shall contain identification markings as required by the applicable ASTM standard. All PVC fittings shall be gasketed joint, except as indicated for interior drop structures. Plastic fittings shall be as manufactured by GPK Products, Inc., Plasti-Trends, the Harrington Corporation (Harco), or approved equal.

Page 10-61, Sub-article 1034-2 Plastic Pipe (B) PVC Force Main Sewer Pipe
Replace with the following:

In order to prevent the sanitary sewer force main from being mistaken for a water main, all force main PVC pipe shall be green in color.

Two (2) inch PVC pipe shall be manufactured using Grade 1 PVC compound material as defined in ASTM D-1784 and shall be SDR21, pressure class 200 in accordance with ASTM D 2241 or SDR-17 with a pressure rating of 250 psi, in accordance with ASTM D-2241. Fittings for two (2) inch PVC shall be solvent welded Schedule 80 PVC. The pipe shall be plainly marked with the manufacturer’s name, size, material (PVC) type and grade or compound, NSF seal, pressure rating and reference to appropriate product standards.

All PVC pipe four (4) inches through 12 inches and couplings shall be manufactured using virgin compounds as defined in ASTM D-1784, with a 4000 psi HDB rating and designated as PVC 1120 to be in strict accordance with AWWA C900. The pipe shall be Class 150 and conform to the thickness requirements of DR18. The pipe and fittings shall be manufactured to withstand 755 psi quick burst pressure tested in accordance with ASTM D-1599 and withstand 500 psi for a minimum of 1,000 hours tested in accordance with ASTM D-1598. Couplings shall be compression, twin gasket type in accordance with ASTM D-3139 for push-on joints and ASTM F-477 for elastomeric seals (gaskets). PVC fittings are not acceptable for mains other than two

(2) inch. The pipe joints shall be of the integral bell type with rubber gaskets conforming to the requirements of ASTM D-3139 or ASTM F-477. Fittings and specials for mains four (4) inches and larger shall be ductile iron, bell end in accordance with AWWA C110, 200-psi pressure rating unless otherwise shown or specified, except that profile of bell may have specials of the same material as the pipe with elastomeric-gaskets, all in conformance with the requirements of AWWA C900. Ductile iron fittings to PVC pipe shall be adequately supported on a firm trench foundation. Fittings shall be for bell and spigot pipe or plain end pipe, or as applicable.

Mechanical restraining systems shall not be used on PVC pipe.

Page 10-61, Sub-article 1034-2 Plastic Pipe (C) Polyethylene (PE) Pipe Force Main Sewer Pipe
Replace with the following:

PE pipe shall not be used for force main sewer pipe unless approved in writing by the utility owner. All sewer pipes shall be PVC or Ductile Iron as specified herein.

(D) High Density Polyethylene (HDPE) Pipe Force Main Sewer Pipe

The diameter and wall thickness of all high-density polyethylene (HDPE) pipe and fittings shall comply with the appropriate ASTM Specification and the class of pipe designated on the Drawings.

Page 10-61, Sub-article 1034-4 Ductile Iron Pipe (A) Gravity Flow Sewer Pipe
Add the following sentences:

All ductile iron pipe and fittings shall be in strict accordance with ANSI A21.51 and AWWA C151, Class 50 or Class 51, as applicable, in every aspect. The working pressure shall be a minimum of 200 psi. Pipe shall be furnished in 18 or 20-foot lengths. All pipe joints used in open trench construction shall be furnished with "push-on" joints, unless otherwise indicated on the drawings or specified. All joints and fittings shall be in accordance with ANSI A21.11 and AWWA C111. All ductile iron interior surfaces shall be lined with two (2) coats of ceramic epoxy to produce a total minimum dry film thickness of 40 mils. The exterior pipe surfaces shall be protected with asphaltic coating as specified in AWWA C151 and C110.

For aerial crossings which are 4 inches through 12 inches in diameter, manufactured restrained joint ductile iron pipe Class 53, or Class 53 flanged ductile iron pipe shall be used in accordance with the detail on the drawings for aerial crossings. For aerial crossings larger than 12 inches, or as noted specifically on the plans, flange joint ductile iron pipe, Class 53, shall be used in accordance with the drawings. The location of flanges shall be specifically designed for each application. The flange pipe shall be in accordance with ANSI / AWWA C115 / A21.15. Threads for threaded flange pipe shall be in accordance with ANSI B2.1, shop fabricated as outlined by AWWA C115 with serrated faces furnished on the pipe, completely factory installed. Welding of flanges to the body of the pipe will not be acceptable. Ductile iron fittings and flanges shall be in accordance with ANSI/AWWA C110/A21.10 with a minimum working pressure of 250 psi. Gaskets shall be full faced SBR rubber with a minimum 1/8” thickness. Linings and coatings shall be as outlined for ductile iron pipe.

Mechanical Joint Fittings: Joints shall be installed in accordance with AWWA C600 and shall conform to AWWA C111. Mechanical joints shall be of the stuffing box type and shall conform to ANSI A21.11 for four inch (4") pipe and larger. Fittings and specials shall be ductile iron. Compact fittings shall be ductile iron in accordance with ANSI A 21.53 (AWWA C153) for 4" thru 24" sizes only. Note: mechanical joint wyes are not included in the AWWA C153 specification. Pressure rating shall be not less than 200 psi unless otherwise specified. All ductile iron fittings shall be lined with two (2) coats of ceramic epoxy to produce a total minimum dry film thickness of 40 mils. Mechanical joint fittings shall be used on ductile iron mains and ductile iron laterals. Mechanical joint fittings shall not be used on PVC mains, unless otherwise approved by PWC.

The interior of pipe and fittings shall be lined with two (2) coats of ceramic epoxy to produce a minimum dry film thickness of 40 mils.

Page 10-61, Sub-article 1034-4 Ductile Iron Pipe (A) Force Main Sewer Pipe
Add the following sentences:

All ductile iron pipe and fittings (six (6) inches and above) shall be in strict accordance with ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51, Class 50, in every respect. Four (4) inch ductile iron pipe shall be Class 51. Joints shall be mechanical joint or push on joint as specified and installed in accordance with AWWA C600 and shall conform to AWWA C111. Mechanical joints shall be of the stuffing box type and shall conform to ANSI A21.11 for four (4) inch pipe through 12-inch pipe. Push on joints, rubber gaskets and lubricant shall conform to ANSI A21.11. Fittings and specials shall be ductile iron and shall be manufactured in accordance with AWWA C110 (ANSI A21.11).

Compact fittings shall be mechanically restrained, ductile iron in accordance with ANSI A 21.53 (AWWA C153) for four (4) inch through 12-inch sizes only. Where thrust blocking is used, fittings shall be full body ductile iron in accordance with ANSI A 21.53 (AWWA C110). Pressure rating shall be not less than 200 psi unless otherwise specified. All ductile iron interior surfaces shall be lined with two (2) coats of ceramic epoxy to produce a total minimum dry film thickness of 40 mils. The exterior pipe surfaces shall be protected with asphaltic coating as specified in AWWA C151 and C110.

For aerial crossings which are four (4) inches through 12 inches in diameter, manufactured restrained joint ductile iron pipe Class 53, or Class 53 flanged ductile iron pipe shall be used in accordance with the detail on the drawings for aerial crossings. Iron mechanical joint restraint retaining glands are not an allowable means of restraint for aerial crossings. For aerial crossings larger than 12 inches, or as noted specifically on the plans, flange joint ductile iron pipe, Class 53, shall be used in accordance with the drawings. The location of flanges shall be specifically designed for each application. The flange pipe shall be in accordance with AWWA C115. Threads for threaded flange pipe shall be in accordance with ANSI B2.1, shop fabricated as outlined by AWWA C115 with serrated faces furnished on the pipe, completely factory installed. Welding of flanges to the body of the pipe will not be acceptable. Ductile iron fittings and flanges shall be in accordance with ANSI/AWWA C110/A21.10 with a minimum working pressure of 250 psi. Gaskets shall be full faced SBR rubber per ANSI/AWWA C111/A21.11 with a minimum 1/8” thickness. Linings and coatings shall be as outlined for ductile iron pipe.

Page 10-61, Sub-article 1034-4 Ductile Iron Pipe (a) Force Main Sewer Pipe
Add the following sentences:

1034-5 Sleeves, Couplings and Miscellaneous

(A) Ductile Iron Pipe Size x SDR26 Transition Adapter

All ductile iron x PVC transition adapters shall be one (1) piece, bell x bell (gasket x gasket). Transition adapters shall range in size from four (4) inches through 12 inches. Transition adapters for pipe larger than 12-inches shall be as specified herein. All transition adapters shall have a flow way tapered to allow a smooth transition between the ductile iron and PVC. Transition adapters shall be either PVC or ductile iron, in accordance with the following:

PVC – All PVC transition fittings shall be made from DR 18 C900 pipe stock. The C900 pipe stock shall meet the requirements of AWWA C900/C905, and have a minimum cell classification of 12454 as defined in ASTM D1784. The wall thickness shall meet or exceed DR 18. PVC transition fittings shall have SBR gaskets in accordance with ASTM F477. All six (6) inch and eight (8) inch adapters shall be molded. Molded fitting joints shall be 235 psi rated, in accordance with ASTM D3139, and shall have SBR rubber gaskets. Four (4) inch, ten (10) inch and 12 inch transition adapters shall have SBR Rieber style gaskets meeting ASTM F477. Joints shall be 235 psi rated, in accordance with ASTM D3139 for the C900 (ductile iron) bell, and in accordance with ASTM D3212 for the sewer (SRD26) bell. Molded C900 bell depths shall comply with AWWA C907. Fabricated (4-inch, 10-inch and 12-inch) bell depths and molded sewer (SDR26) bell depths shall be in accordance with ASTM F1336.

Ductile iron – Ductile iron transition fittings shall be deep bell, push-on joint, and air test rated. The ductile iron material shall comply with ASTM A536, Grade 65-45-12 or 80-55-06. The bell depth shall be in accordance with ASTM F1336. Gaskets shall be of SBR rubber, in accordance with ASTM F477. Transition gaskets are not allowed. All ductile iron transition fittings shall be lined with two (2) coats of ceramic epoxy to produce a total minimum dry film thickness of 40 mils.

(B) Pipe to Manhole Connector (Boot):

The connector assembly shall be the sole element to provide a watertight seal of the pipe to the manhole or other structure. The connector shall consist of a rubber gasket, an internal compression sleeve, and one or more external take-up clamps. The connector shall consist of natural or synthetic rubber and Series 300 non-magnetic stainless steel. No plastic components shall be allowed.

The rubber gasket shall be constructed of synthetic or natural rubber, and shall meet or exceed the requirements of ASTM C923. The connector shall have a minimum tensile strength of 1,600 psi. The minimum cross-sectional thickness shall be 0.275 inches.

The internal expansion sleeve shall be comprised of Series 300 non-magnetic stainless steel. No welds shall be used in its construction.

The external compression take-up clamps shall be Series 300 non-magnetic stainless steel. No welds shall be use in its construction. The clamps shall be installed using a torque-setting wrench furnished by the connector manufacturer.

The finished connection shall provide a sealing to a minimum of 13 psi, and shall accommodate a minimum pipe deflection of seven (7) degrees without the loss of seal.

1034-6 Sewer Line and Fittings

(A) Saddles

Sewer service saddles may be use for sewer lateral installations. All sewer service saddles shall be ductile iron with stainless steel straps, bolts, nuts, and washers. The nuts shall be coated to prevent galling. The saddle body shall be ductile iron, in accordance with ASTM A536, Grade 65-45-12. The gasket material shall be SBR, in accordance with ASTM D2000. Saddles for PVC or DI laterals shall have an alignment flange. All stainless steel straps shall be pre-formed at the factory, to the specified outside diameters of the pipe.

(B) Sewer Laterals

Ductile iron laterals – For ductile iron mains, using mechanical joint fittings or an approved saddle with an alignment flange. For PVC mains, use an approved saddle with an alignment flange or ductile iron fittings as specified above.

PVC laterals – use a saddle with an alignment flange on PVC or ductile iron mains; ues a mechanical joint tee with SDR 35 transition gaskets on ductile iron mains; or use PVC fittings as specified above on PVC mains.

The following table summarizes the materials to be used for sewer main to lateral connections:

	PVC Main	DI Main
DI Lateral	DI fitting or approved saddle	MJ fitting or approved saddle
PVC Lateral	PVC fitting or approved saddle	MJ fitting with transition gasket or approved saddle

Sewer laterals shall be as specified herein and as indicated on the drawings.

Page 10-62, Sub-article 1036-1 General
Add the following sentences:

Unless otherwise designated on Drawings or permitted by PWC, all water mains four (4) inches and larger in diameter shall be ductile iron as specified herein. Two (2) inch water mains shall be PVC conforming to specifications contained herein.

Page 10-62, Sub-article 1036-2 Copper Pipe, second paragraph
Replace paragraph with the following:

For buried service, use copper water pipe and tube conforming to ASTM B88 soft annealed Type K. The minimum pressure rating for the copper water pipe shall be 655 psi. Use cast brass flared or compression type fittings manufactured for use with copper water pipe and conforming to AWWA C800 and local plumbing codes. All brass fittings shall have a 300 psi minimum pressure rating. All services installed in new construction shall be one continuous run of pipe with no splices from the corporation stop to the meter.

Page 10-62, Sub-article 1036-3 (A) (1) Pressure Rated Pipe
Replace with the following:

Pressure rated pipe shall not be used as water pipe.

Page 10-62, Sub-article 1036-3 (A) (2) Pressure Class Pipe
Replace with the following:

Two inch (2”) PVC pipe shall be manufactured using Grade 1 PVC compound material as defined in ASTM D-1784 and shall be SDR-21, pressure class 200 in accordance with ASTM D 2241 or SDR-17 with a pressure rating of 250 psi, in accordance with ASTM D-2241. Fittings for 2” PVC pipe shall be solvent weld Schedule 80 PVC and brass FIP x pack joint for PVC fittings shall be used to transition from PVC to brass. The pipe shall be plainly marked with the manufacturer’s name, size, material (PVC) type and grade or compound, NSF seal, pressure rating and reference to appropriate product standards.

All PVC pipe (4" thru 12" diameter) shall be manufactured using virgin compounds as defined in ASTM D-1784, with a 4000 psi HDB rating and designated as PVC 1120 to be in strict accordance with AWWA C900. The pipe shall be Class 150 and conform to the thickness requirements of DR18. The pipe shall be manufactured to withstand 755 psi quick burst pressure tested in accordance with ASTM D-1599 and withstand 500 psi for a minimum of 1,000 hours tested in accordance with ASTM D-1598. PVC fittings are not acceptable for water mains four inches (4") or greater. The pipe joints shall be of the integral bell type with rubber gaskets and shall conform to the requirements of ASTM D 3139 or ASTM F-477.

Mechanical restraining systems shall not be used on PVC pipe.

Fittings and specials shall be ductile iron, bell end in accordance with AWWA C110, 200 psi pressure rating unless otherwise shown or specified. Ductile iron fittings to PVC pipe shall be adequately supported on a firm trench foundation. Ductile iron fittings and specials shall be cement mortar lined (standard thickness) in accordance with ANSI A21.4 and AWWA C104/ANSI A21.4.

Page 10-62, Sub-article 1036-4 Steel Pipe
Add the following sentence:

Steel pipe shall not be used without prior approval by Utility Owner or as indicated on the drawings.

Page 10-63, Sub-article 1036-5 Ductile Iron Pipe and Fittings
Replace with the following:

(A) Pressure Class Pipe

All ductile iron pipe shall be four inches (4") and larger. All ductile iron pipe shall be designated as "Pressure Class", unless otherwise specified. The pipe furnished shall have a minimum thickness calculated in accordance with ANSI A21.50 / AWWA C150, with a factor of safety of two (2); a working pressure of 200 psi to 350 psi, plus 100 psi water hammer allowance; and AASHTO H-20 live truck load with 2.5 feet of cover. In no case shall "Pressure Class" pipe's nominal thickness be less than the following:

SIZE (In.)	PRESSURE CLASS	NOMINAL THICKNESS (In.)
4	350	0.25
6	350	0.25
8	350	0.25
10	350	0.26
12	350	0.28
16	250	0.30
24	250	0.37

(B) Thickness Class Pipe

For aerial crossings and other specific situations designated herein or where indicated on the drawings, the ductile iron pipe shall be Thickness Class. The minimum thickness class for four (4) inch water mains shall be Class 51. The minimum thickness class for pipe diameters six (6) inches and larger shall be Class 50. All thickness class pipe shall be in accordance with AWWA C151, with a minimum working pressure of 200 psi.

For aerial crossings which are 4" to 12" in diameter, Class 53 manufactured restrained joint or Class 53 flanged ductile iron pipe shall be used in accordance with the standard details. For aerial crossings larger than 12" or as noted specifically on the plans, flange joint ductile iron pipe, Class 53 shall be used in accordance with the drawings. The working pressure shall not be less than 200 psi. Flanges shall be designed for each application specifically. The flange pipe shall be in accordance with AWWA C115. Threads for threaded flange pipe shall be in accordance with ANSI B2.1, shop fabricated as outlined by AWWA C115 with serrated faces furnished on the pipe, completely factory installed. Welding of flanges to the body of the pipe will not be acceptable. Ductile iron fittings and flanges shall be in accordance with AWWA C110 with a minimum working pressure of 250 psi. Gaskets shall be full faced SBR rubber per AWWA C111 with a minimum 1/8" thickness. Linings and coating shall be as previously outlined for all ductile iron pipe and fittings.

(C) Joint Types

Joints shall be mechanical joint, push on joint, or factory restrained joint, unless otherwise indicated, conforming to AWWA C600 and AWWA C111. Mechanical joints shall be of the stuffing box type and shall conform to ANSI A21.11 for 4-inch pipe through 12-inch pipe. Push on joints, rubber gaskets, and lubricant shall conform to ANSI A21.11.

(1) Factory Restrained Joints

Factory restrained joint pipe shall be utilized for all pipe greater than 12-inches in diameter, unless otherwise approved by the Utility Owner. Factory restrained joint pipe shall be furnished for the locations shown on the approved Contract Drawings. The pipe, joints, and gaskets shall be in accordance with applicable ANSI/AWWA Standards. Factory restrained joints shall be rated for a working pressure of 350 psi for sizes up to 12-inches and 250 psi for larger sizes.

All factory restrained joint pipe shall have the restraints internal to the pipe (i.e., “boltless”). All restrained joint ductile iron pipe and fittings larger than 12-inches shall be as manufactured by U.S. Pipe’s TR-Flex, Griffin Pipe Products SNAP-LOK, American Cast Iron Pipe Company's Flex-Ring Joint, or approved equal. The method of restraining the valves to the factory restrained ductile iron pipe shall be reviewed and approved by the Utility Owner on a case by case basis. The valves shall have the same working pressure as the pipe.

(D) Fittings

Fittings and specials shall be ductile iron and shall be manufactured in accordance with AWWA C110 (ANSI A21.11). Compact fittings shall be mechanically restrained, ductile iron in accordance with AWWA C153 (ANSI A21.53) for 4" through 12" sizes only. Where thrust blocking is used, fittings shall be full body ductile iron in accordance with AWWA C110 (ANSI A21.11). Pressure rating shall be not less than 200 psi unless otherwise specified.

Tangential welded on outlets (i.e., bosses) shall only be utilized on pipe 24-inches and larger, as approved by PWC. All bosses shall be factory welded; field fabrication is not allowed. The pipe shall be in accordance with these specifications. Bosses shall be of the size and location indicated on the approved drawings.

(E) Linings and Coatings

All ductile iron pipe and ductile iron-cast iron fittings and specials shall be lined with standard thickness cement mortar lining and asphaltic seal coat in accordance with ANSI A21.4 / AWWA C104. Pipe and fittings shall have an outside asphaltic coating as specified in AWWA C151 and C110, respectively. The coating shall be strongly adherent to the pipe at all temperatures.

(F) Quality Assurance

When requested by PWC, each joint of pipe and each fitting shall be inspected by an independent domestic testing laboratory, approved by PWC, and certification shall be supplied to PWC that all pipe and fittings meet project specifications. In addition, upon request, the Contractor shall furnish to PWC a six inch (6") test section from each lot of water pipe as per AWWA C104 to be used for additional test of the pipe lining by PWC. Satisfactory results of this test must be obtained before acceptance of the pipe.

Page 10-63, Sub-article 1036-6 Fire Hydrant
Replace with the following:

All fire hydrants shall be dry barrel, traffic type and conform to the latest revision of AWWA C502 except as listed below or as otherwise directed by PWC. All working parts shall be bronzed. The size of the fire hydrants (designated by the nominal diameter of the valve opening) shall not be less than four and one-half inches (4 1/2"). All hydrants shall be able to deliver 1,000 gallons per minute with a friction loss of not more than five (5) pounds per square inch total head loss through the hydrant. Hydrants shall be of compression type (opening shall be of such design that when the barrel is broken off the hydrant valve will remain closed and reasonably tight against leakage). All hydrants shall be mechanical joint to accommodate the spigot end of six inch (6") Class 350, AWWA C151, ductile iron pipe. Bosses (6") may be substituted for tees in pipe sizes exceeding 24 inches in diameter. The boss shall be welded to the bottom of the main to provide effective flushing of the system.

All hydrants shall be furnished with two (2) two and one-half inch (2 1/2") nozzles and one (1) four and one-half inch (4 1/2") pumper nozzle. Outlets shall have American National Standard fire hose coupling thread, in accordance with the City of Fayetteville standard, and shall be provided with nozzle caps securely chained to the body of the hydrant. The base of the hydrant shall have two (2) cast lugs suitable for use in strapping the hydrant to the connecting pipe. The operating nut shall be pentagonal in shape, finished with a slight taper to one and one-half inches (1 1/2") from point to flat. All hydrants shall open left or counter-clockwise. Hydrants shall be suitable for working pressure of one hundred and fifty (150) pounds per square inch and test pressure of twice the working pressure. Fire hydrants shall be specific models manufactured by Mueller Company (Model Centurion 200), Clow Corporation (Medallion), American Darling (Model Mark 73-1) or approved equal. The interior of the hydrant shoe shall be coated with a 4 mil thickness FDA approved epoxy coating. Paint hydrants with one coat of primer paint and two coats of an approved paint of the PWC's standard colors, as indicated in the standard detail. Apply the final coat after hydrant installation.

Page 10-63, Sub-article 1036-7 (A) Gate Valves
Replace with the following:

All manually operated valves 4" and larger shall be ductile iron or cast iron body resilient wedge type gate valves conforming to ANSI / AWWA C509 for resilient seat-type valves or to ANNA / AWWA C515 for reduced-wall, resilient seat gate valves. Valve connections shall be as required for the piping in which they are installed and shall conform to ANSI / AWWA C111 / A21.11. Gate valves shall have a design working water pressure of 250 psi.

All valves shall have triple "O" ring stem seals. The design and machining of valves shall be such as to permit the replacement of the upper two (2) "O" rings without undue leakage while the valve is wide open and in service. The wedge shall be ductile iron encapsulated in nitrile rubber (4"-12") sizes and SBR rubber (14"-24") sizes. All internal and external surfaces of the valve body and bonnet shall have a fusion bonded epoxy coating complying with AWWA C550 applied electrostatically prior to assembly, conforming to AWWA C550. Valves shall have a clear waterway equal to the full nominal diameter of the valve. All valves shall be tested for leakage and distortion in strict accordance with the latest revision of AWWA C500.

For buried service, gate valves shall have non-rising stems, 2 inch square operating nuts and shall open by turning counter clockwise. The operating nut shall have an arrow cut in the metal, indicating the direction of opening. Where the valve operating nut is more than 3 feet below the valve box cover, provide an extension stem to bring the operating nut to a point 36 to 42 inches below the surface of the cover. Construct stem of steel using pipe, bar stock, and plates. Field verify required stem length prior to fabrication. Hot dip galvanize completed stem after fabrication.

Gate valves installed in meter vaults shall have a wheel in lieu of a square operating nut and shall also have a non-rising stem. The wheel shall have an arrow cut in the metal indicating the direction of opening. Flanges shall not be buried. An approved pit shall be provided for all flange connections.

All valves shall be manufactured in strict accordance with the latest specifications of ANSI/AWWA standards. Valves shall be manufactured by: Mueller Company, Clow Corporation, or American Darling Company. Certification shall be furnished to PWC by the manufacturer that all valves are in accordance with these specifications.

Where specified on the plans and approved by PWC, resilient valves shall be supplied with gearing. Spur gearing for valves installed in a vertical position and bevel gearing for valves installed in a horizontal position. In cases where valve locations on plans do not designate valve gearing and the proposed depth of water main is not adequate to achieve normal depth above valve bonnet of at least two (2) feet in cover, provide bevel gearing for all large diameter valves (16-inches and larger) upon approval by the Utility Owner.

Page 10-63, Sub-article 1036-7 (B) Bronze Gate Valves
Replace with the following:

Bronze gate valves shall not be used. All valves smaller than 4 inches shall be ball valves.

Page 10-63, Sub-article 1036-7 (C) Tapping Valves
Replace with the following:

Use tapping valves conforming to Subarticle 1036-7(A) with appropriately sized openings, with flanged by mechanical joint ends and pressure rated at 250 psi.

Resilient seated tapping valves shall be furnished with the tapping flange having a raised face or lip designed to engage the corresponding recess in the tapping sleeve flange in accordance with MSS-SP60. Tapping valves without the raised face on the tapping flange are not permitted since they do not assure the proper alignment required to prevent damage by a misaligned shell cutter. The interior of the waterway in the body shall be a full opening and capable of passing a full sized shell cutter equal to the nominal diameter of the valve.

Page 10-63, Sub-article 1036-7 (C) Tapping Valves
Add the following after 1036-7 (C):

(D) Ball Valves

For all valves smaller than four inches (4”), ball valves shall be used. Ball valves shall be installed in accordance with these provisions.

Ball valves shall be all bronze construction, with tee head operator and having a removable disc. Ball valves shall have threaded connections, in accordance with the standard details. Ball valves shall be manufactured and tested in accordance with AWWA/ANSI C800. The valve shall be equipped with packing nut, gland, and packing material. Ball valves shall be of an approved type made from approved materials conforming to ASTM Specifications and shall also meet the approval of the Utility Owner. The turn required to travel from fully closed to fully open on the ball valve shall be 90 degrees.

Page 10-63, Sub-article 1036-8 (A) Tapping Sleeves
Replace with the following:

Water tapping sleeves shall be ductile iron mechanical joint or type 304 stainless steel full gasket and have a minimum working pressure of 150 psi for all tapping of mains up to and including 24” inch diameter with a branch less than or equal to 12" diameter. Branch diameter greater than 12" on 16" diameter pipe and larger shall require full body ductile iron mechanical joint tapping sleeve.

Ductile iron mechanical joint tapping sleeves shall be as manufactured by Clow, M&H, Mueller, American, or an approved equal and shall be furnished with complete joint accessories. The mechanical joint sleeve shall be compatible with type and class of pipe being tapped. The outlet flange shall be class 125 per ANSI B16.1 compatible with approved tapping valves. The sleeve shall have a mechanical joint body with side flange gaskets. Secure side flange gaskets to existing main using restraining glands acceptable to material of existing main. The sleeve shall have a mechanical joint body with side flange gaskets. Secure side flange gaskets to existing main using restraining glands acceptable to material of existing main.

Stainless steel tapping sleeves shall only be used upon authorization of PWC. Stainless steel tapping sleeves shall be furnished with all accessories. The sleeve, lugs, bolts and nuts shall be 18-8 type 304 stainless steel, as provided by the manufacturer. The outlet flange shall be ductile iron or stainless steel. The gasket shall be a grid pattern design and shall provide full circumferential sealing around pipe to be tapped. The sleeve shall include a 3/4 NPT test plug. All welds shall be passivated. The outlet flange shall be class case D per AWWA C207-ANSI 150 lb. drilling compatible with approved tapping sleeves.

The tapping sleeve and valve shall be in accordance with the details on the drawing.

Page 10-63, Sub-article 1036-8 (B) Transition Sleeves and Couplings

Add the following material to this sub-article:

Use mechanical joint full body solid sleeves conforming to MJ fittings of this special provision of 1036-5. Sleeve shall be rated for 250 psi working pressure.

Page 10-64, Sub-article 1036-9 Service Line Valves and Fittings
Replace with the following:

(A) Ball Valves

For all valves smaller than four inches (4”), including corporation stops and curb stops, ball valves shall be used.

Ball valves shall be all bronze construction, with tee head operator and having a removable disc. Ball valves shall have threaded connections, as indicated on the drawings. Ball valves shall be manufactured and tested in accordance with AWWA C800. The valve shall be equipped with packing nut, gland, and packing material. Ball valves shall be of an approved type made from approved materials conforming to ASTM Specifications and shall also meet the approval of PWC. The turn required to travel from fully closed to fully open on the ball valve shall be 90 degrees.

(B) Water Service Saddles

All water service saddles for use on 2-inch PVC shall be 1” brass saddles as manufactured by Ford, McDonald, Mueller or approved equal.

Water service saddles for 1-inch and 2-inch taps on 4-inch, 6-inch, 8-inch, 12-inch and larger size PVC and asbestos-cement (AC) and also 4-inch and larger size iron pipe shall be ductile iron with stainless steel strap(s), bolts, nuts and washers. Ford Models FS 101, FS 202; Romac Models 101S, 202S; Smith-Blair Model 315, 317 or approved equal shall be used. Stainless steel straps must be pre-formed at the factory to the specified outside diameters of the pipe.

Water service saddles with 2-inch outlet shall be double strap.

Water service saddles for pipe sizes 12-inch through 24-inch shall be double strap.

Water service saddles for pipe sizes exceeding 24-inches shall be as specified by the herein and as indicated on the drawings.

(C) Fittings

Use cast brass compression type fittings manufactured for use with copper or PE water pipe, as applicable, and conforming to AWWA C800 and local plumbing codes. All brass fittings shall have a 300 psi minimum pressure rating.

Page 10-64, Sub-article 1036-11 Identification of Plastic or Non-metallic Pipes
Add the following provisions:

For the purpose of identification of plastic or non-metallic pipes during future trenching or location, a continuous "detectable" identification wire shall be installed. The wire shall be a minimum 12-gauge, single strand, coated copper or copper clad steel wire that is suitable for underground use. Splices shall be accomplished utilizing a corrosion proof wire connector. The connectors shall “lock” the wires in place and contain a dielectric sealant to prevent corrosion.

Page 10-64, Sub-article 1036-12 Valves Box
Add the following material specifications for valve box:

Valve boxes shall be "slip-type" made of close-grained, gray cast iron metal painted with a protective asphaltic coating. Construction shall be in three pieces as follows: The lower of base pieces, which shall be flanged at the bottom, the upper part which shall be flanged on the lower end, and of such size as to telescope over the lower part, the upper end being constructed in the form of a socket to receive the cap or cover; and the cover or cap shall have cast on the upper surface, in raised letters, the word "WATER". All valve boxes shall be equal in quality and workmanship to those manufactured by Sigma Corporation (VB-462), Tyler Union (6855 Series), Star Pipe Products (VB-0004), or an approved equal. Valve box shall have a 3/8-inchhole drilled in the upper part 4-inches to 6-inches from the top of the box to accommodate ¼-inch x 1-1/2-inch galvanized bolt for securing tracer wire. The valve box shall be in accordance with the standard details.

Valve box protector rings shall be installed to protect valve boxes located outside pavements (i.e. roadway shoulders). The ring shall be constructed in accordance with the standard details.

Valve Box and Stem Extension for Buried Applications: For all buried valves greater than three (3) to four (4) feet in depth, provide as necessary an extension system to raise 2-inch operating nut to within three (3) feet of the finished grade. Stem diameter according to valve manufacturer's recommendations, but not less than 1-inch. Extension stem shall be provided spacer and stop to reinforce point of applied torque and keep assembly from separating at full extended length.

Page 15-1, Sub-article 1500-2 Cooperation with the Utility Owner, paragraph 2:
add the following sentences:

The Utility Owner is the Fayetteville Public Works Commission (FayPWC). The contact person is Allan J. Riddle, P.E. and can be reached by phone at (910) 223-4785.

(1) Provisions for fire hydrant accessibility

Existing fire hydrants shall be accessible to the Fire Department at all times. Fire hydrants shall not be taken out of service without the utility owner’s written approval. The Fire Department shall be notified of any fire hydrant taken out of service.

If the fire hydrants are in need of replacement, relocation, or connected to a new water main, the Utility Owner, the Design Engineer, and the appropriate Fire Department shall be notified and coordinated with prior to commencing work. Fire hydrants shall not be removed from service without prior approval of the Utility Owner. The existing fire hydrants shall be returned to the Utility Owner. Fire hydrants not in service shall be covered with burlap bag, whether existing or new.

(2) Provisions for construction around utility poles and guy wires

The Contractor will be required to perform construction work around utility poles and guy wires which may be left in place within the construction limits of the project. The Contractor shall contact the owner of the utility to coordinate securing the poles during construction. It may be

necessary for the Contractor to hire an electrical utility contractor to secure poles. All work outlined in this paragraph shall be at no additional cost to the Department and/or Utility Owner.

Page 15-1, Sub-article 1500-3, Utility Locations and Contractor's Responsibility:
Add the following paragraphs:

(1) Mapping of existing water and sewer lateral facilities

Exhibit 2-Table 1 of these Utility Construction Special Provisions shall supplement existing water and sewer lateral facilities on the plans. Unless otherwise directed by the Utility Owner, Table 1 shall supersede any plan discrepancy regarding size, number and/or material.

Add the following paragraphs that designate site layout and staking responsibilities for the proposed water and sewer utility work:

Construction staking will be performed by the Department (NCDOT's Division Office), who will also prepare and furnish construction cut sheets to the Design Engineer, Utility Owner and Contractor. The Contractor shall not install any utilities without a cut sheet. All requests for staking will be made not less than 96 hours in advance. Engineer.

Utilities shall be installed at the locations and elevations indicated on the cut sheets unless otherwise approved by the Utility Owner. Should a conflict arise between the Contract Drawings and the cut sheets, the cut sheets shall take precedence. Contractor shall make the Utility Owner and Design Engineer aware of any conflict between the Contract Drawings and the cut sheets as soon as it is discovered. The Contractor shall verify invert elevations of all water mains, sewer mains, water laterals, sewer laterals, and manholes by instrument.

(2) Repair of any damage to existing water services by Contractor caused damage

The Contractor shall replace the existing water services that are damaged as a result of their operations in accordance with these Special Provisions. Damaged water services shall be replaced from the meter to the existing main utilizing copper tubing and all new fittings. The Contractor shall properly abandon the existing tap, and install a new tap, utilizing a new tapping saddle and corporation in accordance with these Special Provisions.

The Contractor shall be responsible for connecting the new tailpiece to the customer's existing service utilizing brass fittings. The Contractor is responsible for all necessary fittings in order to connect the copper tubing to the existing meter.

The existing meter boxes shall be replaced as part of the renewal of the water services. A composite, H-20 rated meter box shall be used if the meter is to be located in asphalt or concrete. The Contractor shall be responsible for furnishing and installing the meter boxes. All work shall be approved by PWC.

Page 15-1, Sub-article 1500-4, Weekend, Night and Holiday Work
Add the following paragraphs:

During the course of construction, it may be necessary to complete portions of the Work outside of the normal working hours, to accommodate the utility owner's operations, traffic, and/or public convenience. The Department, Contractor, and the utility owner will determine an acceptable schedule required for Work during such hours. The costs for such Work shall be considered incidental to the Project and no additional payment will be made.

Legal holidays observed by the Fayetteville Public Works Commission include New Year's Day, Martin Luther King's Birthday, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving (2 days), and Christmas (2 days).

Page 15-1, Sub-article 1500-5 Relation of Water Mains to Sewers
Add the following paragraph:

Relation of water mains to sewers shall also apply to all sewer lateral crossings (4-inches and 6-inches).

Page 15-1, Sub-article 1500-5-A Crossing Existing or Proposed Utilities
Add the following sub-article:

The Contractor shall conduct their operations so that the following requirements are adhered to:

1. Underground telephone, cable TV, and gas utilities or conduit banks shall be crossed maintaining a minimum of 18-inch separation or clearance.

2. Electrical crossings shall be performed while the conductor is de-energized and at all times in the presence of the utility owner. Electrical crossings shall be in accordance with NESC requirements. Electrical primary conductor crossings shall be as follows:

    a. Crossing over a conductor, maintain a minimum of 12-inches of undisturbed soil encasing the conductor.

Crossing under a conductor shall be accomplished by boring, maintaining 12-inches of undisturbed soil encasing the conductor.

Page 15-2, Sub-article 1500-7 Submittals and Records, first paragraph
Replace "Provide 2 copies to the utility owner" with the following:

Provide 2 paper copies and 1 electronic (portable document format) copy to the utility owner.

Page 15-2, Sub-article 1500-7 Submittals and Records
Add the following sentences:

Do not perform any portion of the utility work requiring submittal and review until the respective submittal has been reviewed by the utility owner.

The Contractor shall provide submittals on the following:

- A sample door hanger, notifying the residents of the project and those times that the resident may not have water service

- Contractor's safety plan, including confined space program
- Identification of the proposed project superintendent and representative authorized to act on behalf of the Contractor.
- Proposed project schedule. The schedule shall include the sequencing and coordination of connections to existing water mains, pipeline inspections, trenchless crossings, temporary water main set up and removal, and final restoration.
- All piping, fittings and structures including that to furnish temporary water during extended service interruptions
- Contractor personnel emergency contact information

Upon completion of the project, prior to the Contractor de-mobilizing and before payment for associated items, the Contractor shall provide the following:

PWC Sewer Work:

- • Manholes located outside of pavement must have a PWC issued marker.
- • All manholes having cam-lock ring and covers shall be locked.
- • Install a PWC issued marker at all valve and air release valves at manholes outside of pavement as directed by PWC.
- • Verify all plugs have been removed.

Water Work:

- • Verify all valves are fully open.
- • Verify all valves are accessible and can be operated.

Page 15-2, Sub-article 1500-8, Locating and Marking:
Add the following requirements:

For identification of plastic water services, the wire shall be buried along the water service lateral from the main to the meter box. The wire shall extend a minimum of 12 inches into the meter boxes.

For identification of plastic or non-metallic pipes, the wire shall be continuously along the pipe. The wire shall be "stubbed" into valve boxes and secured such that a direct/conductive metal detector may be used to trace the pipe location. Bolts shall be used to secure the detectable wire and the attachment location shall be readily available from finished grade without special equipment. The wire shall be installed above all non-metallic pipelines.

Page 15-2, Sub-article 1500-8 Locating and Marking
Add the following requirements:

For identification of plastic water services, the wire shall be buried along the water service lateral from the main to the meter box. The wire shall extend a minimum of 12 inches into the meter boxes.

For identification of plastic or non-metallic pipes, the wire shall be continuously along the pipe. The wire shall be "stubbed" into valve boxes and secured such that a direct/conductive metal detector may be used to trace the pipe location. Bolts shall be used to secure the detectable wire

and the attachment location shall be readily available from finished grade without special equipment. The wire shall be installed above all non-metallic pipelines.

Page 15-2, Sub-article 1500-9 Placing Pipelines into Service
Add the following sentences:

Obtain approval from Utility Owner prior to placing a new water line into service. Use backflow prevention assemblies for temporary connections to isolate new water lines from existing water line. A representative from the Utility Owner shall witness all tests performed on their water and sewer facilities.

Page 15-2, Sub-article 1500-9 Placing Pipelines into Service
Add the following sentences:

Prior to final inspection, all sanitary sewer laterals, mains, and manholes newly installed on the collection system shall be flushed and cleaned. Prior to beginning the flushing operation, the downstream manhole invert out pipe shall be plugged with a watertight plug to protect the existing sewer main. All water and debris shall be removed and properly disposed of by the Contractor. This condition shall be maintained until PWC issues final acceptance for the project.

Page 15-2, Sub-article 1500-9 Placing Pipelines into Service
Add the following sentences:

Coordination of temporary interruptions to water and/or sewer services shall be the responsibility of the Contractor. The Contractor shall schedule a coordination meeting with the Department, Design Engineer, Utility Owner's Project Coordinator, and Utility Owner a minimum of three (3) business days prior to any planned service interruption and prior to any notices being issued. The purpose of this coordination meeting is to ensure that the Contractor has a good understanding of the requirements related to the proposed outage, verify that there are no utility conflicts, discuss any necessary contingency plans, and all equipment, materials, tools, and all other incidentals necessary to complete the work are on the project site in good working order. Should, for any reason, the Department and/or Utility Owner deem that the Contractor is not prepared for the proposed outage, the outage notifications will not be distributed and the outage shall be postponed a minimum of two (2) weeks. The Department will provide written notification to the Contractor of this decision. No additional contract time will be granted for this delay.

The duration of the service interruption shall be coordinated with Utility Owner, the Department, and the Design Engineer. Service interruptions to residents shall be limited to no more than eight (8) hours at any given time. If the service interruption is anticipated to exceed eight (8) hours, temporary service shall be provided. The Contractor shall provide all the necessary equipment and materials for temporary service. The notifications shall describe the work to be undertaken and approximate dates of the work. The text of the notifications shall be approved by the Department and Utility Owner in advance. The Contractor shall furnish a copy of the notification to the Utility Owner Project Coordinator each time such notification is issued to the residents.

Whenever the property owner's use of the water and/or sanitary sewer must be interrupted by the Work, the Contractor shall notify the residents a minimum of 48 hours prior to service interruption.

This notification shall be accomplished with door hanger notification cards placed at the addresses of the affected residents. Property owners shall be informed when service interruption takes place and the expected duration. The Contractor shall make every effort to minimize inconvenience to the public and property owners.

The Contractor shall complete the required work and restore water service within the given time period for the outage. Utility Owner reserves the right to cancel or postpone the outage at any time, for any reason.

Page 15-2, Sub-article 1500-9 Placing Pipelines into Service
Add the following sentences:

(1) Provisions for furnishing pressurized, temporary water service:

Provide and maintain pressurized, temporary water supply to all services connected to water mains that must be depressurized and/or interrupted for any reason related to the Work including cut in construction and ties in. The only exception to this requirement is the performance of emergency repair and if the planned interruption of service is expected to last less than eight (8) consecutive hours. Provide temporary water supply if the interruption extends past eight (8) consecutive hours.

Maintain and operate temporary water supply until completion of required disinfection and flushing procedures and, receipt of confirmation of acceptable bacteriological test results for the section of water main that was interrupted or as otherwise directed by the utility owner.

The Contractor shall submit a detailed temporary water layout plan to the utility owner prior to the planned outage. The Contractor will be responsible for furnishing, installing, maintaining and removing all temporary water lines during the course of the work. All costs associated this item shall be incidental for the work that is needed for.

The temporary lines shall be leak free and installed in a neat and orderly fashion. The Contractor shall be responsible for protection of the temporary line and shall provide the personnel necessary to immediately respond to all water line breaks, leaks, and outages associated with the project. A 24-hour “hotline” shall be established for the utility owner to call when a problem arises with the temporary water system. Any leaks on the temporary water service lines shall be repaired immediately. The Contractor shall also take all necessary precautions to protect the temporary water system from freezing and shall include freezing protection procedures in the temporary water layout plan.

The Contractor shall connect the temporary water system directly to the customer’s meter, utilizing all appropriate fittings. This may necessitate the meter being placed outside of the meter box. During weather that may result in the meter and/or temporary service lines freezing, the Contractor shall take all reasonable precautions (i.e., covering the meter with dirt) to prevent the meter and/or temporary bypass lines from freezing.

Fire protection must be maintained at all times during construction. Temporary fire hydrants must meet the approval of the applicable Fire Department, prior to their use.

Prior to installing any temporary service lines, the Contractor shall verify the need for such lines, especially on streets with multiple water mains. Any costs incurred by installing temporary water lines that are not needed shall be at the Contractor's expense.

Backflow prevention measures will be required when the temporary water system is serving any commercial businesses. Backflow prevention measures will not be necessary when the temporary water system is only serving residential homes. Where backflow prevention is required, a reduced pressure device shall be utilized in accordance with Utility Owner standards and the Utility Owner's Cross-Connection Control Ordinance. The Contractor shall call Utility Owner's Environmental System Protection Department (910-223-4699) for additional information and requirements.

Restrained joint PVC piping will be allowed if properly placed so as to prevent its damage by traffic. All temporary service pipe crossing streets and/or commercial driveways must cross in a fashion that will not create a traffic hazard. Boring or punching may be required when crossing streets with high traffic volume or higher speeds. Temporary piping crossing sidewalks or wheel chair access ramps must be ramped or buried. Any temporary water lines crossing a driveway shall be covered with a rubber ramp or bituminous cold patch provided by the Contractor. When temporary paving is used to ramp temporary services lines, it must be compacted by a roller or compaction device to minimize tracking. The Contractor is to maintain ramps and patches to ensure access by public. Piping must be buried when so directed by the Department and/or the utility owner. All temporary water piping connected to fire hydrants shall be constructed in such a manner that if necessary, can be easily removed so the fire hydrant can be used for firefighting purposes with minimal effort. All such connections to the fire hydrants must be compatible with applicable Fire Department requirements for each fire hydrant outlet used. Where fire hydrants cannot be used or are not available, the Contractor shall make below ground taps for bypass connections.

Direct connections to the existing water system will not be allowed until chlorination is complete and each section of temporary line, including service lines, has passed bacteriological and turbidity testing. All dead-end temporary services lines shall be equipped with a temporary blow-off.

Temporary service lines longer than 750 linear feet must have a supply at each end. Temporary service lines must have a main line shut off valve at least every 500 feet. Fire protection must be maintained at all times during construction.

Upon activation of the newly relocated or installed pipe, the Contractor shall remove all temporary service lines and shall leave all streets, sidewalks, and adjacent properties in a condition of equal or better than original. Prior to installing the meter and connecting the customer to the new main, the existing service line shall be thoroughly flushed to remove any deposits collected during the work.

The pipe, hoses, and other materials which are to be furnished by the Contractor for use as temporary service pipe shall be clean, water tight and fully adequate to withstand the existing pressure and all other conditions of use and shall be approved by the utility owner. Care shall be exercised throughout the installation of all temporary pipe and service fittings to avoid any possible contaminations of any mains or services.

All piping utilized in the temporary water system shall be NSF Standard 61 certified for use in potable water applications or FDA CFR 177.2600 approved, for use in contact with food articles, if such use is approved by NCDEQ. The Contractor may utilize PVC pipe only if the pipe is equipped with restrained joints.

Testing and Disinfection

The Contractor shall coordinate and fully cooperate with the Utility Owner when scheduling testing. The Contractor shall provide a minimum of two (2) business days' notice when scheduling testing with the Utility Owner. All testing shall be in accordance with these special provisions.

All temporary water piping, newly lined mains, and newly installed mains shall be flushed and disinfected prior to placing into service. For water samples on Utility Owner's owned water mains, the Utility Owner's Project Coordinator shall take the appropriate sample(s) to the Utility Owner's lab for analysis. Upon successful completion of the disinfection process, the water lines can be placed into service. Disinfection shall be in accordance with these Special Provisions. All water samples from Utility Owner's owned mains shall be taken to the Utility Owner Lab by the Utility Owner's Project Coordinator.

The Contractor shall provide all equipment, materials, personnel, traffic control and all means necessary to perform all testing and inspection at no additional cost to the Department. If the same line segment fails the required testing more than two (2) times, Utility Owner will charge a fee of $100.00 per test, beginning with the third attempt, until a passing test achieved.

All environmental regulations governing the release and/or disposal of chlorinated testing water shall be met by the Contractor. AWWA C655 defines "highly chlorinated" water as water having more than four (4) ppm. Any water with a chlorine level greater than four (4) ppm shall be de-chlorinated by the Contractor prior to being released to the environment.

The Contractor will be required to flush and remove the chlorine from the main 24 hours after initial chlorination. The cost of main disinfection and disposal of the chlorinated water shall be included in the appropriate measurement and payment item.

Page 15-4, Sub-article 1505-3 (C) Bedding
Add the following sentence:

Sewer and water main bedding shall also conform to the requirements of the details on the drawings for sewer bedding and water main bedding.

Page 15-4, Sub-article 1505-3 (C) Bedding
Add the following sentences:

(1) Gravity Flow Sewer Pipe

The bottom of the trench shall be excavated to a minimum of four inches (4") below the outside bottom of the pipe being installed to allow adequate placement and compaction of bedding material prior to installation.

Select bedding material shall be placed a minimum of four inches (4") and a maximum of six inches (6") under the pipe for full width of the trench and halfway up the pipe on the sides. Bedding material shall be placed in layers not exceeding six inches (6") loose thickness for compacting by vibratory mechanical tamps under the haunches and concurrently on each side of the pipe for the full width of the trench. The final result shall be "Class B" bedding for rigid pipe. If the existing material under the pipe bedding material is unsuitable, the unsuitable material shall be removed and replaced with select bedding material (No. 57 or No. 5 stone), as authorized and approved by PWC.

Page 15-4, Sub-article 1505-3 (D) Pipe Laying
Add the following sentences:

All pipes and fittings shall be lowered into the trench in such a manner to prevent damage to the protective coatings and linings. Under no circumstances shall pipe materials be dropped or dumped into the trench. Pipe shall be carried into position and not dragged.

All dust, dirt, oil, tar (other than standard coating), or other foreign matter shall be cleaned from the jointing surfaces, and the gasket, bell, and spigot shall be lubricated with lubricant recommended by the manufacturer.

All pipe shall be installed in accordance with the approved plans and cut sheets, unless otherwise directed by PWC.

For water pipe and sewer force main pipes sizes up to 12-inches, mechanical equipment shall not be used to assemble the pipe. For water pipe and sewer force main pipes sizes over 12-inches, mechanical equipment may be used, in accordance with the pipe manufacturer's instructions. Any damage resulting from the use of mechanical equipment shall be replaced as directed by and at no additional cost.

Gravity flow sewer pipe shall be laid upgrade, beginning at the lower end with the tongue or spigot ends pointing in the direction of the flow to the correct line and grade, unless otherwise approved by PWC. The sewer pipe section to be installed shall be aligned by batter board or laser beam with the last installed pipe section. Mechanical equipment should not be used to assemble the pipe. Pipe shall be assembled in accordance with the pipe manufacturer's instructions. Any damage resulting from the use of mechanical equipment shall be replaced as directed by and at no additional cost to the Department.

Adjustments in grade by exerting force on the barrel of the pipe with excavating equipment will not be allowed. The Contractor shall verify line and grade after assembling each joint.

No pipe shall be laid in water or where in PWC's opinion trench conditions are unsuitable. Every precaution shall be taken to prevent material from entering the pipe while it is being installed.

Page 15-4, Sub-article 1505-3 (D) Pipe Laying
Add the following sentences:

(1) Pipe Laying Schedule and Marking Diagram

Provide a laying schedule and marking diagram for all mains 16-inches and larger and for all mains that have factory restrained joints or flanged joints.

Laying schedule shall indicate by consecutive number the order and direction of installation of each pipe section or segment, length of restraint, special fitting, valves, tees, temporary taps or flushing points, and other appurtenances. In addition, the laying schedule shall include:

A. The station and elevation to which the bell end of each pipe shall be laid and all changes in gradient or horizontal alignment.
B. All elements of curves and bends, both in horizontal and vertical alignment.
C. Length of restraint

Do not start production of pipe and fittings prior to review by the Utility Owner.

Provide final approved lay schedule on a CD-ROM in portable document format (*.PDF).

Page 15-4, Sub-article 1505-3 (E) Thrust Restraint paragraph 3
Replace with the following:

At locations where restrained joints are shown on the plans, use ductile iron pipe and fittings with push-on factory restrained joints. The pipe, joints, and gaskets shall be in accordance with ANSI/AWWA Standards as previously specified for ductile iron pipe in Sub-article 1036-5.. Restrained joints, fittings and valves shall be rated for a working pressure of 350 psi for sizes 4" through 24" and 250 psi for larger sizes. All factory restrained joint pipe, valves, and fittings shall have the restraints internal to the pipe (i.e., “boltless”). The use of mechanical restraints are not allowed, unless otherwise specifically directed in writing by PWC. All valves, pipe, and fittings shall be compatible with the factory restraint system. All push-on factory restrained joint ductile iron pipe and fittings shall be as manufactured by U.S. Pipe’s TR-Flex, Griffin Pipe Products SNAP-LOK, American Cast Iron Pipe Company's Flex-Ring Joint, or approved equal.

Special accessories such as mechanical joint retainer glands or field locking gaskets are acceptable on pipe 12-inch and less in diameter, upon approval from PWC. Use concrete reaction blocking and thrust collars only where joint restraint is impractical and with the approval of PWC.

Page 15-5, Sub-article 1505-5 Concrete Encasement of Utility Lines
Replace the paragraph with the following:

Water and/or sewer utility lines are not to be encased in concrete unless approved in writing by the utility owner.

Page 15-5, Sub-article 1510-2 Materials, Paragraph 5
Add the following sentences:

Clay pipe, PE pipe, steel pipe and concrete pipe shall not be used for water pipe unless approved in writing by PWC. All water pipes shall be Ductile Iron or PVC with ductile iron fittings as specified herein unless otherwise indicated on the drawings.

Splices shall be accomplished using a corrosion proof wire connector. The connectors shall "lock" the wires in place and contain a dielectric sealant to prevent corrosion. The attachment location shall be readily available from finished grade without special equipment.

For the purpose of identification of plastic water services during trenching, a continuous "detectable" identification wire shall be installed. The wire shall be a minimum 12-gauge, single strand, coated copper or copper clad steel wire that is suitable for underground use. The wire shall be buried along the water service lateral form the main to the meter box. The wire shall extend a minimum of 12-inches into the meter boxes.

Page 15-6, Sub-article 1510-3 (A) General

In the sixth paragraph, replace the words "36" to 42" of cover" with "a minimum of 42" of cover:"

Page 15-6, Sub-article 1510-3 (A) General
Add the following sentences:

When thrust blocking is to be used, backfilling shall not occur until the concrete has time to set. No hydrostatic pressure testing shall occur until the concrete thrust blocking has cured for a minimum of five (5) calendar days.

Add the following construction methods for service interruptions and cut ins:

1. Coordinate all service interruptions with Utility Owner and submit a shut down or service interruption work plan for review and approval by the Utility Owner a minimum of 30 calendar days prior to service interruption. Service interruption shall address all facets of the planned outage and how the Contractor will adhere to service interruption policies and critical items defined herein. The Utility Owner will schedule a test shut down to ensure existing valves are in proper working order. Where existing valves are determined to be non-functional or unable to isolate the work area, a field directive will be issued to insert a valve, or cut in a valve, if other existing valves will not accommodate a service interruption that does not disrupt significant number of customers. A cut in valve installation shall follow these same measures.
2. Perform customer notification adhering to customer notification procedures as contained in these Special Provisions.
3. Provide sufficient construction staff or crews, certified site superintendent present, pumps of sufficient size to quickly dewater and ensure all equipment is present and functional.
4. Provide sufficient lighting for night operations.
5. Provide dual purpose sleeves, retainers glands, fittings, etc. to complete the tie in expediently.
6. Perform the following tasks in advance of the shutdown:
   A. Evaluate vertical depth of existing main and any conflicting utilities.
   B. Provide detailed layout plan with dimensions and fittings as part of the shutdown plan.
   C. Complete excavation to pipe.
   D. Preassemble fittings above ground when possible.

E. Place crushed rock in excavation to provide footing and minimize contamination.
F. Verify notification of customers has been completed.
G. Perform the following tasks after shutdown:
    a. Relieve pressure off existing main through use of existing hydrants or blow-offs which are within the isolated part of the system
    b. Cut pipe on bottom and sides in manner to dewater pipe quickly and to avoid water spray
    c. Use cut out section for measurement when possible
    d. Disinfect fittings and pipe with chlorine solution adhering to Cut in Construction requirements of AWWA C651-14, Section 4.11

Page 15-6, Sub-article 1510-3 (B) Testing and Sterilization
Replace the sixth paragraph (beginning at line 39) with the following:

Sterilize water lines in accordance with Section 1003 of The Rules Governing Public Water supply and AWWA C651 Section 4.4.3, the Continuous Feed Method. Provide a chlorine solution with between 50 parts per million and 100 parts per million in the initial feed. Solid sterilization agent is not allowed. In no case shall the chlorine level exceed 300 ppm. If the chlorine level is over 300 ppm, the system shall be completely flushed and re-chlorinated. The chlorine solution must remain in contact with all interior surfaces for 24 hours. If the chlorine level drops below 10 parts per million during a 24-hour period, then flush, refill with fresh chlorine solution, and repeat for 24 hours. Once the 24-hour period has passed with the chlorine level at least 10 ppm, thoroughly flush the system until the chlorine solution is reduced to same level as existing connected water main. Coordinate flushing and operation of the valves with the Utility Owner. Provide certified bacteriological and contaminant test results from a state-approved or state-certified laboratory. The Utility Owner has its own laboratory for conducting bacteriological and contaminant testing on Utility Owned water mains. All samples from Utility -owned water mains shall be taken to the Utility Owner's laboratory by the Utility Owner's Project Coordinator. Operate all valves and controls to assure thorough sterilization. During the flushing period, open and close each fire hydrant several times to flush the hydrant. Provide all chlorinating equipment, sterilization solution, taps, corporation stops, and blow offs necessary to complete testing and sterilization. If any disruption to the disinfection process occurs, or if any repair procedure is necessary then the disinfection process shall start over.

Take all necessary measures to prevent downstream erosion caused by flushing the lines. All erosion/damages shall be repaired at no additional expense to the Utility Owner. All environmental regulations governing the release and/or disposal of chlorinated testing water shall be met by the Contractor. AWWA C655 defines "highly chlorinated" water as water having more than four (4) ppm. Any water with a chlorine level greater than four (4) ppm shall be de-chlorinated by the Contractor prior to being released to the environment.

Each valved section shall be tested individually. Where any section of a water line is installed with concrete thrust blocking for fittings or hydrants, the hydrostatic test shall not be made until at least five (5) days after installation of the blocking.

Each valved section of pipe shall be slowly filled with water and to the specified test pressure based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to PWC. Before applying the specified test pressure, all air shall be expelled from the pipe. If hydrants or blow offs are not available at the high places, taps shall be made to provide blow offs at no additional cost to the Department.

Any taps which are not to be used in the final build out (i.e. testing and/or blow off taps) shall be killed out at the main. If these taps are converted to irrigation taps they must be installed according to the drawings and be witnessed by Utility Owner. Utility Owner shall be present and observe all valve operation by the Contractor. Under no circumstances shall a Contractor tamper with any valves not installed by him unless it is an emergency.

Damaged or defective materials discovered as a result of the pressure test shall be removed and replaced with new material, and the test shall be repeated until the test results are satisfactory to Engineer.

All replacement, repair or retesting shall be accomplished at no additional cost to the Department. All repairs shall be reviewed and approved by PWC prior to backfill. The use of couplings, fittings, sleeves, etc. shall be reviewed and approved by PWC prior to use. The main must successfully pass the hydrostatic test prior to sterilization.

After disinfection, the water supply shall not be accepted or placed into service until bacteriological tests results or representative water samples analyzed in the Utility Owner's laboratory are found to be satisfactory. The disinfection shall be repeated until tests indicate the absence of pollution for at least two (2) full days. The Utility Owner shall be responsible for taking the sample(s), and transporting them to the laboratory.

Use the procedures for disinfecting of the new installation and the existing main at the cut-in point in accordance with AWWA C651-14, Section 4.11.

Page 15-6, Sub-article 1510-3 Construction Methods
Add the following sentences:

(C) Alignment and Grade

All pipe shall be installed to the required lines and grades. Structures shall be installed at the required locations. The lines and grades of the pipe will generally be indicated by stakes parallel to the line of the pipe. The Contractor shall be responsible for installing the pipe to proper line and grade.

All ductile iron pipe and fittings shall be installed in accordance with ANSI / AWWA C110 / A21.10. All C900 PVC pipe shall be installed in accordance with ASTM D-2321. The PVC pipe shall be installed in a manner that will ensure that external loads will not subsequently cause a decrease of more than five percent (5%) in the vertical cross section dimension (deflection). Whenever it is necessary to deflect pipe, the amount of deflection allowable shall not exceed seventy five percent of the maximum values represented in the AWWA standards and the manufacturer's recommendations.

If alignment requires deflection in excess of the specified limitations or as determined by Utility Owner, bends shall be used. Joint deflection shall not exceed 80% of the limits recommended by the pipe manufacturer.

Pipe passing through walls of NCDOT bridges, retaining walls, and other concrete structures shall be factory restrained push-on joint ductile iron and be installed in casings/sleeves in accordance with NCDOT specifications. Annular space between walls and sleeves shall be filled with an approved cement mortar that meets NCDOT specifications. The annular space between the sleeve and the pipe shall be filled with an approved mastic.

Pipe passing through the walls of meter vaults, valve pits, and storm drainage structures shall be restrained joint ductile iron. Pipe shall be installed in a casing/sleeve if determined to be necessary. Annular space between walls and sleeves shall be filled with an approved cement mortar. Annular space between pipe and sleeves shall be filled with mastic. Proposed conflict boxes with storm and water shall be reviewed by PWC and approved on a case by case basis.

All ductile iron pipe (regardless of diameter) within casings shall be factory restrained, in accordance with these specifications and as indicated on the drawings. The use of mechanical restraints shall not be used on pipe within casings.

All ductile iron pipe (regardless of diameter) used for trenchless installations (i.e., horizontal directional drilling, pipe-bursting, etc.) shall be factory restrained, in accordance with these specifications and the applicable specification section for the trenchless technology. The use of mechanical restraints shall not be used.

When pipe is field cut, the cut end shall be smooth and at right angles to the axis of the pipe. All sharp edges shall be removed. All field cut pipe shall be beveled. The beveled end of PVC pipe shall be removed, when installing into mechanical joint ductile iron fittings.

When connecting unlike (class, material, etc.) pipe, an approved fitting shall be used. All pipe shall be installed in accordance with AWWA C600 for buried lines and the manufacturer's recommendations. For mechanical joint pipe and fittings, all nuts shall be tightened with a suitable (preferable torque-limiting) wrench. The torque for various sizes of bolts shall be in accordance with the manufacturer's instructions.

Concrete thrust blocking shall be used on all PVC water mains. The concrete thrust blocking shall be in accordance with the drawings. When thrust blocking is to be used, backfilling shall not occur until the concrete has time to set. No hydrostatic pressure testing shall occur until the concrete thrust blocking has cured for a minimum of five (5) calendar days.

Page 15-8, Sub-article 1515-2 Materials

Revise valve box type in Line 11 as follows: Remove "screw or". Only slip type valve boxes are permissible.

Page 15-8, Sub-article 1515-2 Materials
Add the following paragraph:

Service saddles for two (2) inch taps on four (4) inch and larger size iron pipe shall be ductile iron with stainless steel double straps, bolts, nuts and washers

Ball valves shall be all bronze construction, with a handle operator. Ball valves shall be manufactured and tested in accordance with AWWA C800. The valve shall be equipped with packing nut, gland, and packing material. Ball valves shall be of an approved type made from approved materials conforming to ASTM specifications. The turn required to travel from fully closed to fully open on a ball valve shall be 90 degrees.

Page 15-8, sub-article 1515-2 Materials:
Replace paragraph beginning "Double check valves…" with the following:

Double Check valves (DCV) and Reduced Pressure Zone principal (RPZ) backflow prevention assemblies shall be on the utility owner's list of approved backflow devices.

Page 15-8, sub-article 1515-2 Materials:
Revise valve box type in Line 11 as follows: Remove "screw or". Only slip type valve boxes are permissible.

Page 15-8, sub-article 1515-2 Materials:
Add the following paragraph:

Use Type K copper tubing for all one (1) inch water services installed or relocated. Use a continuous run, without splices, from the corporation stop to the meter for all water services installed or relocated.

If a two (2) inch meter box is located less than five (5) feet away from the main or as directed by the Utility Owner, the two (2) inch pipe and fittings shall be brass from the tap to the meter. Otherwise, use two (2) inch PVC SDR 21 pipe.

Page 15-8, Sub-article 1515-3 Construction Methods
Add the following to the second paragraph:

Provide four (4) NCDOT concrete block at each valve box section and two (2) inch meter box, in accordance with the standard details. Provide NCDOT concrete brick as a meter base for one (1) inch services, in accordance with the drawings.

Page 15-8, Sub-article 1515-3 (A) Valves
Replace with the following:

Valves in water mains shall be located as shown on plans. Install all valves with an approved valve box set flush with the finished ground or finished pavement elevation. Place a 24-inch diameter 2,500 psi precast concrete ring flush with the finished ground around all valve boxes not in pavement. Place a 24-inch diameter 3,000 psi poured in place concrete collar flush with the finished pavement around all valve boxes in a traffic area.

Stuffing boxes shall be tightened and the valve shall be fully opened and fully closed to ensure that all parts are in working condition. A valve box shall be provided for every valve. Valves and valve boxes shall be installed in accordance with the drawings. The valve box shall be centered and plumb over the operating nut of the valve. It shall not transmit shock or stress to the valve.

All dead ends on new mains shall have a 2" blow-off assembly installed as indicated on the drawings. The blow-off assembly shall be in accordance with the drawings.

All tapping sleeves shall be sterilized and hydrostatically pressure tested prior to the tap being accomplished. Use of air to complete the pressure test is not acceptable. The tapping sleeve shall be tested to 150 psi. Utility Owner shall witness and approve the testing.

Page 15-8, Sub-article 1515-3 (B) Meters
Add the following paragraphs:

Connect or reconnect meter to the customer's plumbing using brass fittings. A composite, H-20 rated meter box shall be used if the meter is to be located in asphalt or concrete pavement or a traffic area. The meter boxes shall be in accordance with the standard details.

Page 15-8, Sub-article 1515-3 (D) Fire Hydrants
Add the following sentences:

Fire hydrants shall be located and installed as shown on the approved drawings. Each fire hydrant shall have a minimum of 42-inches of cover. Fittings between the valve and fire hydrant may be used with prior approval from PWC. The valve shall be located at the main unless otherwise approved by PWC. Each fire hydrant shall be restrained to the pipe with suitable mechanical joint restraint, in accordance with drawings. Concrete thrust blocking shall be placed in accordance with the drawings. The hydrant branch shall not be backfilled until inspected and approved by PWC. Fire hydrants shall be installed in accordance with the drawings.

Page 15-9, Sub-article 1515-3(E) Line Stops:
Add the following paragraph:

Unless otherwise indicated on the Drawings, do not use line stops without the authorization of the Design Engineer and utility owner.

Page 15-10, Sub-article 1515-4 Measurement and Payment
Add the following sentence to Line 2:

Meter box, meter setter, connection of new lateral to meter setter and reconnection of existing plumbing to tailpiece utilizing brass fittings are incidental items.

Page 15-10, Sub-article 1520-2 Materials, Paragraph 5
Add the following sentences:

For force main sewer pipes, the wire shall be "stubbed" into marker posts and air release valve manholes and secured such that a "direct"/conductive metal detector may be used to trace the pipe location. The marker posts shall be green with a "Sewer Force Main" warning decal and have

internal terminals. The marker posts shall use an anchor system for direct bury installations. The identification wire shall be attached to the marker posts as specified herein and as indicated on the drawings. Tracing wire marker posts shall be located no more than 500 feet apart.

When the force main is located in unpaved areas such as easements the marker posts shall be installed along the centerline of the force main. When the force main is located in paved areas the marker posts may be offset from the centerline of the force main in a uniform manner.

Page 15-10, Sub-article 1520-2 Materials
Add the following sentences:

Clay pipe, PE pipe and concrete pipe shall not be used for sewer pipe unless approved in writing by PWC. All sewer pipes shall be Ductile Iron or PVC with ductile iron fittings as specified herein unless otherwise indicated on the drawings.

If the Design Engineer determines that an expansion coupling is required, it shall be installed as indicated on the drawings. The expansion coupling shall not be buried.

All pipe joints within an encasement shall be furnished with manufactured restrained joints, and as indicated on the drawings for encasements.

For subsurface water crossings (i.e., streams, wetlands), restrained joint ductile iron pipe shall be used. No mechanical restraint systems shall be used. The pipe shall be installed in a casing, as indicated on the drawings, unless otherwise specifically approved by PWC.

Transition between ductile iron pipe and HDPE shall be accomplished using mechanical restraints as approved by PWC.

The same material pipe shall be use from manhole to manhole, unless otherwise approved by PWC. If the section of pipe between manholes is 250 feet or less, no transitions will be allowed (either all PVC or all ductile iron). Should the length between manholes exceed 250 feet, only one transition will be allowed. Use of a C900 x SDR 26 adaptor shall be used to accomplish the transition. A transition is defined as the use of one C900 x SDR26 adaptor. No more than one (1) adaptor shall be use in any given manhole to manhole segment.

Page 15-11, Sub-article 1520-3(A)(2) Testing
Replace the second paragraph with the following:

Test all gravity sewer lines for leakage using the air test. Perform visual inspection on all installed gravity sewer lines and the gravity sewer lines repaired or reconnected to existing and or new manholes. Perform line and grade testing and deflection testing on all gravity sewer lines.

Page 15-12, Sub-article 1520-3(A)(2)(c) Air Test
Replace Table 1520-1 with:

AIR TEST TIME			
Pipe Dia (in)	**Minimum time (minutes)**	**Length for Min Time (ft)**	**Time for Longer Length (sec)**
4	**3:46**	**597**	**0.380L**
6	**5:40**	**398**	**0.854L**
8	**7:34**	**298**	**1.520L**
10	**9:26**	**239**	**2.374L**
12	**11:20**	**199**	**3.418L**
15	**14:10**	**159**	**5.342L**
16	**15:06**	**149**	**6.078L**
18	**17:00**	**133**	**7.692L**
21	**19:50**	**114**	**10.470L**
24	**22:40**	**99**	**13.674L**
27	**25:30**	**88**	**17.306L**
30	**28:20**	**80**	**21.366L**
33	**31:10**	**72**	**25.852L**
36	**34:00**	**66**	**30.768L**

Page 15-12, Sub-article 1520-3(A)(2)(d) Visual Inspection:
Replace first sentence with the following:

Visually inspect all installed gravity sewer lines and the gravity sewer lines repaired or reconnected to existing and or new manholes from the inside using approved cameras.

Page 15-12, Add Sub-article 1520-3(A)(2)(g) Hydrostatic Test:
Add Hydrostatic Test provisions for gravity sewers as defined as follows:

All sewers within protected conditions (See this Special Provision 1520-3, Line 7) require hydrostatic testing. The Contractor will furnish all labor and material, including test pumps, plugs, and all other incidentals for making hydrostatic tests. Hydrostatic pressure testing shall be conducted on the completed main, including the laterals.

The duration of the pressure test shall be at least one hour or longer, as directed by the Utility Owner. The hydrostatic pressure shall be 150 psi. Each section of pipe shall be slowly filled with water and the specified test pressure based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Utility Owner. Before applying the specified test pressure, all air shall be expelled from the pipe.

Page 15-12, Sub-article 1520-3 (B) (1) Installation, paragraph 2
Replace with the following:

All sewer force mains shall have automatic air release valves installed at all high points, as indicated on the plans and as specified herein.

Page 15-12, Sub-article 1520-3 (B) (1) Installation
Add the following sentences:

Maintain sewer flow at all times. Use temporary diversions or pumping to maintain flow when connecting proposed sewers to existing sewers. Use engineered temporary pumping systems capable of handling full pipe flow. Use pumping systems with automatic reliable operation or constantly tended manual operation. By-pass pumping assemblies shall be installed in accordance with these Special Provisions.

Page 15-12, Sub-article 1520-3 (B) (1) Installation
Add the following sentences:

(a) Alignment and Grade

All pipe shall be installed to the required lines and grades. Structures shall be installed at the required locations. The lines and grades of the pipe will generally be indicated by stakes parallel to the line of the pipe. The Contractor shall be responsible for installing the pipe to proper line and grade.

Threaded PVC and cemented joints will not be permitted. The ends of push on joints shall be beveled to facilitate assembly. Pipe shall be marked to indicate when the pipe is fully seated and the gasket lubricated to prevent displacement. Care shall be exercised to insure that the gasket remains in proper position in the bell or coupling while marking the joint.

All pipe installations shall be properly restrained, using either thrust blocks or approved restraint systems. The thrust blocking shall be in accordance with the drawings, and as designed by the Design Engineer. The approved restraint system shall be installed in accordance with the manufacturer's instructions.

Page 15-12, Sub-article 1520-3 (B) (2) Testing, paragraph 1
Add the following sentences:

Where any section of a force main is provided with concrete thrust blocking for fittings, the hydrostatic test shall not be made until at least five (5) days after installation of the blocking unless otherwise approved. Utility Owner's representative shall be present for all testing. Coordinate with PWC for disposing of the test water from the system. If blow offs are not available at the high places, taps shall be made to provide blow offs.

Page 15-14, Sub-article 1525-2 Materials, paragraph 3
Add the following sentences:

The frame and cover shall be manufactured by the same manufacturer. All castings shall be in accordance with the drawings. Any defective castings shall be removed and replaced. Camlock ring and covers shall be in accordance with the drawings. Camlock bolt head shall be compatible with Utility Owner's standard tool for turning camlock mechanism. Camlock ring and covers shall be installed as indicated on the drawings, in accordance with drawings.

Page 15-14, Sub-article 1525-2 Materials
Add the following sentences:

All manholes shall be constructed as specified herein and as indicated on the drawings. Installation shall be in accordance with ASTM C-891 and as specified herein.

Existing manhole walls, inverts, and shelves shall be coated with cement mixed with an anti-microbial additive. New manholes that contain a force main discharge shall be cast with an anti-microbial admixture. A color identifier shall be applied to the interior of each concrete piece fabricated with the anti-microbial admixture. Each piece shall also be plainly stenciled with the name of the anti-microbial admixture on the exterior of each piece.

The liquid anti-microbial admixture shall be used in accordance with the manufacturer's recommendations. The amount of the admixture shall be included in the total water content of the concrete or mortar mix design. The admixture shall be added to the concrete or mortar mix water, to ensure even distribution of the admixture throughout the concrete or mortar mix. When properly prepared, the anti-microbial admixture shall render the concrete or mortar uninhabitable for bacterial growth.

Any special linings and coatings that are specified for a manhole and installed at the production facility, in the field, or during repairs, shall be applied in accordance with the applicable special coatings specification and the manufacturer's specifications for that material.

In unpaved areas, cam-lock ring and cover shall be used. Camlock ring and cover shall be installed in accordance with the drawings.

(1) Sewer Manhole Vents

Sewer manhole vent shall be fabricated from three (3) inch Schedule 40 aluminum pipe. Vent shall be threaded into manhole lid. Manhole lid shall be drilled and tapped to accommodate three (3) inch diameter threaded pipe. Minimum height shall be four (4) feet to crest of vent. Vent shall extend to two (2) feet above the 100-year flood elevation where manholes are located in a FEMA flood hazard zone. Vent opening shall be protected with stainless steel screen. Vents shall be placed very 1,000 feet or as directed by PWC.

Page 15-14, Article 1525-3 Construction Methods:
Replace the third paragraph with:

Provide an inside drop assembly on manholes for sewer pipes entering with two and a half (2.5) feet or more vertical drop. Inside drop assemblies shall be used for connections to existing manholes when the drop exceeds two and a half (2.5) feet and the manhole diameter is five (5) feet or larger. Provide a pipe slide where vertical separation between inverts is less than two and a half (2.5) feet.

Page 15-14, Article 1525-3 Construction Methods:
Replace the fourth paragraph with:

In all sewer manholes, provide steps spaced 16 inches on center. Install steps in line with the effluent opening unless otherwise specified.

Page 15-14, Article 1525-3 Construction Methods:
Replace the fifth paragraph with:

The invert channel shall be constructed of brick and mortar, in accordance with the manhole details in the plans. Precast inverts are not allowed. The invert channel shall be smooth and semicircular in shape conforming to the inside of the connecting sewer section. Changes in direction of flow shall be made with a smooth curve as large as a radius as the size of the manhole will permit without a decrease in flow velocity. Changes in size and grade of the channel shall be made gradually and evenly. The invert channel walls shall be constructed to three quarters (3/4) of the height of the crown of the outlet sewer and in such a manner not to obstruct maintenance, inspection or flow in the sewers. The inverts shall have a minimum slope of one (1) percent across the bottom of the manhole. A shelf shall be provided on each side of any manhole invert channel. Inverts in manholes with standing water will not be acceptable. The shelf shall be sloped not less than 1:12 (min) and no more than 2:12 (max). The bottom of the boot for the new sewer main or lateral shall be set one (1) inch above existing shelf unless otherwise indicated.

Page 15-15, Article 1525-3 (B) Construction Methods, Precast Units:
Add the following paragraph:

All exterior manhole riser joints, including the joint at the cone, shall be sealed with an external rubber sleeve. The sleeve shall be made of stretchable, self-shrinking rubber, with a minimum thickness of 30 mils. The back side of each wrap shall be coated with a cross-linked reinforced butyl adhesive. The butyl adhesive shall be a non-hardening sealant, with a minimum thickness of 30 mils.

Page 15-15, Sub-article 1525-3 (C) Fittings and Connections
Add the following sentence:

Pipe connections to a manhole shall be by gasketed flexible watertight connections (boot for small diameter and A Loc for larger diameter pipe) or as approved by PWC.

A watertight, flexible pipe-to-manhole connector shall be used on all pipe to manhole connections, for both new and existing manholes and pipes, unless otherwise specifically authorized in writing by PWC.

Installation of the connector shall be performed using a calibrated installation tool furnished by the connector manufacturer. Installation shall require no re-tightening after the initial installation. Installation shall be done in accordance with the manufacturer's instructions.

The external compression take-up clamps shall be installed in accordance with the manufacturer's instructions.

The Contractor shall use the proper size connector in accordance with the connector manufacturer's recommendations. All dead-end pipe stubs shall be restrained in accordance with ASTM C-923.

Page 15-15, Sub-article 1525-3 (D) Testing
Add the following sentence:

(1) Vacuum Testing Sewer Manholes:

All precast sanitary sewer manholes installed by the Contractor shall be vacuum tested for leakage. This test shall be done in accordance with ASTM C-1244 and in the presence of Utility Owner. Provide all the necessary labor, materials, equipment, testing apparatus, and all other incidentals necessary to complete the vacuum test. All testing equipment used shall be approved for use in vacuum testing manholes.

Each manhole shall be tested after assembly. All lift holes shall be plugged with an approved non-shrink grout. All lines, including laterals, entering the manhole shall be temporarily plugged. Ensure that the pipes and plugs are secure in place to prevent them being drawn into the manhole. The test head shall be placed directly on top of the concrete surface of the manhole following the manufacturer's recommendations, rather than to the cast iron seating ring.

Manholes may be tested either prior to backfill or post backfill at the contractor's option. For pre-backfill testing, a vacuum of 10 inches of Mercury (inches Hg) shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9 inches of Mercury (inches Hg). The manhole is acceptable if the time for the vacuum reading to drop from 10 inches of Mercury to 9 inches of Mercury meets or exceeds the values indicated below:

	Diameter of Manhole		
Manhole Depth	4' Diameter	5' Diameter	6' Diameter
10' or less	25 sec	33 sec	41 sec
11' to 15'	38 sec	49 sec	62 sec
16' to 20'	50 sec	65 sec	81 sec
21' to 25'	62 sec	82 sec	101 sec
25' to 30'	74 sec	98 sec	121 sec

Vacuum testing backfilled manholes is not recommended in the presence of groundwater. Vacuum testing a backfilled manhole that is subjected to hydrostatic pressure may exceed the design limits of the flexible connecters and could lead to failure of the structure, joints, and/or connectors. Where groundwater is present a reduction in the vacuum pressure applied to the manhole will be required. The vacuum shall be reduced by 1 inch of Mercury for every 1 foot of hydrostatic head between 12 feet and 21 feet. A vacuum test should not be performed when the hydrostatic head exceeds 22 feet. See the chart below:

Hydrostatic Head (ft)*	12	13	14	15	16	17	18	19	20	21	22
Vacuum Pressure (in Hg)	10	9	8	7	6	5	4	3	2	1	**

*Hydrostatic head above the critical connector (critical connector is bottom most flexible connector)
**Do not perform vacuum test

If the manhole fails the initial test, the manhole shall be repaired by an approved method until a satisfactory test is obtained. All repair methods shall be approved by PWC prior to being used. Retesting shall be performed until a satisfactory test is accomplished.

Page 15-16, Sub-article 1530-3 (A) Abandoning Pipe
Add the following paragraphs:

Perform kill-outs of existing mains to be abandoned as designated on the Drawings. Kill-outs shall consist of the following requirements:

1. Kill out shall be done a minimum of five (5) feet from any fitting on the existing water main that is to remain in service.
2. Ductile iron pipe stiff knee shall be four (4) inch diameter for mains 12-inches or less. Utilize eight (8) inch ductile iron pipe or larger for mains larger than 12-inches. Minimum length of five (5) feet of stiff knee shall be provided. Stiff knee shall be encased in concrete. Concrete shall cover the abandoned pipe but it shall not come in contact with the active water main or any fittings on the active water main. Place blocks rated as the same compressive strength as the concrete under the stiff knee to provide support during concrete placement.
3. On the active water main side of the stiff knee, provide full body mechanical joint sleeve with restraining gland and restraining plug or cap.
4. On the abandoned water main side, provide minimum one-quarter (¼) inch steel plate or ductile iron cap or plug.
5. Coordinate outages with Utility Owner and other work to minimize number of planned outages.
6. Abandoned pipe shall be grout filled or removed in accordance with Section 1530.

Remove valves, or close valves and remove the top of the valve box to an elevation two (2) feet below the roadway subgrade or finished grade, and backfill.

Page 15-17, Sub-article 1530-4 Measurement and Payment
Add the following sentence to the first paragraph:

Kill out of existing water mains to be abandoned shall be incidental to the other work and will not be measured and paid.

Page 15-18, Sub-article 1540-2 Materials
Add the following paragraphs:

The Contractor may substitute larger size casing pipe (particularly for sewer mains where grade and alignment are critical) with the proper wall thickness. All additional costs shall be included in the cost of the encasement. Furthermore, the Contractor will be responsible for all engineering costs to update the 100-year design service life for the larger encasement at their expense.

The carrier pipe installed for water or force main applications, within the casing pipe shall be CL 50 ductile iron restrained joint pipe. Use of pressure class ductile iron pipe for water mains is acceptable, in accordance with these Special Provisions for Section 1036. Mechanical joint restraint systems are not an acceptable means of restraint within the casing pipe for water mains or force mains.

The material for the gravity sanitary sewer carrier pipe shall be C900 PVC (DR 18) unless noted on the Drawings to be ductile iron. Where ductile iron is called out, gravity sewer pipe shall be CL 50 ductile iron restrained joint pipe. All ductile iron carrier pipes in sewer service shall have the appropriate lining and coating. Use of restraining gaskets (i.e., field-lock gaskets) is an acceptable means of restraint for gravity sewer mains. Use of iron MJ restraint retaining glands are not approved for restraint within casings.

Page 15-20, Sub-article 1550-3 (B) Design
Add the following sentences to the last paragraph:

For boring and tunneling operations, the certified calculations shall include a geotechnical analysis to confirm the selected method will not result in road settlement or upheaval, a road movement monitoring plan and remediation plan should the work result in settlement or upheaval. For drilling operations, appropriate calculations shall be provided to evaluate hydraulic fracturing and to develop a Fraction Mitigation Contingency Plan.

Page 15-20, Sub-article 1550-4 (A) Bore and Jack
Add the following paragraphs for Guided Auger Bore and Jack:

Locate all existing utilities in the proposed location of the jack and bore.

Page 15-21, Sub-article 1550-4 (B), Trenchless Methods:
Add the following paragraph:

At the horizontal directional drill locations and prior to drilling, remove the upper 18 inches of the bearing soil and place a geotextile (Mirafi 140 N or equivalent) over the entire bearing location. Backfill the excavation with clean, washed, NCDOT #57 stone to the bearing level of the working platform. The thickness of the NCDOT #57 stone should not exceed two feet in thickness before

being compacted with a vibratory plate compactor. Have a qualified geotechnical engineer provide written approval of the working platform bearing grades once final locations are selected and prior to starting the advancement of the directional drills.

PROJECT SPECIAL PROVISIONS
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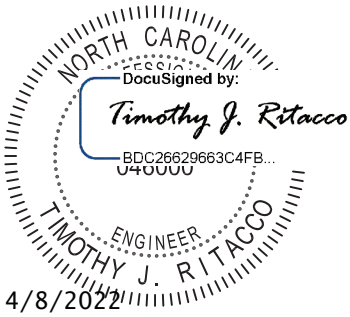

Revise the 2018 Standard Specifications as follows:

Page 10-61, Sub-article 1034-2 Plastic Pipe (A) PVC Gravity Flow Sewer
Replace with the following:

PVC sewer pipe and fittings 4 inches thru 15 inches shall be in accordance with ASTM D-3034 with a standard dimension ratio (SDR) of 26 for sewer mains and laterals. Both pipe and fittings shall be made of PVC plastic having a cell classification of 12454 as specified in ASTM D-1784. Larger diameter pipe (16 inches and larger) shall be in accordance with C900, with a SDR of 18.

Pipe joining shall be push on elastomeric gasket joints only and the joints shall be manufactured and assembled in accordance with ASTM D-3212. Elastomeric seals shall meet the requirements of ASTM F-477. The pipe shall be furnished with integral bells and with gaskets that are permanently installed at the factory and in accordance with ASTM D-3212 and contain a steel reinforcing ring. PVC sewer pipe shall be made by continuous extrusion of prime green unplasticized PVC and contain identification markings as required by the applicable ASTM standard.

The use of restrained joint C900 PVC (DR 18) shall be used for all gravity sewer mains installations (4 inches through 24 inches) within encasements. The restraint system shall provide uniform circumferential contact thereby eliminating any concerns over point loading. It shall be manufactured with compounds meeting a 12454 designation according to ASTM D1784 and shall have Rieber style joints meeting the requirements of ASTM D3139 with gaskets meeting the requirements of ASTM F477 The PVC restrained joint shall utilize a Rieber gasket per ASTM F477 to seal the integral bell socket to the spigot of the next joint (which conforms to the requirements of ASTM D3139). Each male end is beveled to facilitate joint assembly, and the spigot is reference marked to ensure proper insertion depth.

Ductile Iron Push-on Fittings: Ductile iron sewer fittings on PVC mains shall be deep bell, gasketed joint, and air test rated. Gasket groves shall be machined in the factory. Material shall be ductile iron, in accordance with ASTM A536, Grade 65-45-12 and ASTM F1336. Wall thickness shall meet the requirements of AWWA C153. Gaskets shall have a minimum cross

sectional area of 0.20 square inches, and conform to ASTM F477. All ductile iron fittings shall be lined with two (2) coats of ceramic epoxy to produce a total minimum dry film thickness of 40 mils. All ductile iron fittings on PVC pipe shall provide a flow line that provides a smooth transition between the materials.

Mechanical Joint Fittings: Joints shall be installed in accordance with AWWA C-600 and shall conform to AWWA Standard C-111. Mechanical joints shall be of the stuffing box type and shall conform to ANSI A21.11 for four inch (4") pipe and larger. Fittings and specials shall be ductile iron and shall be manufactured in accordance with AWWA Standard C-110 (ANSI A21.11). Compact fittings shall be ductile iron in accordance with ANSI A 21.53 (AWWA C-153) for 4" thru 24" sizes only. Note: mechanical joint wyes are not included in the AWWA C-153 specification. Pressure rating shall be not less than 200 psi unless otherwise specified. All ductile iron fittings shall be lined with two (2) coats of ceramic epoxy to produce a total minimum dry film thickness of 40 mils. Mechanical joint fittings shall be utilized on ductile iron mains and ductile iron laterals. Mechanical joint fittings shall not be utilized on PVC mains, unless otherwise approved by PWC.

PVC Fittings: PVC fittings shall be manufactured in accordance with ASTM D-3034, F-1336, and F-679. Molded fittings shall be use in sizes from 4” to 8” (or larger, if available). Fabricated fittings shall only be use with prior approval from PWC. Fabricated fittings are defined as those fittings that are made from pipe or a combination of pipe and molded components. All PVC fittings shall contain identification markings as required by the applicable ASTM standard. All PVC fittings shall be gasketed joint, except as indicated for interior drop structures. Plastic fittings shall be as manufactured by GPK Products, Inc., Plasti-Trends, the Harrington Corporation (Harco), or approved equal.

Page 10-61, Sub-article 1034-2 Plastic Pipe (B) PVC Force Main Sewer Pipe
Replace with the following:

In order to prevent the sanitary sewer force main from being mistaken for a water main, all force main PVC pipe shall be green in color.

Two (2) inch PVC pipe shall be manufactured using Grade 1 PVC compound material as defined in ASTM D-1784 and shall be SDR21, pressure class 200 in accordance with ASTM D 2241 or SDR-17 with a pressure rating of 250 psi, in accordance with ASTM D-2241. Fittings for two (2) inch PVC shall be solvent welded Schedule 80 PVC. The pipe shall be plainly marked with the manufacturer’s name, size, material (PVC) type and grade or compound, NSF seal, pressure rating and reference to appropriate product standards.

All PVC pipe four (4) inches through 12 inches and couplings shall be manufactured using virgin compounds as defined in ASTM D-1784, with a 4000 psi HDB rating and designated as PVC 1120 to be in strict accordance with AWWA C900. The pipe shall be Class 150 and conform to the thickness requirements of DR18. The pipe and fittings shall be manufactured to withstand 755 psi quick burst pressure tested in accordance with ASTM D-1599 and withstand 500 psi for a minimum of 1,000 hours tested in accordance with ASTM D-1598. Couplings shall be compression, twin gasket type in accordance with ASTM D-3139 for push-on joints and ASTM F-477 for elastomeric seals (gaskets). PVC fittings are not acceptable for mains other than two

(2) inch. The pipe joints shall be of the integral bell type with rubber gaskets conforming to the requirements of ASTM D-3139 or ASTM F-477. Fittings and specials for mains four (4) inches and larger shall be ductile iron, bell end in accordance with AWWA C110, 200-psi pressure rating unless otherwise shown or specified, except that profile of bell may have specials of the same material as the pipe with elastomeric-gaskets, all in conformance with the requirements of AWWA C900. Ductile iron fittings to PVC pipe shall be adequately supported on a firm trench foundation. Fittings shall be for bell and spigot pipe or plain end pipe, or as applicable.

Mechanical restraining systems shall not be used on PVC pipe.

Page 10-61, Sub-article 1034-2 Plastic Pipe (C) Polyethylene (PE) Pipe Force Main Sewer Pipe
Replace with the following:

PE pipe shall not be used for force main sewer pipe unless approved in writing by the utility owner. All sewer pipes shall be PVC or Ductile Iron as specified herein.

(D) High Density Polyethylene (HDPE) Pipe Force Main Sewer Pipe

The diameter and wall thickness of all high-density polyethylene (HDPE) pipe and fittings shall comply with the appropriate ASTM Specification and the class of pipe designated on the Drawings.

Page 10-61, Sub-article 1034-4 Ductile Iron Pipe (A) Gravity Flow Sewer Pipe
Add the following sentences:

All ductile iron pipe and fittings shall be in strict accordance with ANSI A21.51 and AWWA C151, Class 50 or Class 51, as applicable, in every aspect. The working pressure shall be a minimum of 200 psi. Pipe shall be furnished in 18 or 20-foot lengths. All pipe joints used in open trench construction shall be furnished with "push-on" joints, unless otherwise indicated on the drawings or specified. All joints and fittings shall be in accordance with ANSI A21.11 and AWWA C111. All ductile iron interior surfaces shall be lined with two (2) coats of ceramic epoxy to produce a total minimum dry film thickness of 40 mils. The exterior pipe surfaces shall be protected with asphaltic coating as specified in AWWA C151 and C110.

For aerial crossings which are 4 inches through 12 inches in diameter, manufactured restrained joint ductile iron pipe Class 53, or Class 53 flanged ductile iron pipe shall be used in accordance with the detail on the drawings for aerial crossings. For aerial crossings larger than 12 inches, or as noted specifically on the plans, flange joint ductile iron pipe, Class 53, shall be used in accordance with the drawings. The location of flanges shall be specifically designed for each application. The flange pipe shall be in accordance with ANSI / AWWA C115 / A21.15. Threads for threaded flange pipe shall be in accordance with ANSI B2.1, shop fabricated as outlined by AWWA C115 with serrated faces furnished on the pipe, completely factory installed. Welding of flanges to the body of the pipe will not be acceptable. Ductile iron fittings and flanges shall be in accordance with ANSI/AWWA C110/A21.10 with a minimum working pressure of 250 psi. Gaskets shall be full faced SBR rubber with a minimum 1/8” thickness. Linings and coatings shall be as outlined for ductile iron pipe.

Mechanical Joint Fittings: Joints shall be installed in accordance with AWWA C600 and shall conform to AWWA C111. Mechanical joints shall be of the stuffing box type and shall conform to ANSI A21.11 for four inch (4") pipe and larger. Fittings and specials shall be ductile iron. Compact fittings shall be ductile iron in accordance with ANSI A 21.53 (AWWA C153) for 4" thru 24" sizes only. Note: mechanical joint wyes are not included in the AWWA C153 specification. Pressure rating shall be not less than 200 psi unless otherwise specified. All ductile iron fittings shall be lined with two (2) coats of ceramic epoxy to produce a total minimum dry film thickness of 40 mils. Mechanical joint fittings shall be used on ductile iron mains and ductile iron laterals. Mechanical joint fittings shall not be used on PVC mains, unless otherwise approved by PWC.

The interior of pipe and fittings shall be lined with two (2) coats of ceramic epoxy to produce a minimum dry film thickness of 40 mils.

Page 10-61, Sub-article 1034-4 Ductile Iron Pipe (A) Force Main Sewer Pipe
Add the following sentences:

All ductile iron pipe and fittings (six (6) inches and above) shall be in strict accordance with ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51, Class 50, in every respect. Four (4) inch ductile iron pipe shall be Class 51. Joints shall be mechanical joint or push on joint as specified and installed in accordance with AWWA C600 and shall conform to AWWA C111. Mechanical joints shall be of the stuffing box type and shall conform to ANSI A21.11 for four (4) inch pipe through 12-inch pipe. Push on joints, rubber gaskets and lubricant shall conform to ANSI A21.11. Fittings and specials shall be ductile iron and shall be manufactured in accordance with AWWA C110 (ANSI A21.11).

Compact fittings shall be mechanically restrained, ductile iron in accordance with ANSI A 21.53 (AWWA C153) for four (4) inch through 12-inch sizes only. Where thrust blocking is used, fittings shall be full body ductile iron in accordance with ANSI A 21.53 (AWWA C110). Pressure rating shall be not less than 200 psi unless otherwise specified. All ductile iron interior surfaces shall be lined with two (2) coats of ceramic epoxy to produce a total minimum dry film thickness of 40 mils. The exterior pipe surfaces shall be protected with asphaltic coating as specified in AWWA C151 and C110.

For aerial crossings which are four (4) inches through 12 inches in diameter, manufactured restrained joint ductile iron pipe Class 53, or Class 53 flanged ductile iron pipe shall be used in accordance with the detail on the drawings for aerial crossings. Iron mechanical joint restraint retaining glands are not an allowable means of restraint for aerial crossings. For aerial crossings larger than 12 inches, or as noted specifically on the plans, flange joint ductile iron pipe, Class 53, shall be used in accordance with the drawings. The location of flanges shall be specifically designed for each application. The flange pipe shall be in accordance with AWWA C115. Threads for threaded flange pipe shall be in accordance with ANSI B2.1, shop fabricated as outlined by AWWA C115 with serrated faces furnished on the pipe, completely factory installed. Welding of flanges to the body of the pipe will not be acceptable. Ductile iron fittings and flanges shall be in accordance with ANSI/AWWA C110/A21.10 with a minimum working pressure of 250 psi. Gaskets shall be full faced SBR rubber per ANSI/AWWA C111/A21.11 with a minimum 1/8” thickness. Linings and coatings shall be as outlined for ductile iron pipe.

Page 10-61, Sub-article 1034-4 Ductile Iron Pipe (a) Force Main Sewer Pipe
Add the following sentences:

1034-5 Sleeves, Couplings and Miscellaneous

(A) Ductile Iron Pipe Size x SDR26 Transition Adapter

All ductile iron x PVC transition adapters shall be one (1) piece, bell x bell (gasket x gasket). Transition adapters shall range in size from four (4) inches through 12 inches. Transition adapters for pipe larger than 12-inches shall be as specified herein. All transition adapters shall have a flow way tapered to allow a smooth transition between the ductile iron and PVC. Transition adapters shall be either PVC or ductile iron, in accordance with the following:

PVC – All PVC transition fittings shall be made from DR 18 C900 pipe stock. The C900 pipe stock shall meet the requirements of AWWA C900/C905, and have a minimum cell classification of 12454 as defined in ASTM D1784. The wall thickness shall meet or exceed DR 18. PVC transition fittings shall have SBR gaskets in accordance with ASTM F477. All six (6) inch and eight (8) inch adapters shall be molded. Molded fitting joints shall be 235 psi rated, in accordance with ASTM D3139, and shall have SBR rubber gaskets. Four (4) inch, ten (10) inch and 12 inch transition adapters shall have SBR Rieber style gaskets meeting ASTM F477. Joints shall be 235 psi rated, in accordance with ASTM D3139 for the C900 (ductile iron) bell, and in accordance with ASTM D3212 for the sewer (SRD26) bell. Molded C900 bell depths shall comply with AWWA C907. Fabricated (4-inch, 10-inch and 12-inch) bell depths and molded sewer (SDR26) bell depths shall be in accordance with ASTM F1336.

Ductile iron – Ductile iron transition fittings shall be deep bell, push-on joint, and air test rated. The ductile iron material shall comply with ASTM A536, Grade 65-45-12 or 80-55-06. The bell depth shall be in accordance with ASTM F1336. Gaskets shall be of SBR rubber, in accordance with ASTM F477. Transition gaskets are not allowed. All ductile iron transition fittings shall be lined with two (2) coats of ceramic epoxy to produce a total minimum dry film thickness of 40 mils.

(B) Pipe to Manhole Connector (Boot):

The connector assembly shall be the sole element to provide a watertight seal of the pipe to the manhole or other structure. The connector shall consist of a rubber gasket, an internal compression sleeve, and one or more external take-up clamps. The connector shall consist of natural or synthetic rubber and Series 300 non-magnetic stainless steel. No plastic components shall be allowed.

The rubber gasket shall be constructed of synthetic or natural rubber, and shall meet or exceed the requirements of ASTM C923. The connector shall have a minimum tensile strength of 1,600 psi. The minimum cross-sectional thickness shall be 0.275 inches.

The internal expansion sleeve shall be comprised of Series 300 non-magnetic stainless steel. No welds shall be used in its construction.

The external compression take-up clamps shall be Series 300 non-magnetic stainless steel. No welds shall be use in its construction. The clamps shall be installed using a torque-setting wrench furnished by the connector manufacturer.

The finished connection shall provide a sealing to a minimum of 13 psi, and shall accommodate a minimum pipe deflection of seven (7) degrees without the loss of seal.

1034-6 Sewer Line and Fittings

(A) Saddles

Sewer service saddles may be use for sewer lateral installations. All sewer service saddles shall be ductile iron with stainless steel straps, bolts, nuts, and washers. The nuts shall be coated to prevent galling. The saddle body shall be ductile iron, in accordance with ASTM A536, Grade 65-45-12. The gasket material shall be SBR, in accordance with ASTM D2000. Saddles for PVC or DI laterals shall have an alignment flange. All stainless steel straps shall be pre-formed at the factory, to the specified outside diameters of the pipe.

(B) Sewer Laterals

Ductile iron laterals – For ductile iron mains, using mechanical joint fittings or an approved saddle with an alignment flange. For PVC mains, use an approved saddle with an alignment flange or ductile iron fittings as specified above.

PVC laterals – use a saddle with an alignment flange on PVC or ductile iron mains; ues a mechanical joint tee with SDR 35 transition gaskets on ductile iron mains; or use PVC fittings as specified above on PVC mains.

The following table summarizes the materials to be used for sewer main to lateral connections:

	PVC Main	DI Main
DI Lateral	DI fitting or approved saddle	MJ fitting or approved saddle
PVC Lateral	PVC fitting or approved saddle	MJ fitting with transition gasket or approved saddle

Sewer laterals shall be as specified herein and as indicated on the drawings.

Page 10-62, Sub-article 1036-1 General
Add the following sentences:

Unless otherwise designated on Drawings or permitted by PWC, all water mains four (4) inches and larger in diameter shall be ductile iron as specified herein. Two (2) inch water mains shall be PVC conforming to specifications contained herein.

Page 10-62, Sub-article 1036-2 Copper Pipe, second paragraph
Replace paragraph with the following:

For buried service, use copper water pipe and tube conforming to ASTM B88 soft annealed Type K. The minimum pressure rating for the copper water pipe shall be 655 psi. Use cast brass flared or compression type fittings manufactured for use with copper water pipe and conforming to AWWA C800 and local plumbing codes. All brass fittings shall have a 300 psi minimum pressure rating. All services installed in new construction shall be one continuous run of pipe with no splices from the corporation stop to the meter.

Page 10-62, Sub-article 1036-3 (A) (1) Pressure Rated Pipe
Replace with the following:

Pressure rated pipe shall not be used as water pipe.

Page 10-62, Sub-article 1036-3 (A) (2) Pressure Class Pipe
Replace with the following:

Two inch (2”) PVC pipe shall be manufactured using Grade 1 PVC compound material as defined in ASTM D-1784 and shall be SDR-21, pressure class 200 in accordance with ASTM D 2241 or SDR-17 with a pressure rating of 250 psi, in accordance with ASTM D-2241. Fittings for 2” PVC pipe shall be solvent weld Schedule 80 PVC and brass FIP x pack joint for PVC fittings shall be used to transition from PVC to brass. The pipe shall be plainly marked with the manufacturer’s name, size, material (PVC) type and grade or compound, NSF seal, pressure rating and reference to appropriate product standards.

All PVC pipe (4" thru 12" diameter) shall be manufactured using virgin compounds as defined in ASTM D-1784, with a 4000 psi HDB rating and designated as PVC 1120 to be in strict accordance with AWWA C900. The pipe shall be Class 150 and conform to the thickness requirements of DR18. The pipe shall be manufactured to withstand 755 psi quick burst pressure tested in accordance with ASTM D-1599 and withstand 500 psi for a minimum of 1,000 hours tested in accordance with ASTM D-1598. PVC fittings are not acceptable for water mains four inches (4") or greater. The pipe joints shall be of the integral bell type with rubber gaskets and shall conform to the requirements of ASTM D 3139 or ASTM F-477.

Mechanical restraining systems shall not be used on PVC pipe.

Fittings and specials shall be ductile iron, bell end in accordance with AWWA C110, 200 psi pressure rating unless otherwise shown or specified. Ductile iron fittings to PVC pipe shall be adequately supported on a firm trench foundation. Ductile iron fittings and specials shall be cement mortar lined (standard thickness) in accordance with ANSI A21.4 and AWWA C104/ANSI A21.4.

Page 10-62, Sub-article 1036-4 Steel Pipe
Add the following sentence:

Steel pipe shall not be used without prior approval by Utility Owner or as indicated on the drawings.

Page 10-63, Sub-article 1036-5 Ductile Iron Pipe and Fittings
Replace with the following:

(A) Pressure Class Pipe

All ductile iron pipe shall be four inches (4") and larger. All ductile iron pipe shall be designated as "Pressure Class", unless otherwise specified. The pipe furnished shall have a minimum thickness calculated in accordance with ANSI A21.50 / AWWA C150, with a factor of safety of two (2); a working pressure of 200 psi to 350 psi, plus 100 psi water hammer allowance; and AASHTO H-20 live truck load with 2.5 feet of cover. In no case shall "Pressure Class" pipe's nominal thickness be less than the following:

SIZE (In.)	PRESSURE CLASS	NOMINAL THICKNESS (In.)
4	350	0.25
6	350	0.25
8	350	0.25
10	350	0.26
12	350	0.28
16	250	0.30
24	250	0.37

(B) Thickness Class Pipe

For aerial crossings and other specific situations designated herein or where indicated on the drawings, the ductile iron pipe shall be Thickness Class. The minimum thickness class for four (4) inch water mains shall be Class 51. The minimum thickness class for pipe diameters six (6) inches and larger shall be Class 50. All thickness class pipe shall be in accordance with AWWA C151, with a minimum working pressure of 200 psi.

For aerial crossings which are 4" to 12" in diameter, Class 53 manufactured restrained joint or Class 53 flanged ductile iron pipe shall be used in accordance with the standard details. For aerial crossings larger than 12" or as noted specifically on the plans, flange joint ductile iron pipe, Class 53 shall be used in accordance with the drawings. The working pressure shall not be less than 200 psi. Flanges shall be designed for each application specifically. The flange pipe shall be in accordance with AWWA C115. Threads for threaded flange pipe shall be in accordance with ANSI B2.1, shop fabricated as outlined by AWWA C115 with serrated faces furnished on the pipe, completely factory installed. Welding of flanges to the body of the pipe will not be acceptable. Ductile iron fittings and flanges shall be in accordance with AWWA C110 with a minimum working pressure of 250 psi. Gaskets shall be full faced SBR rubber per AWWA C111 with a minimum 1/8" thickness. Linings and coating shall be as previously outlined for all ductile iron pipe and fittings.

(C) Joint Types

Joints shall be mechanical joint, push on joint, or factory restrained joint, unless otherwise indicated, conforming to AWWA C600 and AWWA C111. Mechanical joints shall be of the stuffing box type and shall conform to ANSI A21.11 for 4-inch pipe through 12-inch pipe. Push on joints, rubber gaskets, and lubricant shall conform to ANSI A21.11.

(1) Factory Restrained Joints

Factory restrained joint pipe shall be utilized for all pipe greater than 12-inches in diameter, unless otherwise approved by the Utility Owner. Factory restrained joint pipe shall be furnished for the locations shown on the approved Contract Drawings. The pipe, joints, and gaskets shall be in accordance with applicable ANSI/AWWA Standards. Factory restrained joints shall be rated for a working pressure of 350 psi for sizes up to 12-inches and 250 psi for larger sizes.

All factory restrained joint pipe shall have the restraints internal to the pipe (i.e., “boltless”). All restrained joint ductile iron pipe and fittings larger than 12-inches shall be as manufactured by U.S. Pipe’s TR-Flex, Griffin Pipe Products SNAP-LOK, American Cast Iron Pipe Company's Flex-Ring Joint, or approved equal. The method of restraining the valves to the factory restrained ductile iron pipe shall be reviewed and approved by the Utility Owner on a case by case basis. The valves shall have the same working pressure as the pipe.

(D) Fittings

Fittings and specials shall be ductile iron and shall be manufactured in accordance with AWWA C110 (ANSI A21.11). Compact fittings shall be mechanically restrained, ductile iron in accordance with AWWA C153 (ANSI A21.53) for 4" through 12" sizes only. Where thrust blocking is used, fittings shall be full body ductile iron in accordance with AWWA C110 (ANSI A21.11). Pressure rating shall be not less than 200 psi unless otherwise specified.

Tangential welded on outlets (i.e., bosses) shall only be utilized on pipe 24-inches and larger, as approved by PWC. All bosses shall be factory welded; field fabrication is not allowed. The pipe shall be in accordance with these specifications. Bosses shall be of the size and location indicated on the approved drawings.

(E) Linings and Coatings

All ductile iron pipe and ductile iron-cast iron fittings and specials shall be lined with standard thickness cement mortar lining and asphaltic seal coat in accordance with ANSI A21.4 / AWWA C104. Pipe and fittings shall have an outside asphaltic coating as specified in AWWA C151 and C110, respectively. The coating shall be strongly adherent to the pipe at all temperatures.

(F) Quality Assurance

When requested by PWC, each joint of pipe and each fitting shall be inspected by an independent domestic testing laboratory, approved by PWC, and certification shall be supplied to PWC that all pipe and fittings meet project specifications. In addition, upon request, the Contractor shall furnish to PWC a six inch (6") test section from each lot of water pipe as per AWWA C104 to be used for additional test of the pipe lining by PWC. Satisfactory results of this test must be obtained before acceptance of the pipe.

Page 10-63, Sub-article 1036-6 Fire Hydrant
Replace with the following:

All fire hydrants shall be dry barrel, traffic type and conform to the latest revision of AWWA C502 except as listed below or as otherwise directed by PWC. All working parts shall be bronzed. The size of the fire hydrants (designated by the nominal diameter of the valve opening) shall not be less than four and one-half inches (4 1/2"). All hydrants shall be able to deliver 1,000 gallons per minute with a friction loss of not more than five (5) pounds per square inch total head loss through the hydrant. Hydrants shall be of compression type (opening shall be of such design that when the barrel is broken off the hydrant valve will remain closed and reasonably tight against leakage). All hydrants shall be mechanical joint to accommodate the spigot end of six inch (6") Class 350, AWWA C151, ductile iron pipe. Bosses (6") may be substituted for tees in pipe sizes exceeding 24 inches in diameter. The boss shall be welded to the bottom of the main to provide effective flushing of the system.

All hydrants shall be furnished with two (2) two and one-half inch (2 1/2") nozzles and one (1) four and one-half inch (4 1/2") pumper nozzle. Outlets shall have American National Standard fire hose coupling thread, in accordance with the City of Fayetteville standard, and shall be provided with nozzle caps securely chained to the body of the hydrant. The base of the hydrant shall have two (2) cast lugs suitable for use in strapping the hydrant to the connecting pipe. The operating nut shall be pentagonal in shape, finished with a slight taper to one and one-half inches (1 1/2") from point to flat. All hydrants shall open left or counter-clockwise. Hydrants shall be suitable for working pressure of one hundred and fifty (150) pounds per square inch and test pressure of twice the working pressure. Fire hydrants shall be specific models manufactured by Mueller Company (Model Centurion 200), Clow Corporation (Medallion), American Darling (Model Mark 73-1) or approved equal. The interior of the hydrant shoe shall be coated with a 4 mil thickness FDA approved epoxy coating. Paint hydrants with one coat of primer paint and two coats of an approved paint of the PWC's standard colors, as indicated in the standard detail. Apply the final coat after hydrant installation.

Page 10-63, Sub-article 1036-7 (A) Gate Valves
Replace with the following:

All manually operated valves 4" and larger shall be ductile iron or cast iron body resilient wedge type gate valves conforming to ANSI / AWWA C509 for resilient seat-type valves or to ANNA / AWWA C515 for reduced-wall, resilient seat gate valves. Valve connections shall be as required for the piping in which they are installed and shall conform to ANSI / AWWA C111 / A21.11. Gate valves shall have a design working water pressure of 250 psi.

All valves shall have triple "O" ring stem seals. The design and machining of valves shall be such as to permit the replacement of the upper two (2) "O" rings without undue leakage while the valve is wide open and in service. The wedge shall be ductile iron encapsulated in nitrile rubber (4"-12") sizes and SBR rubber (14"-24") sizes. All internal and external surfaces of the valve body and bonnet shall have a fusion bonded epoxy coating complying with AWWA C550 applied electrostatically prior to assembly, conforming to AWWA C550. Valves shall have a clear waterway equal to the full nominal diameter of the valve. All valves shall be tested for leakage and distortion in strict accordance with the latest revision of AWWA C500.

For buried service, gate valves shall have non-rising stems, 2 inch square operating nuts and shall open by turning counter clockwise. The operating nut shall have an arrow cut in the metal, indicating the direction of opening. Where the valve operating nut is more than 3 feet below the valve box cover, provide an extension stem to bring the operating nut to a point 36 to 42 inches below the surface of the cover. Construct stem of steel using pipe, bar stock, and plates. Field verify required stem length prior to fabrication. Hot dip galvanize completed stem after fabrication.

Gate valves installed in meter vaults shall have a wheel in lieu of a square operating nut and shall also have a non-rising stem. The wheel shall have an arrow cut in the metal indicating the direction of opening. Flanges shall not be buried. An approved pit shall be provided for all flange connections.

All valves shall be manufactured in strict accordance with the latest specifications of ANSI/AWWA standards. Valves shall be manufactured by: Mueller Company, Clow Corporation, or American Darling Company. Certification shall be furnished to PWC by the manufacturer that all valves are in accordance with these specifications.

Where specified on the plans and approved by PWC, resilient valves shall be supplied with gearing. Spur gearing for valves installed in a vertical position and bevel gearing for valves installed in a horizontal position. In cases where valve locations on plans do not designate valve gearing and the proposed depth of water main is not adequate to achieve normal depth above valve bonnet of at least two (2) feet in cover, provide bevel gearing for all large diameter valves (16-inches and larger) upon approval by the Utility Owner.

Page 10-63, Sub-article 1036-7 (B) Bronze Gate Valves
Replace with the following:

Bronze gate valves shall not be used. All valves smaller than 4 inches shall be ball valves.

Page 10-63, Sub-article 1036-7 (C) Tapping Valves
Replace with the following:

Use tapping valves conforming to Subarticle 1036-7(A) with appropriately sized openings, with flanged by mechanical joint ends and pressure rated at 250 psi.

Resilient seated tapping valves shall be furnished with the tapping flange having a raised face or lip designed to engage the corresponding recess in the tapping sleeve flange in accordance with MSS-SP60. Tapping valves without the raised face on the tapping flange are not permitted since they do not assure the proper alignment required to prevent damage by a misaligned shell cutter. The interior of the waterway in the body shall be a full opening and capable of passing a full sized shell cutter equal to the nominal diameter of the valve.

Page 10-63, Sub-article 1036-7 (C) Tapping Valves
Add the following after 1036-7 (C):

(D) Ball Valves

For all valves smaller than four inches (4”), ball valves shall be used. Ball valves shall be installed in accordance with these provisions.

Ball valves shall be all bronze construction, with tee head operator and having a removable disc. Ball valves shall have threaded connections, in accordance with the standard details. Ball valves shall be manufactured and tested in accordance with AWWA/ANSI C800. The valve shall be equipped with packing nut, gland, and packing material. Ball valves shall be of an approved type made from approved materials conforming to ASTM Specifications and shall also meet the approval of the Utility Owner. The turn required to travel from fully closed to fully open on the ball valve shall be 90 degrees.

Page 10-63, Sub-article 1036-8 (A) Tapping Sleeves
Replace with the following:

Water tapping sleeves shall be ductile iron mechanical joint or type 304 stainless steel full gasket and have a minimum working pressure of 150 psi for all tapping of mains up to and including 24” inch diameter with a branch less than or equal to 12" diameter. Branch diameter greater than 12" on 16" diameter pipe and larger shall require full body ductile iron mechanical joint tapping sleeve.

Ductile iron mechanical joint tapping sleeves shall be as manufactured by Clow, M&H, Mueller, American, or an approved equal and shall be furnished with complete joint accessories. The mechanical joint sleeve shall be compatible with type and class of pipe being tapped. The outlet flange shall be class 125 per ANSI B16.1 compatible with approved tapping valves. The sleeve shall have a mechanical joint body with side flange gaskets. Secure side flange gaskets to existing main using restraining glands acceptable to material of existing main. The sleeve shall have a mechanical joint body with side flange gaskets. Secure side flange gaskets to existing main using restraining glands acceptable to material of existing main.

Stainless steel tapping sleeves shall only be used upon authorization of PWC. Stainless steel tapping sleeves shall be furnished with all accessories. The sleeve, lugs, bolts and nuts shall be 18-8 type 304 stainless steel, as provided by the manufacturer. The outlet flange shall be ductile iron or stainless steel. The gasket shall be a grid pattern design and shall provide full circumferential sealing around pipe to be tapped. The sleeve shall include a 3/4 NPT test plug. All welds shall be passivated. The outlet flange shall be class case D per AWWA C207-ANSI 150 lb. drilling compatible with approved tapping sleeves.

The tapping sleeve and valve shall be in accordance with the details on the drawing.

Page 10-63, Sub-article 1036-8 (B) Transition Sleeves and Couplings

Add the following material to this sub-article:

Use mechanical joint full body solid sleeves conforming to MJ fittings of this special provision of 1036-5. Sleeve shall be rated for 250 psi working pressure.

Page 10-64, Sub-article 1036-9 Service Line Valves and Fittings
Replace with the following:

(A) Ball Valves

For all valves smaller than four inches (4”), including corporation stops and curb stops, ball valves shall be used.

Ball valves shall be all bronze construction, with tee head operator and having a removable disc. Ball valves shall have threaded connections, as indicated on the drawings. Ball valves shall be manufactured and tested in accordance with AWWA C800. The valve shall be equipped with packing nut, gland, and packing material. Ball valves shall be of an approved type made from approved materials conforming to ASTM Specifications and shall also meet the approval of PWC. The turn required to travel from fully closed to fully open on the ball valve shall be 90 degrees.

(B) Water Service Saddles

All water service saddles for use on 2-inch PVC shall be 1” brass saddles as manufactured by Ford, McDonald, Mueller or approved equal.

Water service saddles for 1-inch and 2-inch taps on 4-inch, 6-inch, 8-inch, 12-inch and larger size PVC and asbestos-cement (AC) and also 4-inch and larger size iron pipe shall be ductile iron with stainless steel strap(s), bolts, nuts and washers. Ford Models FS 101, FS 202; Romac Models 101S, 202S; Smith-Blair Model 315, 317 or approved equal shall be used. Stainless steel straps must be pre-formed at the factory to the specified outside diameters of the pipe.

Water service saddles with 2-inch outlet shall be double strap.

Water service saddles for pipe sizes 12-inch through 24-inch shall be double strap.

Water service saddles for pipe sizes exceeding 24-inches shall be as specified by the herein and as indicated on the drawings.

(C) Fittings

Use cast brass compression type fittings manufactured for use with copper or PE water pipe, as applicable, and conforming to AWWA C800 and local plumbing codes. All brass fittings shall have a 300 psi minimum pressure rating.

Page 10-64, Sub-article 1036-11 Identification of Plastic or Non-metallic Pipes
Add the following provisions:

For the purpose of identification of plastic or non-metallic pipes during future trenching or location, a continuous "detectable" identification wire shall be installed. The wire shall be a minimum 12-gauge, single strand, coated copper or copper clad steel wire that is suitable for underground use. Splices shall be accomplished utilizing a corrosion proof wire connector. The connectors shall “lock” the wires in place and contain a dielectric sealant to prevent corrosion.

Page 10-64, Sub-article 1036-12 Valves Box
Add the following material specifications for valve box:

Valve boxes shall be "slip-type" made of close-grained, gray cast iron metal painted with a protective asphaltic coating. Construction shall be in three pieces as follows: The lower of base pieces, which shall be flanged at the bottom, the upper part which shall be flanged on the lower end, and of such size as to telescope over the lower part, the upper end being constructed in the form of a socket to receive the cap or cover; and the cover or cap shall have cast on the upper surface, in raised letters, the word "WATER". All valve boxes shall be equal in quality and workmanship to those manufactured by Sigma Corporation (VB-462), Tyler Union (6855 Series), Star Pipe Products (VB-0004), or an approved equal. Valve box shall have a 3/8-inchhole drilled in the upper part 4-inches to 6-inches from the top of the box to accommodate ¼-inch x 1-1/2-inch galvanized bolt for securing tracer wire. The valve box shall be in accordance with the standard details.

Valve box protector rings shall be installed to protect valve boxes located outside pavements (i.e. roadway shoulders). The ring shall be constructed in accordance with the standard details.

Valve Box and Stem Extension for Buried Applications: For all buried valves greater than three (3) to four (4) feet in depth, provide as necessary an extension system to raise 2-inch operating nut to within three (3) feet of the finished grade. Stem diameter according to valve manufacturer's recommendations, but not less than 1-inch. Extension stem shall be provided spacer and stop to reinforce point of applied torque and keep assembly from separating at full extended length.

Page 15-1, Sub-article 1500-2 Cooperation with the Utility Owner, paragraph 2:
add the following sentences:

The Utility Owner is the Fayetteville Public Works Commission (FayPWC). The contact person is Allan J. Riddle, P.E. and can be reached by phone at (910) 223-4785.

(1) Provisions for fire hydrant accessibility

Existing fire hydrants shall be accessible to the Fire Department at all times. Fire hydrants shall not be taken out of service without the utility owner’s written approval. The Fire Department shall be notified of any fire hydrant taken out of service.

If the fire hydrants are in need of replacement, relocation, or connected to a new water main, the Utility Owner, the Design Engineer, and the appropriate Fire Department shall be notified and coordinated with prior to commencing work. Fire hydrants shall not be removed from service without prior approval of the Utility Owner. The existing fire hydrants shall be returned to the Utility Owner. Fire hydrants not in service shall be covered with burlap bag, whether existing or new.

(2) Provisions for construction around utility poles and guy wires

The Contractor will be required to perform construction work around utility poles and guy wires which may be left in place within the construction limits of the project. The Contractor shall contact the owner of the utility to coordinate securing the poles during construction. It may be

necessary for the Contractor to hire an electrical utility contractor to secure poles. All work outlined in this paragraph shall be at no additional cost to the Department and/or Utility Owner.

Page 15-1, Sub-article 1500-3, Utility Locations and Contractor's Responsibility:
Add the following paragraphs:

(1) Mapping of existing water and sewer lateral facilities

Exhibit 2-Table 1 of these Utility Construction Special Provisions shall supplement existing water and sewer lateral facilities on the plans. Unless otherwise directed by the Utility Owner, Table 1 shall supersede any plan discrepancy regarding size, number and/or material.

Add the following paragraphs that designate site layout and staking responsibilities for the proposed water and sewer utility work:

Construction staking will be performed by the Department (NCDOT's Division Office), who will also prepare and furnish construction cut sheets to the Design Engineer, Utility Owner and Contractor. The Contractor shall not install any utilities without a cut sheet. All requests for staking will be made not less than 96 hours in advance. Engineer.

Utilities shall be installed at the locations and elevations indicated on the cut sheets unless otherwise approved by the Utility Owner. Should a conflict arise between the Contract Drawings and the cut sheets, the cut sheets shall take precedence. Contractor shall make the Utility Owner and Design Engineer aware of any conflict between the Contract Drawings and the cut sheets as soon as it is discovered. The Contractor shall verify invert elevations of all water mains, sewer mains, water laterals, sewer laterals, and manholes by instrument.

(2) Repair of any damage to existing water services by Contractor caused damage

The Contractor shall replace the existing water services that are damaged as a result of their operations in accordance with these Special Provisions. Damaged water services shall be replaced from the meter to the existing main utilizing copper tubing and all new fittings. The Contractor shall properly abandon the existing tap, and install a new tap, utilizing a new tapping saddle and corporation in accordance with these Special Provisions.

The Contractor shall be responsible for connecting the new tailpiece to the customer's existing service utilizing brass fittings. The Contractor is responsible for all necessary fittings in order to connect the copper tubing to the existing meter.

The existing meter boxes shall be replaced as part of the renewal of the water services. A composite, H-20 rated meter box shall be used if the meter is to be located in asphalt or concrete. The Contractor shall be responsible for furnishing and installing the meter boxes. All work shall be approved by PWC.

Page 15-1, Sub-article 1500-4, Weekend, Night and Holiday Work
Add the following paragraphs:

During the course of construction, it may be necessary to complete portions of the Work outside of the normal working hours, to accommodate the utility owner's operations, traffic, and/or public convenience. The Department, Contractor, and the utility owner will determine an acceptable schedule required for Work during such hours. The costs for such Work shall be considered incidental to the Project and no additional payment will be made.

Legal holidays observed by the Fayetteville Public Works Commission include New Year's Day, Martin Luther King's Birthday, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving (2 days), and Christmas (2 days).

Page 15-1, Sub-article 1500-5 Relation of Water Mains to Sewers
Add the following paragraph:

Relation of water mains to sewers shall also apply to all sewer lateral crossings (4-inches and 6-inches).

Page 15-1, Sub-article 1500-5-A Crossing Existing or Proposed Utilities
Add the following sub-article:

The Contractor shall conduct their operations so that the following requirements are adhered to:

1. Underground telephone, cable TV, and gas utilities or conduit banks shall be crossed maintaining a minimum of 18-inch separation or clearance.

2. Electrical crossings shall be performed while the conductor is de-energized and at all times in the presence of the utility owner. Electrical crossings shall be in accordance with NESC requirements. Electrical primary conductor crossings shall be as follows:

    a. Crossing over a conductor, maintain a minimum of 12-inches of undisturbed soil encasing the conductor.

Crossing under a conductor shall be accomplished by boring, maintaining 12-inches of undisturbed soil encasing the conductor.

Page 15-2, Sub-article 1500-7 Submittals and Records, first paragraph
Replace "Provide 2 copies to the utility owner" with the following:

Provide 2 paper copies and 1 electronic (portable document format) copy to the utility owner.

Page 15-2, Sub-article 1500-7 Submittals and Records
Add the following sentences:

Do not perform any portion of the utility work requiring submittal and review until the respective submittal has been reviewed by the utility owner.

The Contractor shall provide submittals on the following:

- A sample door hanger, notifying the residents of the project and those times that the resident may not have water service

- Contractor's safety plan, including confined space program
- Identification of the proposed project superintendent and representative authorized to act on behalf of the Contractor.
- Proposed project schedule. The schedule shall include the sequencing and coordination of connections to existing water mains, pipeline inspections, trenchless crossings, temporary water main set up and removal, and final restoration.
- All piping, fittings and structures including that to furnish temporary water during extended service interruptions
- Contractor personnel emergency contact information

Upon completion of the project, prior to the Contractor de-mobilizing and before payment for associated items, the Contractor shall provide the following:

PWC Sewer Work:

- • Manholes located outside of pavement must have a PWC issued marker.
- • All manholes having cam-lock ring and covers shall be locked.
- • Install a PWC issued marker at all valve and air release valves at manholes outside of pavement as directed by PWC.
- • Verify all plugs have been removed.

Water Work:

- • Verify all valves are fully open.
- • Verify all valves are accessible and can be operated.

Page 15-2, Sub-article 1500-8, Locating and Marking:
Add the following requirements:

For identification of plastic water services, the wire shall be buried along the water service lateral from the main to the meter box. The wire shall extend a minimum of 12 inches into the meter boxes.

For identification of plastic or non-metallic pipes, the wire shall be continuously along the pipe. The wire shall be "stubbed" into valve boxes and secured such that a direct/conductive metal detector may be used to trace the pipe location. Bolts shall be used to secure the detectable wire and the attachment location shall be readily available from finished grade without special equipment. The wire shall be installed above all non-metallic pipelines.

Page 15-2, Sub-article 1500-8 Locating and Marking
Add the following requirements:

For identification of plastic water services, the wire shall be buried along the water service lateral from the main to the meter box. The wire shall extend a minimum of 12 inches into the meter boxes.

For identification of plastic or non-metallic pipes, the wire shall be continuously along the pipe. The wire shall be "stubbed" into valve boxes and secured such that a direct/conductive metal detector may be used to trace the pipe location. Bolts shall be used to secure the detectable wire

and the attachment location shall be readily available from finished grade without special equipment. The wire shall be installed above all non-metallic pipelines.

Page 15-2, Sub-article 1500-9 Placing Pipelines into Service
Add the following sentences:

Obtain approval from Utility Owner prior to placing a new water line into service. Use backflow prevention assemblies for temporary connections to isolate new water lines from existing water line. A representative from the Utility Owner shall witness all tests performed on their water and sewer facilities.

Page 15-2, Sub-article 1500-9 Placing Pipelines into Service
Add the following sentences:

Prior to final inspection, all sanitary sewer laterals, mains, and manholes newly installed on the collection system shall be flushed and cleaned. Prior to beginning the flushing operation, the downstream manhole invert out pipe shall be plugged with a watertight plug to protect the existing sewer main. All water and debris shall be removed and properly disposed of by the Contractor. This condition shall be maintained until PWC issues final acceptance for the project.

Page 15-2, Sub-article 1500-9 Placing Pipelines into Service
Add the following sentences:

Coordination of temporary interruptions to water and/or sewer services shall be the responsibility of the Contractor. The Contractor shall schedule a coordination meeting with the Department, Design Engineer, Utility Owner's Project Coordinator, and Utility Owner a minimum of three (3) business days prior to any planned service interruption and prior to any notices being issued. The purpose of this coordination meeting is to ensure that the Contractor has a good understanding of the requirements related to the proposed outage, verify that there are no utility conflicts, discuss any necessary contingency plans, and all equipment, materials, tools, and all other incidentals necessary to complete the work are on the project site in good working order. Should, for any reason, the Department and/or Utility Owner deem that the Contractor is not prepared for the proposed outage, the outage notifications will not be distributed and the outage shall be postponed a minimum of two (2) weeks. The Department will provide written notification to the Contractor of this decision. No additional contract time will be granted for this delay.

The duration of the service interruption shall be coordinated with Utility Owner, the Department, and the Design Engineer. Service interruptions to residents shall be limited to no more than eight (8) hours at any given time. If the service interruption is anticipated to exceed eight (8) hours, temporary service shall be provided. The Contractor shall provide all the necessary equipment and materials for temporary service. The notifications shall describe the work to be undertaken and approximate dates of the work. The text of the notifications shall be approved by the Department and Utility Owner in advance. The Contractor shall furnish a copy of the notification to the Utility Owner Project Coordinator each time such notification is issued to the residents.

Whenever the property owner's use of the water and/or sanitary sewer must be interrupted by the Work, the Contractor shall notify the residents a minimum of 48 hours prior to service interruption.

This notification shall be accomplished with door hanger notification cards placed at the addresses of the affected residents. Property owners shall be informed when service interruption takes place and the expected duration. The Contractor shall make every effort to minimize inconvenience to the public and property owners.

The Contractor shall complete the required work and restore water service within the given time period for the outage. Utility Owner reserves the right to cancel or postpone the outage at any time, for any reason.

Page 15-2, Sub-article 1500-9 Placing Pipelines into Service
Add the following sentences:

(1) Provisions for furnishing pressurized, temporary water service:

Provide and maintain pressurized, temporary water supply to all services connected to water mains that must be depressurized and/or interrupted for any reason related to the Work including cut in construction and ties in. The only exception to this requirement is the performance of emergency repair and if the planned interruption of service is expected to last less than eight (8) consecutive hours. Provide temporary water supply if the interruption extends past eight (8) consecutive hours.

Maintain and operate temporary water supply until completion of required disinfection and flushing procedures and, receipt of confirmation of acceptable bacteriological test results for the section of water main that was interrupted or as otherwise directed by the utility owner.

The Contractor shall submit a detailed temporary water layout plan to the utility owner prior to the planned outage. The Contractor will be responsible for furnishing, installing, maintaining and removing all temporary water lines during the course of the work. All costs associated this item shall be incidental for the work that is needed for.

The temporary lines shall be leak free and installed in a neat and orderly fashion. The Contractor shall be responsible for protection of the temporary line and shall provide the personnel necessary to immediately respond to all water line breaks, leaks, and outages associated with the project. A 24-hour “hotline” shall be established for the utility owner to call when a problem arises with the temporary water system. Any leaks on the temporary water service lines shall be repaired immediately. The Contractor shall also take all necessary precautions to protect the temporary water system from freezing and shall include freezing protection procedures in the temporary water layout plan.

The Contractor shall connect the temporary water system directly to the customer’s meter, utilizing all appropriate fittings. This may necessitate the meter being placed outside of the meter box. During weather that may result in the meter and/or temporary service lines freezing, the Contractor shall take all reasonable precautions (i.e., covering the meter with dirt) to prevent the meter and/or temporary bypass lines from freezing.

Fire protection must be maintained at all times during construction. Temporary fire hydrants must meet the approval of the applicable Fire Department, prior to their use.

Prior to installing any temporary service lines, the Contractor shall verify the need for such lines, especially on streets with multiple water mains. Any costs incurred by installing temporary water lines that are not needed shall be at the Contractor's expense.

Backflow prevention measures will be required when the temporary water system is serving any commercial businesses. Backflow prevention measures will not be necessary when the temporary water system is only serving residential homes. Where backflow prevention is required, a reduced pressure device shall be utilized in accordance with Utility Owner standards and the Utility Owner's Cross-Connection Control Ordinance. The Contractor shall call Utility Owner's Environmental System Protection Department (910-223-4699) for additional information and requirements.

Restrained joint PVC piping will be allowed if properly placed so as to prevent its damage by traffic. All temporary service pipe crossing streets and/or commercial driveways must cross in a fashion that will not create a traffic hazard. Boring or punching may be required when crossing streets with high traffic volume or higher speeds. Temporary piping crossing sidewalks or wheel chair access ramps must be ramped or buried. Any temporary water lines crossing a driveway shall be covered with a rubber ramp or bituminous cold patch provided by the Contractor. When temporary paving is used to ramp temporary services lines, it must be compacted by a roller or compaction device to minimize tracking. The Contractor is to maintain ramps and patches to ensure access by public. Piping must be buried when so directed by the Department and/or the utility owner. All temporary water piping connected to fire hydrants shall be constructed in such a manner that if necessary, can be easily removed so the fire hydrant can be used for firefighting purposes with minimal effort. All such connections to the fire hydrants must be compatible with applicable Fire Department requirements for each fire hydrant outlet used. Where fire hydrants cannot be used or are not available, the Contractor shall make below ground taps for bypass connections.

Direct connections to the existing water system will not be allowed until chlorination is complete and each section of temporary line, including service lines, has passed bacteriological and turbidity testing. All dead-end temporary services lines shall be equipped with a temporary blow-off.

Temporary service lines longer than 750 linear feet must have a supply at each end. Temporary service lines must have a main line shut off valve at least every 500 feet. Fire protection must be maintained at all times during construction.

Upon activation of the newly relocated or installed pipe, the Contractor shall remove all temporary service lines and shall leave all streets, sidewalks, and adjacent properties in a condition of equal or better than original. Prior to installing the meter and connecting the customer to the new main, the existing service line shall be thoroughly flushed to remove any deposits collected during the work.

The pipe, hoses, and other materials which are to be furnished by the Contractor for use as temporary service pipe shall be clean, water tight and fully adequate to withstand the existing pressure and all other conditions of use and shall be approved by the utility owner. Care shall be exercised throughout the installation of all temporary pipe and service fittings to avoid any possible contaminations of any mains or services.

All piping utilized in the temporary water system shall be NSF Standard 61 certified for use in potable water applications or FDA CFR 177.2600 approved, for use in contact with food articles, if such use is approved by NCDEQ. The Contractor may utilize PVC pipe only if the pipe is equipped with restrained joints.

Testing and Disinfection

The Contractor shall coordinate and fully cooperate with the Utility Owner when scheduling testing. The Contractor shall provide a minimum of two (2) business days' notice when scheduling testing with the Utility Owner. All testing shall be in accordance with these special provisions.

All temporary water piping, newly lined mains, and newly installed mains shall be flushed and disinfected prior to placing into service. For water samples on Utility Owner's owned water mains, the Utility Owner's Project Coordinator shall take the appropriate sample(s) to the Utility Owner's lab for analysis. Upon successful completion of the disinfection process, the water lines can be placed into service. Disinfection shall be in accordance with these Special Provisions. All water samples from Utility Owner's owned mains shall be taken to the Utility Owner Lab by the Utility Owner's Project Coordinator.

The Contractor shall provide all equipment, materials, personnel, traffic control and all means necessary to perform all testing and inspection at no additional cost to the Department. If the same line segment fails the required testing more than two (2) times, Utility Owner will charge a fee of $100.00 per test, beginning with the third attempt, until a passing test achieved.

All environmental regulations governing the release and/or disposal of chlorinated testing water shall be met by the Contractor. AWWA C655 defines "highly chlorinated" water as water having more than four (4) ppm. Any water with a chlorine level greater than four (4) ppm shall be de-chlorinated by the Contractor prior to being released to the environment.

The Contractor will be required to flush and remove the chlorine from the main 24 hours after initial chlorination. The cost of main disinfection and disposal of the chlorinated water shall be included in the appropriate measurement and payment item.

Page 15-4, Sub-article 1505-3 (C) Bedding
Add the following sentence:

Sewer and water main bedding shall also conform to the requirements of the details on the drawings for sewer bedding and water main bedding.

Page 15-4, Sub-article 1505-3 (C) Bedding
Add the following sentences:

(1) Gravity Flow Sewer Pipe

The bottom of the trench shall be excavated to a minimum of four inches (4") below the outside bottom of the pipe being installed to allow adequate placement and compaction of bedding material prior to installation.

Select bedding material shall be placed a minimum of four inches (4") and a maximum of six inches (6") under the pipe for full width of the trench and halfway up the pipe on the sides. Bedding material shall be placed in layers not exceeding six inches (6") loose thickness for compacting by vibratory mechanical tamps under the haunches and concurrently on each side of the pipe for the full width of the trench. The final result shall be "Class B" bedding for rigid pipe. If the existing material under the pipe bedding material is unsuitable, the unsuitable material shall be removed and replaced with select bedding material (No. 57 or No. 5 stone), as authorized and approved by PWC.

Page 15-4, Sub-article 1505-3 (D) Pipe Laying
Add the following sentences:

All pipes and fittings shall be lowered into the trench in such a manner to prevent damage to the protective coatings and linings. Under no circumstances shall pipe materials be dropped or dumped into the trench. Pipe shall be carried into position and not dragged.

All dust, dirt, oil, tar (other than standard coating), or other foreign matter shall be cleaned from the jointing surfaces, and the gasket, bell, and spigot shall be lubricated with lubricant recommended by the manufacturer.

All pipe shall be installed in accordance with the approved plans and cut sheets, unless otherwise directed by PWC.

For water pipe and sewer force main pipes sizes up to 12-inches, mechanical equipment shall not be used to assemble the pipe. For water pipe and sewer force main pipes sizes over 12-inches, mechanical equipment may be used, in accordance with the pipe manufacturer's instructions. Any damage resulting from the use of mechanical equipment shall be replaced as directed by and at no additional cost.

Gravity flow sewer pipe shall be laid upgrade, beginning at the lower end with the tongue or spigot ends pointing in the direction of the flow to the correct line and grade, unless otherwise approved by PWC. The sewer pipe section to be installed shall be aligned by batter board or laser beam with the last installed pipe section. Mechanical equipment should not be used to assemble the pipe. Pipe shall be assembled in accordance with the pipe manufacturer's instructions. Any damage resulting from the use of mechanical equipment shall be replaced as directed by and at no additional cost to the Department.

Adjustments in grade by exerting force on the barrel of the pipe with excavating equipment will not be allowed. The Contractor shall verify line and grade after assembling each joint.

No pipe shall be laid in water or where in PWC's opinion trench conditions are unsuitable. Every precaution shall be taken to prevent material from entering the pipe while it is being installed.

Page 15-4, Sub-article 1505-3 (D) Pipe Laying
Add the following sentences:

(1) Pipe Laying Schedule and Marking Diagram

Provide a laying schedule and marking diagram for all mains 16-inches and larger and for all mains that have factory restrained joints or flanged joints.

Laying schedule shall indicate by consecutive number the order and direction of installation of each pipe section or segment, length of restraint, special fitting, valves, tees, temporary taps or flushing points, and other appurtenances. In addition, the laying schedule shall include:

A. The station and elevation to which the bell end of each pipe shall be laid and all changes in gradient or horizontal alignment.
B. All elements of curves and bends, both in horizontal and vertical alignment.
C. Length of restraint

Do not start production of pipe and fittings prior to review by the Utility Owner.

Provide final approved lay schedule on a CD-ROM in portable document format (*.PDF).

Page 15-4, Sub-article 1505-3 (E) Thrust Restraint paragraph 3
Replace with the following:

At locations where restrained joints are shown on the plans, use ductile iron pipe and fittings with push-on factory restrained joints. The pipe, joints, and gaskets shall be in accordance with ANSI/AWWA Standards as previously specified for ductile iron pipe in Sub-article 1036-5.. Restrained joints, fittings and valves shall be rated for a working pressure of 350 psi for sizes 4" through 24" and 250 psi for larger sizes. All factory restrained joint pipe, valves, and fittings shall have the restraints internal to the pipe (i.e., “boltless”). The use of mechanical restraints are not allowed, unless otherwise specifically directed in writing by PWC. All valves, pipe, and fittings shall be compatible with the factory restraint system. All push-on factory restrained joint ductile iron pipe and fittings shall be as manufactured by U.S. Pipe’s TR-Flex, Griffin Pipe Products SNAP-LOK, American Cast Iron Pipe Company's Flex-Ring Joint, or approved equal.

Special accessories such as mechanical joint retainer glands or field locking gaskets are acceptable on pipe 12-inch and less in diameter, upon approval from PWC. Use concrete reaction blocking and thrust collars only where joint restraint is impractical and with the approval of PWC.

Page 15-5, Sub-article 1505-5 Concrete Encasement of Utility Lines
Replace the paragraph with the following:

Water and/or sewer utility lines are not to be encased in concrete unless approved in writing by the utility owner.

Page 15-5, Sub-article 1510-2 Materials, Paragraph 5
Add the following sentences:

Clay pipe, PE pipe, steel pipe and concrete pipe shall not be used for water pipe unless approved in writing by PWC. All water pipes shall be Ductile Iron or PVC with ductile iron fittings as specified herein unless otherwise indicated on the drawings.

Splices shall be accomplished using a corrosion proof wire connector. The connectors shall "lock" the wires in place and contain a dielectric sealant to prevent corrosion. The attachment location shall be readily available from finished grade without special equipment.

For the purpose of identification of plastic water services during trenching, a continuous "detectable" identification wire shall be installed. The wire shall be a minimum 12-gauge, single strand, coated copper or copper clad steel wire that is suitable for underground use. The wire shall be buried along the water service lateral form the main to the meter box. The wire shall extend a minimum of 12-inches into the meter boxes.

Page 15-6, Sub-article 1510-3 (A) General

In the sixth paragraph, replace the words "36" to 42" of cover" with "a minimum of 42" of cover:"

Page 15-6, Sub-article 1510-3 (A) General
Add the following sentences:

When thrust blocking is to be used, backfilling shall not occur until the concrete has time to set. No hydrostatic pressure testing shall occur until the concrete thrust blocking has cured for a minimum of five (5) calendar days.

Add the following construction methods for service interruptions and cut ins:

1. Coordinate all service interruptions with Utility Owner and submit a shut down or service interruption work plan for review and approval by the Utility Owner a minimum of 30 calendar days prior to service interruption. Service interruption shall address all facets of the planned outage and how the Contractor will adhere to service interruption policies and critical items defined herein. The Utility Owner will schedule a test shut down to ensure existing valves are in proper working order. Where existing valves are determined to be non-functional or unable to isolate the work area, a field directive will be issued to insert a valve, or cut in a valve, if other existing valves will not accommodate a service interruption that does not disrupt significant number of customers. A cut in valve installation shall follow these same measures.
2. Perform customer notification adhering to customer notification procedures as contained in these Special Provisions.
3. Provide sufficient construction staff or crews, certified site superintendent present, pumps of sufficient size to quickly dewater and ensure all equipment is present and functional.
4. Provide sufficient lighting for night operations.
5. Provide dual purpose sleeves, retainers glands, fittings, etc. to complete the tie in expediently.
6. Perform the following tasks in advance of the shutdown:
   A. Evaluate vertical depth of existing main and any conflicting utilities.
   B. Provide detailed layout plan with dimensions and fittings as part of the shutdown plan.
   C. Complete excavation to pipe.
   D. Preassemble fittings above ground when possible.

E. Place crushed rock in excavation to provide footing and minimize contamination.
F. Verify notification of customers has been completed.
G. Perform the following tasks after shutdown:
    a. Relieve pressure off existing main through use of existing hydrants or blow-offs which are within the isolated part of the system
    b. Cut pipe on bottom and sides in manner to dewater pipe quickly and to avoid water spray
    c. Use cut out section for measurement when possible
    d. Disinfect fittings and pipe with chlorine solution adhering to Cut in Construction requirements of AWWA C651-14, Section 4.11

Page 15-6, Sub-article 1510-3 (B) Testing and Sterilization
Replace the sixth paragraph (beginning at line 39) with the following:

Sterilize water lines in accordance with Section 1003 of The Rules Governing Public Water supply and AWWA C651 Section 4.4.3, the Continuous Feed Method. Provide a chlorine solution with between 50 parts per million and 100 parts per million in the initial feed. Solid sterilization agent is not allowed. In no case shall the chlorine level exceed 300 ppm. If the chlorine level is over 300 ppm, the system shall be completely flushed and re-chlorinated. The chlorine solution must remain in contact with all interior surfaces for 24 hours. If the chlorine level drops below 10 parts per million during a 24-hour period, then flush, refill with fresh chlorine solution, and repeat for 24 hours. Once the 24-hour period has passed with the chlorine level at least 10 ppm, thoroughly flush the system until the chlorine solution is reduced to same level as existing connected water main. Coordinate flushing and operation of the valves with the Utility Owner. Provide certified bacteriological and contaminant test results from a state-approved or state-certified laboratory. The Utility Owner has its own laboratory for conducting bacteriological and contaminant testing on Utility Owned water mains. All samples from Utility -owned water mains shall be taken to the Utility Owner's laboratory by the Utility Owner's Project Coordinator. Operate all valves and controls to assure thorough sterilization. During the flushing period, open and close each fire hydrant several times to flush the hydrant. Provide all chlorinating equipment, sterilization solution, taps, corporation stops, and blow offs necessary to complete testing and sterilization. If any disruption to the disinfection process occurs, or if any repair procedure is necessary then the disinfection process shall start over.

Take all necessary measures to prevent downstream erosion caused by flushing the lines. All erosion/damages shall be repaired at no additional expense to the Utility Owner. All environmental regulations governing the release and/or disposal of chlorinated testing water shall be met by the Contractor. AWWA C655 defines "highly chlorinated" water as water having more than four (4) ppm. Any water with a chlorine level greater than four (4) ppm shall be de-chlorinated by the Contractor prior to being released to the environment.

Each valved section shall be tested individually. Where any section of a water line is installed with concrete thrust blocking for fittings or hydrants, the hydrostatic test shall not be made until at least five (5) days after installation of the blocking.

Each valved section of pipe shall be slowly filled with water and to the specified test pressure based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to PWC. Before applying the specified test pressure, all air shall be expelled from the pipe. If hydrants or blow offs are not available at the high places, taps shall be made to provide blow offs at no additional cost to the Department.

Any taps which are not to be used in the final build out (i.e. testing and/or blow off taps) shall be killed out at the main. If these taps are converted to irrigation taps they must be installed according to the drawings and be witnessed by Utility Owner. Utility Owner shall be present and observe all valve operation by the Contractor. Under no circumstances shall a Contractor tamper with any valves not installed by him unless it is an emergency.

Damaged or defective materials discovered as a result of the pressure test shall be removed and replaced with new material, and the test shall be repeated until the test results are satisfactory to Engineer.

All replacement, repair or retesting shall be accomplished at no additional cost to the Department. All repairs shall be reviewed and approved by PWC prior to backfill. The use of couplings, fittings, sleeves, etc. shall be reviewed and approved by PWC prior to use. The main must successfully pass the hydrostatic test prior to sterilization.

After disinfection, the water supply shall not be accepted or placed into service until bacteriological tests results or representative water samples analyzed in the Utility Owner's laboratory are found to be satisfactory. The disinfection shall be repeated until tests indicate the absence of pollution for at least two (2) full days. The Utility Owner shall be responsible for taking the sample(s), and transporting them to the laboratory.

Use the procedures for disinfecting of the new installation and the existing main at the cut-in point in accordance with AWWA C651-14, Section 4.11.

Page 15-6, Sub-article 1510-3 Construction Methods
Add the following sentences:

(C) Alignment and Grade

All pipe shall be installed to the required lines and grades. Structures shall be installed at the required locations. The lines and grades of the pipe will generally be indicated by stakes parallel to the line of the pipe. The Contractor shall be responsible for installing the pipe to proper line and grade.

All ductile iron pipe and fittings shall be installed in accordance with ANSI / AWWA C110 / A21.10. All C900 PVC pipe shall be installed in accordance with ASTM D-2321. The PVC pipe shall be installed in a manner that will ensure that external loads will not subsequently cause a decrease of more than five percent (5%) in the vertical cross section dimension (deflection). Whenever it is necessary to deflect pipe, the amount of deflection allowable shall not exceed seventy five percent of the maximum values represented in the AWWA standards and the manufacturer's recommendations.

If alignment requires deflection in excess of the specified limitations or as determined by Utility Owner, bends shall be used. Joint deflection shall not exceed 80% of the limits recommended by the pipe manufacturer.

Pipe passing through walls of NCDOT bridges, retaining walls, and other concrete structures shall be factory restrained push-on joint ductile iron and be installed in casings/sleeves in accordance with NCDOT specifications. Annular space between walls and sleeves shall be filled with an approved cement mortar that meets NCDOT specifications. The annular space between the sleeve and the pipe shall be filled with an approved mastic.

Pipe passing through the walls of meter vaults, valve pits, and storm drainage structures shall be restrained joint ductile iron. Pipe shall be installed in a casing/sleeve if determined to be necessary. Annular space between walls and sleeves shall be filled with an approved cement mortar. Annular space between pipe and sleeves shall be filled with mastic. Proposed conflict boxes with storm and water shall be reviewed by PWC and approved on a case by case basis.

All ductile iron pipe (regardless of diameter) within casings shall be factory restrained, in accordance with these specifications and as indicated on the drawings. The use of mechanical restraints shall not be used on pipe within casings.

All ductile iron pipe (regardless of diameter) used for trenchless installations (i.e., horizontal directional drilling, pipe-bursting, etc.) shall be factory restrained, in accordance with these specifications and the applicable specification section for the trenchless technology. The use of mechanical restraints shall not be used.

When pipe is field cut, the cut end shall be smooth and at right angles to the axis of the pipe. All sharp edges shall be removed. All field cut pipe shall be beveled. The beveled end of PVC pipe shall be removed, when installing into mechanical joint ductile iron fittings.

When connecting unlike (class, material, etc.) pipe, an approved fitting shall be used. All pipe shall be installed in accordance with AWWA C600 for buried lines and the manufacturer's recommendations. For mechanical joint pipe and fittings, all nuts shall be tightened with a suitable (preferable torque-limiting) wrench. The torque for various sizes of bolts shall be in accordance with the manufacturer's instructions.

Concrete thrust blocking shall be used on all PVC water mains. The concrete thrust blocking shall be in accordance with the drawings. When thrust blocking is to be used, backfilling shall not occur until the concrete has time to set. No hydrostatic pressure testing shall occur until the concrete thrust blocking has cured for a minimum of five (5) calendar days.

Page 15-8, Sub-article 1515-2 Materials

Revise valve box type in Line 11 as follows: Remove "screw or". Only slip type valve boxes are permissible.

Page 15-8, Sub-article 1515-2 Materials
Add the following paragraph:

Service saddles for two (2) inch taps on four (4) inch and larger size iron pipe shall be ductile iron with stainless steel double straps, bolts, nuts and washers

Ball valves shall be all bronze construction, with a handle operator. Ball valves shall be manufactured and tested in accordance with AWWA C800. The valve shall be equipped with packing nut, gland, and packing material. Ball valves shall be of an approved type made from approved materials conforming to ASTM specifications. The turn required to travel from fully closed to fully open on a ball valve shall be 90 degrees.

Page 15-8, sub-article 1515-2 Materials:
Replace paragraph beginning "Double check valves…" with the following:

Double Check valves (DCV) and Reduced Pressure Zone principal (RPZ) backflow prevention assemblies shall be on the utility owner's list of approved backflow devices.

Page 15-8, sub-article 1515-2 Materials:
Revise valve box type in Line 11 as follows: Remove "screw or". Only slip type valve boxes are permissible.

Page 15-8, sub-article 1515-2 Materials:
Add the following paragraph:

Use Type K copper tubing for all one (1) inch water services installed or relocated. Use a continuous run, without splices, from the corporation stop to the meter for all water services installed or relocated.

If a two (2) inch meter box is located less than five (5) feet away from the main or as directed by the Utility Owner, the two (2) inch pipe and fittings shall be brass from the tap to the meter. Otherwise, use two (2) inch PVC SDR 21 pipe.

Page 15-8, Sub-article 1515-3 Construction Methods
Add the following to the second paragraph:

Provide four (4) NCDOT concrete block at each valve box section and two (2) inch meter box, in accordance with the standard details. Provide NCDOT concrete brick as a meter base for one (1) inch services, in accordance with the drawings.

Page 15-8, Sub-article 1515-3 (A) Valves
Replace with the following:

Valves in water mains shall be located as shown on plans. Install all valves with an approved valve box set flush with the finished ground or finished pavement elevation. Place a 24-inch diameter 2,500 psi precast concrete ring flush with the finished ground around all valve boxes not in pavement. Place a 24-inch diameter 3,000 psi poured in place concrete collar flush with the finished pavement around all valve boxes in a traffic area.

Stuffing boxes shall be tightened and the valve shall be fully opened and fully closed to ensure that all parts are in working condition. A valve box shall be provided for every valve. Valves and valve boxes shall be installed in accordance with the drawings. The valve box shall be centered and plumb over the operating nut of the valve. It shall not transmit shock or stress to the valve.

All dead ends on new mains shall have a 2" blow-off assembly installed as indicated on the drawings. The blow-off assembly shall be in accordance with the drawings.

All tapping sleeves shall be sterilized and hydrostatically pressure tested prior to the tap being accomplished. Use of air to complete the pressure test is not acceptable. The tapping sleeve shall be tested to 150 psi. Utility Owner shall witness and approve the testing.

Page 15-8, Sub-article 1515-3 (B) Meters
Add the following paragraphs:

Connect or reconnect meter to the customer's plumbing using brass fittings. A composite, H-20 rated meter box shall be used if the meter is to be located in asphalt or concrete pavement or a traffic area. The meter boxes shall be in accordance with the standard details.

Page 15-8, Sub-article 1515-3 (D) Fire Hydrants
Add the following sentences:

Fire hydrants shall be located and installed as shown on the approved drawings. Each fire hydrant shall have a minimum of 42-inches of cover. Fittings between the valve and fire hydrant may be used with prior approval from PWC. The valve shall be located at the main unless otherwise approved by PWC. Each fire hydrant shall be restrained to the pipe with suitable mechanical joint restraint, in accordance with drawings. Concrete thrust blocking shall be placed in accordance with the drawings. The hydrant branch shall not be backfilled until inspected and approved by PWC. Fire hydrants shall be installed in accordance with the drawings.

Page 15-9, Sub-article 1515-3(E) Line Stops:
Add the following paragraph:

Unless otherwise indicated on the Drawings, do not use line stops without the authorization of the Design Engineer and utility owner.

Page 15-10, Sub-article 1515-4 Measurement and Payment
Add the following sentence to Line 2:

Meter box, meter setter, connection of new lateral to meter setter and reconnection of existing plumbing to tailpiece utilizing brass fittings are incidental items.

Page 15-10, Sub-article 1520-2 Materials, Paragraph 5
Add the following sentences:

For force main sewer pipes, the wire shall be "stubbed" into marker posts and air release valve manholes and secured such that a "direct"/conductive metal detector may be used to trace the pipe location. The marker posts shall be green with a "Sewer Force Main" warning decal and have

internal terminals. The marker posts shall use an anchor system for direct bury installations. The identification wire shall be attached to the marker posts as specified herein and as indicated on the drawings. Tracing wire marker posts shall be located no more than 500 feet apart.

When the force main is located in unpaved areas such as easements the marker posts shall be installed along the centerline of the force main. When the force main is located in paved areas the marker posts may be offset from the centerline of the force main in a uniform manner.

Page 15-10, Sub-article 1520-2 Materials
Add the following sentences:

Clay pipe, PE pipe and concrete pipe shall not be used for sewer pipe unless approved in writing by PWC. All sewer pipes shall be Ductile Iron or PVC with ductile iron fittings as specified herein unless otherwise indicated on the drawings.

If the Design Engineer determines that an expansion coupling is required, it shall be installed as indicated on the drawings. The expansion coupling shall not be buried.

All pipe joints within an encasement shall be furnished with manufactured restrained joints, and as indicated on the drawings for encasements.

For subsurface water crossings (i.e., streams, wetlands), restrained joint ductile iron pipe shall be used. No mechanical restraint systems shall be used. The pipe shall be installed in a casing, as indicated on the drawings, unless otherwise specifically approved by PWC.

Transition between ductile iron pipe and HDPE shall be accomplished using mechanical restraints as approved by PWC.

The same material pipe shall be use from manhole to manhole, unless otherwise approved by PWC. If the section of pipe between manholes is 250 feet or less, no transitions will be allowed (either all PVC or all ductile iron). Should the length between manholes exceed 250 feet, only one transition will be allowed. Use of a C900 x SDR 26 adaptor shall be used to accomplish the transition. A transition is defined as the use of one C900 x SDR26 adaptor. No more than one (1) adaptor shall be use in any given manhole to manhole segment.

Page 15-11, Sub-article 1520-3(A)(2) Testing
Replace the second paragraph with the following:

Test all gravity sewer lines for leakage using the air test. Perform visual inspection on all installed gravity sewer lines and the gravity sewer lines repaired or reconnected to existing and or new manholes. Perform line and grade testing and deflection testing on all gravity sewer lines.

Page 15-12, Sub-article 1520-3(A)(2)(c) Air Test
Replace Table 1520-1 with:

AIR TEST TIME			
Pipe Dia (in)	**Minimum time (minutes)**	**Length for Min Time (ft)**	**Time for Longer Length (sec)**
4	**3:46**	**597**	**0.380L**
6	**5:40**	**398**	**0.854L**
8	**7:34**	**298**	**1.520L**
10	**9:26**	**239**	**2.374L**
12	**11:20**	**199**	**3.418L**
15	**14:10**	**159**	**5.342L**
16	**15:06**	**149**	**6.078L**
18	**17:00**	**133**	**7.692L**
21	**19:50**	**114**	**10.470L**
24	**22:40**	**99**	**13.674L**
27	**25:30**	**88**	**17.306L**
30	**28:20**	**80**	**21.366L**
33	**31:10**	**72**	**25.852L**
36	**34:00**	**66**	**30.768L**

Page 15-12, Sub-article 1520-3(A)(2)(d) Visual Inspection:
Replace first sentence with the following:

Visually inspect all installed gravity sewer lines and the gravity sewer lines repaired or reconnected to existing and or new manholes from the inside using approved cameras.

Page 15-12, Add Sub-article 1520-3(A)(2)(g) Hydrostatic Test:
Add Hydrostatic Test provisions for gravity sewers as defined as follows:

All sewers within protected conditions (See this Special Provision 1520-3, Line 7) require hydrostatic testing. The Contractor will furnish all labor and material, including test pumps, plugs, and all other incidentals for making hydrostatic tests. Hydrostatic pressure testing shall be conducted on the completed main, including the laterals.

The duration of the pressure test shall be at least one hour or longer, as directed by the Utility Owner. The hydrostatic pressure shall be 150 psi. Each section of pipe shall be slowly filled with water and the specified test pressure based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Utility Owner. Before applying the specified test pressure, all air shall be expelled from the pipe.

Page 15-12, Sub-article 1520-3 (B) (1) Installation, paragraph 2
Replace with the following:

All sewer force mains shall have automatic air release valves installed at all high points, as indicated on the plans and as specified herein.

Page 15-12, Sub-article 1520-3 (B) (1) Installation
Add the following sentences:

Maintain sewer flow at all times. Use temporary diversions or pumping to maintain flow when connecting proposed sewers to existing sewers. Use engineered temporary pumping systems capable of handling full pipe flow. Use pumping systems with automatic reliable operation or constantly tended manual operation. By-pass pumping assemblies shall be installed in accordance with these Special Provisions.

Page 15-12, Sub-article 1520-3 (B) (1) Installation
Add the following sentences:

(a) Alignment and Grade

All pipe shall be installed to the required lines and grades. Structures shall be installed at the required locations. The lines and grades of the pipe will generally be indicated by stakes parallel to the line of the pipe. The Contractor shall be responsible for installing the pipe to proper line and grade.

Threaded PVC and cemented joints will not be permitted. The ends of push on joints shall be beveled to facilitate assembly. Pipe shall be marked to indicate when the pipe is fully seated and the gasket lubricated to prevent displacement. Care shall be exercised to insure that the gasket remains in proper position in the bell or coupling while marking the joint.

All pipe installations shall be properly restrained, using either thrust blocks or approved restraint systems. The thrust blocking shall be in accordance with the drawings, and as designed by the Design Engineer. The approved restraint system shall be installed in accordance with the manufacturer's instructions.

Page 15-12, Sub-article 1520-3 (B) (2) Testing, paragraph 1
Add the following sentences:

Where any section of a force main is provided with concrete thrust blocking for fittings, the hydrostatic test shall not be made until at least five (5) days after installation of the blocking unless otherwise approved. Utility Owner's representative shall be present for all testing. Coordinate with PWC for disposing of the test water from the system. If blow offs are not available at the high places, taps shall be made to provide blow offs.

Page 15-14, Sub-article 1525-2 Materials, paragraph 3
Add the following sentences:

The frame and cover shall be manufactured by the same manufacturer. All castings shall be in accordance with the drawings. Any defective castings shall be removed and replaced. Camlock ring and covers shall be in accordance with the drawings. Camlock bolt head shall be compatible with Utility Owner's standard tool for turning camlock mechanism. Camlock ring and covers shall be installed as indicated on the drawings, in accordance with drawings.

Page 15-14, Sub-article 1525-2 Materials
Add the following sentences:

All manholes shall be constructed as specified herein and as indicated on the drawings. Installation shall be in accordance with ASTM C-891 and as specified herein.

Existing manhole walls, inverts, and shelves shall be coated with cement mixed with an anti-microbial additive. New manholes that contain a force main discharge shall be cast with an anti-microbial admixture. A color identifier shall be applied to the interior of each concrete piece fabricated with the anti-microbial admixture. Each piece shall also be plainly stenciled with the name of the anti-microbial admixture on the exterior of each piece.

The liquid anti-microbial admixture shall be used in accordance with the manufacturer's recommendations. The amount of the admixture shall be included in the total water content of the concrete or mortar mix design. The admixture shall be added to the concrete or mortar mix water, to ensure even distribution of the admixture throughout the concrete or mortar mix. When properly prepared, the anti-microbial admixture shall render the concrete or mortar uninhabitable for bacterial growth.

Any special linings and coatings that are specified for a manhole and installed at the production facility, in the field, or during repairs, shall be applied in accordance with the applicable special coatings specification and the manufacturer's specifications for that material.

In unpaved areas, cam-lock ring and cover shall be used. Camlock ring and cover shall be installed in accordance with the drawings.

(1) Sewer Manhole Vents

Sewer manhole vent shall be fabricated from three (3) inch Schedule 40 aluminum pipe. Vent shall be threaded into manhole lid. Manhole lid shall be drilled and tapped to accommodate three (3) inch diameter threaded pipe. Minimum height shall be four (4) feet to crest of vent. Vent shall extend to two (2) feet above the 100-year flood elevation where manholes are located in a FEMA flood hazard zone. Vent opening shall be protected with stainless steel screen. Vents shall be placed very 1,000 feet or as directed by PWC.

Page 15-14, Article 1525-3 Construction Methods:
Replace the third paragraph with:

Provide an inside drop assembly on manholes for sewer pipes entering with two and a half (2.5) feet or more vertical drop. Inside drop assemblies shall be used for connections to existing manholes when the drop exceeds two and a half (2.5) feet and the manhole diameter is five (5) feet or larger. Provide a pipe slide where vertical separation between inverts is less than two and a half (2.5) feet.

Page 15-14, Article 1525-3 Construction Methods:
Replace the fourth paragraph with:

In all sewer manholes, provide steps spaced 16 inches on center. Install steps in line with the effluent opening unless otherwise specified.

Page 15-14, Article 1525-3 Construction Methods:
Replace the fifth paragraph with:

The invert channel shall be constructed of brick and mortar, in accordance with the manhole details in the plans. Precast inverts are not allowed. The invert channel shall be smooth and semicircular in shape conforming to the inside of the connecting sewer section. Changes in direction of flow shall be made with a smooth curve as large as a radius as the size of the manhole will permit without a decrease in flow velocity. Changes in size and grade of the channel shall be made gradually and evenly. The invert channel walls shall be constructed to three quarters (3/4) of the height of the crown of the outlet sewer and in such a manner not to obstruct maintenance, inspection or flow in the sewers. The inverts shall have a minimum slope of one (1) percent across the bottom of the manhole. A shelf shall be provided on each side of any manhole invert channel. Inverts in manholes with standing water will not be acceptable. The shelf shall be sloped not less than 1:12 (min) and no more than 2:12 (max). The bottom of the boot for the new sewer main or lateral shall be set one (1) inch above existing shelf unless otherwise indicated.

Page 15-15, Article 1525-3 (B) Construction Methods, Precast Units:
Add the following paragraph:

All exterior manhole riser joints, including the joint at the cone, shall be sealed with an external rubber sleeve. The sleeve shall be made of stretchable, self-shrinking rubber, with a minimum thickness of 30 mils. The back side of each wrap shall be coated with a cross-linked reinforced butyl adhesive. The butyl adhesive shall be a non-hardening sealant, with a minimum thickness of 30 mils.

Page 15-15, Sub-article 1525-3 (C) Fittings and Connections
Add the following sentence:

Pipe connections to a manhole shall be by gasketed flexible watertight connections (boot for small diameter and A Loc for larger diameter pipe) or as approved by PWC.

A watertight, flexible pipe-to-manhole connector shall be used on all pipe to manhole connections, for both new and existing manholes and pipes, unless otherwise specifically authorized in writing by PWC.

Installation of the connector shall be performed using a calibrated installation tool furnished by the connector manufacturer. Installation shall require no re-tightening after the initial installation. Installation shall be done in accordance with the manufacturer's instructions.

The external compression take-up clamps shall be installed in accordance with the manufacturer's instructions.

The Contractor shall use the proper size connector in accordance with the connector manufacturer's recommendations. All dead-end pipe stubs shall be restrained in accordance with ASTM C-923.

Page 15-15, Sub-article 1525-3 (D) Testing
Add the following sentence:

(1) Vacuum Testing Sewer Manholes:

All precast sanitary sewer manholes installed by the Contractor shall be vacuum tested for leakage. This test shall be done in accordance with ASTM C-1244 and in the presence of Utility Owner. Provide all the necessary labor, materials, equipment, testing apparatus, and all other incidentals necessary to complete the vacuum test. All testing equipment used shall be approved for use in vacuum testing manholes.

Each manhole shall be tested after assembly. All lift holes shall be plugged with an approved non-shrink grout. All lines, including laterals, entering the manhole shall be temporarily plugged. Ensure that the pipes and plugs are secure in place to prevent them being drawn into the manhole. The test head shall be placed directly on top of the concrete surface of the manhole following the manufacturer's recommendations, rather than to the cast iron seating ring.

Manholes may be tested either prior to backfill or post backfill at the contractor's option. For pre-backfill testing, a vacuum of 10 inches of Mercury (inches Hg) shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9 inches of Mercury (inches Hg). The manhole is acceptable if the time for the vacuum reading to drop from 10 inches of Mercury to 9 inches of Mercury meets or exceeds the values indicated below:

	Diameter of Manhole		
Manhole Depth	4' Diameter	5' Diameter	6' Diameter
10' or less	25 sec	33 sec	41 sec
11' to 15'	38 sec	49 sec	62 sec
16' to 20'	50 sec	65 sec	81 sec
21' to 25'	62 sec	82 sec	101 sec
25' to 30'	74 sec	98 sec	121 sec

Vacuum testing backfilled manholes is not recommended in the presence of groundwater. Vacuum testing a backfilled manhole that is subjected to hydrostatic pressure may exceed the design limits of the flexible connecters and could lead to failure of the structure, joints, and/or connectors. Where groundwater is present a reduction in the vacuum pressure applied to the manhole will be required. The vacuum shall be reduced by 1 inch of Mercury for every 1 foot of hydrostatic head between 12 feet and 21 feet. A vacuum test should not be performed when the hydrostatic head exceeds 22 feet. See the chart below:

Hydrostatic Head (ft)*	12	13	14	15	16	17	18	19	20	21	22
Vacuum Pressure (in Hg)	10	9	8	7	6	5	4	3	2	1	**

*Hydrostatic head above the critical connector (critical connector is bottom most flexible connector)
**Do not perform vacuum test

If the manhole fails the initial test, the manhole shall be repaired by an approved method until a satisfactory test is obtained. All repair methods shall be approved by PWC prior to being used. Retesting shall be performed until a satisfactory test is accomplished.

Page 15-16, Sub-article 1530-3 (A) Abandoning Pipe
Add the following paragraphs:

Perform kill-outs of existing mains to be abandoned as designated on the Drawings. Kill-outs shall consist of the following requirements:

1. Kill out shall be done a minimum of five (5) feet from any fitting on the existing water main that is to remain in service.
2. Ductile iron pipe stiff knee shall be four (4) inch diameter for mains 12-inches or less. Utilize eight (8) inch ductile iron pipe or larger for mains larger than 12-inches. Minimum length of five (5) feet of stiff knee shall be provided. Stiff knee shall be encased in concrete. Concrete shall cover the abandoned pipe but it shall not come in contact with the active water main or any fittings on the active water main. Place blocks rated as the same compressive strength as the concrete under the stiff knee to provide support during concrete placement.
3. On the active water main side of the stiff knee, provide full body mechanical joint sleeve with restraining gland and restraining plug or cap.
4. On the abandoned water main side, provide minimum one-quarter (¼) inch steel plate or ductile iron cap or plug.
5. Coordinate outages with Utility Owner and other work to minimize number of planned outages.
6. Abandoned pipe shall be grout filled or removed in accordance with Section 1530.

Remove valves, or close valves and remove the top of the valve box to an elevation two (2) feet below the roadway subgrade or finished grade, and backfill.

Page 15-17, Sub-article 1530-4 Measurement and Payment
Add the following sentence to the first paragraph:

Kill out of existing water mains to be abandoned shall be incidental to the other work and will not be measured and paid.

Page 15-18, Sub-article 1540-2 Materials
Add the following paragraphs:

The Contractor may substitute larger size casing pipe (particularly for sewer mains where grade and alignment are critical) with the proper wall thickness. All additional costs shall be included in the cost of the encasement. Furthermore, the Contractor will be responsible for all engineering costs to update the 100-year design service life for the larger encasement at their expense.

The carrier pipe installed for water or force main applications, within the casing pipe shall be CL 50 ductile iron restrained joint pipe. Use of pressure class ductile iron pipe for water mains is acceptable, in accordance with these Special Provisions for Section 1036. Mechanical joint restraint systems are not an acceptable means of restraint within the casing pipe for water mains or force mains.

The material for the gravity sanitary sewer carrier pipe shall be C900 PVC (DR 18) unless noted on the Drawings to be ductile iron. Where ductile iron is called out, gravity sewer pipe shall be CL 50 ductile iron restrained joint pipe. All ductile iron carrier pipes in sewer service shall have the appropriate lining and coating. Use of restraining gaskets (i.e., field-lock gaskets) is an acceptable means of restraint for gravity sewer mains. Use of iron MJ restraint retaining glands are not approved for restraint within casings.

Page 15-20, Sub-article 1550-3 (B) Design
Add the following sentences to the last paragraph:

For boring and tunneling operations, the certified calculations shall include a geotechnical analysis to confirm the selected method will not result in road settlement or upheaval, a road movement monitoring plan and remediation plan should the work result in settlement or upheaval. For drilling operations, appropriate calculations shall be provided to evaluate hydraulic fracturing and to develop a Fraction Mitigation Contingency Plan.

Page 15-20, Sub-article 1550-4 (A) Bore and Jack
Add the following paragraphs for Guided Auger Bore and Jack:

Locate all existing utilities in the proposed location of the jack and bore.

Page 15-21, Sub-article 1550-4 (B), Trenchless Methods:
Add the following paragraph:

At the horizontal directional drill locations and prior to drilling, remove the upper 18 inches of the bearing soil and place a geotextile (Mirafi 140 N or equivalent) over the entire bearing location. Backfill the excavation with clean, washed, NCDOT #57 stone to the bearing level of the working platform. The thickness of the NCDOT #57 stone should not exceed two feet in thickness before

being compacted with a vibratory plate compactor. Have a qualified geotechnical engineer provide written approval of the working platform bearing grades once final locations are selected and prior to starting the advancement of the directional drills.

PROJECT SPECIAL PROVISIONS
Utilities by Others

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General:

A) Lumbee River EMC (Power Distribution)
B) CenturyLink (Communication)
C) Spectrum (Communication)
D) Piedmont Natural Gas (Gas Transmission)
E) Piedmont Natural Gas (Gas Distribution)
F) Aqua NC (Water)
G) AT&T Long-Haul (Communications)

The conflicting facilities of these concerns will be adjusted prior to the date of availability, unless otherwise noted and are therefore listed in these special provisions for the benefit of the Contractor. All utility work listed herein will be done by the utility owner. All utilities are shown on the plans from the best available information.

The Contractor's attention is directed to Article 105.8 of the Standard Specifications.

Utilities Requiring Adjustment:
Utility relocations are shown on the Utilities by Others Plans. The utilities will phase their relocations by area. Completion dates for each utility in each area are given in the Utilities Relocation Phasing section of these Special Provisions.

A) Lumbee River EMC (Power Distribution)

Contact person for Lumbee River EMC: Ken Rowell, 910-843-7953
ken.rowell@lumbeeriver.com

B) CenturyLink (Communication)

Contact person for CenturyLink: Kevin Godwin, 910-366-2142
Kevin.godwin@centurylink.com

C) Spectrum (Communication)

Contact person for Spectrum: Robbie Bullard, 910-308-5660
robert.bullard@twcable.com

PROJECT SPECIAL PROVISIONS
Utilities by Others

D) Piedmont Natural Gas (Gas Transmission)

Contact person for Piedmont Natural Gas: Tommy Mallard, 704-516-8295
tmallard@maserconsulting.com

E) Piedmont Natural Gas (Gas Distribution)

Contact person for Piedmont Natural Gas: Jimmy Bowen, 704-960-3685
jimmy.bowen@duke-energy.com

F) Aqua NC (Water)

Contact person for Aqua NC: Pankil Patel, 919-851-8077
ppatel@wetherilleng.com

G) AT&T Long-Haul (Communications)

Contact person for AT&T Long-Haul (Comms): Homer Marona, 910- 638-1798
hmarona@embarqmail.com

Utilities Relocation Phasing:

Utility relocations will be constructed in the following areas:

Area 1:
-Y13DET- and -Y-13- (Camden Road) LT & RT from STA 12+00 to 79+00
Includes all tie-ins to the U-2519AB

Area 2:
-Y16-, -Y16DET-, and -Y15DET- (Stoney Point Road)
-Y16- LT & RT from STA 08+00 to 40+00
-Y16DET- LT&RT from STA 10+00 to 40+00
-Y15DET- LT&RT from STA 10+00 to 12+00

Area 3:
-Y16B- (Braddy Road) RT STA 10+00 to 16+00 & from STA +00 to 34+50
-Y16C- (Grimes Road) RT STA 10+00 to 15+00

Area 4:
-Y14DET- and -Y-14- (King Road) LT & RT STA 5+00 to 34+82.88
-Y14B- LT STA 10+00 to 12+50

Relocations in each area will proceed as outlined in the following sections:

PROJECT SPECIAL PROVISIONS
Utilities by Others

Area 1 Schedule:
-Y13DET- and -Y-13- (Camden Road) LT & RT from STA 12+00 to 79+00
Includes all tie-ins to the U-2519AB

A) Lumbee River EMC (Power Distribution)

LREMC's relocation work will be completed by Let date.

B) CenturyLink (Communication)

CenturyLink's relocation work will be completed by August 12, 2022.

C) Spectrum (Communication)

Spectrum's relocation work will be completed by the date of availability.

D) Piedmont Natural Gas (Gas Transmission)

PNG's relocation work will be completed by the date of availability.

E) Piedmont Natural Gas (Gas Distribution)

PNG's relocation work will be completed by August 12, 2022.

F) Aqua NC (Water)

Aqua's relocations will be completed by September 30, 2022.

G) AT&T Long-Haul (Communications)

AT&T's relocation work will be completed by the date of availability.

Area 2 Schedule:
-Y16-, -Y16DET-, and -Y15DET- (Stoney Point Road)
-Y16- LT & RT from STA 08+00 to 40+00
-Y16DET- LT&RT from STA 10+00 to 40+00
-Y15DET- LT&RT from STA 10+00 to 12+00

A) Lumbee River EMC (Power Distribution)

LREMC's relocation work will be completed by September 5, 2022.

PROJECT SPECIAL PROVISIONS
Utilities by Others

B) CenturyLink (Communication)

CenturyLink's relocation work will be completed by August 5, 2022.

C) Spectrum (Communication)

Spectrum will begin relocations on August 22, 2022.
Spectrum's relocation work will be completed by October 3, 2022.

D) Piedmont Natural Gas (Gas Transmission)

PNG's relocation work will be completed by date of availability.

E) Piedmont Natural Gas (Gas Distribution)

PNG will begin relocations October 3. 2022.
PNG's relocation work will be completed by December 9, 2022.

Area 3 Schedule:
-Y16B- (Braddy Road) RT STA 10+00 to 16+00 & from STA +00 to 34+50
-Y16C- (Grimes Road) RT STA 10+00 to 15+00

A) Lumbee River EMC (Power Distribution)

LREMC's relocation work will be completed by the date of availability.

B) CenturyLink (Communication)

CenturyLink will begin relocations on August 5, 2022.
CenturyLink's relocation work will be completed by August 17, 2022.

C) Spectrum (Communication)

Spectrum will begin relocations Auust. 29, 2022
Spectrum's relocation work will be completed by October 3, 2022.

D) Piedmont Natural Gas (Gas Distribution)

PNG will begin relocations on September 6, 2022
PNG's relocation work will be completed by September 30, 2022.

PROJECT SPECIAL PROVISIONS
Utilities by Others

Area 4 Schedule:
-Y14DET- and -Y-14- (King Road) LT & RT STA 5+00 to 34+82.88
-Y14B- LT STA 10+00 to 12+50

A) Lumbee River EMC (Power Distribution)

LREMC's relocation work will be completed by the date of availability.

B) CenturyLink (Communication)

CenturyLink will begin relocations on August 17, 2022.
CenturyLink's relocation work will be completed by September 14, 2022.

C) Spectrum (Communication)

Spectrum's relocation work will be completed by Aug 26, 2022.

D) Piedmont Natural Gas (Gas Transmission)

PNG will begin relocations on September 1, 2022
PNG's relocation work will be completed by November 30, 2022.

PROJECT SPECIAL PROVISIONS
Utilities by Others

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General:

A) Lumbee River EMC (Power Distribution)
B) CenturyLink (Communication)
C) Spectrum (Communication)
D) Piedmont Natural Gas (Gas Distribution)
E) Aqua NC (Water)

The conflicting facilities of these concerns will be adjusted prior to the date of availability, unless otherwise noted and are therefore listed in these special provisions for the benefit of the Contractor. All utility work listed herein will be done by the utility owner. All utilities are shown on the plans from the best available information.

The Contractor's attention is directed to Article 105.8 of the Standard Specifications.

Utilities Requiring Adjustment:

Utility relocations are shown on the Utilities by Others Plans. The utilities will phase their relocations by area. Completion dates for each utility in each area are given in the Utilities Relocation Phasing section of these Special Provisions.

A) Lumbee River EMC (Power Distribution)

Contact person for Lumbee River EMC: Ken Rowell, 910-843-7953
ken.rowell@lumbeeriver.com

B) CenturyLink (Communication)

Contact person for CenturyLink: Kevin Godwin, 910-366-2142
Kevin.godwin@centurylink.com

C) Spectrum (Communication)

Contact person for Spectrum: Robbie Bullard, 910-308-5660
robert.bullard@twcable.com

PROJECT SPECIAL PROVISIONS
Utilities by Others

D) Piedmont Natural Gas (Gas Distribution)

Contact person for Piedmont Natural Gas: Jimmy Bowen, 704-960-3685
jimmy.bowen@duke-energy.com

E) Aqua NC (Water)

Contact person for Aqua NC: Pankil Patel, 919-851-8077
ppatel@wetherilleng.com

Utilities Relocation Phasing:

Utility relocations will be constructed in the following areas:

Area 1:
-Y16- (Stoney Point Road) LT & RT from STA 32+00 to 69+00

Area 2:
-Y17- (Barefoot Road) LT & RT from STA 10+00 to 20+00
-Y17A- (Barefoot Road) LT & RT from STA 17+00 to 23+00

Area 3:
-Y18- (Strickland Bridge Road) LT & RT from STA. 14+00 to 35+50
-Y17- (New Location) LT & RT from STA 70+00 to 87+00
-DR1- (New Location) RT from STA 10+00 to 18+50
-Y17RPC- (New Location) from STA 28+00 to 35+00

Area 4:
-Y19- (Century Circle Road) LT & RT from STA. 36+71.95 to 14+00
-Y17- (Century Circle Road) LT & RT from STA. 82+00 to 106+00
-Y18- (Strickland Bridge Road) LT & RT from STA 44+00 to 52+00

Relocations in each area will proceed as outlined in the following sections.

Area 1 Schedule:
-Y16- (Stoney Point Road) LT & RT from STA 32+00 to 69+00

A) Lumbee River EMC (Power Distribution)

LREMC's relocation work will be completed by Let.

PROJECT SPECIAL PROVISIONS
Utilities by Others

B) CenturyLink (Communication)

CenturyLink's relocation work will be completed by the date of availability.

C) Spectrum (Communication)

Spectrum's relocation work will be completed by Let.

D) Piedmont Natural Gas (Gas Distribution)

PNG will begin relocations on October 3, 2022
PNG's relocation work will be completed by December 9, 2022.

Area 2 Schedule:
-Y17- (Barefoot Road) LT & RT from STA 10+00 to 20+00
-Y17A- (Barefoot Road) LT & RT from STA 17+00 to 23+00

A) Lumbee River EMC (Power Distribution)

LREMC's relocation work is complete.

B) CenturyLink (Communication)

CenturyLink's relocation work will be completed by August 3, 2022.

C) Spectrum (Communication)

Spectrum's relocation work will be completed by Let

Area 3 Schedule:
-Y18- (Strickland Bridge Road) LT & RT from STA. 14+00 to 35+50
-Y17- (New Location) LT & RT from STA 70+00 to 87+00
-DR1- (New Location) RT from STA 10+00 to 18+50
-Y17RPC- (New Location) from STA 28+00 to 35+00

A) Lumbee River EMC (Power Distribution)

LREMC's relocation work will be completed by Let.

B) CenturyLink (Communication)

CenturyLink will begin relocations on August 3, 2022.
CenturyLink's relocation work will be completed by August 24, 2022.

PROJECT SPECIAL PROVISIONS
Utilities by Others

C) Spectrum (Communication)

Spectrum's relocation work will be completed by the date of availability.

Area 4 Schedule:
-Y19- (Century Circle Road) LT & RT from STA. 36+71.95 to 14+00
-Y17- (Century Circle Road) LT & RT from STA. 82+00 to 106+00
-Y18- (Strickland Bridge Road) LT & RT from STA 44+00 to 52+00

A) Lumbee River EMC (Power Distribution)

LREMC's relocation work will be completed by Let.

B) CenturyLink (Communication)

CenturyLink will begin relocations on August 24, 2022.
CenturyLink all relocation work will be completed by September 7, 2022.

C) Spectrum (Communication)

Spectrum's relocation work will be completed by Let.

D) Piedmont Natural Gas (Gas Distribution)

PNG all relocation work will be completed by August 12, 2022.

E) Aqua NC (Water)

All relocations are complete.

Project Special Provisions
Erosion Control

STABILIZATION REQUIREMENTS:
(4-30-2019)

Stabilization for this project shall comply with the time frame guidelines as specified by the NCG-010000 general construction permit effective April 1, 2019 issued by the North Carolina Department of Environmental Quality Division of Water Resources. Temporary or permanent ground cover stabilization shall occur within 7 calendar days from the last land-disturbing activity, with the following exceptions in which temporary or permanent ground cover shall be provided in 14 calendar days from the last land-disturbing activity:

- Slopes between 2:1 and 3:1, with a slope length of 10 ft. or less
- Slopes 3:1 or flatter, with a slope of length of 50 ft. or less
- Slopes 4:1 or flatter

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

SEEDING AND MULCHING: **(East)**

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

All Roadway Areas

March 1 - August 31		**September 1 - February 28**	
50#	Tall Fescue	50#	Tall Fescue
10#	Centipede	10#	Centipede
25#	Bermudagrass (hulled)	35#	Bermudagrass (unhulled)
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Waste and Borrow Locations

March 1 – August 31		**September 1 - February 28**	
75#	Tall Fescue	75#	Tall Fescue
25#	Bermudagrass (hulled)	35#	Bermudagrass (unhulled)
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Note: 50# of Bahiagrass may be substituted for either Centipede or Bermudagrass only upon Engineer's request.

Approved Tall Fescue Cultivars

06 Dust	Escalade	Justice	Serengeti
2nd Millennium	Essential	Kalahari	Shelby
3rd Millennium	Evergreen 2	Kitty Hawk 2000	Sheridan
Apache III	Falcon IV	Legitimate	Signia
Avenger	Falcon NG	Lexington	Silver Hawk
Barlexas	Falcon V	LSD	Sliverstar
Barlexas II	Faith	Magellan	Shenandoah Elite
Bar Fa	Fat Cat	Matador	Sidewinder
Barrera	Festnova	Millennium SRP	Skyline
Barrington	Fidelity	Monet	Solara
Barrobusto	Finelawn Elite	Mustang 4	Southern Choice II
Barvado	Finelawn Xpress	Ninja 2	Speedway
Biltmore	Finesse II	Ol' Glory	Spyder LS
Bingo	Firebird	Olympic Gold	Sunset Gold
Bizem	Firecracker LS	Padre	Taccoa
Blackwatch	Firenza	Patagonia	Tanzania
Blade Runner II	Five Point	Pedigree	Trio
Bonsai	Focus	Picasso	Tahoe II
Braveheart	Forte	Piedmont	Talladega
Bravo	Garrison	Plantation	Tarheel
Bullseye	Gazelle II	Proseeds 5301	Terrano
Cannavaro	Gold Medallion	Prospect	Titan ltd
Catalyst	Grande 3	Pure Gold	Titanium LS
Cayenne	Greenbrooks	Quest	Tracer
Cessane Rz	Greenkeeper	Raptor II	Traverse SRP
Chipper	Gremlin	Rebel Exeda	Tulsa Time
Cochise IV	Greystone	Rebel Sentry	Turbo
Constitution	Guardian 21	Rebel IV	Turbo RZ
Corgi	Guardian 41	Regiment II	Tuxedo RZ
Corona	Hemi	Regenerate	Ultimate
Coyote	Honky Tonk	Rendition	Venture
Darlington	Hot Rod	Rhambler 2 SRP	Umbrella
Davinci	Hunter	Rembrandt	Van Gogh
Desire	Inferno	Reunion	Watchdog
Dominion	Innovator	Riverside	Wolfpack II
Dynamic	Integrity	RNP	Xtremegreen
Dynasty	Jaguar 3	Rocket	
Endeavor	Jamboree	Scorpion	

On cut and fill slopes 2:1 or steeper Centipede shall be applied at the rate of 5 pounds per acre and add 20# of Sericea Lespedeza from January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Native Grass Seeding and Mulching (East)

Native Grass Seeding and Mulching shall be performed on the disturbed areas of wetlands and riparian areas, and adjacent to Stream Relocation construction within a 50 foot zone on both sides of the stream or depression, measured from top of stream bank or center of depression. The stream bank of the stream relocation shall be seeded by a method that does not alter the typical cross section of the stream bank. Native Grass Seeding and Mulching shall also be performed in the permanent soil reinforcement mat section of preformed scour holes, and in other areas as directed.

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

March 1 - August 31		**September 1 - February 28**	
18#	Creeping Red Fescue	18#	Creeping Red Fescue
6#	Indiangrass	6#	Indiangrass
8#	Little Bluestem	8#	Little Bluestem
4#	Switchgrass	4#	Switchgrass
25#	Browntop Millet	35#	Rye Grain
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Approved Creeping Red Fescue Cultivars:

Aberdeen Boreal Epic Cindy Lou

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Native Grass Seeding and Mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

Measurement and Payment

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

All areas seeded and mulched shall be tacked with asphalt. Crimping of straw in lieu of asphalt tack shall not be allowed on this project.

CRIMPING STRAW MULCH:

Crimping shall be required on this project adjacent to any section of roadway where traffic is to be maintained or allowed during construction. In areas within six feet of the edge of pavement, straw is to be applied and then crimped. After the crimping operation is complete, an additional application of straw shall be applied and immediately tacked with a sufficient amount of undiluted emulsified asphalt.

Straw mulch shall be of sufficient length and quality to withstand the crimping operation.

Crimping equipment including power source shall be subject to the approval of the Engineer providing that maximum spacing of crimper blades shall not exceed 8".

TEMPORARY SEEDING:

Fertilizer shall be the same analysis as specified for *Seeding and Mulching* and applied at the rate of 400 pounds and seeded at the rate of 50 pounds per acre. Sweet Sudan Grass, German Millet or Browntop Millet shall be used in summer months and Rye Grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

FERTILIZER TOPDRESSING:

Fertilizer used for topdressing on all roadway areas except slopes 2:1 and steeper shall be 10-20-20 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 10-20-20 analysis and as directed.

Fertilizer used for topdressing on slopes 2:1 and steeper and waste and borrow areas shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis and as directed.

SUPPLEMENTAL SEEDING:

The kinds of seed and proportions shall be the same as specified for *Seeding and Mulching*, with the exception that no centipede seed will be used in the seed mix for supplemental seeding. The rate of application for supplemental seeding may vary from 25# to 75# per acre. The actual rate per acre will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre, total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a sod seeder shall be used for incorporating seed into the soil as to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

MOWING:

The minimum mowing height on this project shall be 4 inches.

LAWN TYPE APPEARANCE:

All areas adjacent to lawns must be hand finished as directed to give a lawn type appearance. Remove all trash, debris, and stones ¾" and larger in diameter or other obstructions that could interfere with providing a smooth lawn type appearance. These areas shall be reseeded to match their original vegetative conditions, unless directed otherwise by the Field Operations Engineer.

RESPONSE FOR EROSION CONTROL:

Description

Furnish the labor, materials, tools and equipment necessary to move personnel, equipment, and supplies to the project necessary for the pursuit of any or all of the following work as shown herein, by an approved subcontractor.

Section	Erosion Control Item	Unit
1605	Temporary Silt Fence	LF
1606	Special Sediment Control Fence	LF/TON
1615	Temporary Mulching	ACR
1620	Seed - Temporary Seeding	LB
1620	Fertilizer - Temporary Seeding	TN
1631	Matting for Erosion Control	SY
SP	Coir Fiber Mat	SY
1640	Coir Fiber Baffles	LF
SP	Permanent Soil Reinforcement Mat	SY
1660	Seeding and Mulching	ACR
1661	Seed - Repair Seeding	LB
1661	Fertilizer - Repair Seeding	TON
1662	Seed - Supplemental Seeding	LB
1665	Fertilizer Topdressing	TON
SP	Safety/Highly Visible Fencing	LF
SP	Response for Erosion Control	EA

Construction Methods

Provide an approved subcontractor who performs an erosion control action as described in the NPDES Inspection Form SPPP30. Each erosion control action may include one or more of the above work items.

Measurement and Payment

Response for Erosion Control will be measured and paid for by counting the actual number of times the subcontractor moves onto the project, including borrow and waste sites, and satisfactorily completes an erosion control action described in Form 1675. The provisions of Article 104-5 of the *Standard Specifications* will not apply to this item of work.

Payment will be made under:

Pay Item	Pay Unit
Response for Erosion Control	Each

MINIMIZE REMOVAL OF VEGETATION:

The Contractor shall minimize removal of vegetation within project limits to the maximum extent practicable. Vegetation along stream banks and adjacent to other jurisdictional resources outside the construction limits shall only be removed upon approval of Engineer. No additional payment will be made for this minimization work.

STOCKPILE AREAS:

The Contractor shall install and maintain erosion control devices sufficient to contain sediment around any erodible material stockpile areas as directed.

ACCESS AND HAUL ROADS:

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

CONSTRUCTION MATERIALS MANAGEMENT
(3-19-19) (rev. 04-27-19)

Description

The requirements set forth shall be adhered to in order to meet the applicable materials handling requirements of the NCG010000 permit. Structural controls installed to manage construction materials stored or used on site shall be shown on the E&SC Plan. Requirements for handling materials on construction sites shall be as follows:

Polyacrylamides (PAMS) and Flocculants

Polyacrylamides (PAMS) and flocculants shall be stored in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures designed to protect adjacent surface waters. PAMS or other flocculants used shall be selected from the NC DWR List of Approved PAMS/Flocculants The concentration of PAMS and other flocculants used shall not exceed those specified in the NC DWR List of Approved PAMS/Flocculants and in accordance with the manufacturer's instructions. The NC DWR List of Approved PAMS/Flocculants is available at:

https://files.nc.gov/ncdeq/Water%20Quality/Environmental%20Sciences/ATU/ApprovedPAMS4_1_2017.pdf

Equipment Fluids

Fuels, lubricants, coolants, and hydraulic fluids, and other petroleum products shall be handled and disposed of in a manner so as not to enter surface or ground waters and in accordance with applicable state and federal regulations. Equipment used on the site must be operated and maintained properly to prevent discharge of fluids. Equipment, vehicle, and other wash waters shall not be discharged into E&SC basins or other E&SC devices. Alternative controls should be provided such that there is no discharge of soaps, solvents, or detergents.

Waste Materials

Construction materials and land clearing waste shall be disposed of in accordance with North Carolina General Statutes, Chapter 130A, Article 9 - Solid Waste Management, and rules governing the disposal of solid waste (15A NCAC 13B). Areas dedicated for managing construction material and land clearing waste shall be at least 50 feet away from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. Paint and other liquid construction material waste shall not be dumped into storm drains. Paint and other liquid construction waste washouts should be located at least 50 feet away from storm drain inlets unless there is no alternative. Other options are to install lined washouts or use portable, removable bags or bins. Hazardous or toxic waste shall be managed in accordance with the federal Resource Conservation and Recovery Act (RCRA) and NC Hazardous Waste Rules at 15A NCAC, Subchapter 13A. Litter and sanitary waste shall be managed in a manner to prevent it from entering jurisdictional waters and shall be disposed of offsite.

Herbicide, Pesticide, and Rodenticides

Herbicide, pesticide, and rodenticides shall be stored and applied in accordance with the Federal Insecticide, Fungicide, and Rodenticide Act, North Carolina Pesticide Law of 1971 and labeling restrictions.

Concrete Materials

Concrete materials onsite, including excess concrete, must be controlled and managed to avoid contact with surface waters, wetlands or buffers. No concrete or cement slurry shall be discharged from the site. (Note that discharges from onsite concrete plants require coverage under a separate NPDES permit – NCG140000.) Concrete wash water shall be managed in accordance with the *Concrete Washout Structure* provision. Concrete slurry shall be managed and disposed of in accordance with *NCDOT DGS and HOS DCAR Distribution of Class A Residuals Statewide* (Permit No. WQ0035749). Any hardened concrete residue will be disposed of, or recycled on site, in accordance with state solid waste regulations.

Earthen Material Stock Piles

Earthen material stock piles shall be located at least 50 feet away from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available.

Measurement and Payment

Conditions set within the *Construction Materials Management* provision are incidental to the project for which no direct compensation will be made.

WASTE AND BORROW SOURCES:

Payment for temporary erosion control measures, except those made necessary by the Contractor's own negligence or for his own convenience, will be paid for at the appropriate contract unit price for the devices or measures utilized in borrow sources and waste areas.

No additional payment will be made for erosion control devices or permanent seeding and mulching in any commercial borrow or waste pit. All erosion and sediment control practices that may be required on a commercial borrow or waste site will be done at the Contractor's expense.

All offsite Staging Areas, Borrow and Waste sites shall be in accordance with "Borrow and Waste Site Reclamation Procedures for Contracted Projects" located at:

https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/ContractedReclamationProcedures.pdf

All forms and documents referenced in the "Borrow and Waste Site Reclamation Procedures for Contracted Projects" shall be included with the reclamation plans for offsite staging areas, and borrow and waste sites.

TEMPORARY DIVERSION:

This work consists of installation, maintenance, and cleanout of *Temporary Diversions* in accordance with Section 1630 of the *Standard Specifications*. The quantity of excavation for

installation and cleanout will be measured and paid for as *Silt Excavation* in accordance with Article 1630-3 of the *Standard Specifications*.

CLEAN WATER DIVERSION:

Description

This work consists of installing, maintaining, and removing any and all material required for the construction of clean water diversions. The clean water diversions shall be used to direct water flowing from offsite around/away from specific area(s) of construction.

Materials

Refer to Division 10

Item	Section
Geotextile for Soil Stabilization, Type 4	1056

Construction Methods

The Contractor shall install the clean water diversions in accordance with the details in the plans and at locations indicated in the plans, and as directed. Upon installation, the excavated material shall be immediately stabilized as provided in Section 1620 of the *Standard Specifications*. Other stabilization methods may be utilized with prior approval from the Engineer.

Line clean water diversion with geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury top of slope geotextile edge in a trench at least 5" deep and tamp securely. Make vertical overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile.

Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 6" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically.

Measurement and Payment

Silt Excavation will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*.

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

Stabilization of the excavated material will be paid for as *Temporary Seeding* as provided in Section 1620 of the *Standard Specifications*.

Such price and payment shall be considered full compensation for all work covered by this section including all materials, construction, maintenance, and removal of the clean water diversions.

SAFETY FENCE AND JURISDICTIONAL FLAGGING:

Description

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

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

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

Materials

(A) Safety Fencing

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

Either wood posts or steel posts may be used. Wood posts shall be hardwood with a wedge or pencil tip at one end, and shall be at least 5 ft. in length with a minimum nominal 2" x 2” cross section. Steel posts shall be at least 5 ft. in length, and have a minimum weight of 0.85 lb/ft of length.

(B) Boundary Flagging

Wooden stakes shall be 4 feet in length with a minimum nominal 3/4” x 1-3/4” cross section. The flagging shall be at least 1” in width. The flagging material shall be vinyl and shall be orange in color and highly visible.

Construction Methods

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

(A) Safety Fencing

Posts shall be set at a maximum spacing of 10 ft., maintained in a vertical position and hand set or set with a post driver. Posts shall be installed a minimum of 2 ft. into the ground. If hand set, all

backfill material shall be thoroughly tamped. Wood posts may be sharpened to a dull point if power driven. Posts damaged by power driving shall be removed and replaced prior to final acceptance. The tops of all wood posts shall be cut at a 30-degree angle. The wood posts may, at the option of the Contractor, be cut at this angle either before or after the posts are erected.

The fence geotextile shall be attached to the wood posts with one 2" galvanized wire staple across each cable or to the steel posts with wire or other acceptable means.

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

The Contractor shall be required to maintain the safety fence in a satisfactory condition for the duration of the project as determined by the Engineer.

(B) Boundary Flagging

Boundary flagging delineation of interior boundaries shall consist of wooden stakes on 25 feet maximum intervals with highly visible orange flagging attached. Stakes shall be installed a minimum of 6" into the ground. Interior boundaries may be staked on a tangent that runs parallel to buffer but must not encroach on the buffer at any location. Interior boundaries of hand clearing shall be identified with a different colored flagging to distinguish it from mechanized clearing.

Boundary flagging delineation of interior boundaries will be placed in accordance with Article 105-9 or Article 801-1 of the *Standard Specifications*. No direct pay will be made for delineation of the interior boundaries. This delineation will be considered incidental to the work being paid for as *Construction Surveying,* except that where there is no pay item or construction surveying the cost of boundary flagging delineation shall be included in the unit prices bid for the various items in the contract. Installation for delineation of all jurisdictional boundaries at staging areas, waste sites, or borrow pits shall consist of wooden stakes on 25 feet maximum intervals with highly visible orange flagging attached. Stakes shall be installed a minimum of 6" into the ground. Additional flagging may be placed on overhanging vegetation to enhance visibility but does not substitute for installation of stakes.

Installation of boundary flagging for delineation of all jurisdictional boundaries at staging areas, waste sites, or borrow pits shall be performed in accordance with Subarticle 230-4(B)(5) or Subarticle 802-2(F) of the *Standard Specifications*. No direct pay will be made for this delineation, as the cost of same shall be included in the unit prices bid for the various items in the contract.

The Contractor shall be required to maintain alternative stakes and highly visible flagging in a satisfactory condition for the duration of the project as determined by the Engineer.

Measurement and Payment

Safety Fence will be measured and paid as the actual number of linear feet of polyethylene or polypropylene fence installed in place and accepted. Such payment will be full compensation including but not limited to furnishing and installing fence geotextile with necessary posts and post bracing, staples, tie wires, tools, equipment and incidentals necessary to complete this work.

Payment will be made under:

Pay Item	**Pay Unit**
Safety Fence	Linear Foot

PERMANENT SOIL REINFORCEMENT MAT:

Description

This work consists of furnishing and placing *Permanent Soil Reinforcement Mat*, of the type specified, over previously prepared areas as directed.

Materials

The product shall be a permanent erosion control reinforcement mat and shall be constructed of synthetic or a combination of coconut and synthetic fibers evenly distributed throughout the mat between a bottom UV stabilized netting and a heavy duty UV stabilized top net. The matting shall be stitched together with UV stabilized polypropylene thread to form a permanent three-dimensional structure. The mat shall have the following minimum physical properties:

Property	**Test Method**	**Value**	**Unit**
Light Penetration	ASTM D6567	9	%
Thickness	ASTM D6525	0.40	in
Mass Per Unit Area	ASTM D6566	0.55	lb/sy
Tensile Strength	ASTM D6818	385	lb/ft
Elongation (Maximum)	ASTM D6818	49	%
Resiliency	ASTM D1777	>70	%
UV Stability *	ASTM D4355	$\geq$80	%
Porosity (Permanent Net)	ECTC Guidelines	$\geq$85	%
Maximum Permissible Shear Stress (Vegetated)	Performance Bench Test	$\geq$8.0	lb/ft^2
Maximum Allowable Velocity (Vegetated)	Performance Bench Test	$\geq$16.0	ft/s

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

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

(A) the chemical and physical properties of the mat used, and

(B) conformance of the mat with this specification.

Construction Methods

Matting shall be installed in accordance with Subarticle 1631-3(B) of the *Standard Specifications*.

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

Measurement and Payment

Permanent Soil Reinforcement Mat will be measured and paid for as the actual number of square yards measured along the surface of the ground over which Permanent Soil Reinforcement Mat is installed and accepted. Overlaps will not be included in the measurement, and will be considered as incidental to the work. Such payment shall be full compensation for furnishing and installing the mat, including overlaps, and for all required maintenance.

Payment will be made under:

Pay Item	Pay Unit
Permanent Soil Reinforcement Mat	Square Yard

SKIMMER BASIN WITH BAFFLES: (East)

Description

Provide a skimmer basin to remove sediment from construction site runoff at locations shown in the erosion control plans. See the Skimmer Basin with Baffles Detail sheet provided in the erosion control plans. Work includes constructing sediment basin, installation of temporary slope drain pipe and coir fiber baffles, furnishing, installation and cleanout of skimmer, providing and placing stone pad on bottom of basin underneath skimmer device, providing and placing a geotextile spillway liner, providing coir fiber mat stabilization for the skimmer outlet, disposing of excess materials, removing temporary slope drain, coir fiber baffles, geotextile liner and skimmer device, backfilling basin area with suitable material and providing proper drainage when basin area is abandoned.

Materials

Item	Section
Stone for Erosion Control, Class B	1042
Geotextile for Soil Stabilization, Type 4	1056
Fertilizer for Temporary Seeding	1060-2
Seed for Temporary Seeding	1060-4

Seeding and Mulching	1060-4
Matting for Erosion Control	1060-8
Staples	1060-8
Coir Fiber Mat	1060-14
Temporary Slope Drain	1622-2
Coir Fiber Baffle	1640

Provide appropriately sized and approved skimmer device.

Provide Schedule 40 PVC pipe with a length of 6 ft. to attach to the skimmer and the coupling connection to serve as the arm pipe. For skimmer sizes of 2.5 in. and smaller, the arm pipe diameter shall be 1.5 inches. For skimmer sizes of 3 in. and larger, refer to manufacturer recommendation.

Provide 4” diameter Schedule 40 PVC pipe to attach to coupling connection of skimmer to serve as the barrel pipe through the earthen dam.

The geotextile for the spillway liner shall meet the following minimum physical properties for low permeability, woven polypropylene geotextiles:

Property	**Test Method**	**Value**	**Unit**
Tensile Strength	ASTM D-4632	315	lb.
Tensile Elongation (Maximum)	ASTM D-4632	15	%
Trapezoidal Tear	ASTM D-4533	120	lbs.
CBR Puncture	ASTM D-6241	900	lbs.
UV Resistance (% retained at 500 hrs.)	ASTM D-4355	70	%
Apparent Opening Size (AOS)	ASTM D-4751	40	US Std. Sieve
Permittivity	ASTM D-4491	0.05	sec^{-1}
Water Flow Rate	ASTM D-4491	4	$gal/min/ft^2$

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

Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Excavate basin according to the erosion control plans with basin surface free of obstructions, debris, and pockets of low-density material. Install temporary slope drain pipe and construct the primary spillway according to the Skimmer Basin with Baffles Detail sheet in the erosion control plans. Temporary slope drain pipe at inlet of basin may be replaced by Type 4 geotextile as directed. Construct the coir fiber baffles according to *Roadway Standard Drawings* No. 1640.01 and Section 1640 of the *Standard Specifications*.

Install skimmer device according to manufacturer recommendations. Install 4” Schedule 40 PVC pipe into dam on the lower side of basin 1 ft. from the bottom of the basin and according to the detail, and extend the pipe so the basin will drain. Attach a 6 ft. arm pipe to the coupling connection and skimmer according to manufacturer recommendations. The coupling shall be rigid and non-buoyant and not exceed a diameter of 4” and 12” in length. Attach the rope included with the skimmer to the tee between the vent socket and the tube inlet, and the other end to a wooden stake or metal post. Clean out skimmer device when it becomes clogged with sediment and/or debris and is unable to float at the top of water in skimmer basin. Take appropriate measures to avoid ice accumulation in the skimmer device. Construct a stone pad of Class B stone directly underneath the skimmer device at bottom of basin. The pad shall be a minimum of 12” in height, and shall have a minimum cross sectional area of 4 ft. by 4 ft.

Line primary spillway with low permeability polypropylene geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury edges of geotextile in a trench at least 5" deep and tamp firmly. If geotextile for the primary spillway is not one continuous piece of material, make horizontal overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile. Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 12" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically. Geotextile shall be placed to the bottom and across the entire width of the basin according to the Skimmer Basin with Baffles detail. Place sealant inside basin around barrel pipe on top of geotextile with a minimum width of 6 in.

At the skimmer outlet, provide a smooth soil surface free from stones, clods, or debris that will prevent contact of the coir fiber matting with the soil. Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Wooden stakes, reinforcement bars, or staples may be used as anchors in accordance with the details in the plans and as directed. Place anchors across the matting at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the matting 3 ft. apart.

All bare side slope sections of the skimmer basin shall be seeded with a temporary or permanent seed mix as directed and in accordance with Articles 1620-3, 1620-4, 1620-5, 1660-4, 1660-5 and

1660-7 of the *Standard Specifications*. Straw or excelsior matting shall be installed on all bare side slope sections immediately upon the completion of seeding and in accordance with Article 1631-3 of the *Standard Specifications*.

Measurement and Payment

Silt Excavation will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*, as calculated from the typical section throughout the length of the basin as shown on the final approved plans.

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

Low Permeability Geotextile will be measured and paid for as the actual number of square yards measured along the surface of the spillway over which the geotextile is installed and accepted.

Coir Fiber Baffles will be measured and paid for in accordance with Article 1640-4 of the *Standard Specifications*.

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

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

Temporary Slope Drain will be measured and paid for in accordance with Article 1622-4 of the *Standard Specifications*.

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

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

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

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

Matting for Erosion Control will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

Pay Item	Pay Unit
__" Skimmer	Each
Coir Fiber Mat	Square Yard
Low Permeability Geotextile	Square Yard

TIERED SKIMMER BASIN WITH BAFFLES: **(East)**

Description

Provide a tiered skimmer basin to remove sediment from construction site runoff at locations shown in the erosion control plans. See the Tiered Skimmer Basin Detail sheet provided in the erosion control plans. Tiered Skimmer Basins shall be installed in areas where topography creates a large elevation difference between the inlet and outlet of a single skimmer basin. Work includes constructing sediment basins, installation of coir fiber baffles, installation of temporary slope drain pipe, furnishing, installation and cleanout of skimmer, providing and placing stone pad on bottom of basin underneath skimmer device, providing and placing geotextile spillway liners, providing coir fiber mat stabilization for the skimmer outlet, disposing of excess materials, removing temporary slope drain pipe, coir fiber baffles, geotextile liner and skimmer device, backfilling basin area with suitable material and providing proper drainage when basin area is abandoned.

Materials

Item	Section
Stone for Erosion Control, Class B	1042
Fertilizer for Temporary Seeding	1060-2
Seed for Temporary Seeding	1060-4
Seeding and Mulching	1060-4
Matting for Erosion Control	1060-8
Staples	1060-8
Coir Fiber Mat	1060-14
Temporary Slope Drain	1622-2
Coir Fiber Baffle	1640

Provide appropriately sized and approved skimmer device.

Provide Schedule 40 PVC pipe with a length of 6 ft. to attach to the skimmer and the coupling connection to serve as the arm pipe. For skimmer sizes of 2.5 in. and smaller, the arm pipe diameter shall be 1.5 inches. For skimmer sizes of 3 in. and larger, refer to manufacturer recommendation.

Provide 4” diameter Schedule 40 PVC pipe to attach to coupling connection of skimmer to serve as the barrel pipe through the earthen dam.

The geotextile for the spillway liner shall meet the following minimum physical properties for low permeability, woven polypropylene geotextiles:

Property	Test Method	Value	Unit
Tensile Strength	ASTM D-4632	315	lb.
Tensile Elongation (Maximum)	ASTM D-4632	15	%
Trapezoidal Tear	ASTM D-4533	120	lbs.
CBR Puncture	ASTM D-6241	900	lbs.
UV Resistance (% retained at 500 hrs.)	ASTM D-4355	70	%
Apparent Opening Size (AOS)	ASTM D-4751	40	US Std. Sieve
Permittivity	ASTM D-4491	0.05	sec^{-1}
Water Flow Rate	ASTM D-4491	4	$gal/min/ft^2$

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

Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Excavate basins according to the erosion control plans with basin surface free of obstructions, debris, and pockets of low-density material. Install temporary slope drain pipe and construct the primary spillways according to the Tiered Skimmer Basin Detail sheet in the erosion control plans. Construct the coir fiber baffles according to *Roadway Standard Drawings* No. 1640.01 and Section 1640 of the *Standard Specifications*. Multiple upper basins, or Modified Silt Basins Type 'B' as labeled on the detail, may be required based on site conditions and as directed.

Install skimmer device according to manufacturer recommendations. Install 4" Schedule 40 PVC pipe into dam on the lower side of basin 1 ft. from the bottom of the basin and according to the detail, and extend the pipe so the basin will drain. Attach a 6 ft. arm pipe to the coupling connection

and skimmer according to manufacturer recommendations. The coupling shall be rigid and non-buoyant and not exceed a diameter of 4" and 12" in length. Attach the rope included with the skimmer to the tee between the vent socket and the tube inlet, and the other end to a wooden stake or metal post. Clean out skimmer device when it becomes clogged with sediment and/or debris and is unable to float at the top of water in skimmer basin. Take appropriate measures to avoid ice accumulation in the skimmer device. Construct a stone pad of Class B stone directly underneath the skimmer device at bottom of basin. The pad shall be a minimum of 12" in height, and shall have a minimum cross sectional area of 4 ft. by 4 ft.

Line primary spillways with low permeability polypropylene geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury edges of geotextile in a trench at least 5" deep and tamp firmly. If geotextile for primary spillways is not one continuous piece of material, make horizontal overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile. Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 12" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically. Geotextile shall be placed to the bottom and across the entire width of the basin according to the Tiered Skimmer Basin with Baffles detail.

At the skimmer outlet, provide a smooth soil surface free from stones, clods, or debris that will prevent contact of the coir fiber matting with the soil. Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Wooden stakes, reinforcement bars, or staples may be used as anchors in accordance with the details in the plans and as directed. Place anchors across the matting at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the matting 3 ft. apart. Place sealant inside basin around barrel pipe on top of geotextile with a minimum width of 6 in.

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

Measurement and Payment

Silt Excavation will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*, as calculated from the typical section throughout the length of the basin as shown on the final approved plans.

Low Permeability Geotextile will be measured and paid for as the actual number of square yards measured along the surface of the spillway over which the geotextile is installed and accepted.

Coir Fiber Baffles will be measured and paid for in accordance with Article 1640-4 of the *Standard Specifications*.

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

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

Temporary Slope Drain will be measured and paid for in accordance with Article 1622-4 of the *Standard Specifications*.

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

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

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

Fertilizer for Temporary Seeding will be measured and paid for in accordance with Article 1620-6 of the *Standard Specifications*.
Matting for Erosion Control will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

Pay Item	**Pay Unit**
__" Skimmer	Each
Coir Fiber Mat	Square Yard
Low Permeability Geotextile	Square Yard

COIR FIBER WATTLES WITH POLYACRYLAMIDE (PAM):

Description

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

Materials

Coir Fiber Wattle shall meet the following specifications:

100% Coir (Coconut) Fibers	
Minimum Diameter	12 in.
Minimum Density	3.5 lb/ft^3 +/- 10%
Net Material	Coir Fiber
Net Openings	2 in. x 2 in.
Net Strength	90 lbs.
Minimum Weight	2.6 lbs./ft. +/- 10%

Anchors: Stakes shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes a minimum of 2-ft. long with a 2 in. x 2 in. nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving down into the underlying soil.

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

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

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

Construction Methods

Coir Fiber Wattles shall be secured to the soil by wire staples approximately every 1 linear foot and at the end of each section of wattle. A minimum of 4 stakes shall be installed on the downstream side of the wattle with a maximum spacing of 2 linear feet along the wattle, and according to the detail. Install a minimum of 2 stakes on the upstream side of the wattle according to the detail provided in the plans. Stakes shall be driven into the ground a minimum of 10 in. with no more than 2 in. projecting from the top of the wattle. Drive stakes at an angle according to the detail provided in the plans.

Only install coir fiber wattle(s) to a height in ditch so flow will not wash around wattle and scour ditch slopes and according to the detail provided in the plans and as directed. Overlap adjoining sections of wattles a minimum of 6 in.

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

Apply PAM over the lower center portion of the coir fiber wattle where the water is going to flow over at a rate of 2 ounces per wattle, and 1 ounce of PAM on matting on each side of the wattle. PAM applications shall be done during construction activities after every rainfall event that is equal to or exceeds 0.50 in.

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

Measurement and Payment

Coir Fiber Wattles will be measured and paid for by the actual number of linear feet of wattles which are installed and accepted. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to install the *Coir Fiber Wattles*.

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

Polyacrylamide(PAM) will be measured and paid for by the actual weight in pounds of PAM applied to the coir fiber wattles. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to apply the *Polyacrylamide(PAM)*.

Payment will be made under:

Pay Item	**Pay Unit**
Polyacrylamide(PAM)	Pound
Coir Fiber Wattle	Linear Foot

SILT FENCE COIR FIBER WATTLE BREAK:

(8-21-12) 1605,1630

Description

Silt fence coir fiber wattle breaks are tubular products consisting of coir fibers (coconut fibers) encased in coir fiber netting and used in conjunction with temporary silt fence at the toe of fills to intercept runoff. Silt fence coir fiber wattle breaks are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation, maintenance and removing Silt fence coir fiber wattle breaks.

Materials

Coir fiber wattle shall meet the following specifications:

100% Coir (Coconut) Fibers	
Minimum Diameter	12"
Minimum Length	10 ft
Minimum Density	3.5 lb/cf ± 10%
Net Material	Coir Fiber
Net Openings	2" x 2"
Net Strength	90 lb.
Minimum Weight	2.6 lb/ft ± 10%

Stakes shall be used as anchors. Provide hardwood stakes a minimum of 2-ft long with a 2" x 2" nominal square cross section. One end of the stake shall be sharpened or beveled to facilitate driving down into the underlying soil.

Provide staples made of 0.125" diameter new steel wire formed into a U-shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Excavate a trench the entire length of each wattle with a depth of 1" to 2" for the wattle to be placed. Secure silt fence coir fiber wattle breaks to the soil by wire staples approximately every linear foot and at the end of each wattle. Install at least 4 stakes on the downslope side of the wattle with a maximum spacing of 2 linear feet and according to the detail. Install at least 2 stakes on the upslope side of the silt fence coir fiber wattle break according to the detail provided in the plans. Drive stakes into the ground at least 10" with no more than 2" projecting from the top of the wattle. Drive stakes at an angle according to the detail provided in the plans.

Install temporary silt fence in accordance with Section 1605 of the *Standard Specifications* and overlap each downslope side of silt fence wattle break by 6".

Maintain the silt fence coir fiber wattle breaks until the project is accepted or until the silt fence coir fiber wattle breaks are removed, and remove and dispose of silt accumulations at the silt fence coir fiber wattle breaks when so directed in accordance with Section 1630 of the *Standard Specifications*.

Measurement and Payment

Coir Fiber Wattle will be measured and paid as the actual number of linear feet of wattles installed and accepted. Such price and payment will be full compensation for all work covered by this provision, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to install the silt fence coir fiber wattle break.

Payment will be made under:

Pay Item	**Pay Unit**
Coir Fiber Wattle	Linear Foot

COIR FIBER WATTLE BARRIER:
(5-20-13) 1630

Description

Coir fiber wattle barriers are tubular products consisting of coir fibers (coconut fibers) encased in coir fiber or synthetic netting and used at the toe of fills or on slopes to intercept runoff. Coir fiber wattle barriers are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation, maintenance and removing coir fiber wattle barriers.

Materials

Coir fiber wattle shall meet the following specifications:

Inner Material	100% Coir (Coconut) Fibers
Minimum Diameter	18"
Minimum Length	10 ft.
Minimum Density	5 lb./c.f. ± 10%
Net Material	Coir (Coconut) or Synthetic
Net Openings	2" x 2"
Net Strength	90 lb.
Minimum Weight	10 lb./ft. ± 10%

Stakes shall be used as anchors. Provide hardwood stakes a minimum of 2-ft long with a 2" x 2" nominal square cross section. One end of the stake shall be sharpened or beveled to facilitate driving down into the underlying soil.

Provide staples made of 0.125" diameter new steel wire formed into a U-shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Align coir fiber wattle barriers in an overlapping and alternating pattern. Excavate a trench the entire length of each wattle with a depth of 2" to 3" for the wattle to be placed. Secure coir fiber wattle barriers to the soil by wire staples approximately every linear foot and at the end of each wattle. Install at least 4 stakes on the downslope side of the wattle with a maximum spacing of 2 linear feet and according to the detail. Install at least 2 stakes on the upslope side of the coir fiber wattle barriers according to the detail provided in the plans. Drive stakes into the ground at least 10" with no more than 2" projecting from the top of the wattle. Drive stakes at an angle according to the detail provided in the plans.

For coir fiber wattle barriers used to reduce runoff velocity for large slopes, use a maximum spacing of 25 ft. for the barrier measured along the slope.

Maintain the coir fiber wattle barriers until the project is accepted or until the coir fiber wattle barriers are removed, and remove and dispose of silt accumulations at the coir fiber wattle barriers when so directed in accordance with Section 1630 of the *Standard Specifications*.

Measurement and Payment

Coir Fiber Wattle Barrier will be measured and paid as the actual number of linear feet of coir fiber wattle barrier installed and accepted. Such price and payment will be full compensation for all work covered by this provision, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to install the coir fiber wattle barrier.

Payment will be made under:

Pay Item	**Pay Unit**
Coir Fiber Wattle Barrier	Linear Foot

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

Description

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

Materials

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

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

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

Polyacrylamide (PAM) shall be applied in powder form and shall be anionic or neutrally charged. Soil samples shall be obtained in areas where the Temporary Rock Silt Checks Type A with

Excelsior Matting and PAM will be placed, and from offsite material used to construct the roadway, and analyzed for the appropriate PAM flocculant to be utilized with each Temporary Rock Silt Check Type A. The PAM product used shall be listed on the North Carolina Department of Environmental Quality Division of Water Resources web site as an approved PAM product for use in North Carolina.

Construction Methods

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

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

Apply PAM at a rate of 4 ounces over the center portion of the Temporary Rock Silt Checks Type A and matting where the water is going to flow over. PAM applications shall be done during construction activities and after every rainfall event that is equal to or exceeds 0.50 in.

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

Measurement and Payment

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

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

Polyacrylamide(PAM) will be measured and paid for by the actual weight in pounds of PAM applied to the Temporary Rock Silt Checks Type A. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to apply the *Polyacrylamide(PAM)*.

Payment will be made under:

Pay Item	Pay Unit
Polyacrylamide(PAM)	Pound

BORROW PIT DEWATERING BASIN:
(3-17-09) (Rev 3-2-11)

Description

Water discharge from borrow pit sites shall not cause surface waters to exceed 50 NTUs (nephelometric turbidity unit) in streams not designated as trout waters and 10 NTUs in streams, lakes or reservoirs designated as trout waters. For lakes and reservoirs not designated as trout waters, the turbidity shall not exceed 25 NTUs. If the turbidity exceeds these levels due to natural background conditions, the existing turbidity level shall not be increased.

Construct, maintain and remove earth embankments used to reduce turbidity from dewatering borrow sites. Work includes providing porous coir fiber baffle, filtration geotextile, stone and outlet structures; cleaning out, maintaining, removing and disposing of the borrow pit dewatering basin and all components; and reshaping, dressing, seeding and mulching the area.

Materials

Refer to Division 10

Item	Section
Riprap, Class A, B, 1, and 2	1042
Geotextile for Drainage, Type 2	1056
Coir Fiber Baffle	1640-2

Use suitable excavated materials, as specified in Sections 225, 230 and 240 of the *Standard Specifications* in the construction of earth embankments for borrow pit dewatering basins, except where otherwise specified.

Construction Methods

Construct borrow pit dewatering basins according to the detail in the erosion control plans, and at locations shown on Reclamation Plans or in areas as directed.

The volume of the borrow pit dewatering basin will be based on a 2 hour retention time. The pump rate shall not exceed 1,000 GPM. The Contractor, at his option, may use a greater retention time for managing turbidity.

The straight line distance between the inlet and outlet shall be divided to include a forebay chamber in the upper quarter cell. Install one porous coir fiber baffle across the full width of the basin to delineate the forebay chamber. Do not use earthen or rock baffle. Install filtration geotextile on the interior side slopes and the floor of the forebay.

The water pumped from the borrow pit into the dewatering basin shall be obtained from the top of the water column and shall be discharged into the forebay in a non-erodible manner.

The borrow pit dewatering basin outlet shall be a vertical non-perforated riser pipe or flash board riser attached with a watertight connection to a barrel that carries the water through the embankment.

Maintenance and Removal

Maintain the borrow pit dewatering basin, coir fiber baffle, and remove and dispose of silt accumulations in accordance with Article 1630-3 of the *Standard Specifications*. The Contractor may include a drain device for maintenance and removal at his discretion.

Remove the borrow pit dewatering basin once dewatering operations are completed. Grade, seed, and mulch the area after removal of the borrow pit dewatering basin in accordance with Section 1660 of the *Standard Specifications*. The area shall be stabilized with an approved groundcover before final acceptance of the site.

Measurement and Payment

No direct payment will be made for borrow pit dewatering basins with the exception of the work of silt removal during dewatering basin operation and the work of seeding and mulching after removal of the dewatering basin. All other work and materials required for installation, maintenance and removal of borrow pit dewatering basins shall be incidental to *Borrow Excavation*. Such price and payments will be full compensation for the work of constructing, maintaining and removing the borrow pit dewatering basin including, but not limited to, the construction and removal of the borrow pit dewatering basin; furnishing of the outlet structure, baffle, filtration geotextile, stone and optional drain devices; and removal of all such items once dewatering operations are completed.

Removal and disposal of silt accumulations during dewatering operations will be measured and paid at the contract unit price per cubic yard for *Silt Excavation* in accordance with Article 1630-4 of the *Standard Specifications.*

Grading, seeding, and mulching the area after removal of the borrow pit dewatering basin will be measured and paid at the contract unit price per acre for *Seeding and Mulching* in accordance with Section 1660-8 of the *Standard Specifications*.

CULVERT DIVERSION CHANNEL:

Description

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

Materials

Refer to Division 10

Item	Section
Geotextile for Soil Stabilization, Type 4	1056

Construction Methods

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

Line channel with geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury top of slope geotextile edge in a trench at least 5" deep and tamp securely. Make vertical overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile.

Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 6" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically.

Measurement and Payment

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

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

Such price and payment shall be considered full compensation for all work covered by this section including all materials, construction, maintenance, and removal of *Culvert Diversion Channel*.

Payment will be made under:

Pay Item	Pay Unit
Culvert Diversion Channel	Cubic Yard

IMPERVIOUS DIKE:

Description

This work consists of furnishing, installing, maintaining, and removing an *Impervious Dike* for the purpose of diverting normal stream flow around the construction site. The Contractor shall construct an impervious dike in such a manner approved by the Engineer. The impervious dike shall not permit seepage of water into the construction site or contribute to siltation of the stream.

The impervious dike shall be constructed of an acceptable material in the locations noted on the plans or as directed.

Materials

Acceptable materials shall include but not be limited to sheet piles, sandbags, and/or the placement of an acceptable size stone lined with polypropylene or other impervious geotextile.

Earth material shall not be used to construct an impervious dike when it is in direct contact with the stream unless vegetation can be established before contact with the stream takes place.

Measurement and Payment

Impervious Dike will be measured and paid as the actual number of linear feet of impervious dike(s) constructed, measured in place from end to end of each separate installation that has been completed and accepted. Such price and payment will be full compensation for all work including but not limited to furnishing materials, construction, maintenance, and removal of the impervious dike.

Payment will be made under:

Pay Item	Pay Unit
Impervious Dike	Linear Foot

TEMPORARY PIPE FOR CULVERT CONSTRUCTION:

Description

This work consists of furnishing, installing, maintaining and removing any and all temporary pipe used on this project in conjunction with the culvert construction.

Construction Methods

The Contractor shall install temporary pipe in locations shown on the plans in such a manner approved by the Engineer. The temporary pipe shall provide a passageway for the stream through the work-site. The minimum size requirements will be as stated on the erosion control plans.

Measurement and Payment

__" *Temporary Pipe* will be measured and paid for at the contract unit price per linear foot of temporary pipe approved by the Engineer and measured in place from end to end. Such price and payment will be full compensation for all work covered by this section including but not limited to furnishing all materials required for installation, construction, maintenance, and removal of temporary pipe.

Payment will be made under:

Pay Item	Pay Unit
__" Temporary Pipe	Linear Foot

COIR FIBER MAT:

Description

Furnish material, install and maintain coir fiber mat in locations shown on the plans or in locations as directed. Work includes providing all materials, excavating and backfilling, and placing and securing coir fiber mat with stakes, steel reinforcement bars or staples as directed.

Materials

Item	Section
Coir Fiber Mat	1060-14

Anchors: Stakes, reinforcement bars, or staples shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Place the coir fiber mat immediately upon final grading. Provide a smooth soil surface free from stones, clods, or debris that will prevent the contact of the mat with the soil. Unroll the mat and apply without stretching such that it will lie smoothly but loosely on the soil surface.

For stream relocation applications, take care to preserve the required line, grade, and cross section of the area covered. Bury the top slope end of each piece of mat in a narrow trench at least 6 in.

deep and tamp firmly. Where one roll of matting ends and a second roll begins, overlap the end of the upper roll over the buried end of the second roll so there is a 6 in. overlap. Construct check trenches at least 12 in. deep every 50 ft. longitudinally along the edges of the mat or as directed. Fold over and bury mat to the full depth of the trench, close and tamp firmly. Overlap mat at least 6 in. where 2 or more widths of mat are installed side by side.

Place anchors across the mat at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the mat 3 ft. apart.

Adjustments in the trenching or anchoring requirements to fit individual site conditions may be required.

Measurement and Payment

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

No measurement will be made for anchor items.

Payment will be made under:

Pay Item	**Pay Unit**
Coir Fiber Mat	Square Yard

FLOATING TURBIDITY CURTAIN:

Description

This work consists of furnishing a *Floating Turbidity Curtain* to deter silt suspension and movement of silt particles during construction. The floating turbidity curtain shall be constructed at locations as directed.

Materials

The curtain material shall be made of a tightly woven nylon, plastic or other non-deteriorating material meeting the following specifications:

Property	**Value**
Grab tensile strength	*md-370 lbs *cd-250 lbs
Mullen burst stength	480 psi
Trapezoid tear strength	*md-100 lbs *cd-60 lbs
Apparent opening size	70 US standard sieve
Percent open area	4% permittivity 0.28 sec-1

*md - machine direction
*cd - cross machine direction

In the event that more than one width of fabric is required, a 6" overlap of the material shall also be required.

The curtain material shall be supported by a flotation material having over 29 lbs/ft buoyancy. The floating curtain shall have a 5/16" galvanized chain as ballast and dual 5/16" galvanized wire ropes with a heavy vinyl coating as load lines.

Construction Methods

The Contractor shall maintain the *Floating Turbidity Curtain* in a satisfactory condition until its removal is requested by the Engineer. The curtain shall extend to the bottom of the jurisdictional resource. Anchor the curtain according to manufacturer recommendations.

Measurement and Payment

Floating Turbidity Curtain will be measured and paid for as the actual number of square yards of curtain furnished as specified and accepted. Such price and payment will be full compensation for the work as described in this section including but not limited to furnishing all materials, tools, equipment, and all incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Floating Turbidity Curtain	Square Yard

CONCRETE WASHOUT STRUCTURE:
(12-10-20)

Description

Concrete washout structures are enclosures above or below grade to contain concrete waste water and associated concrete mix from washing out ready-mix trucks, drums, pumps, or other equipment. Concrete washouts must collect and retain all the concrete washout water and solids, so that this material does not migrate to surface waters or into the ground water. These enclosures are not intended for concrete waste not associated with wash out operations.

The concrete washout structure may include constructed devices above or below ground and or commercially available devices designed specifically to capture concrete wash water.

Materials

Item	Section
Temporary Silt Fence	1605

Safety Fence shall meet the specifications as provided elsewhere in this contract.

Geomembrane basin liner shall meet the following minimum physical properties for low permeability; it shall consist of a polypropylene or polyethylene 10 mil think geomembrane. If the minimum setback dimensions can be achieved the liner is not required. (5 feet above groundwater, 50 feet from top of bank of perennial stream, other surface water body, or wetland.)

Construction Methods

Build an enclosed earthen berm or excavate to form an enclosure in accordance with the details and as directed.

Install temporary silt fence around the perimeter of the enclosure in accordance with the details and as directed if structure is not located in an area where existing erosion and sedimentation control devices are capable to containing any loss of sediment.
Post a sign with the words "Concrete Washout" in close proximity of the concrete washout area, so it is clearly visible to site personnel. Install safety fence as directed for visibility to construction traffic.

The construction details for the above grade and below grade concrete washout structures can be found on the following web page link:

https://connect.ncdot.gov/resources/roadside/SoilWaterDocuments/ConcreteWashoutStructuredetail.pdf

Alternate details for accommodating concrete washout may be submitted for review and approval.

The alternate details shall include the method used to retain and dispose of the concrete waste water within the project limits and in accordance with the minimum setback requirements. (5 feet above groundwater, 50 feet from top of bank of perennial stream, other surface water body, or wetland.)

Maintenance and Removal

Maintain the concrete washout structure(s) to provide adequate holding capacity plus a minimum freeboard of 12 inches. Remove and dispose of hardened concrete and return the structure to a functional condition after reaching 75% capacity.

Inspect concrete washout structures for damage and maintain for effectiveness.

Remove the concrete washout structures and sign upon project completion. Grade the earth material to match the existing contours and permanently seed and mulch area.

Measurement and Payment

Concrete Washout Structure will be paid for per each enclosure installed in accordance with the details. If alternate details or commercially available devices are approved, then those devices will also be paid for per each approved and installed device.

Temporary Silt Fence will be measured and paid for in accordance with Article 1605-5 of the *Standard Specifications*.

Safety Fence shall be measured and paid for as provided elsewhere in this contract.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

Pay Item	Pay Unit
Concrete Washout Structure	Each

FABRIC INSERT INLET PROTECTION DEVICE (HIGH FLOW)
(6-29-17)
Description

This work shall consist of installing, maintaining, and removing *Fabric Insert Inlet Protection Device*, of the type specified, in inlet structures (catch basins, drop inlets, etc) in areas where asphalt or concrete may prevent the proper installation of a Rock Inlet Sediment Traps Type C, or as directed.

Materials

The product shall be a fabric inlet protection device composed of a fitted woven polypropylene geotextile double sewn with nylon thread suspended sack. The *Fabric Insert Inlet Protection Device* shall be manufactured to fit the opening of the catch basin or drop inlet or shall have a deflector to direct runoff from the curb opening into the fabric sack. The *Fabric Insert Inlet Protection Device* shall have a rigid frame or support system to support the loaded weight of the product. The product shall have lifting loops for removing the device from the basin and will have dump straps attached at the bottom to facilitate the emptying of the device. The *Fabric Insert Inlet Protection Device* shall have an overflow system to allow stormwater to enter the inlet structure and avoid ponding on the roadway when the device reaches capacity.

The stitching shall meet the following physical properties:

Physical	Test Method	English
Average Wide Width Strength	ASTM D-4884	165 lb/in

The fitted filter assembly shall have the following physical properties:

Physical	Test Method	English
Grab Tensile	ASTM D-4632	255 x 275 lbs
Minimum Puncture Strength	ASTM D-4833	125 lbs
Mullen Burst	ASTM D-3786	420 PSI
Minimum UV Resistance	ASTM D-4355	70 %.
Flow Rate	ASTM D-4491	200 gal/min/ft^2

Apparent Opening	ASTM D-4751	20 US Sieve
Permittivity	ASTM D-4491	1.5 sec^{-1}

Construction Methods

Strictly comply with manufacturer's installation instructions and recommendations. Maintenance shall include regular daily inspections and after each qualifying rain event. The *Fabric Insert Inlet Protection Device* shall be emptied, cleaned and placed back into the basin when it reaches 50% capacity or as directed.

Measurement and Payment

This work will be paid for at the contract unit price per *Fabric Insert Inlet Protection Device* of the type specified, complete in place and accepted. Such payment shall be full compensation for furnishing and installing the *Fabric Insert Inlet Protection Device* in accordance with this specification and for all required maintenance.

Maintenance of the device, cleanout and disposal of accumulated sediments shall be paid for by *Fabric Insert Inlet Protection Device Cleanout*.

Payment will be made under:

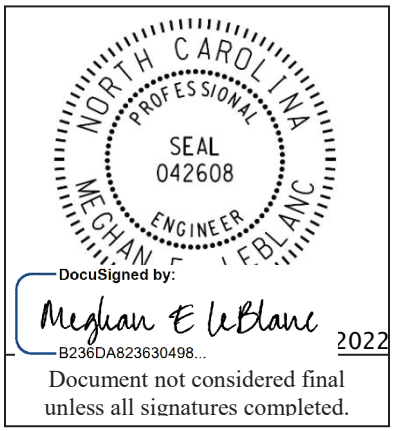
Pay Item	Pay Unit
Fabric Insert Inlet Protection Device	Each
Fabric Insert Inlet Protection Device Cleanout	Each

POND DRAINAGE PLAN REQUIREMENT:

The Contractor shall develop a Pond Drainage Plan for all ponds that are required to be drained for the construction of this project and submit the plan to the Engineer at the preconstruction conference for approval. The Pond Drainage Plan shall include but not be limited to procedures and rate of water drawdown, sediment control measures, water quality monitoring, fish and wildlife relocation plan, shall address procedures avoiding the inundation of a receiving body of water with deoxygenated or nutrient rich water resulting in impacts to aquatic life or algae bloom and procedures for maintaining downstream channel stability. If such ponds to be drained are on the NC DEQ Dam Safety Inventory List, all NC DEQ Dam Safety procedures must be followed.

Any erosion control devices or permanent seeding and mulching in areas where ponds have been drained will be paid for at the contract unit price for the item required. All additional erosion and sediment control practices not included in the contract documents that may be required on a pond drainage site will be done at the Contractor's expense.

No direct payment will be made for developing or implementing the Pond Drainage Plan as the cost of such shall be included in the lump sum price bid for *Clearing and Grubbing*.



Signals and Intelligent Transportation Systems
Project Special Provisions
(Version 18.6)

Prepared By: _MEL__
8-Feb-22

Contents

1. 2018 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES

The 2018 Standard Specifications are revised as follows:

1.1. GENERAL REQUIREMENTS – Construction Methods (1700-3(K))

Page 17-4, revise sentence starting on line 14 to read "Modify existing electrical services, as necessary, to meet the grounding requirements of the NEC, these *Standard Specifications, Standard Drawings,* and the project plans."

Page 17-4, revise sentence beginning on line 21 to read "Furnish and install additional ground rods to grounding electrode system as necessary to meet the *Standard Specifications, Standard Drawings*, and test requirements."

1.2. GENERAL REQUIREMENTS – Construction Methods (1700-3(M))

Page 17-4, Replace the sentence beginning on line 41 with "Prior to placing signal in the steady (stop-and-go) mode, the signal should be placed in the flashing mode for up to 7 days or as directed by the Engineer. The signal should not be placed in the steady (stop-and-go) mode on a Saturday or Sunday without prior approval from the Engineer. Do not place the signal in steady (stop-and-go) mode until inspected and without the prior approval of the Engineer."

1.3. WOOD POLES – Construction Methods (1720-3)

Page 17-18, revise sentence starting on line 13 to read "On new Department-owned poles, install a grounding system consisting of #6 AWG solid bare copper wire that is mechanically crimped using an irreversible compression tool with die to a single ground rod installed at base of pole or to the electrical service grounding electrode system located within 10 feet of the pole."

2. SIGNAL HEADS

2.1. MATERIALS

A. General:

Fabricate vehicle signal head housings and end caps from die-cast aluminum. Fabricate 12-inch and 16-inch pedestrian signal head housings and end caps from die-cast aluminum. Fabricate 9-inch pedestrian signal head housings, end caps, and visors from virgin polycarbonate material. Provide visor mounting screws, door latches, and hinge pins fabricated from stainless steel. Provide interior screws, fasteners, and metal parts fabricated from stainless steel.

Fabricate tunnel and traditional visors from sheet aluminum.

Paint all surfaces inside and outside of signal housings and doors. Paint outside surfaces of tunnel and traditional visors, wire outlet bodies, wire entrance fitting brackets and end caps when supplied as components of messenger cable mounting assemblies, pole and pedestal mounting assemblies, and pedestrian pushbutton housings. Have electrostatically-applied, fused-polyester paint in highway yellow (Federal Standard 595C, Color Chip Number 13538) a minimum of 2.5 to 3.5 mils thick. Do not apply paint to the latching hardware, rigid vehicle signal head mounting brackets for mast-arm attachments, messenger cable hanger components or balance adjuster components.

Have the interior surfaces of tunnel and traditional visors painted an alkyd urea black synthetic baking enamel with a minimum gloss reflectance and meeting the requirements of MIL-E-10169, "Enamel Heat Resisting, Instrument Black."

Where required, provide polycarbonate signal heads and visors that comply with the provisions pertaining to the aluminum signal heads listed on the QPL with the following exceptions:

Fabricate signal head housings, end caps, and visors from virgin polycarbonate material. Provide UV stabilized polycarbonate plastic with a minimum thickness of 0.1 ± 0.01 inches that is highway yellow (Federal Standard 595C, Color Chip 13538). Ensure the color is incorporated into the plastic material before molding the signal head housings and end caps. Ensure the plastic formulation provides the following physical properties in the assembly (tests may be performed on separately molded specimens):

Test	Required	Method
Specific Gravity	1.17 minimum	ASTM D 792
Flammability	Self-extinguishing	ASTM D 635
Tensile Strength, yield, PSI	8500 minimum	ASTM D 638
Izod impact strength, ft-lb/in [notched, 1/8 inch]	12 minimum	ASTM D 256

For pole mounting, provide side of pole mounting assemblies with framework and all other hardware necessary to make complete, watertight connections of the signal heads to the poles and pedestals. Fabricate the mounting assemblies and frames from aluminum with all necessary hardware, screws, washers, etc. to be stainless steel. Provide mounting fittings that match the positive locking device on the signal head with the serrations integrally cast into the brackets. Provide upper and lower pole plates that have a 1 ¼-inch vertical conduit entrance hubs with the hubs capped on the lower plate and 1 ½-inch horizontal hubs. Ensure that the assemblies provide rigid attachments to poles and pedestals so as to allow no twisting or swaying of the signal heads. Ensure that all raceways are free of sharp edges and protrusions, and can accommodate a minimum of ten Number 14 AWG conductors.

For pedestal mounting, provide a post-top slipfitter mounting assembly that matches the positive locking device on the signal head with serrations integrally cast into the slipfitter. Provide stainless steel hardware, screws, washers, etc. Provide a minimum of six 3/8 X 3/4-inch long square head bolts for attachment to pedestal. Provide a center post for multi-way slipfitters.

For light emitting diode (LED) traffic signal modules, provide the following requirements for inclusion on the Department's Qualified Products List for traffic signal equipment.

1. Sample submittal,
2. Third-party independent laboratory testing results for each submitted module with evidence of testing and conformance with all of the Design Qualification Testing specified in section 6.4 of each of the following Institute of Transportation Engineers (ITE) specifications:
   - Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement
   - Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement
   - Pedestrian Traffic Control Signal Indications –Light Emitting Diode (LED) Signal Modules.

   (Note: The Department currently recognizes two approved independent testing laboratories. They are Intertek ETL Semko and Light Metrics, Incorporated with Garwood Laboratories. Independent laboratory tests from other laboratories may be considered as part of the QPL submittal at the discretion of the Department,
3. Evidence of conformance with the requirements of these specifications,

4. A manufacturer's warranty statement in accordance with the required warranty, and
5. Submittal of manufacturer's design and production documentation for the model, including but not limited to, electrical schematics, electronic component values, proprietary part numbers, bill of materials, and production electrical and photometric test parameters.
6. Evidence of approval of the product to bear the Intertek ETL Verified product label for LED traffic signal modules.

In addition to meeting the performance requirements for the minimum period of 60 months, provide a written warranty against defects in materials and workmanship for the modules for a period of 60 months after installation of the modules. During the warranty period, the manufacturer must provide new replacement modules within 45 days of receipt of modules that have failed at no cost to the State. Repaired or refurbished modules may not be used to fulfill the manufacturer's warranty obligations. Provide manufacturer's warranty documentation to the Department during evaluation of product for inclusion on Qualified Products List (QPL).

B. Vehicle Signal Heads:

Comply with the ITE standard "Vehicle Traffic Control Signal Heads". Provide housings with provisions for attaching backplates.

Provide visors that are 8 inches in length for 8-inch vehicle signal head sections. Provide visors that are 10 inches in length for 12-inch vehicle signal heads.

Provide a termination block with one empty terminal for field wiring for each indication plus one empty terminal for the neutral conductor. Have all signal sections wired to the termination block. Provide barriers between the terminals that have terminal screws with a minimum Number 8 thread size and that will accommodate and secure spade lugs sized for a Number 10 terminal screw.

Mount termination blocks in the yellow signal head sections on all in-line vehicle signal heads. Mount the termination block in the red section on five-section vehicle signal heads.

Furnish vehicle signal head interconnecting brackets. Provide one-piece aluminum brackets less than 4.5 inches in height and with no threaded pipe connections. Provide hand holes on the bottom of the brackets to aid in installing wires to the signal heads. Lower brackets that carry no wires and are used only for connecting the bottom signal sections together may be flat in construction.

For messenger cable mounting, provide messenger cable hangers, wire outlet bodies, balance adjusters, bottom caps, wire entrance fitting brackets, and all other hardware necessary to make complete, watertight connections of the vehicle signal heads to the messenger cable. Fabricate messenger cable hanger components, wire outlet bodies and balance adjuster components from stainless steel or malleable iron galvanized in accordance with ASTM A153 (Class A) or ASTM A123. Provide serrated rings made of aluminum. Provide messenger cable hangers with U-bolt clamps. Fabricate washers, screws, hex-head bolts and associated nuts, clevis pins, cotter pins, U-bolt clamps and nuts from stainless steel.

For mast-arm mounting, provide rigid vehicle signal head mounting brackets and all other hardware necessary to make complete, watertight connections of the vehicle signal heads to the mast arms and to provide a means for vertically adjusting the vehicle signal heads to proper alignment. Fabricate the mounting assemblies from aluminum, and provide serrated rings made of aluminum. Provide stainless steel cable attachment assemblies to secure the brackets to the mast arms. Ensure all fastening hardware and fasteners are fabricated from stainless steel.

Provide LED vehicular traffic signal modules (hereafter referred to as modules) that consist of an assembly that uses LEDs as the light source in lieu of an incandescent lamp for use in traffic signal

sections. Use LEDs that are aluminum indium gallium phosphorus (AlInGaP) technology for red and yellow indications and indium gallium nitride (InGaN) for green indications. Install the ultra bright type LEDs that are rated for 100,000 hours of continuous operation from -40°F to +165°F. Design modules to have a minimum useful life of 60 months and to meet all parameters of this specification during this period of useful life.

For the modules, provide spade terminals crimped to the lead wires and sized for a #10 screw connection to the existing terminal block in a standard signal head. Do not provide other types of crimped terminals with a spade adapter.

Ensure the power supply is integral to the module assembly. On the back of the module, permanently mark the date of manufacture (month & year) or some other method of identifying date of manufacture.

Tint the red, yellow and green lenses to correspond with the wavelength (chromaticity) of the LED. Transparent tinting films are unacceptable. Provide a lens that is integral to the unit with a smooth outer surface.

1. LED Circular Signal Modules:

Provide modules in the following configurations: 12-inch circular sections, and 8-inch circular sections. All makes and models of LED modules purchased for use on the State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

Provide the manufacturer's model number and the product number (assigned by the Department) for each module that appears on the 2018 or most recent Qualified Products List. In addition, provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications,* that each module meets or exceeds the ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement" dated June 27, 2005 (hereafter referred to as VTCSH Circular Supplement) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the VTCSH Circular Supplement:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
12-inch red circular	17	11
8-inch red circular	13	8
12-inch green circular	15	15
8-inch green circular	12	12

For yellow circular signal modules, provide modules tested under the procedures outlined in the VTCSH Circular Supplement to insure power required at 77° F is 22 Watts or less for the 12-inch circular module and 13 Watts or less for the 8-inch circular module.

Note: Use a wattmeter having an accuracy of ±1% to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

2. LED Arrow Signal Modules

Provide 12-inch omnidirectional arrow signal modules. All makes and models of LED modules purchased for use on the State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

Provide the manufacturer's model number and the product number (assigned by the Department) for each module that appears on the 2018 or most recent Qualified Products List. In addition, provide

manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications,* that each module meets or exceeds the requirements for 12-inch omnidirectional modules specified in the ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement" dated July 1, 2007 (hereafter referred to as VTCSH Arrow Supplement) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the VTCSH Arrow Supplement:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
12-inch red arrow	12	9
12-inch green arrow	11	11

For yellow arrow signal modules, provide modules tested under the procedures outlined in the VTCSH Arrow Supplement to insure power required at 77° F is 12 Watts or less.

Note: Use a wattmeter having an accuracy of ±1% to measure the nominal wattage and maximum wattage of an arrow traffic signal module. Power may also be derived from voltage, current and power factor measurements.

3. LED U-Turn Arrow Signal Modules:

Provide modules in the following configurations: 12-inch left u-turn arrow signal modules and 12-inch right u-turn arrow signal modules.

Modules are not required to be listed on the ITS and Signals Qualified Products List. Provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications,* that each module meets or exceeds the ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement" dated June 27, 2005 (hereafter referred to as VTCSH Circular Supplement) and other requirements stated in this specification.

Provide modules that have minimum maintained luminous intensity values that are not less than 16% of the values calculated using the method described in section 4.1 of the VTCSH Circular Supplement.

Provide modules that meet the following requirements when tested under the procedures outlined in the VTCSH Circular Supplement:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
12-inch red u-turn arrow	17	11
12-inch green u-turn arrow	15	15

For yellow u-turn arrow signal modules, provide modules tested under the procedures outlined in the VTCSH Circular Supplement to ensure power required at 77° F is 22 Watts or less.

Note: Use a wattmeter having an accuracy of ±1% to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

4. LED Bi-Modal Green-Yellow Arrow Signal Modules

Provide 12-inch omnidirectional bi-modal arrow signal modules. Ensure both green and yellow arrow indications are in each module with a clear lens that is integral to the unit. Ensure both indications display an incandescent style look.

Modules are not required to be listed on the ITS and Signals Qualified Products List. Ensure that both indications along with the module meet or exceed the requirements in sections 1, 2, 3, 4 and 5 of the VTCSH Arrow Supplement and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the VTCSH Arrow Supplement:

Arrow Type	Nominal Wattage at 77° F
12-inch yellow arrow	12
12-inch green arrow	11

Note: Use a wattmeter having an accuracy of ±1% to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

C. Pedestrian Signal Heads:

Provide pedestrian signal heads with international symbols that meet the MUTCD. Do not provide letter indications.

Comply with the ITE standard for "Pedestrian Traffic Control Signal Indications" and the following sections of the ITE standard for "Vehicle Traffic Control Signal Heads" in effect on the date of advertisement:

- Section 3.00 - "Physical and Mechanical Requirements"
- Section 4.01 - "Housing, Door, and Visor: General"
- Section 4.04 - "Housing, Door, and Visor: Materials and Fabrication"
- Section 7.00 - "Exterior Finish"

Provide a double-row termination block with three empty terminals and number 10 screws for field wiring. Provide barriers between the terminals that accommodate a spade lug sized for number 10 terminal screws. Mount the termination block in the hand section. Wire all signal sections to the terminal block.

Where required by the plans, provide 16-inch pedestrian signal heads with traditional three-sided, rectangular visors, 6 inches long. Where required by the plans, provide 12-inch pedestrian signal heads with traditional three-sided, rectangular visors, 8 inches long.

Provide 2-inch diameter pedestrian push-buttons with weather-tight housings fabricated from die-cast aluminum and threading in compliance with the NEC for rigid metal conduit. Provide a weep hole in the housing bottom and ensure that the unit is vandal resistant.

Provide push-button housings that are suitable for mounting on flat or curved surfaces and that will accept 1/2-inch conduit installed in the top. Provide units that have a heavy duty push-button assembly with a sturdy, momentary, normally-open switch. Have contacts that are electrically insulated from the housing and push-button. Ensure that the push-buttons are rated for a minimum of 5 mA at 24 volts DC and 250 mA at 12 volts AC.

Provide standard R10-3 signs with mounting hardware that comply with the MUTCD in effect on the date of advertisement. Provide R10-3E signs for countdown pedestrian heads and R10-3B for non-countdown pedestrian heads.

Design the LED pedestrian traffic signal modules (hereafter referred to as modules) for installation into standard pedestrian traffic signal sections that do not contain the incandescent signal section reflector, lens, eggcrate visor, gasket, or socket. Provide modules that consist of an assembly that uses LEDs as the light source in lieu of an incandescent lamp. Use LEDs that are of the latest aluminum indium gallium phosphorus (AlInGaP) technology for the Portland Orange hand and

countdown displays. Use LEDs that are of the latest indium gallium nitride (InGaN) technology for the Lunar White walking man displays. Install the ultra-bright type LEDs that are rated for 100,000 hours of continuous operation from -40°F to +165°F. Design modules to have a minimum useful life of 60 months and to meet all parameters of this specification during this period of useful life.

Design all modules to operate using a standard 3 - wire field installation. Provide spade terminals crimped to the lead wires and sized for a #10 screw connection to the existing terminal block in a standard pedestrian signal housing. Do not provide other types of crimped terminals with a spade adapter.

Ensure the power supply is integral to the module assembly. On the back of the module, permanently mark the date of manufacture (month & year) or some other method of identifying date of manufacture.

Provide modules in the following configuration: 16-inch displays which have the solid hand/walking man overlay on the left and the countdown on the right, and 12-inch displays which have the solid hand/walking man module as an overlay. All makes and models of LED modules purchased for use on the State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

Provide the manufacturer's model number and the product number (assigned by the Department) for each module that appears on the 2018 or most recent Qualified Products List. In addition, provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications,* that each module meets or exceeds the ITE "Pedestrian Traffic Control Signal Indicators - Light Emitting Diode (LED) Signal Modules" dated August 04, 2010 (hereafter referred to as PTCSI Pedestrian Standard) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the PTCSI Pedestrian Standard:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
Hand Indication	16	13
Walking Man Indication	12	9
Countdown Indication	16	13

Note: Use a wattmeter having an accuracy of ±1% to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

Provide module lens that is hard coated or otherwise made to comply with the material exposure and weathering effects requirements of the Society of Automotive Engineers (SAE) J576. Ensure all exposed components of the module are suitable for prolonged exposure to the environment, without appreciable degradation that would interfere with function or appearance.

Ensure the countdown display continuously monitors the traffic controller to automatically learn the pedestrian phase time and update for subsequent changes to the pedestrian phase time.

Ensure the countdown display begins normal operation upon the completion of the preemption sequence and no more than one pedestrian clearance cycle.

D. Signal Cable:

Furnish 16-4 and 16-7 signal cable that complies with IMSA specification 20-1 except provide the following conductor insulation colors:

- For 16-4 cable: white, yellow, red, and green

- For 16-7 cable: white, yellow, red, green, yellow with black stripe tracer, red with black stripe tracer, and green with black stripe tracer. Apply continuous stripe tracer on conductor insulation with a longitudinal or spiral pattern.

Provide a ripcord to allow the cable jacket to be opened without using a cutter. IMSA specification 19-1 will not be acceptable. Provide a cable jacket labeled with the IMSA specification number and provide conductors constructed of stranded copper.

3. CONTROLLERS WITH CABINETS

3.1.MATERIALS – GENERAL CABINETS

Provide a moisture resistant coating on all circuit boards.

Provide one 20 mm diameter radial lead UL-recognized metal oxide varistor (MOV) between each load switch field terminal and equipment ground. Electrical performance is outlined below.

PROPERTIES OF MOV SURGE PROTECTOR	
Maximum Continuous Applied Voltage at 185° F	150 VAC (RMS) 200 VDC
Maximum Peak 8x20µs Current at 185° F	6500 A
Maximum Energy Rating at 185° F	80 J
Voltage Range 1 mA DC Test at 77° F	212-268 V
Max. Clamping Voltage 8x20µs, 100A at 77° F	395 V
Typical Capacitance (1 MHz) at 77° F	1600 pF

Provide a power line surge protector that is a two-stage device that will allow connection of the radio frequency interference filter between the stages of the device. Ensure that a maximum continuous current is at least 10A at 120V. Ensure that the device can withstand a minimum of 20 peak surge current occurrences at 20,000A for an 8x20 microsecond waveform. Provide a maximum clamp voltage of 395V at 20,000A with a nominal series inductance of 200µh. Ensure that the voltage does not exceed 395V. Provide devices that comply with the following:

Frequency (Hz)	Minimum Insertion Loss (dB)
60	0
10,000	30
50,000	55
100,000	50
500,000	50
2,000,000	60
5,000,000	40
10,000,000	20
20,000,000	25

3.2. MATERIALS – TYPE 170E CABINETS

A. Type 170 E Cabinets General:

Conform to the city of Los Angeles' Specification No. 54-053-08, *Traffic Signal Cabinet Assembly Specification* (dated July 2008), except as required herein.

Furnish model 336S pole mounted cabinets configured for 8 vehicle phases, 4 pedestrian phases, and 6 overlaps. Do not reassign load switches to accommodate overlaps unless shown on electrical details. Provide 336S pole mounted cabinets that are 46" high with 40" high internal rack assemblies.

Furnish model 332 base mounted cabinets configured for 8 vehicle phases, 4 pedestrian phases, and 6 overlaps. When overlaps are required, provide auxiliary output files for the overlaps. Do not reassign load switches to accommodate overlaps unless shown on electrical details.

Provide model 200 load switches, model 222 loop detector sensors, model 252 AC isolators, and model 242 DC isolators according to the electrical details. As a minimum, provide one (1) model 2018 conflict monitor, one (1) model 206L power supply unit, two (2) model 204 flashers, one (1) DC isolator (located in slot I14), and four (4) model 430 flash transfer relays (provide seven (7) model 430 flash transfer relays if auxiliary output file is installed) with each cabinet.

B. Type 170 E Cabinet Electrical Requirements:

Provide a cabinet assembly designed to ensure that upon leaving any cabinet switch or conflict monitor initiated flashing operation, the controller starts up in the programmed start up phases and start up interval.

Furnish two sets of non-fading cabinet wiring diagrams and schematics in a paper envelope or container and placed in the cabinet drawer.

All AC+ power is subject to radio frequency signal suppression.

Provide surge suppression in the cabinet for each type of cabinet device. Provide surge protection for the full capacity of the cabinet input file. Provide surge suppression devices that operate properly over a temperature range of -40º F to +185º F. Ensure the surge suppression devices provide both common and differential modes of protection.

Provide a pluggable power line surge protector that is installed on the back of the PDA (power distribution assembly) chassis to filter and absorb power line noise and switching transients. Ensure the device incorporates LEDs for failure indication and provides a dry relay contact closure for the purpose of remote sensing. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20µs)……..20,000A
Occurrences (8x20µs waveform)……..10 minimum @ 20,000A
Maximum Clamp Voltage…….395VAC
Operating Current……..15 amps
Response Time……..< 5 nanoseconds

Provide a loop surge suppressor for each set of loop terminals in the cabinet. Ensure the device meets the following specifications:

Peak Surge Current (6 times, 8x20µs)
(Differential Mode)…….400A
(Common Mode)……1,000A
Occurrences (8x20µs waveform)……..500 min @ 200A
Maximum Clamp Voltage
(Differential Mode @400A)……35V
(Common Mode @1,000A)…….35V
Response Time……..< 5 nanoseconds
Maximum Capacitance……..35 pF

Provide a data communications surge suppressor for each communications line entering or leaving the cabinet. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20µs)……..10,000A
Occurrences (8x20µs waveform)……..100 min @ 2,000A
Maximum Clamp Voltage…….Rated for equipment protected
Response Time……..< 1 nanosecond
Maximum Capacitance…….1,500 pF
Maximum Series Resistance…….15Ω

Provide a DC signal surge suppressor for each DC input channel in the cabinet. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20µs)……..10,000A
Occurrences (8x20µs waveform)……..100 @ 2,000A
Maximum Clamp Voltage…….30V
Response Time……..< 1 nanosecond

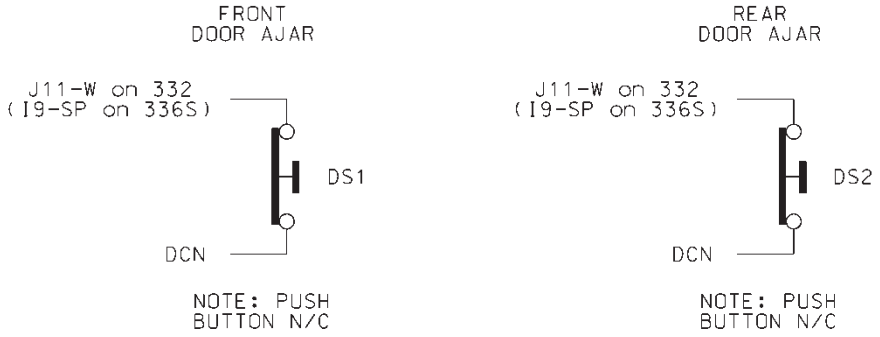
Provide a 120 VAC signal surge suppressor for each AC+ interconnect signal input. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20µs)……..20,000A
Maximum Clamp Voltage……350VAC
Response Time……..< 200 nanoseconds
Discharge Voltage……<200 Volts @ 1,000A
Insulation Resistance……≥100 MΩ

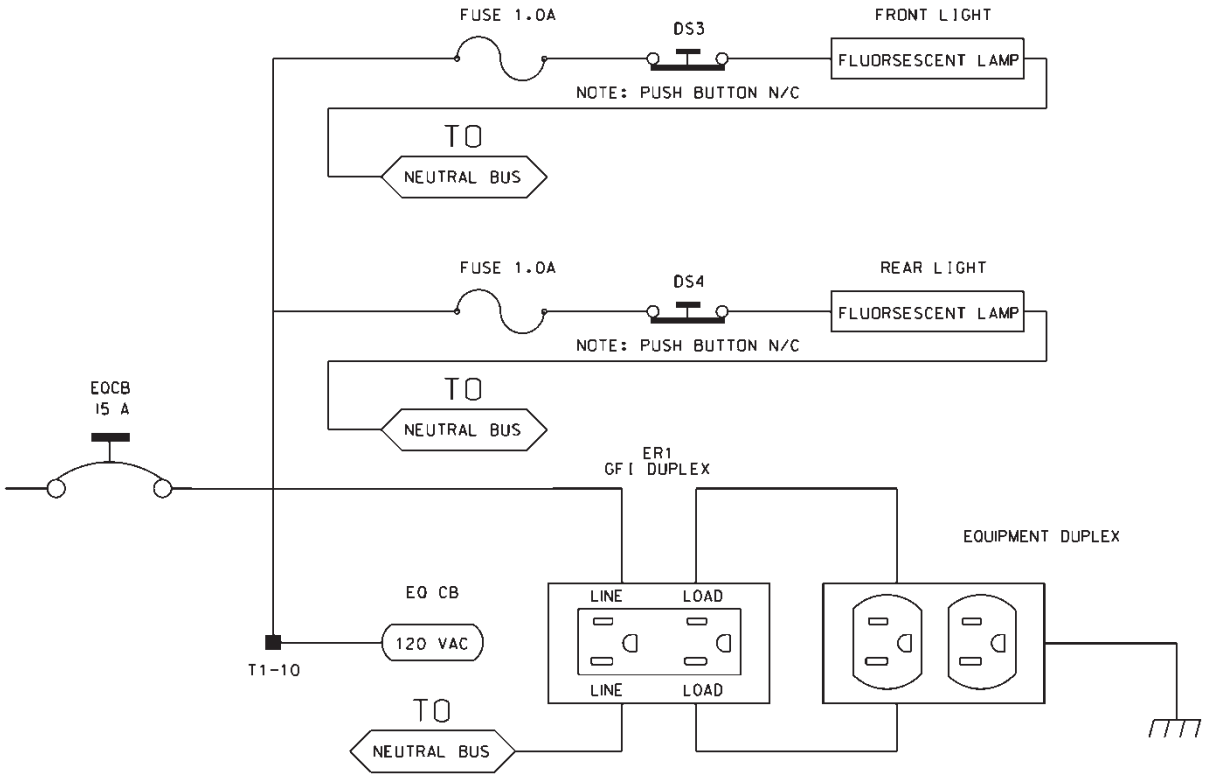
Provide conductors for surge protection wiring that are of sufficient size (ampacity) to withstand maximum overcurrents which could occur before protective device thresholds are attained and current flow is interrupted.

If additional surge protected power outlets are needed to accommodate fiber transceivers, modems, etc., install a UL listed, industrial, heavy-duty type power outlet strip with a minimum rating of 15 A / 125 VAC, 60 Hz. Provide a strip that has a minimum of 3 grounded outlets. Ensure the power outlet strip plugs into one of the controller unit receptacles located on the rear of the PDA. Ensure power outlet strip is mounted securely; provide strain relief if necessary.

Provide a door switch in the front and a door switch in the rear of the cabinet that will provide the controller unit with a Door Ajar alarm when either the front or the rear door is open. Ensure the door switches apply DC ground to the Input File when either the front door or the rear door is open.



Furnish a fluorescent fixture in the rear across the top of the cabinet and another fluorescent fixture in the front across the top of the cabinet at a minimum. Ensure that the fixtures provide sufficient light to illuminate all terminals, labels, switches, and devices in the cabinet. Conveniently locate the fixtures so as not to interfere with a technician's ability to perform work on any devices or terminals in the cabinet. Provide a protective diffuser to cover exposed bulbs. Install 16 watt T-4 lamps in the fluorescent fixtures. Provide a door switch to provide power to each fixture when the respective door is open. Wire the fluorescent fixtures to the 15 amp ECB (equipment circuit breaker).



Furnish a police panel with a police panel door. For model 336S cabinets, mount the police panel on the rear door. Ensure that the police panel door permits access to the police panel when the main door is closed. Ensure that no rainwater can enter the cabinet even with the police panel door open. Provide a police panel door hinged on the right side as viewed from the front. Provide a police panel door lock that is keyed to a standard police/fire call box key. In addition to the requirements of LA Specification No. 54-053-08, provide the police panel with a toggle switch connected to switch the intersection operation between normal stop-and-go operation (AUTO) and manual operation (MANUAL). Ensure that manual control can be implemented using inputs and software such that the controller provides full programmed clearance times for the yellow clearance and red clearance for each phase while under manual control.

Provide a 1/4-inch locking phone jack in the police panel for a hand control to manually control the intersection. Provide sufficient room in the police panel for storage of a hand control and cord.

Ensure the 336S cabinet Input File is wired as follows:

336S Cabinet Port-Bit/C-1 Pin Assignment														
Slot #	1	2	3	4	5	6	7	8	9	10	11	12	13	14
C-1 (Spares)	59	60	61	62	63	64	65	66	75	76	77	78	79	80
Port	3-2	1-1	3-4	1-3	3-1	1-2	3-3	1-4	2-5	5-5	5-6	5-1	5-2	6-7
C-1	56	39	58	41	55	40	57	42	51	71	72	67	68	81
Port	2-1	1-5	2-3	1-7	2-2	1-6	2-4	1-8	2-6	5-7	5-8	5-3	5-4	6-8
C-1	47	43	49	45	48	44	50	46	52	73	74	69	70	82

For model 332 base mounted cabinets, ensure terminals J14-E and J14-K are wired together on the rear of the Input File. Connect TB9-12 (J14 Common) on the Input Panel to T1-2 (AC-) on the rear of the PDA.

Provide detector test switches mounted at the top of the cabinet rack or other convenient location which may be used to place a call on each of eight phases based on the chart below. Provide three positions for each switch: On (place call), Off (normal detector operation), and Momentary On (place momentary call and return to normal detector operation after switch is released). Ensure that the switches are located such that the technician can read the controller display and observe the intersection.

Connect detector test switches for cabinets as follows:

336S Cabinet		332 Cabinet	
Detector Call Switches	**Terminals**	**Detector Call Switches**	**Terminals**
Phase 1	I1-F	Phase 1	I1-W
Phase 2	I2-F	Phase 2	I4-W
Phase 3	I3-F	Phase 3	I5-W
Phase 4	I4-F	Phase 4	I8-W
Phase 5	I5-F	Phase 5	J1-W
Phase 6	I6-F	Phase 6	J4-W
Phase 7	I7-F	Phase 7	J5-W
Phase 8	I8-F	Phase 8	J8-W

Provide the PCB 28/56 connector for the conflict monitor unit (CMU) with 28 independent contacts per side, dual-sided with 0.156 inch contact centers. Provide the PCB 28/56 connector contacts with solder eyelet terminations. Ensure all connections to the PCB 28/56 connector are soldered to the solder eyelet terminations.

Ensure that all cabinets have the CMU connector wired according to the 332 cabinet connector pin assignments (include all wires for auxiliary output file connection). Wire pins 13, 16, R, and U of the CMU connector to a separate 4 pin plug, P1, as shown below. Provide a second plug, P2, which will mate with P1 and is wired to the auxiliary output file as shown below. Provide an additional plug, P3, which will mate with P1 and is wired to the pedestrian yellow circuits as shown

below. When no auxiliary output file is installed in the cabinet, provide wires for the green and yellow inputs for channels 11, 12, 17, and 18, the red inputs for channels 17 and 18, and the wires for the P2 plug. Terminate the two-foot wires with ring type lugs, insulated, and bundled for optional use.

	P1		P2		P3	
PIN	**FUNCTION**	**CONN TO**	**FUNCTION**	**CONN TO**	**FUNCTION**	**CONN TO**
1	CH-9G	CMU-13	OLA-GRN	A123	2P-YEL	114
2	CH-9Y	CMU-16	OLA-YEL	A122	4P-YEL	105
3	CH-10G	CMU-R	OLB-GRN	A126	6P-YEL	120
4	CH-10Y	CMU-U	OLB-YEL	A125	8P-YEL	111

Do not provide the P20 terminal assembly (red monitor board) or red interface ribbon cable as specified in LA Specification No. 54-053-08.

Provide a P20 connector that mates with and is compatible with the red interface connector mounted on the front of the conflict monitor. Ensure that the P20 connector and the red interface connector on the conflict monitor are center polarized to ensure proper connection. Ensure that removal of the P20 connector will cause the conflict monitor to recognize a latching fault condition and place the cabinet into flashing operation.

Wire the P20 connector to the output file and auxiliary output file using 22 AWG stranded wires. Ensure the length of these wires is a minimum of 42 inches in length. Provide a durable braided sleeve around the wires to organize and protect the wires.

Wire the P20 connector to the traffic signal red displays to provide inputs to the conflict monitor as shown below. Ensure the pedestrian Don't Walk circuits are wired to channels 13 through 16 of the P20 connector. When no auxiliary output file is installed in the cabinet, provide wires for channels 9 through 12 reds. Provide a wire for special function 1. Terminate the unused wires with ring type lugs, insulated, and bundled for optional use.

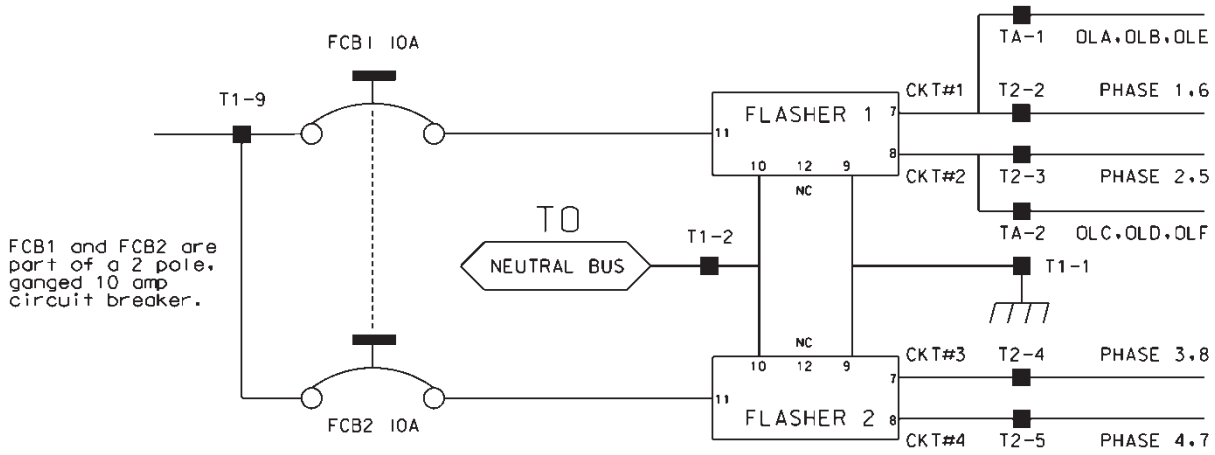
	P20 Connector				
PIN	**FUNCTION**	**CONN TO**	**PIN**	**FUNCTION**	**CONN TO**
1	Channel 15 Red	119	2	Channel 16 Red	110
3	Channel 14 Red	104	4	Chassis GND	01-9
5	Channel 13 Red	113	6	N/C	
7	Channel 12 Red	AUX 101	8	Spec Function 1	
9	Channel 10 Red	AUX 124	10	Channel 11 Red	AUX 114
11	Channel 9 Red	AUX 121	12	Channel 8 Red	107
13	Channel 7 Red	122	14	Channel 6 Red	134
15	Channel 5 Red	131	16	Channel 4 Red	101
17	Channel 3 Red	116	18	Channel 2 Red	128
19	Channel 1 Red	125	20	Red Enable	01-14

Ensure the controller unit outputs to the auxiliary output file are pre-wired to the C5 connector. When no auxiliary output file is installed in the cabinet, connect the C5 connector to a storage socket located on the Input Panel or on the rear of the PDA.

Do not wire pin 12 of the load switch sockets.

In addition to the requirements of LA Specification No. 54-053-08, ensure relay K1 on the Power Distribution Assembly (PDA) is a four pole relay and K2 on the PDA is a two pole relay.

Provide a two pole, ganged circuit breaker for the flash bus circuit. Ensure the flash bus circuit breaker is an inverse time circuit breaker rated for 10 amps at 120 VAC with a minimum of 10,000 RMS symmetrical amperes short circuit current rating. Do not provide the auxiliary switch feature on the flash bus circuit breaker. Ensure the ganged flash bus circuit breaker is certified by the circuit breaker manufacturer to provide gang tripping operation.



Ensure auxiliary output files are wired as follows:

AUXILIARY OUTPUT FILE TERMINAL BLOCK TA ASSIGNMENTS	
POSITION	**FUNCTION**
1	Flasher Unit #1, Circuit 1/FTR1 (OLA, OLB)/FTR3 (OLE)
2	Flasher Unit #1, Circuit 2/FTR2 (OLC, OLD)/FTR3 (OLF)
3	Flash Transfer Relay Coils
4	AC -
5	Power Circuit 5
6	Power Circuit 5
7	Equipment Ground Bus
8	NC

Provide four spare load resistors mounted in each cabinet. Ensure each load resistor is rated as shown in the table below. Wire one side of each load resistor to AC-. Connect the other side of each resistor to a separate terminal on a four (4) position terminal block. Mount the load resistors and terminal block either inside the back of Output File No. 1 or on the upper area of the Service Panel.

ACCEPTABLE LOAD RESISTOR VALUES	
VALUE (ohms)	**WATTAGE**
1.5K – 1.9 K	25W (min)
2.0K – 3.0K	10W (min)

Provide Model 200 load switches, Model 204 flashers, Model 242 DC isolators, Model 252 AC isolators, and Model 206L power supply units that conform to CALTRANS' "*Transportation Electrical Equipment Specifications*" dated March 12, 2009 with Erratum 1.

C. Type 170 E Cabinet Physical Requirements:

Do not mold, cast, or scribe the name "City of Los Angeles" on the outside of the cabinet door as specified in LA Specification No. 54-053-08. Do not provide a Communications Terminal Panel as specified in LA Specification No. 54-053-08. Do not provide terminal block TBB on the Service Panel. Do not provide Cabinet Verification Test Program software or associated test jigs as specified in LA Specification No. 54-053-08.

Furnish unpainted, natural, aluminum cabinet shells. Ensure that all non-aluminum hardware on the cabinet is stainless steel or a Department approved non-corrosive alternate.

Ensure the lifting eyes, gasket channels, police panel, and all supports welded to the enclosure and doors are fabricated from 0.125 inch minimum thickness aluminum sheet and meet the same standards as the cabinet and doors.

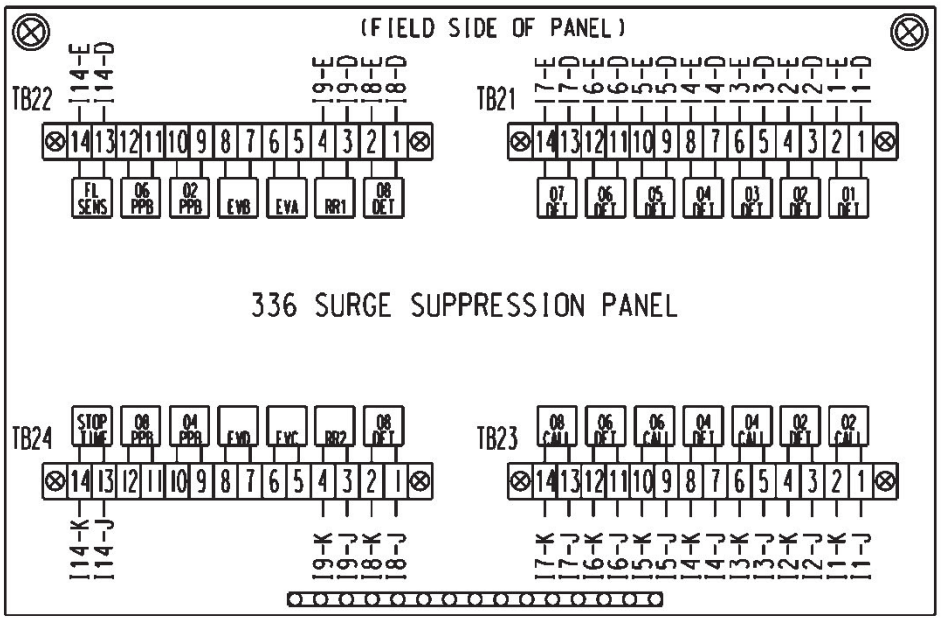
Provide front and rear doors with latching handles that allow padlocking in the closed position. Furnish 0.75 inch minimum diameter stainless steel handles with a minimum 0.5 inch shank. Place

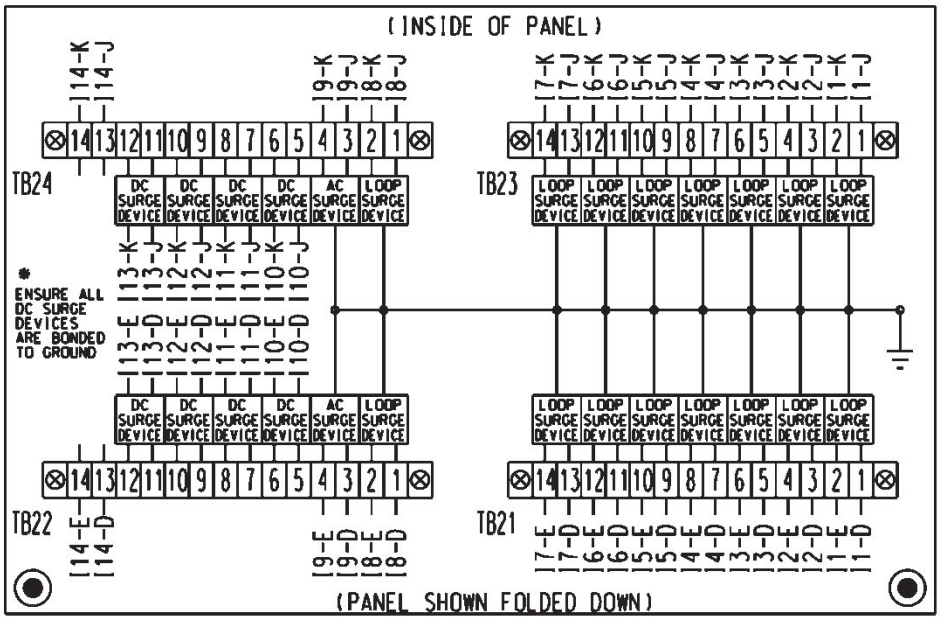
the padlocking attachment at 4.0 inches from the handle shank center to clear the lock and key. Provide an additional 4.0 inches minimum gripping length.

Provide Corbin #2 locks on the front and rear doors. Provide one (1) Corbin #2 and one (1) police master key with each cabinet. Ensure main door locks allow removal of keys in the locked position only.

Provide a surge protection panel with 16 loop surge protection devices and designed to allow sufficient free space for wire connection/disconnection and surge protection device replacement. For model 332 cabinets, provide an additional 20 loop surge protection devices. Provide an additional two AC+ interconnect surge devices to protect one slot and eight DC surge protection devices to protect four slots. Provide no protection devices on slot I14.

For pole mounted cabinets, mount surge protection devices for the AC+ interconnect inputs, inductive loop detector inputs, and low voltage DC inputs on a swing down panel assembly fabricated from sturdy aluminum. Attach the swing down panel to the bottom rear cabinet rack assembly using thumb screws. Ensure the swing down panel allows for easy removal of the input file without removing the surge protection panel assembly or its parts. Have the surge protection devices mounted horizontally on the panel and soldered to the feed through terminals of four 14 position terminal blocks with #8 screws mounted on the other side. Ensure the top row of terminals is connected to the upper slots and the bottom row of terminals is connected to the bottom slots. Provide a 15 position copper equipment ground bus attached to the field terminal side (outside) of the swing down panel for termination of loop lead-in shield grounds. Ensure that a Number 4 AWG green wire connects the surge protection panel assembly ground bus to the main cabinet equipment ground.





For base mounted cabinets, mount surge protection panels on the left side of the cabinet as viewed from the rear. Attach each panel to the cabinet rack assembly using bolts and make it easily removable. Mount the surge protection devices in vertical rows on each panel and connect the devices to one side of 12 position, double row terminal blocks with #8 screws. For each surge protection panel, terminate all grounds from the surge protection devices on a copper equipment ground bus attached to the surge protection panel. Wire the terminals to the rear of a standard input file using spade lugs for input file protection.

Provide permanent labels that indicate the slot and the pins connected to each terminal that may be viewed from the rear cabinet door. Label and orient terminals so that each pair of inputs is next to each other. Indicate on the labeling the input file (I or J), the slot number (1-14) and the terminal pins of the input slots (either D & E for upper or J & K for lower).

Provide a minimum 14 x 16 inch pull out, hinged top shelf located immediately below controller mounting section of the cabinet. Ensure the shelf is designed to fully expose the table surface outside the controller at a height approximately even with the bottom of the controller. Ensure the shelf has a storage bin interior which is a minimum of 1 inch deep and approximately the same dimensions as the shelf. Provide an access to the storage area by lifting the hinged top of the shelf. Fabricate the shelf and slide from aluminum or stainless steel and ensure the assembly can support the 2070L controller plus 15 pounds of additional weight. Ensure shelf has a locking mechanism to secure it in the fully extended position and does not inhibit the removal of the 2070L controller or removal of cards inside the controller when fully extended. Provide a locking mechanism that is easily released when the shelf is to be returned to its non-use position directly under the controller.

D. Model 2018 Enhanced Conflict Monitor:

Furnish Model 2018 Enhanced Conflict Monitors that provide monitoring of 18 channels. Ensure each channel consists of a green, yellow, and red field signal input. Ensure that the conflict monitor meets or exceeds CALTRANS' Transportation Electrical Equipment Specifications dated March 12, 2009, with Erratum 1 (hereafter referred to as CALTRANS' 2009 TEES) for a model 210 monitor unit and other requirements stated in this specification.

Ensure the conflict monitor is provided with an 18 channel conflict programming card. Pin EE and Pin T of the conflict programming card shall be connected together. Pin 16 of the conflict programming card shall be floating. Ensure that the absence of the conflict programming card will cause the conflict monitor to trigger (enter into fault mode), and remain in the triggered state until the programming card is properly inserted and the conflict monitor is reset.

Provide a conflict monitor that incorporates LED indicators into the front panel to dynamically display the status of the monitor under normal conditions and to provide a comprehensive review of field inputs with monitor status under fault conditions. Ensure that the monitor indicates the channels that were active during a conflict condition and the channels that experienced a failure for all other per channel fault conditions detected. Ensure that these indications and the status of each channel are retained until the Conflict Monitor is reset. Furnish LED indicators for the following:

- AC Power (Green LED indicator)
- VDC Failed (Red LED indicator)
- WDT Error (Red LED indicator)
- Conflict (Red LED indicator)
- Red Fail (Red LED indicator)
- Dual Indication (Red LED indicator)
- Yellow/Clearance Failure (Red LED indicator)
- PCA/PC Ajar (Red LED indicator)
- Monitor Fail/Diagnostic Failure (Red LED indicator)
- 54 Channel Status Indicators (1 Red, 1 Yellow, and 1 Green LED indicator for each of the 18 channels)

Provide a switch to set the Red Fail fault timing. Ensure that when the switch is in the ON position the Red Fail fault timing value is set to 1350 +/- 150 ms (2018 mode). Ensure that when the switch is in the OFF position the Red Fail fault timing value is set to 850 +/- 150 ms (210 mode).

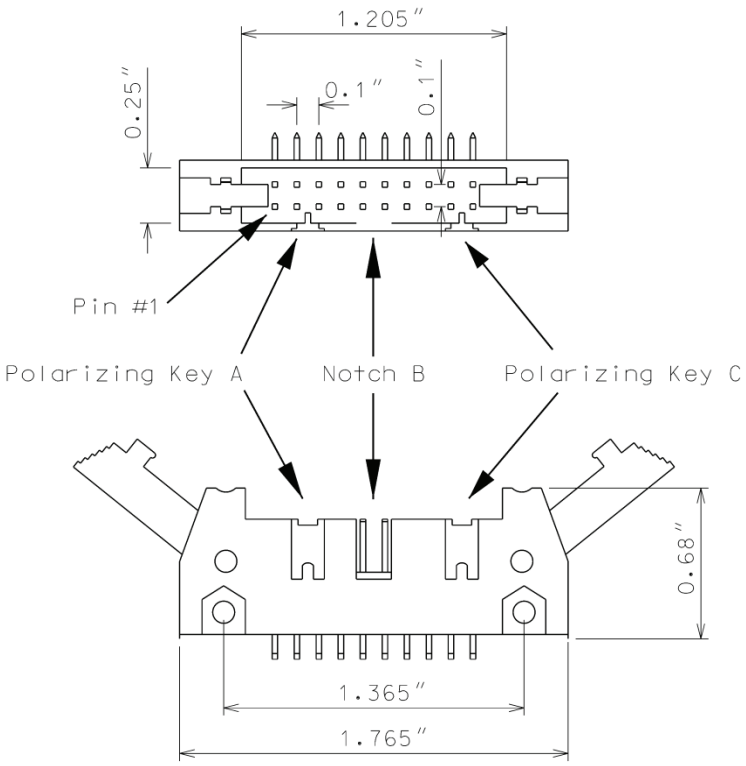
Provide a switch to set the Watchdog fault timing. Ensure that when the switch is in the ON position the Watchdog fault timing value is set to 1.0 +/- 0.1 s (2018 mode). Ensure that when the switch is in the OFF position the Watchdog fault timing value is set to 1.5 +/- 0.1 s (210 mode).

Provide a jumper or switch to set the AC line brown-out levels. Ensure that when the jumper is present or the switch is in the ON position the AC line dropout voltage threshold is 98 +/- 2 Vrms, the AC line restore voltage threshold is 103 +/- 2 Vrms, and the AC line brown-out timing value is set to 400 +/- 50ms (2018 mode). Ensure that when the jumper is not present or the switch is in the OFF position the AC line dropout voltage threshold is 92 +/- 2 Vrms, the AC line restore voltage threshold is 98 +/- 2 Vrms, and the AC line brown-out timing value is set to 80 +/- 17 ms (210 mode).

Provide a jumper or switch that will enable and disable the Watchdog Latch function. Ensure that when the jumper is not present or the switch is in the OFF position the Watchdog Latch function is disabled. In this mode of operation, a Watchdog fault will be reset following a power loss, brownout, or power interruption. Ensure that when the jumper is present or the switch is in the ON position the Watchdog Latch function is enabled. In this mode of operation, a Watchdog fault will be retained until a Reset command is issued.

Provide a jumper that will reverse the active polarity for pin #EE (output relay common). Ensure that when the jumper is not present pin #EE (output relay common) will be considered ‘Active’ at a voltage greater than 70 Vrms and ‘Not Active’ at a voltage less than 50 Vrms (Caltrans mode). Ensure that when the jumper is present pin #EE (output relay common) will be considered ‘Active’ at a voltage less than 50 Vrms and ‘Not Active’ at a voltage greater than 70 Vrms (Failsafe mode).

In addition to the connectors required by CALTRANS’ 2009 TEES, provide the conflict monitor with a red interface connector mounted on the front of the monitor. Ensure the connector is a 20 pin, right angle, center polarized, male connector with latching clip locks and polarizing keys. Ensure the right angle solder tails are designed for a 0.062” thick printed circuit board. Keying of the connector shall be between pins 3 and 5, and between 17 and 19. Ensure the connector has two rows of pins with the odd numbered pins on one row and the even pins on the other row. Ensure the connector pin row spacing is 0.10” and pitch is 0.10”. Ensure the mating length of the connector pins is 0.24”. Ensure the pins are finished with gold plating 30µ” thick.



Ensure the red interface connector pins on the monitor have the following functions:

Pin #	Function	Pin #	Function
1	Channel 15 Red	2	Channel 16 Red
3	Channel 14 Red	4	Chassis Ground
5	Channel 13 Red	6	Special Function 2
7	Channel 12 Red	8	Special Function 1
9	Channel 10 Red	10	Channel 11 Red
11	Channel 9 Red	12	Channel 8 Red
13	Channel 7 Red	14	Channel 6 Red
15	Channel 5 Red	16	Channel 4 Red
17	Channel 3 Red	18	Channel 2 Red
19	Channel 1 Red	20	Red Enable

Ensure that removal of the P20 cable connector will cause the conflict monitor to recognize a latching fault condition and place the cabinet into flashing operation.

Provide Special Function 1 and Special Function 2 inputs to the unit which shall disable only Red Fail Monitoring when either input is sensed active. A Special Function input shall be sensed active when the input voltage exceeds 70 Vrms with a minimum duration of 550 ms. A Special Function input shall be sensed not active when the input voltage is less than 50 Vrms or the duration is less

than 250 ms. A Special Function input is undefined by these specifications and may or may not be sensed active when the input voltage is between 50 Vrms and 70 Vrms or the duration is between 250 ms and 550 ms.

Ensure the conflict monitor recognizes field signal inputs for each channel that meet the following requirements:

- consider a Red input greater than 70 Vrms and with a duration of at least 500 ms as an "on" condition;
- consider a Red input less than 50 Vrms or with a duration of less than 200 ms as an "off" condition (no valid signal);
- consider a Red input between 50 Vrms and 70 Vrms or with a duration between 200 ms and 500 ms to be undefined by these specifications;
- consider a Green or Yellow input greater than 25 Vrms and with a duration of at least 500 ms as an "on" condition;
- consider a Green or Yellow input less than 15 Vrms or with a duration of less than 200 ms as an "off" condition; and
- consider a Green or Yellow input between 15 Vrms and 25 Vrms or with a duration between 200 ms and 500 ms to be undefined by these specifications.

Provide a conflict monitor that recognizes the faults specified by CALTRANS' 2009 TEES and the following additional faults. Ensure the conflict monitor will trigger upon detection of a fault and will remain in the triggered (in fault mode) state until the unit is reset at the front panel or through the external remote reset input for the following failures:

1. **Red Monitoring or Absence of Any Indication (Red Failure):** A condition in which no "on" voltage signal is detected on any of the green, yellow, or red inputs to a given monitor channel. If a signal is not detected on at least one input (R, Y, or G) of a conflict monitor channel for a period greater than 1000 ms when used with a 170 controller and 1500 ms when used with a 2070 controller, ensure monitor will trigger and put the intersection into flash. If the absence of any indication condition lasts less than 700 ms when used with a 170 controller and 1200 ms when used with a 2070 controller, ensure conflict monitor will not trigger. Red fail monitoring shall be enabled on a per channel basis by the use of switches located on the conflict monitor. Have red monitoring occur when all of the following input conditions are in effect:

   a) Red Enable input to monitor is active (Red Enable voltages are "on" at greater than 70 Vrms, off at less than 50 Vrms, undefined between 50 and 70 Vrms), and

   b) Neither Special Function 1 nor Special Function 2 inputs are active.

   c) Pin #EE (output relay common) is not active

2. **Short/Missing Yellow Indication Fault (Clearance Error):** Yellow indication following a green is missing or shorter than 2.7 seconds (with ± 0.1-second accuracy). If a channel fails to detect an "on" signal at the Yellow input for a minimum of 2.7 seconds (± 0.1 second) following the detection of an "on" signal at a Green input for that channel, ensure that the monitor triggers and generates a clearance/short yellow error fault indication. Short/missing

yellow (clearance) monitoring shall be enabled on a per channel basis by the use of switches located on the conflict monitor. This fault shall not occur when the channel is programmed for Yellow Inhibit, when the Red Enable signal is inactive or pin #EE (output relay common) is active.

3. **Dual Indications on the Same Channel:** In this condition, more than one indication (R,Y,G) is detected as "on" at the same time on the same channel. If dual indications are detected for a period greater than 500 ms, ensure that the conflict monitor triggers and displays the proper failure indication (Dual Ind fault). If this condition is detected for less than 200 ms, ensure that the monitor does not trigger. G-Y-R dual indication monitoring shall be enabled on a per channel basis by the use of switches located on the conflict monitor. G-Y dual indication monitoring shall be enabled for all channels by use of a switch located on the conflict monitor. This fault shall not occur when the Red Enable signal is inactive or pin #EE (output relay common) is active.
4. **Configuration Settings Change:** The configuration settings are comprised of (as a minimum) the permissive diode matrix, dual indication switches, yellow disable jumpers, any option switches, any option jumpers, and the Watchdog Enable switch. Ensure the conflict monitor compares the current configuration settings with the previous stored configuration settings on power-up, on reset, and periodically during operation. If any of the configuration settings are changed, ensure that the conflict monitor triggers and causes the program card indicator to flash. Ensure that configuration change faults are only reset by depressing and holding the front panel reset button for a minimum of three seconds. Ensure the external remote reset input does not reset configuration change faults.

Ensure the conflict monitor will trigger and the AC Power indicator will flash at a rate of 2 Hz ± 20% with a 50% duty cycle when the AC Line voltage falls below the "drop-out" level. Ensure the conflict monitor will resume normal operation when the AC Line voltage returns above the "restore" level. Ensure the AC Power indicator will remain illuminated when the AC voltage returns above the "restore" level. Should an AC Line power interruption occur while the monitor is in the fault mode, then upon restoration of AC Line power, the monitor will remain in the fault mode and the correct fault and channel indicators will be displayed.

Provide a flash interval of at least 6 seconds and at most 10 seconds in duration following a power-up, an AC Line interruption, or a brownout restore. Ensure the conflict monitor will suspend all fault monitoring functions, close the Output relay contacts, and flash the AC indicator at a rate of 4 Hz ± 20% with a 50% duty cycle during this interval. Ensure the termination of the flash interval after at least 6 seconds if the Watchdog input has made 5 transitions between the True and False state and the AC Line voltage is greater than the "restore" level. If the watchdog input has not made 5 transitions between the True and False state within 10 ± 0.5 seconds, the monitor shall enter a WDT error fault condition.

Ensure the conflict monitor will monitor an intersection with a minimum of four approaches using the four-section Flashing Yellow Arrow (FYA) vehicle traffic signal as outlined by the NCHRP 3-54 research project for protected-permissive left turn signal displays. Ensure the conflict monitor will operate in the FYA mode and FYAc (Compact) mode as specified below to monitor each channel pair for the following fault conditions: Conflict, Flash Rate Detection, Red Fail, Dual Indication, and

Clearance. Provide a switch to select between the FYA mode and FYAc mode. Provide a switch to select each FYA phase movement for monitoring.

FYA mode

FYA Signal Head	Phase 1	Phase 3	Phase 5	Phase 7
Red Arrow	Channel 9 Red	Channel 10 Red	Channel 11 Red	Channel 12 Red
Yellow Arrow	Channel 9 Yellow	Channel 10 Yellow	Channel 11 Yellow	Channel 12 Yellow
Flashing Yellow Arrow	Channel 9 Green	Channel 10 Green	Channel 11 Green	Channel 12 Green
Green Arrow	Channel 1 Green	Channel 3 Green	Channel 5 Green	Channel 7 Green

FYAc mode

FYA Signal Head	Phase 1	Phase 3	Phase 5	Phase 7
Red Arrow	Channel 1 Red	Channel 3 Red	Channel 5 Red	Channel 7 Red
Yellow Arrow	Channel 1 Yellow	Channel 3 Yellow	Channel 5 Yellow	Channel 7 Yellow
Flashing Yellow Arrow	Channel 1 Green	Channel 3 Green	Channel 5 Green	Channel 7 Green
Green Arrow	Channel 9 Green	Channel 9 Yellow	Channel 10 Green	Channel 10 Yellow

If a FYA channel pair is enabled for FYA operation, the conflict monitor will monitor the FYA logical channel pair for the additional following conditions:

1. **Conflict:** Channel conflicts are detected based on the permissive programming jumpers on the program card. This operation remains unchanged from normal operation except for the solid Yellow arrow (FYA clearance) signal.
2. **Yellow Change Interval Conflict:** During the Yellow change interval of the Permissive Turn channel (flashing Yellow arrow) the conflict monitor shall verify that no conflicting channels to the solid Yellow arrow channel (clearance) are active. These conflicting channels shall be determined by the program card compatibility programming of the Permissive Turn channel (flashing Yellow arrow). During the Yellow change interval of the Protected Turn channel (solid Green arrow) the conflict monitor shall verify that no conflicting channels to the solid Yellow arrow channel (clearance) are active as determined by the program card compatibility programming of the Protected Turn channel (solid Green arrow).

3. **Flash Rate Detection:** The conflict monitor unit shall monitor for the absence of a valid flash rate for the Permissive turn channel (flashing Yellow arrow). If the Permissive turn channel (flashing Yellow arrow) is active for a period greater than 1600 milliseconds, ensure the conflict monitor triggers and puts the intersection into flash. If the Permissive turn channel (flashing Yellow arrow) is active for a period less than 1400 milliseconds, ensure the conflict monitor does not trigger. Ensure the conflict monitor will remain in the triggered (in fault mode) state until the unit is reset at the front panel or through the external remote reset input. Provide a jumper or switch that will enable and disable the Flash Rate Detection function. Ensure that when the jumper is not present or the switch is in the OFF position the Flash Rate Detection function is enabled. Ensure that when the jumper is present or the switch is in the ON position the Flash Rate Detection function is disabled.
4. **Red Monitoring or Absence of Any Indication (Red Failure):** The conflict monitor unit shall detect a red failure if there is an absence of voltage on all four of the inputs of a FYA channel pair (RA, YA, FYA, GA).
5. **Dual Indications on the Same Channel:** The conflict monitor unit shall detect a dual indication if two or more inputs of a FYA channel pair (RA, YA, FYA, GA) are "on" at the same time.
6. **Short/Missing Yellow Indication Fault (Clearance Error):** The conflict monitor unit shall monitor the solid Yellow arrow for a clearance fault when terminating both the Protected Turn channel (solid Green arrow) interval and the Permissive Turn channel (flashing Yellow arrow) interval.

Ensure that the conflict monitor will log at least nine of the most recent events detected by the monitor in non-volatile EEPROM memory (or equivalent). For each event, record at a minimum the time, date, type of event, status of each field signal indication with RMS voltage, and specific channels involved with the event. Ensure the conflict monitor will log the following events: monitor reset, configuration, previous fault, and AC line. Furnish the signal sequence log that shows all channel states (Greens, Yellows, and Reds) and the Red Enable State for a minimum of 2 seconds prior to the current fault trigger point. Ensure the display resolution of the inputs for the signal sequence log is not greater than 50 ms.

For conflict monitors used within an Ethernet communications system, provide a conflict monitor with an Ethernet 10/100 Mbps, RJ-45 port for data communication access to the monitor by a local notebook computer and remotely via a workstation or notebook computer device connected to the signal system local area network. The Ethernet port shall be electrically isolated from the conflict monitor's electronics and shall provide a minimum of 1500 Vrms isolation. Integrate monitor with Ethernet network in cabinet. Provide software to retrieve the time and date from a network server in order to synchronize the on-board times between the conflict monitor and the controller. Furnish and install the following Windows based, graphic user interface software on workstations and notebook computers where the signal system client software is installed: 1) software to view and retrieve all event log information, 2) software that will search and display a list of conflict monitor IP addresses and IDs on the network, and 3) software to change the conflict monitor's network parameters such as IP address and subnet mask.

For non-Ethernet connected monitors, provide a RS-232C/D compliant port (DB-9 female connector) on the front panel of the conflict monitor in order to provide communications from the conflict monitor to the 170/2070 controller or to a Department-furnished laptop computer. Electrically isolate the port interface electronics from all monitor electronics, excluding Chassis Ground. Ensure that the controller can receive all event log information through a controller

Asynchronous Communications Interface Adapter (Type 170E) or Async Serial Comm Module (2070). Furnish and connect a serial cable from the conflict monitor's DB-9 connector to Comm Port 1 of the 2070 controller. Ensure conflict monitor communicates with the controller. Provide a Windows based graphic user interface software to communicate directly through the same monitor RS-232C/D compliant port to retrieve and view all event log information to a Department-furnished laptop computer. The RS-232C/D compliant port on the monitor shall allow the monitor to function as a DCE device with pin connections as follows:

Conflict Monitor RS-232C/D (DB-9 Female) Pinout		
Pin Number	**Function**	**I/O**
1	DCD	O
2	TX Data	O
3	RX Data	I
4	DTR	I
5	Ground	-
6	DSR	O
7	CTS	I
8	RTS	O
9	NC	-

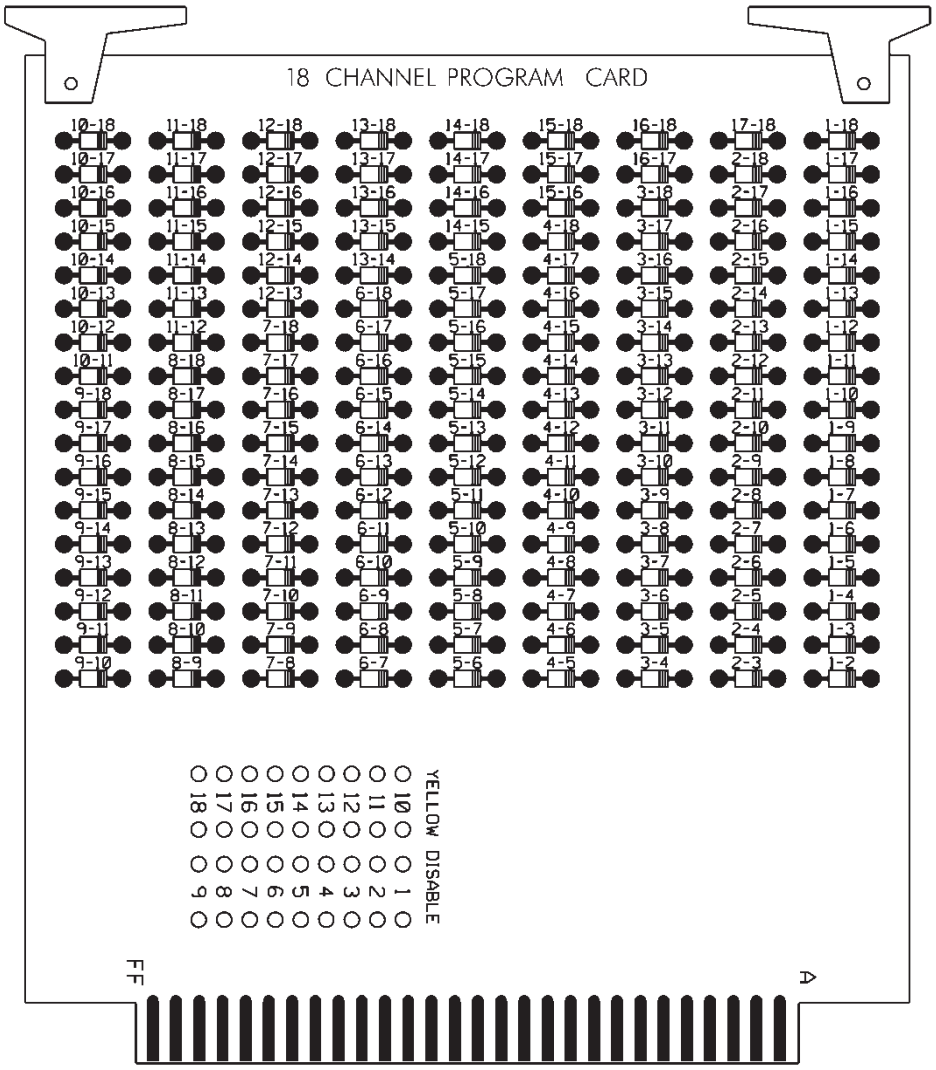
MONITOR BOARD EDGE CONNECTOR			
Pin #	**Function (Back Side)**	**Pin #**	**Function (Component Side)**
1	Channel 2 Green	A	Channel 2 Yellow
2	Channel 13 Green	B	Channel 6 Green
3	Channel 6 Yellow	C	Channel 15 Green
4	Channel 4 Green	D	Channel 4 Yellow
5	Channel 14 Green	E	Channel 8 Green
6	Channel 8 Yellow	F	Channel 16 Green
7	Channel 5 Green	H	Channel 5 Yellow
8	Channel 13 Yellow	J	Channel 1 Green
9	Channel 1 Yellow	K	Channel 15 Yellow
10	Channel 7 Green	L	Channel 7 Yellow
11	Channel 14 Yellow	M	Channel 3 Green
12	Channel 3 Yellow	N	Channel 16 Yellow
13	Channel 9 Green	P	Channel 17 Yellow
14	Channel 17 Green	R	Channel 10 Green
15	Channel 11 Yellow	S	Channel 11 Green
16	Channel 9 Yellow	T	Channel 18 Yellow
17	Channel 18 Green	U	Channel 10 Yellow
--		--	
18	Channel 12 Yellow	V	Channel 12 Green
19	Channel 17 Red	W	Channel 18 Red
20	Chassis Ground	X	Not Assigned
21	AC-	Y	DC Common
22	Watchdog Timer	Z	External Test Reset
23	+24VDC	AA	+24VDC
24	Tied to Pin 25	BB	Stop Time (Output)
25	Tied to Pin 24	CC	Not Assigned
26	Not Assigned	DD	Not Assigned
27	Relay Output, Side #3, N.O.	EE	Relay Output,Side #2,Common
28	Relay Output, Side #1, N.C.	FF	AC+

-- Slotted for keying between Pins 17/U and 18/V

CONFLICT PROGRAM CARD PIN ASSIGNMENTS

Pin #	Function (Back Side)	Pin #	Function (Component Side)
1	Channel 2 Green	A	Channel 1 Green
2	Channel 3 Green	B	Channel 2 Green
3	Channel 4 Green	C	Channel 3 Green
4	Channel 5 Green	D	Channel 4 Green
5	Channel 6 Green	E	Channel 5 Green
6	Channel 7 Green	F	Channel 6 Green
7	Channel 8 Green	H	Channel 7 Green
8	Channel 9 Green	J	Channel 8 Green
9	Channel 10 Green	K	Channel 9 Green
10	Channel 11 Green	L	Channel 10 Green
11	Channel 12 Green	M	Channel 11 Green
12	Channel 13 Green	N	Channel 12 Green
13	Channel 14 Green	P	Channel 13 Green
14	Channel 15 Green	R	Channel 14 Green
15	Channel 16 Green	S	Channel 15 Green
16	N/C	T	PC AJAR
17	Channel 1 Yellow	U	Channel 9 Yellow
18	Channel 2 Yellow	V	Channel 10 Yellow
19	Channel 3 Yellow	W	Channel 11 Yellow
20	Channel 4 Yellow	X	Channel 12 Yellow
21	Channel 5 Yellow	Y	Channel 13 Yellow
22	Channel 6 Yellow	Z	Channel 14 Yellow
23	Channel 7 Yellow	AA	Channel 15 Yellow
24	Channel 8 Yellow	BB	Channel 16 Yellow
--		--	
25	Channel 17 Green	CC	Channel 17 Yellow
26	Channel 18 Green	DD	Channel 18 Yellow
27	Channel 16 Green	EE	PC AJAR (Program Card)
28	Yellow Inhibit Common	FF	Channel 17 Green

-- Slotted for keying between Pins 24/BB and 25/CC



E. Preemption and Sign Control Box

Provide preemption and sign control box to operate in a Model 332 and Model 336S cabinet. Provide hardware to mount the box to the cage of the cabinet to ensure the front side is facing the opposite side of the cabinet. Furnish the material of the box from a durable finished metallic or thermoplastic case. Ensure the size of the box is not greater than 7(l) x 5(w) x 5(d) inches. Ensure that no modification is necessary to mount the box on the cabinet cage.

Provide the following components in the preemption and sign control box: relays, fuses, terminal blocks, MOVs, resistor, RC network, lamp, and push button switch.

Provide UL Listed or Recognized relay K1 as a DPDT enclosed relay (120 VAC, 60 Hz coil) with an 8-pin octal-style plug and associated octal base. Provide contact material made of AgCdO with a 10 amp, 240 VAC rating. Ensure the relay has a specified pickup voltage of 102 VAC.

Provide relay SSR1 as a Triac SPST normally open solid state relay that is rated for 120 VAC input and zero-crossing (resistive load) 25 amp @ 120 VAC output. Ensure the relay turns on at 90 Vrms within 10 ms and turns off at 10 Vrms within 40 ms. Ensure the relay has physical

characteristics as shown in the wiring detail in Figure 1. Provide 4 terminal screws with saddle clamps.

Provide fuses F1 and F2 as a UL Listed ¼″ x 1-1/4″ glass tube rated at 250 volts with a 10kA interrupting rating. Ensure F1 non-delay (fast-acting) and F2 slow-blow (time-delay) fuses have a maximum opening times of 60 minutes and 120 seconds for currents of 135 and 200 percent of the ampere rating, respectively. Ensure F2 slow-blow (time-delay) fuses have a minimum opening times of 12 seconds at 200 percent of the ampere rating. Provide fuse holders that are UL Recognized panel-mounted holders rated 250V, 15 ampere minimum with bayonet-type knobs which accept ¼″ x 1-1/4″ glass tube fuses.

Provide terminal blocks that are rated for 300V and are made of electrical grade thermoplastic or thermosetting plastic. Ensure each terminal block is of closed back design and has recessed-screw terminals with molded barriers between terminals. Ensure each terminal block is labeled with a block designation. Ensure each terminal is labeled with the function and a number.

Provide 3/4-inch diameter radial lead UL-recognized metal oxide varistors (MOVs) that have electrical performance as outlined below.

PROPERTIES OF MOV SURGE PROTECTOR	
Maximum Continuous Applied Voltage at 185° F	150 VAC (RMS) 200 VDC
Maximum Peak 8x20µs Current at 185° F	6500 A
Maximum Energy Rating at 185° F	80 J
Voltage Range 1 mA DC Test at 77° F	212-268 V
Max. Clamping Voltage 8x20µs, 100A at 77° F	395 V
Typical Capacitance (1 MHz) at 77° F	1600 pF

Provide resistor R1 as a 2K ohm, 12 watt, wirewound resistor with tinned terminals and attaching leads. Ensure the resistor is spaced apart from surrounding wires.

Provide a LED or incandescent lamp that has a voltage rating of 120 VAC with a minimum life rating at 50,000 hours.

Wire the preemption and sign control box as shown in Figure 1.

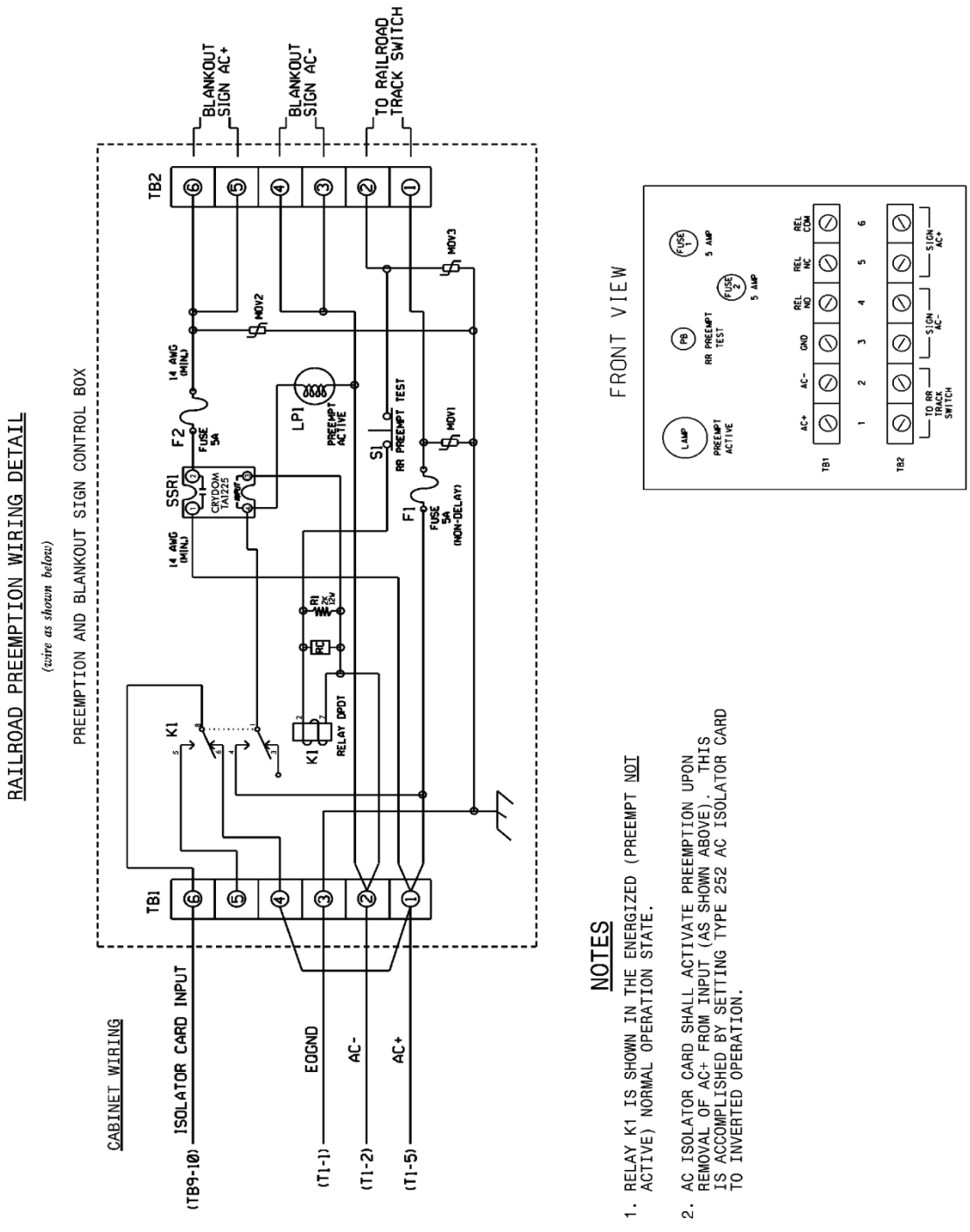

RAILROAD PREEMPTION WIRING DETAIL
(wire as shown below)
PREEMPTION AND BLANKOUT SIGN CONTROL BOX
CABINET WIRING
ISOLATOR CARD INPUT
(TB9-10)
EOGND
(T1-1)
AC-
(T1-2)
AC+
(T1-5)
TB1
TB2
K1
RELAY DPDT
R1
18K
R2
SSR1
CRYDOM
TA1225
F2
FUSE
5A
14 AWG
(MIN.)
LP1
PREEMPT
ACTIVE
S1
RR PREEMPT TEST
F1
FUSE
5A
(NON-DELAY)
MOV1
MOV2
MOV3
BLANKOUT
SIGN AC+
BLANKOUT
SIGN AC-
TO RAILROAD
TRACK SWITCH
NOTES
1. RELAY K1 IS SHOWN IN THE ENERGIZED (PREEMPT NOT ACTIVE) NORMAL OPERATION STATE.
2. AC ISOLATOR CARD SHALL ACTIVATE PREEMPTION UPON REMOVAL OF AC+ FROM INPUT (AS SHOWN ABOVE). THIS IS ACCOMPLISHED BY SETTING TYPE 252 AC ISOLATOR CARD TO INVERTED OPERATION.
FRONT VIEW
LAMP
PREEMPT ACTIVE
PB
RR PREEMPT TEST
FUSE 1
5 AMP
FUSE 2
5 AMP
AC+
AC-
GND
REL NO
REL NC
REL COM
TB1
1 2 3 4 5 6
TB2
TO RR TRACK SWITCH
SIGN AC-
SIGN AC+

Figure 1

3.3. MATERIALS – TYPE 170 DETECTOR SENSOR UNITS

Furnish detector sensor units that comply with Chapter 5 Section 1, "General Requirements," and Chapter 5 Section 2, "Model 222 & 224 Loop Detector Sensor Unit Requirements," of the CALTRANS "Transportation Electrical Equipment Specifications" dated March 12, 2009 with Erratum 1.

3.4. MATERIALS – TYPE 2070LX CONTROLLERS

Furnish model 2070LX controller units that conform to CALTRANS *Transportation Electrical Equipment Specifications* (TEES) (dated March 12, 2009, plus Errata 1 dated January 21, 2010 and Errata 2 dated December 5, 2014) except as required herein.

The Department will provide software at the beginning of the burning-in period. Contractor shall give 5 working days notice before needing software. Program software provided by the Department.

Provide model 2070LX controllers with Linux kernel 2.6.18 or higher and device drivers, composed of the unit chassis and at a minimum the following modules and assemblies:

- MODEL 2070-1C, CPU Module, Single Board, with 8Mb Datakey (blue in color)
- MODEL 2070-2E+, Field I/O Module (FI/O)
  - Note: Configure the Field I/O Module to disable both the External WDT Shunt/Toggle Switch and SP3 (SP3 active indicator is "off")
- MODEL 2070-3B, Front Panel Module (FP), Display B (8x40)
- MODEL 2070-4A, Power Supply Module, 10 AMP

Provide a Board Support Package (BSP) to the state and to any specified applications software manufacturer when requested by the state to facilitate the porting of application software.

4. METAL POLE SUPPORTS

4.1. METAL POLES

A. General:

Furnish and install metal poles, grounding systems, and all necessary hardware. Work covered under this special provision includes requirements for design, fabrication, and installation of standard and custom/site-specific designed metal pole supports and associated foundations.

Comply with applicable sections of the *2018 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES*, hereinafter referred to as the *Standard Specifications.* Provide designs of completed assemblies with hardware equaling or exceeding AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals* 6th Edition, 2013 (hereinafter called 6th Edition AASHTO), including the latest interim specifications. Provide assemblies with a round or near-round (18 sides or more) cross-section, or a multi-sided cross section with no less than six sides. The sides may be straight, convex, or concave.

For bid purposes, pole heights shown on plans are estimated from available data. Prior to furnishing metal poles, use field measurements and adjusted cross-sections to determine whether pole heights will meet required clearances. If pole heights do not meet required clearances, the Contractor should immediately notify the Engineer of the required revised pole heights.

Standard Drawings for Metal Poles are available that supplement these project special provisions. The drawings are located on the Department's website:

https://connect.ncdot.gov/resources/safety/pages/ITS-Design-Resources.aspx

Comply with article 1098-1B of the *Standard Specifications* for submittal requirements. Furnish shop drawings for approval. Provide copies of detailed shop drawings for each type of structure as summarized below. Ensure shop drawings include material specifications for each component. Ensure shop drawings identify welds by type and size on the detail drawing only, not in table format. **Do not release structures for fabrication until shop drawings have been approved by NCDOT**. Ensure shop drawings contain an itemized bill of materials for all structural components and associated connecting hardware.

Comply with article 1098-1A of the *Standard Specifications* for Qualified Products List (QPL) submittals. All shop drawings must include project location description, signal or asset inventory number(s) and project number or work order number.

Summary of information required for metal pole review submittal:

Item	Electronic Submittal	Comments / Special Instructions
Sealed, Approved Signal or ITS Plan/Loading Diagram	1 set	All structure design information needs to reflect the latest approved Signal or ITS plans
Custom Pole Shop Drawings	1 set	Submit drawings on 11” x 17” format media. Show NCDOT signal or asset inventory number(s), Contractor’s name and relevant revision number in the title block. All drawings must have a unique drawing number for each project.
Standard Strain Pole Shop Drawings (from the QPL)	1 set	Submit drawings on 11” x 17” format media. Show NCDOT signal inventory number(s), Contractor’s name and relevant revision number in the title block. All drawings must have a unique drawing number for each project.
Structure Calculations	1 set	Not required for Standard QPL Poles
Standard Strain Pole Foundation Drawings	1 set	Submit drawings on 11” x 17” format media. Submit a completed Standard Foundation Selection form for each pole using foundation table on Metal Pole Drawing M8.
Custom Foundation Drawings	1 set	Submit drawings on 11” x 17” format media. Show NCDOT signal or asset inventory number(s), Contractor’s name and relevant revision number in the title block. All drawings must have a unique drawing number for each project. If QPL Poles are used, include the corresponding QPL pole shop drawings with this submittal.
Foundation Calculations	1 set	**Submit copies of LPILE input, output, and pile tip deflection graph per Section titled Drilled Pier Foundations for Metal Poles of this specification for each foundation.**

		Not required for Standard Strain Poles (from the QPL)
Soil Boring Logs and Report	1 set	Report shall include a location plan and a soil classification report including soil capacity, water level, hammer efficiency, soil bearing pressure, soil density, etc. for each pole.

NOTE – All shop drawings and custom foundation design drawings must be sealed by a Professional Engineer licensed in the state of North Carolina. All geotechnical information must be sealed by either a Professional Engineer or Geologist licensed in the state of North Carolina. Include a title block and revision block on the shop drawings and foundation drawings showing the NCDOT signal or asset inventory number(s).

Shop drawings and foundation drawings may be submitted together or separately for approval. However, shop drawings must be approved before foundations can be reviewed. Foundation designs will be returned without review if the associated shop drawing has not been approved. Boring reports shall include the following: Engineer's summary, boring location maps, soil classification per AASHTO Classification System, hammer efficiency, and Metal Pole Standard Foundation Selection Form. Incomplete submittals will be returned without review. The Reviewer has the right to request additional analysis and copies of the calculations to expedite the approval process.

B. Materials:

Fabricate metal pole from coil or plate steel that meet the requirements of ASTM A 572 Gr 55 or ASTM A 595 Grade A tubes. For structural steel shapes, plates, and bars use, as a minimum, ASTM A572 Gr 50, AASHTO M270 Gr 50, ASTM A709 Gr 50, or an approved equivalent. Provide pole shafts of round or near round (18 sides or more) cross-section, or multi-sided tubular cross-section with no less than six sides, having a uniform linear taper of 0.14 in/ft. Construct shafts from one piece of single-ply plate or coil. For anchor base fabrication, conform to the applicable bolt pattern and orientation as shown on Metal Pole Standard Drawing Sheet M2.

Use the submerged arc process, or other NCDOT previously approved process suitable for shafts, to continuously weld pole shafts along their entire length. Finish the longitudinal seam weld flush with the outside contour of the base metal. Ensure shaft has no circumferential welds except at the lower end joining the shaft to the pole base. Use full penetration groove welds with backing ring for all tube-to-transverse-plate connections in accordance with 6th Edition AASHTO. Provide welding that conforms to Article 1072-18 of the *Standard Specifications.* No field welding on any part of the pole will be permitted unless approved by a qualified Engineer.

After fabrication, hot-dip galvanize steel poles and all assembly components in accordance with section 1076-3 of the *Standard Specifications*. Design structural assemblies with weep holes large enough and properly located to drain molten zinc during the galvanization process. Galvanize hardware in accordance with section 1076-4 of the *Standard Specifications*. Ensure threaded material is brushed and retapped as necessary after galvanizing. Perform repair of damaged galvanizing in accordance with section 1076-7 of the Standard *Specifications. Ensure* all hardware is galvanized steel or stainless steel. The Contractor is responsible for ensuring the Designer/Fabricator specifies connecting hardware and/or materials that prevent a dissimilar metal corrosive reaction.

Ensure each anchor rod is 2-inch minimum diameter and 60-inch length. Provide 10-inch minimum thread projection at the top of the rod, and 8-inch minimum at the bottom of the rod. Use

anchor rod assembly and drilled pier foundation materials complying with SP09_R005, hereinafter referred to as *Foundations and Anchor Rod Assemblies for Metal Poles*.

Ensure anchor bolt hole diameters are ¼-inch larger than the anchor bolt diameters in the base plate.

Provide a circular anchor bolt lock plate securing the anchor bolts at the embedded end with two (2) washers and two (2) nuts. Provide a base plate template matching the bolt circle diameter of the anchor bolt lock plate. Construct plates and templates from ¼-inch minimum thick steel with a minimum width of 4 inches. Hot-dip galvanizing is not required for both plates.

Provide four (4) heavy hex nuts and four (4) flat washers for each anchor bolt. For nuts, use AASHTO M291 grade 2H, DH, or DH3 or equivalent material. For flat washers, use AASHTO M293 or equivalent material. Ensure anchor bolts have required diameters, lengths, and positions, and will develop strengths comparable to their respective poles.

For each pole, provide a grounding lug with a ½-inch minimum thread diameter, coarse thread stud and nut that will accommodate #4 AWG ground wire. Ensure the lug is electrically bonded to the pole and is conveniently located inside the pole at the hand hole.

Provide a removable pole cap with stainless steel attachment screws for the top of each pole. Ensure cap is cast aluminum conforming to Aluminum Association Alloy 356.0F. Furnish cap attached to the pole with a sturdy stainless-steel chain that is long enough to permit cap to hang clear of the pole-top opening when cap is removed.

Where required by the plans, furnish couplings 42 inches above bottom of the pole base for mounting of pedestrian pushbuttons. Provide mounting points consisting of 1½-inch internally threaded half-couplings complying with the NEC, mounted within the poles. Ensure that couplings are essentially flush with the outside surfaces of the poles and are installed before any required hot-dip galvanizing. Provide a threaded plug in each mounting point. Ensure the surface of the plug is essentially flush with the outer end of the mounting point when installed and has a recessed slot that will accommodate a ½ “drive standard socket wrench.

Metal poles may be erected and fully loaded after concrete has attained a minimum allowable compressive strength of 3,000 psi.

Connect poles to grounding electrodes and bond them to the electrical service grounding electrodes.

When field drilling is necessary for wire or cable entrances into the pole, comply with the following requirements:

- Do not drill holes within 2 inches of any welds.
- Do not drill any holes larger than 3 inches in diameter without checking with the ITS & Signals Structure Engineers.
- Avoid drilling multiple holes along the same cross section of tube shafts.
- Install rubber grommets in all field drilled holes that wire, or cable will directly enter unless holes are drilled for installation of weather heads or couplings.
- Treat the inside of the drilled holes and repair all galvanized surfaces in accordance with Section 1076-7 of the latest edition of the *Standard Specification prior to installing grommets, caps, or plugs.*
- Cap or plug any existing field drilled holes that are no longer used with rubber, aluminum, or stainless-steel hole plugs.

When street lighting is installed on metal signal structures, isolate the conductors feeding the luminaires inside the pole shaft using liquid tight flexible metal conduit (Type LFMC), liquid tight flexible nonmetallic conduit (Type LFNC), high density polyethylene conduit (Type HDPE), or approved equivalent. All conductors supplying power for luminaires must run through an external disconnect prior to entrance into the structure. Comply with applicable National Electrical Safety Codes (NESC). Refer to Article "G" Luminaire Arms.

Install a ¼-inch thick plate for a concrete foundation tag to include the following information: concrete grade, depth, diameter, and reinforcement sizes of the installed foundation. Install galvanized wire mesh to cover gap between the base plate and top of foundation for debris and pest control. Refer to standard drawing M7 for further details.

Immediately notify the Engineer of any structural deficiency that becomes apparent in any assembly, or member of any assembly, because of the design requirements imposed by these specifications, the plans, or the typical drawings.

C. Design:

Unless otherwise specified, design all metal pole support structures using the following 6th Edition AASHTO specifications:

- Design for a 50-year service life as recommended by Table 3.8.3-2.
- Use wind pressure map developed from 3-second gust speeds, as provided in Section 3.8.
- Assume wind loads as shown in Figures 3.9.4.2-2 and 3.9.4.2-3 of the 6th Edition AASHTO for Group III loading with Ice.
- Ensure metal pole support structures include natural wind gust loading and truck-induced gust loading for fatigue design, as provided in Sections 11.7.1.2 and 11.7.1.3, respectively. Designs need not consider periodic galloping forces.
- Assume 11.2 mph natural wind gust speed in North Carolina. For natural wind fatigue stress calculations, utilize a drag coefficient (C_d) based on the yearly mean wind velocity of 11.2 mph.
- When selecting Fatigue Importance Factors, utilize Fatigue Importance Category II, as provided for in Table 11.6-1, unless otherwise specified.
- Calculate all stresses using applicable equations from Section 5. The Maximum allowable stress ratio for all metal pole support designs is 0.9.
- Conform to Sections 10.4.2 and 11.8 for deflection requirements. For CCTV and MVD support structures, ensure maximum deflection at top of pole does not exceed 2.0 percent of pole height.
- Assume the combined minimum weight of a messenger cable bundle (including messenger cable, signal cable and detector lead-in cables) is 1.3 lbs/ft. Assume the combined minimum diameter of the cable bundle is 1.3 inches.

- All CCTV and MVD poles shall meet the compact section limits per section 5.5.2 along with Table 5.5.2-1. Minimum thickness of CCTV and MVD pole shafts shall be ¼-inch.
- All CCTV and MVD poles shall use full-penetration groove weld tube-to-transverse plate connection with backing ring. Refer to Metal Pole Standard Drawing Sheet M9 for details. Fillet-welded tube-to-transverse-plate connections are not permitted.

Unless otherwise specified by special loading criteria, the following computed surface area for ice load on signal heads shall be used:

- 3-section, 12-inch, Surface area: 26.0 ft^2
- 4-section, 12-inch, Surface area: 32.0 ft^2
- 5-section, 12-inch, Surface area: 42.0 ft^2

Design a base plate for each pole. The minimum base plate thickness for all poles is determined by the following criteria:

<u>*Case 1*</u> Circular or rectangular solid base plate with the upright pole welded to the top surface of base plate with full penetration butt weld, where no stiffeners are provided. A base plate with a small center hole, which is less than 1/3 of the upright diameter, and located concentrically with the upright pole, may be considered as a solid base plate.

The magnitude of bending moment in the base plate, induced by the anchoring force of each anchor bolt is $M = (P \times D_1) / 2$, where

M = bending moment at the critical section of the base plate induced by one (1) anchor bolt

P = anchoring force of each anchor bolt

D_1 = horizontal distance between the anchor bolt center and the outer face of the upright, or the difference between the bolt circle radius and the outside radius of the upright

Locate the critical section at the face of the anchor bolt and perpendicular to the bolt circle radius. The overlapped part of two (2) adjacent critical sections is considered ineffective.

<u>*Case 2*</u> Circular or rectangular base plate with the upright pole socketed into and attached to the base plate with two (2) lines of fillet weld, and where no stiffeners are provided, or any base plate with a center hole that is larger in diameter than 1/3 of the upright diameter.

The magnitude of bending moment induced by the anchoring force of each anchor bolt is $M = P \times D_2$,

where P = anchoring force of each anchor bolt

D_2 = horizontal distance between the face of the upright and the face of the anchor bolt nut

Locate the critical section at the face of the anchor bolt top nut and perpendicular to the radius of the bolt circle. The overlapped part of two (2) adjacent critical sections is considered ineffective.

If the base plate thickness calculated for Case 2 is less than Case 1, use the thickness calculated for Case 1.

The following additional requirements apply concerning pole base plates.

- Ensure that whichever case governs as defined above, the anchor bolt diameter is set to match the base plate thickness. If the minimum diameter required for the anchor bolt exceeds the thickness required for the base plate, set the base plate thickness equal to the required bolt diameter.
- For all metal poles, use a full penetration groove weld with a backing ring to connect the pole upright component to the base. Refer to Metal Pole Standard Drawing Sheet M3 or M4.

The Professional Engineer is wholly responsible for the design of all poles. Review and acceptance of these designs by the Department does not relieve the said Professional Engineer of his or her responsibility.

D. Strain Poles:

Refer to Metal Pole Standard Drawing Sheets M2 and M3 for fabrication details.

Provide two (2) messenger cable (span wire) clamps and associated hardware for attachment of messenger cable. Ensure diameter of the clamp is appropriate to its location on the pole and is appropriately designed for adjustment from 1'-6" below the top, down to 6'-6" below the top of the pole. Do not attach more than one (1) support cable to a messenger cable clamp.

Provide a minimum of three (3) 2-inch holes equipped with an associated coupling and weatherhead on the messenger cable load side of the pole to accommodate passage of signal cables from inside the pole. Provide galvanized threaded plugs for all unused couplings at pole entrance points. Refer to Metal Pole Standard Drawing Sheet M3 for fabrication details.

Provide designs with a 6" x 12" hand hole with reinforcing frame for each pole.

Provide a terminal compartment with cover and screws in each pole encompassing the hand hole and containing a 12-terminal barrier type terminal block. Provide two (2) terminal screws with a removable shorting bar between them for each termination. Furnish terminal compartment covers attached to the pole by a sturdy chain or cable approved by the Engineer. Ensure chain or cable is long enough to permit cover to hang clear of the compartment opening when cover is removed and is strong enough to prevent vandalism. Ensure chain or cable will not interfere with service to cables in the pole base.

Have poles permanently stamped above the hand holes with the identification tag details as shown on Metal Pole Standard Drawing Sheets M2 and M3.

Provide grounding lug(s) in the approximate vicinity of the messenger cable clamp for bonding and grounding messenger cable. Lugs must accept #4 AWG wire to bond messenger cables to the pole in order to provide an effective ground fault circuit path. Refer to Metal Pole Standard Drawing Sheet M6 for construction details.

Install metal poles, hardware, and fittings as shown on the manufacturer's installation drawings. Ensure the installed pole, when fully loaded, is within 1 degree 40 minutes (1°40') of vertical. Install poles with the manufacturer's recommended "rake." Where required, use threaded leveling nuts to establish rake.

E. Mast Arm Poles:

Refer to Metal Pole Standard Drawing Sheets M2 through M5 for fabrication details.

Fabricate metal arm shaft from coil or plate steel that meet the requirements of ASTM A 595 Grade A tubes. Provide arm shafts of round or near round (18 sides or more) cross-section, or multi-sided tubular cross-section with no less than six sides, having a uniform linear taper of 0.14 in/ft. Construct shafts from one piece of single-ply plate or coil, eliminating circumferential weld splices.

Use the submerged arc process, or other NCDOT previously approved process suitable for arm shafts, to continuously weld arm shafts along their entire length. The longitudinal seam weld shall be finished flush to the outside contour of the base metal. Ensure arm shaft has no circumferential welds except at the lower end joining the shaft to the arm flange plate. Use full penetration groove welds with backing ring for all tube-to-transverse-plate connections in accordance with 6th Edition AASHTO. Provide welding that conforms to Article 1072-18 of the *Standard Specifications*, except no field welding on any part of the arm shaft will be permitted unless approved by a qualified Engineer.

After fabrication, hot-dip galvanize steel arm shafts and all assembly components per section 1076 of the *Standard Specifications*. Design arm shafts with weep holes large enough and properly located to drain molten zinc during the galvanization process. Provide hot-dip galvanizing on steel arm shafts that meets or exceeds ASTM Standard A-123, AASHTO M111, or an approved equivalent. Perform repair of damaged galvanizing that complies with the following *Standard Specifications* article:

Repair of Galvanizing.....Article 1076-7

Ensure metal arm shafts permit cables to be installed inside arm shafts. For holes in arm shafts used to accommodate cables, provide full-circumference grommets. Wire access holes for arm flange plates should be deburred, non-grommeted, and oversized to fit around 4-inch diameter grommeted wire access holes for shaft flange plates.

Provide a minimum of four (4) 1-1/2" diameter high strength bolts for connection between arm plate and pole plate. Increase number of bolts to a minimum of six (6) 1-1/2" diameter high strength bolts when arm lengths are greater than 50'-0" long.

Provide designs with a 6" x 12" hand hole with reinforcing frame for each pole.

Provide a terminal compartment with cover and screws in each pole encompassing the hand hole and containing a 12-terminal barrier type terminal block. Provide two (2) terminal screws with a removable shorting bar between them for each termination. Furnish terminal compartment covers attached to the pole by a sturdy chain or cable approved by the Engineer. Ensure chain or cable is long enough to permit cover to hang clear of the compartment opening when cover is removed and is strong enough to prevent vandalism. Ensure chain or cable will not interfere with service to cables in the pole base.

Have poles permanently stamped above the hand holes with the identification tag details as shown on Metal Pole Standard Drawing Sheets M2 and M4.

Provide a removable end cap with stainless steel attachment screws for the end of each mast arm. Ensure cap is cast aluminum conforming to Aluminum Association Alloy 356.0F. Furnish cap attached to arm with a sturdy chain or cable approved by the Engineer. Ensure chain or cable is long enough to permit cap to hang clear of arm end opening when cap is removed.

Provide pole flange plates and associated gussets and fittings for attachment of required mast arms. As part of each mast arm attachment, provide a cable passage hole in pole to allow passage of cables from pole to arm. Provide a grommeted 4-inch diameter cable passage hole on the shaft side of the connection to allow passage of cables from pole to arm.

Furnish all arm plates and necessary attachment hardware, including bolts and brackets.

Provide two (2) extra bolts for each arm.

Provide arms with weatherproof connections for attaching to the pole shaft.

Provide hardware that is galvanized steel, stainless steel, or corrosive-resistant aluminum.

Install metal poles, hardware, and fittings as shown on the manufacturer's installation drawings. Ensure the installed pole, when fully loaded, is within 1 degree 40 minutes (1°40') of vertical. Install poles with the manufacturer's recommended "rake." Where required, use threaded leveling nuts to establish rake.

Install horizontal-type arms with a manufactured rise preventing arm from deflecting below arm attachment height.

Ensure maximum angular rotation of the top of mast arm pole does not exceed 1 degree 40 minutes (1°40'). Ensure allowable mast arm deflection does not exceed that allowed per 6th Edition

AASHTO. For all group load combinations specified under Section 3 of 6th Edition AASHTO, restrict tip of fully loaded arm from going below arm attachment point with the pole.

F. CCTV and MVD Poles:

Refer to Metal Pole Standard Drawing Sheets M2, M3 and M9 for fabrication details.

Furnish hand hole covers attached to the pole by a sturdy chain or cable approved by the Engineer. Ensure chain or cable is long enough to permit cover to hang clear of the compartment opening when cover is removed and is strong enough to prevent vandalism. Ensure chain or cable will not interfere with service to cables in the pole shaft.

Furnish and install the required Air Terminal & Lightning Protection System as described in the "Air Terminal & Lightning Protection System" Project Special Provisions and as referenced in the following Typical Details:

- CCTV and MVD Camera Installation for Metal Pole with Aerial Electrical Service
- CCTV and MVD Camera Installation for Metal Pole with Underground Electrical Service

Have poles permanently stamped above the hand holes with the identification tag details as shown on Metal Pole Standard Drawing Sheets M2, M3 and M9.

Provide a 2-inch hole equipped with an associated coupling and weather head approximately 5 feet below top of pole to accommodate passage of CCTV and MVD cables from inside pole to CCTV and MVD camera.

Provide a 2-inch hole equipped with an associated coupling and conduit fittings/bodies approximately 18 inches above base of pole to accommodate passage of CCTV and MVD cables from CCTV and MVD cabinet to inside of pole. Refer to Metal Pole Standard Drawing Sheet M3 for fabrication details.

Install CCTV and MVD metal poles, hardware, and fittings as shown on the manufacturer's installation drawings. Ensure the installed pole, when fully loaded, is within 0.5 degrees of vertical. Where required, use threaded leveling nuts to establish rake.

Comply with the following requirements for CCTV and MVD Pole Anchor Bolts and Base Plates:

- Poles up to 40'-0" in length, provide a minimum of four (4) 2-inch diameter anchor bolts, and a minimum 2-inch-thick circular base plate. Provide anchor bolts of Grade 55 ksi, and base plate of Grade 50 ksi.
- Poles greater than 40'-0" and up to 100'-0" in length, provide a minimum of eight (8) 2-inch diameter anchor bolts, and a minimum 2-inch-thick circular base plate. Provide anchor bolts of Grade 55 ksi, and base plate of Grade 50 ksi.

Obtain the Structural Engineer's approval for deviations from these requirements, prior to shop drawing(s) submission.

G. Luminaire Arms:

Comply with the following for Steel Luminaire Arms:

- Furnish tapered tube or standard weight black steel pipe conforming to ASTM A 53-90a, Type E or Type S, Grade B or an approved equivalent.

- Provide welding conforming to Article 1072-18 of the Standard Specifications, except no field welding on any part of the will be permitted unless approved by a qualified Engineer.
- Hot-dip galvanize the structure in accordance with AASHTO M 111 or an approved equivalent, once all fabricating, cutting, punching, and welding are completed.
- In accordance with National Electrical Safety Code (NESC) Article 230.2(E), provide identification of the electrical source provider for the luminaire feeder circuit with contact information on a permanent label located in the pole hand hole near the feeder circuit raceway.

4.2. DRILLED PIER FOUNDATIONS FOR METAL POLES

Analysis procedures and formulas shall be based on AASHTO 6th Edition, latest ACI-318 code and the *Drilled Shafts: Construction Procedures and Design Methods* FHWA-NHI-10-016 manual. Design methods based on engineering publications or research papers must have prior approval from NCDOT. The Department reserves the right to accept or reject any method used for the analysis.

Use the following Safety Factors for the foundation design:

- 1.0 x Service (Unfactored) Loads for LPile Shaft Lateral Deflection
- 1.3 x Torsion (Unfactored) Load for Drilled Shaft Concrete and Steel Strength
- (1.3 / 1.33) x Torsion (Unfactored) Load for Shaft Soil-to-Concrete Torsion Capacity
- (2.0 / 1.33) x Axial (Unfactored) Load for Shaft Axial Capacity in Soil

Ensure deflection at top of foundation does not exceed 1 inch for worst-case lateral load.

Use LPILE Plus V6.0 or later for lateral analysis. Submit inputs, results and corresponding graphs with the design calculations.

Calculate skin friction using the α-method for cohesive soils and the β-method for cohesion-less soils (**Broms method will not be accepted**). Detailed descriptions of the "α" and "β" methods can be found in *FHWA-NHI-10-016*.

Omit first 2.5 feet for cohesive soils when calculating skin friction.

Assume a hammer efficiency of 0.70 unless value is provided.

All CCTV and MVD pole drilled shafts shall be a minimum of 4'-0" diameter. Refer to Standard Drawing Nos. M7 and M8.

Design custom foundations to carry maximum capacity of each metal pole. For standard case strain poles with custom design, use actual shear, axial and moment reactions from the Standard Strain Pole Foundation Selection Table shown on Standard Drawing No. M8.

When poor soil conditions are encountered, which could create an excessively large foundation design, consideration may be given to allow an exemption to the maximum capacity design. The Contractor must gain approval from the Engineer before reducing a foundation's capacity. On projects where poor soil is known to be present, the Contractor should have foundation designs approved before releasing poles for fabrication.

Have the Contractor notify the Engineer if the proposed foundation is to be installed on a slope other than 8H: 1V or flatter.

A. Description:

Furnish and install foundations for NCDOT metal poles with all necessary hardware in accordance with the plans and specifications.

Metal Pole Standards have been developed and implemented by NCDOT for use at signalized intersections in North Carolina. If the plans call for a standard strain pole, then a standard foundation may be selected from the plans. However, the Contractor is not required to use a standard foundation. If the Contractor chooses to design a non-standard site-specific foundation for a standard strain pole or if the plans call for a non-standard site-specific pole, design the foundation to conform to the applicable provisions in the NCDOT Metal Pole Standard Drawings and Section B4 (Non-Standard Foundation Design) below. If non-standard site-specific foundations are designed for standard QPL approved strain poles, the foundation designer must use the design moment specified by load case on Metal Pole Standard Drawing Sheet M8. Failure to conform to this requirement will be grounds for rejection of the design.

If the Contractor chooses to design a non-standard foundation for a standard strain pole and the soil test results indicate a standard foundation is feasible for the site, the Contractor will be paid the cost of the standard foundation. Any additional cost associated with a non-standard site-specific foundation including additional materials, labor and equipment will be considered incidental to the cost of the standard foundation. All costs for the non-standard foundation design will be considered incidental to the cost of the standard foundation.

B. Soil Test and Foundation Determination:

1. General:

Drilled piers are reinforced concrete sections, cast-in-place against in situ, undisturbed material. Drilled piers are of straight shaft type and vertical.

2. Soil Test:

Perform a soil test at each proposed metal pole location. Complete all required fill placement and excavation at each pole location to finished grade before drilling each boring. Soil tests performed that are not in compliance with this requirement may be rejected and will not be paid. Drill one boring to a depth of 26 feet within a 25-foot radius of each proposed foundation.

Perform standard penetration tests (SPT) in accordance with ASTM D 1586 at depths of 1, 2.5, 5, 7.5, 10, 15, 20 and 26 feet. Discontinue the boring if one of the following occurs:

- A total of 100 blows have been applied in any two consecutive 6-inch intervals.
- A total of 50 blows have been applied with < 3-inch penetration.

Describe each pole location along the project corridor in a manner that is easily discernible to both the Contractor's Designer and NCDOT Reviewers. If the pole is at an intersection, label the boring the "Intersection of (*Route or SR #*), *(Street Name)* and (*Route or SR #*), *(Street Name)*, _____ County, Signal or Asset Inventory No. _____". Label borings with "B- *N, S, E, W, NE, NW, SE or SW*" corresponding to the quadrant location within the intersection.

If the pole location is located between intersections, provide a coordinate location and offset, or milepost number and offset. Pole numbers should be made available to the Drill Contractor. Include pole numbers in the boring label if they are available. If they are not available, ensure the boring labels can be cross-referenced to corresponding pole numbers. For each boring, submit a legible (hand-written or typed) boring log signed and sealed by a licensed Geologist or Professional Engineer registered in North Carolina. Include on each boring the SPT blow counts and N-values at each depth, depth of the boring, hammer efficiency, depth of water table and a general description of the soil types encountered using the AASHTO Classification System.

Borings that cannot be easily correlated to their specific pole location will be returned to the Contractor for clarification; or if approved by the Engineer, the foundation may be designed using the worst-case soil condition obtained as part of this project.

3. Standard Foundation Determination:

Use the following method for determining the Design N-value:

$$N_{AVG} = \frac{N_{@1'} + N_{@2.5'} + \cdots + N_{@Deepest\ Boring\ Depth}}{Total\ Number\ of\ N\ values}$$

$$Y = (N_{@1'})^2 + (N_{@2.5'})^2 + \cdots + (N_{@Deepest\ Boring\ Depth})^2$$

$$Z = N_{@1'} + N_{@2.5'} + \cdots + N_{@Deeepest\ Boring\ Depth}$$

$$N_{STD\ DEV} = \sqrt{\left(\frac{(Total\ Number\ of\ N\ values \times Y) - Z^2}{(Total\ Number\ of\ N\ values) \times (Total\ Number\ of\ N\ values - 1)}\right)}$$

Design N-value equals lesser of the following two conditions:

$$N_{AVG} - (N_{STD\ DEV} \times 0.45)$$

OR

$$Average\ of\ First\ Four\ (4) N\ values = \frac{N_{@1'} + N_{@2.5'} + N_{@5'} + N_{@7.5'}}{4}$$

Note: If less than four (4) N-values are obtained because of criteria listed in Section 2 above, use average of N-values collected for second condition. Do not include the N-value at the deepest boring depth for above calculations if the boring is discontinued at or before the required boring depth because of criteria listed in Section 2 above. Use N-value of zero (0) for weight of hammer or weight of rod. If N-value is greater than fifty (50), reduce N-value to fifty (50) for calculations.

If standard NCDOT strain poles are shown on the plans and the Contractor chooses to use standard foundations, determine a drilled pier length, "L," for each signal pole from the Standard Strain Pole Foundations Chart (sheet M8) based on the Design N-value and the predominant soil type. For each standard pole location, submit a completed "Metal Pole Standard Foundation Selection Form" signed by the Contractor's representative. Signature on form is for verification purposes only. Include the Design N-value calculation and resulting drilled pier length, "L," on each form.

If non-standard site-specific poles are shown on the plans, submit completed boring logs collected in accordance with Section 2 (Soil Test) along with pole loading diagrams from the plans to the Contractor-selected pole Fabricator to assist in the pole and foundation design.

If one of the following occurs, the Standard Foundations Chart shown on the plans may not be used and a non-standard foundation may be required. In such case, contact the Engineer.

- The Design N-value is less than four (4).

- The drilled pier length, "L", determined from the Standard Foundations Chart, is greater than the depth of the corresponding boring.

In the case where a standard foundation cannot be used, the Department will be responsible for the additional cost of the non-standard foundation.

Foundation designs are based on level ground around the traffic signal pole. If the slope around the edge of the drilled pier is steeper than 8:1 (H:V) or the proposed foundation will be less than 10 feet from the top of an embankment slope, the Contractor is responsible for providing slope information to the foundation Designer and to the Engineer so it can be considered in the design.

The "Metal Pole Standard Foundation Selection Form" may be found at:

https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx

If assistance is needed, contact the Engineer.

4. Non-Standard Foundation Design:

Design non-standard foundations based upon site-specific soil test information collected in accordance with Section 2 (Soil Test). Design drilled piers for side resistance in accordance with Section 4.6 of the *2002 AASHTO Standard Specifications for Highway Bridges, 17th Edition*. Use computer software LPILE version-6.0 or later manufactured by Ensoft, Inc. to analyze drilled piers. Use computer software gINT V8i or later manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs. Provide a drilled pier foundation for each pole with a length and diameter resulting in horizontal lateral movement less than 1 inch at top of the pier, and horizontal rotational movement less than 1 inch at the edge of pier. Contact the Engineer for pole loading diagrams of standard poles used for non-standard foundation designs. Submit non-standard foundation designs including drawings, calculations, and soil boring logs to the Engineer for review and approval before construction.

C. Drilled Pier Construction:

Construct drilled pier foundation and Install anchor rod assemblies in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* Standard Special Provision SP09-R005 located at:

https://connect.ncdot.gov/resources/Specifications/Pages/2018-Specifications-and-Special-Provisions.aspx

4.3. POLE NUMBERING SYSTEM

A. New Poles

Attach an identification tag to each pole shaft section as shown on Metal Pole Standard Sheet M2 "Typical Fabrication Details for All Metal Poles."

4.4. MEASUREMENT AND PAYMENT

Actual number of metal strain signal poles (without regard to height or load capacity) furnished, installed and accepted.

Actual number of soil tests with SPT borings drilled furnished and accepted.

Actual volume of concrete poured in cubic yards of drilled pier foundation furnished, installed and accepted.

No measurement will be made for foundation designs prepared with metal pole designs, as these will be considered incidental to designing Traffic Signal , CCTV or MVD support structures.

Payment will be made under:

Metal Strain Signal Pole .....Each
Soil Test .....Each
Drilled Pier Foundation..... Cubic Yard

5. JUNCTION BOX MARKERS

5.1. DESCRIPTION

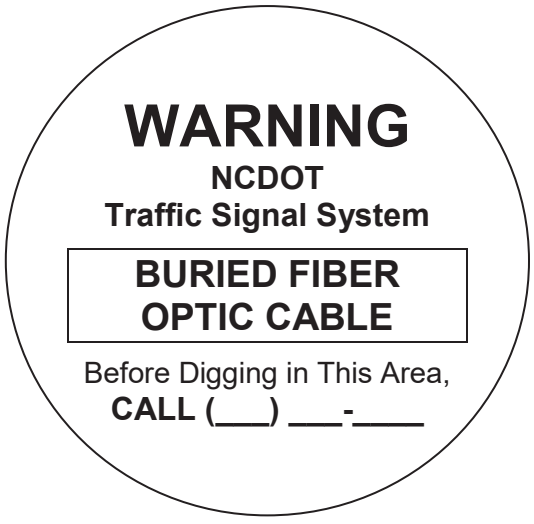
Furnish and install junction box markers with all necessary hardware and adhesives to warn of buried fiber-optic communications cable.

5.2. MATERIALS

A. Junction Box Markers

Furnish durable, non-reflective junction box markers, also known as curb markers, fabricated from UV-resistant, non-metallic materials other than ceramic material, such as polyurethane or high impact polypropylene or other high impact plastic. Provide junction box markers that are designed for outdoor use, that are waterproof, that resist fading, that are temperature stable and that resist chemical and mechanical abrasion. Furnish junction box markers with a quick-setting adhesive designed for use with the junction box markers supplied and designed to permanently adhere junction box markers to Portland cement/concrete, steel, and cast iron as well as other non-porous hard surfaces. Do not provide markers that require intrusive fasteners to secure the marker to the surface. Do not provide adhesives that are not designed for use with the junction markers supplied. Provide junction box markers that do not require special tools such as torches, tamping machines or drills or hardware or special surface preparation for installation. Furnish junction box markers from a manufacturer that has been producing such junction box markers (i.e., curb markers) for a minimum of 10 consecutive years.

Order the junction box marker with the Division's Phone Number printed on the marker, hand written sharpie labeling is not acceptable. Consult with the Engineer to ensure the junction box labels are ordered with the correct Division phone number. Provide junction box markers that contain the text and symbols, text emphasis and text proportions depicted in the example format shown below.:



Overall Junction Box Marker Dimensions: 2.5" diameter
Text: Black
Background: Light Gray (to blend with concrete and granite surfaces)

Submit samples of proposed junction marker to the Engineer for approval before installation. In lieu of designing a custom junction box marker, the Contractor may submit for the Engineer's approval a stock/standard junction box marker format (i.e., off-the-shelf format) from the junction box marker manufacturer that differs from the example format proposed above but that still embodies the content and intent conveyed by the example format.

Have the junction box marker manufacturer provide a list of references along with contract information for at least five different municipal government agencies and/or state departments of transportation that have installed the proposed manufacturer's markers and can attest to the performance of the manufacturer's markers over a continuous period of no less than seven years. Submit these references to the Engineer for review in conjunction with submission of the sample.

5.3. CONSTRUCTION METHODS

A. Junction Box Markers

Apply junction box markers to the surface of the junction box cover/lid on all new and/or existing junction boxes that are to be reused to house the fiber-optic communications cable. Additionally, at locations where a junction box is perpendicular to a raised curb place an additional junction box marker on the curb.

Clean surface to which the junction box marker will be applied. Make sure application surface is dry and free of any loose debris or cracks. Apply adhesive to back side of the junction box marker in accordance with manufacturer's instructions. Apply additional adhesive when surface is uneven or textured to fill voids and assure secure adhesion. Apply the junction box marker to the application surface and press firmly. Ensure that entire edge around perimeter of marker is sealed to the application surface.

Position the marker in the approximate center of the junction box cover and orient the marker so that its text is parallel to long side of the cover. On curb sections install the marker on the flattest surface of the curb at a point that is is perpendicular to the junction box.

Junction box markers are not required to be place on flat surfaces of the roadway where there is no curbing, unless required by the Engineer.

5.4. MEASUREMENT AND PAYMENT

Junction Box Marker will be measured and paid for as the actual number of junction box markers furnished, installed, and accepted.

No measurement will be made of junction box marker adhesive as this will be considered incidental to furnishing and installing the junction box marker.

Payment will be made under:

Junction Box Marker.....Each

6. ETHERNET EDGE SWITCH

Furnish and install a managed Ethernet edge switch as specified below that is fully compatible, interoperable, and completely interchangeable and functional within the existing City or Division traffic signal system communications network.

6.1. DESCRIPTION

A. Ethernet Edge Switch:

Furnish and install a hardened, field Ethernet edge switch (hereafter "edge switch") for traffic signal controllers as specified below. Ensure that the edge switch provides wire-speed, fast Ethernet connectivity at transmission rates of 100 megabits per second from each remote ITS device location to the routing switches.

Contact the City or Division to arrange for the programming of the new Field Ethernet Switches with the necessary network configuration data, including but not limited to, the Project IP Address, Default Gateway, Subnet Mask and VLAN ID information. Provide a minimum five (5) days working notice to allow the City or Division to program the new devices.

B. Network Management:

Ensure that the edge switch is fully compatible with the City's or Division's existing Network Management Software.

6.2. MATERIALS

A. General:

Ensure that the edge switch is fully compatible and interoperable with the trunk Ethernet network interface and that the edge switch supports half and full duplex Ethernet communications.

Furnish an edge switch that provide 99.999% error-free operation, and that complies with the Electronic Industries Alliance (EIA) Ethernet data communication requirements using single-mode fiber-optic transmission medium and copper transmission medium. Ensure that the edge switch has a minimum mean time between failures (MTBF) of 10 years, or 87,600 hours, as calculated using the Bellcore/Telcordia SR-332 standard for reliability prediction.

B. Compatibility Acceptance

The Engineer has the authority to require the Contractor to submit a sample Field Ethernet Switch and Field Ethernet Transceiver along with all supporting documentation, software and testing procedures to allow a compatibility acceptance test be performed prior to approving the proposed Field Ethernet Switch and Field Ethernet Transceiver for deployment**. The Compatibility Acceptance testing will ensure that the proposed device is 100% compatible and interoperable with the existing City Signal System network, monitoring software and Traffic Operations Center network hardware.** Allow fifteen (15) working days for the Compatibility Acceptance Testing to be performed

C. Standards:

Ensure that the edge switch complies with all applicable IEEE networking standards for Ethernet communications, including but not limited to:

- IEEE 802.1D standard for media access control (MAC) bridges used with the Spanning Tree Protocol (STP);
- IEEE 802.1Q standard for port-based virtual local area networks (VLANs);
- IEEE 802.1P standard for Quality of Service (QoS);

- IEEE 802.1w standard for MAC bridges used with the Rapid Spanning Tree Protocol (RSTP);
- IEEE 802.1s standard for MAC bridges used with the Multiple Spanning Tree Protocol;
- IEEE 802.1x standard for port based network access control, including RADIUS;
- IEEE 802.3 standard for local area network (LAN) and metropolitan area network (MAN) access and physical layer specifications;
- IEEE 802.3u supplement standard regarding 100 Base TX/100 Base FX;
- IEEE 802.3x standard regarding flow control with full duplex operation; and
- IFC 2236 regarding IGMP v2 compliance.
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- IEEE 802.3ad Ethernet Link Aggregation
- IEEE 802.3i for 10BASE-T (10 Mbit/s over Fiber-Optic)
- IEEE 802.3ab for 1000BASE-T (1Gbit/s over Ethernet)
- IEEE 802.3z for 1000BASE-X (1 Gbit/s Ethernet over Fiber-Optic)

D. Functional:

Ensure that the edge switch supports all Layer 2 management features and certain Layer 3 features related to multicast data transmission and routing. These features shall include, but not be limited to:

- An STP healing/convergence rate that meets or exceeds specifications published in the IEEE 802.1D standard.
- An RSTP healing/convergence rate that meets or exceeds specifications published in the IEEE 802.1w standard.
- An Ethernet edge switch that is a port-based VLAN and supports VLAN tagging that meets or exceeds specifications as published in the IEEE 802.1Q standard, and has a minimum 4-kilobit VLAN address table (254 simultaneous).
- A forwarding/filtering rate that is a minimum of 14,880 packets per second for 10 megabits per second and 148,800 packets per second for 100 megabits per second.
- A minimum 4-kilobit MAC address table.
- Support of Traffic Class Expediting and Dynamic Multicast Filtering.
- Support of, at a minimum, snooping of Version 2 & 3 of the Internet Group Management Protocol (IGMP).
- Support of remote and local setup and management via telnet or secure Web-based GUI and command line interfaces.
- Support of the Simple Network Management Protocol version 3 (SNMPv3). Verify that the Ethernet edge switch can be accessed using the resident EIA-232 management port, a telecommunication network, or the Trivial File Transfer Protocol (TFTP).
- Port security through controlling access by the users. Ensure that the Ethernet edge switch has the capability to generate an alarm and shut down ports when an unauthorized user accesses the network.
- Support of remote monitoring (RMON-1 & RMON-2) of the Ethernet agent.
- Support of the TFTP and SNTP. Ensure that the Ethernet edge switch supports port mirroring for troubleshooting purposes when combined with a network analyzer.

E. Physical Features:

Ports: Provide 10/100/1000 Mbps auto-negotiating ports (RJ-45) copper Fast Ethernet ports for all edge switches. Provide auto-negotiation circuitry that will automatically negotiate the highest possible data rate and duplex operation possible with attached devices supporting the IEEE 802.3 Clause 28 auto-negotiation standard.

Optical Ports: Ensure that all fiber-optic link ports operate at 1310 or 1550 nanometers in single mode. Provide Type LC connectors for the optical ports, as specified in the Plans or by the Engineer. Do not use mechanical transfer registered jack (MTRJ) type connectors.

Provide an edge switch having a minimum of two optical 100/1000 Base X ports capable of transmitting data at 100/1000 megabits per second. Ensure that each optical port consists of a pair of fibers; one fiber will transmit (TX) data and one fiber will receive (RX) data. Ensure that the optical ports have an optical power budget of at least 15 dB.

Copper Ports: Provide an edge switch that includes a minimum of four copper ports. Provide Type RJ-45 copper ports and that auto-negotiate speed (i.e., 10/100/1000 Base) and duplex (i.e., full or half). Ensure that all 10/100/1000 Base TX ports meet the specifications detailed in this section and are compliant with the IEEE 802.3 standard pinouts. Ensure that all Category 5E unshielded twisted pair/shielded twisted pair network cables are compliant with the EIA/TIA-568-B standard.

*Port Security***:** Ensure that the edge switch supports/complies with the following (remotely) minimum requirements:

- Ability to configure static MAC addresses access;
- Ability to disable automatic address learning per ports; know hereafter as Secure Port. Secure Ports only forward; and
- Trap and alarm upon any unauthorized MAC address and shutdown for programmable duration. Port shutdown requires administrator to manually reset the port before communications are allowed.

F. Management Capabilities:

Ensure that the edge switch supports all Layer 2 management features and certain Layer 3 features related to multicast data transmission and routing. These features shall include, but not be limited to:

- An STP healing/convergence rate that meets or exceeds specifications published in the IEEE 802.1 D standards;
- An RSTP healing/convergence rate that meets or exceeds specifications published in the IEEE 802.1w standard;
- An Ethernet edge switch that is a port-based VLAN and supports VLAN tagging that meets or exceeds specifications as published in the IEEE 802.1Q standard, and has a minimum 4-kilobit VLAN address table (254 simultaneous);
- A forwarding/filtering rate that is a minimum of 14,880 packets per second for 10 megabits per second, 148,800 packets per second for 100 megabits per second and 1,488,000 packets per second for 1000 megabits per second;
- A minimum 4-kilobit MAC address table;
- Support of Traffic Class Expediting and Dynamic Multicast Filtering.
- Support of, at a minimum, snooping of Version 2 & 3 of the Internet Group Management Protocol (IGMP);

- Support of remote and local setup and management via telnet or secure Web-based GUI and command line interfaces; and
- Support of the Simple Network Management Protocol (SNMP). Verify that the Ethernet edge switch can be accessed using the resident EIA-232 management port, a telecommunication network, or the Trivial File Transfer Protocol (TFTP).

*Network Capabilities***:** Provide an edge switch that supports/complies with the following minimum requirements:

- Provide full implementation of IGMPv2 snooping (RFC 2236);
- Provide full implementation of SNMPv1, SNMPv2c, and/or SNMPv3;
- Provide support for the following RMON–I groups, at a minimum:
  - Part 1: Statistics
  - Part 2: History
  - Part 3: Alarm
  - Part 9: Event
- Provide support for the following RMON–2 groups, at a minimum:
  - Part 13: Address Map
  - Part 16: Layer Host
  - Part 17:Layer Matrix
  - Part 18:User History
- Capable of mirroring any port to any other port within the switch;
- Meet the IEEE 802.1Q (VLAN) standard per port for up to four VLANs;
- Meet the IEEE 802.3ad (Port Trunking) standard for a minimum of two groups of four ports;
- Password manageable;
- Telnet/CLI;
- HTTP (Embedded Web Server) with Secure Sockets Layer (SSL); and
- Full implementation of RFC 783 (TFTP) to allow remote firmware upgrades.

*Network Security***:** Provide an edge switch that supports/complies with the following (remotely) minimum network security requirements:

- Multi-level user passwords;
- RADIUS centralized password management (IEEE 802.1X);
- SNMPv3 encrypted authentication and access security;
- Port security through controlling access by the users: ensure that the Ethernet edge switch has the capability to generate an alarm and shut down ports when an unauthorized user accesses the network;
- Support of remote monitoring (RMON-1&2) of the Ethernet agent; and
- Support of the TFTP and SNTP. Ensure that the Ethernet edge switch supports port mirroring for troubleshooting purposes when combined with a network analyzer.

G. Electrical Specifications:

Ensure that the edge switch operates and power is supplied with 115 volts of alternating current (VAC). Ensure that the edge switch has a minimum operating input of 110 VAC and a maximum operating input of 130 VAC. Ensure that if the device requires operating voltages other than 120 VAC, supply the required voltage converter. Ensure that the maximum power consumption does not exceed 50 watts. Ensure that the edge switch has diagnostic light emitting diodes (LEDs), including link, TX, RX, speed (for Category 5E ports only), and power LEDs.

H. Environmental Specifications:

Ensure that the edge switch performs all of the required functions during and after being subjected to an ambient operating temperature range of -30 degrees to 165 degrees Fahrenheit as defined in the environmental requirements section of the NEMA TS 2 standard, with a noncondensing humidity of 0 to 95%.

Provide certification that the device has successfully completed environmental testing as defined in the environmental requirements section of the NEMA TS 2 standard. Provide certification that the device meets the vibration and shock resistance requirements of Sections 2.1.9 and 2.1.10, respectively, of the NEMA TS 2 standard. Ensure that the edge switch is protected from rain, dust, corrosive elements, and typical conditions found in a roadside environment.

The edge switch shall meet or exceed the following environmental standards:

- IEEE 1613 (electric utility substations)
- IEC 61850-3 (electric utility substations)
- IEEE 61800-3 (variable speed drive systems)
- IEC 61000-6-2 (generic industrial)
- EMF – FCC Part 15 CISPR (EN5502) Class A

I. Ethernet Patch Cable:

Furnish a factory pre-terminated/pre-connectorized Ethernet patch cable with each edge switch. Furnish Ethernet patch cables meeting the following physical requirements:

- Five (5)-foot length
- Category 5e or better
- Factory-installed RJ-45 connectors on both ends
- Molded anti-snag hoods over connectors
- Gold plated connectors

Furnish Fast Ethernet patch cords meeting the following minimum performance requirements:

- TIA/EIA-568-B-5, Additional Transmission Performance Specifications for 4-pair 100 Ω Enhanced Category 5 Cabling
- Frequency Range: 1-100 MHz
- Near-End Crosstalk (NEXT): 30.1 dB
- Power-sum NEXT: 27.1 dB
- Attenuation to Crosstalk Ratio (ACR): 6.1 dB
- Power-sum ACR: 3.1 dB
- Return Loss: 10dB
- Propagation Delay: 548 nsec

6.3. CONSTRUCTION METHODS

A. General:

Ensure that the edge switch is UL listed.

Verify that network/field/data patch cords meet all ANSI/EIA/TIA requirements for Category 5E and Category 6 four-pair unshielded twisted pair cabling with stranded conductors and RJ45 connectors.

Contact the Signal Shop a minimum of 5 days prior to installation for the most current edge switch IP Address, VLAN, subnet mask, default gateway and configuration files.

B. Edge Switch:

Mount the edge switch inside each field cabinet by securely fastening the edge switch to the upper end of the right rear vertical rail of the equipment rack using manufacturer-recommended or Engineer-approved attachment methods, attachment hardware and fasteners.

Ensure that the edge switch is mounted securely in the cabinet and is fully accessible by field technicians without blocking access to other equipment. Verify that fiber-optic jumpers consist of a length of cable that has connectors on both ends, primarily used for interconnecting termination or patching facilities and/or equipment.

6.4. MEASURMENT AND PAYMENT

Ethernet edge switch will be measured and paid as the actual number of Ethernet edge switches furnished, installed, and accepted.

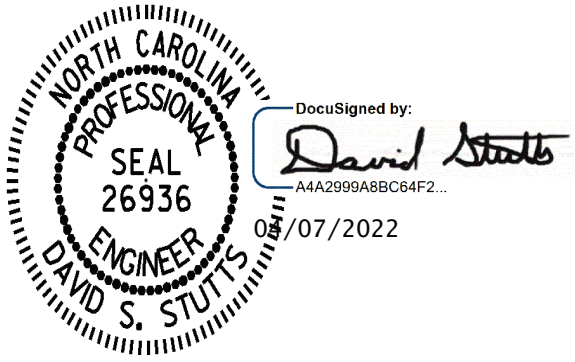
No separate measurement will be made for Ethernet patch cable, power cord, mounting hardware, nuts, bolts, brackets, or edge switch programming as these will be considered incidental to furnishing and installing the edge switch.

Payment will be made under:

Ethernet Edge Switch.....Each

Project Special Provisions
Structures

Table of Contents



CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 397+90.00 -L- **(12-12-13)**

1.0 GENERAL

Construct, maintain, and remove the temporary access required to provide the working area necessary for construction of the new bridge, construction of the temporary detour structure, or for the removal of an existing bridge, as applicable. Temporary access may involve the use of a work bridge or other methods; however, all types of temporary access are required to meet the requirements of all permits, the Standard Specifications, and this Special Provision.

2.0 TEMPORARY WORK BRIDGE

At the contractor's option, construction of a temporary work bridge within the limits shown on the plans is permitted. The temporary work bridge shall have a minimum span length of 20 feet. Submit details of the temporary work bridge to the Engineer prior to constructing the work bridge to ensure conformance with the plans and all permits. Completely remove the temporary bridge prior to final acceptance or as otherwise required by the permits.

3.0 BASIS OF PAYMENT

The lump sum price bid for "Construction, Maintenance and Removal of Temporary Access at Station 397+90.00 -L-" will be full compensation for the above work, or other methods of access, including all material, work bridge components, equipment, tools, labor, disposal, and incidentals necessary to complete the work.

STEEL REINFORCED ELASTOMERIC BEARINGS **(6-22-16)**

The 2018 Standard Specifications shall be revised as follows:
In **Section 1079-2(A) – Elastomeric Bearings** add the following after the second paragraph:

Internal holding pins are required for all shim plates when the contract plans indicate the structure contains the necessary corrosion protection for a corrosive site.

Repair laminated (reinforced) bearing pads utilizing external holding pins via vulcanization. Submit product data for repair material and a detailed application procedure to the Materials and Tests Unit for approval before use and annually thereafter.

THERMAL SPRAYED COATINGS (METALLIZATION) (12-1-2017)

1.0 DESCRIPTION

Apply a thermal sprayed coating (TSC) and sealer to metal surfaces in accordance with the Thermal Sprayed Coatings (Metallization) Program and as specified herein when called for on the plans or by other Special Provisions. Use only Arc Sprayed application methods to apply TSC. The Engineer must approve other methods of application.

The Thermal Sprayed Coatings (Metallization) Program is available on the Materials and Tests Unit website.

2.0 QUALIFICATIONS

Only use NCDOT approved TSC Contractors meeting the requirements outlined in the Thermal Sprayed Coatings (Metallization) Program.

3.0 MATERIALS

Use only materials meeting the requirements of Section 7 of the Thermal Sprayed Coatings (Metallization) Program.

4.0 SURFACE PREPARATION AND TSC APPLICATION

Surface preparation of TSC surfaces shall meet the requirements of Section 8 of the Thermal Sprayed Coatings (Metallization) Program. Apply TSC with the alloy to the thickness specified on the plans or as required by Thermal Sprayed Coatings (Metallization) Program.

5.0 INSPECTION AND TESTING

The TSC Contractor must conduct inspections and tests listed in the Thermal Sprayed Coatings (Metallization) Program.

6.0 REPAIRS

Perform all shop repairs in accordance with the procedures outlined in the Thermal Sprayed Coatings (Metallization) Program.

Repairs associated with field welding shall be made by removing the existing metallizing by blast or power tool cleaning. Affected areas shall be addressed as follows:

- For Marine Environments, incorporate a minimum surface preparation in accordance with SSPC SP-11 (Power Tool Cleaning to Bare Metal) and require an approved epoxy mastic coating applied in accordance with the manufacturer's recommendation. Apply a minimum of two (2) coats at a rate of 5-7 (WFT) per coat to the affected area.

- For Non-Marine Environments, incorporate a minimum surface preparation in accordance with SSPC SP-11 (Power Tool Cleaning to Bare Metal) and require an approved organic zinc-rich coating applied in accordance with the manufacturer's recommendation. Apply a minimum of two (2) coats at a rate of 5-7 (WFT) per coat to the affected area.

    1. Minor localized areas less than or equal to 0.1 ft^2 with exposed substrate shall be repaired as outlined above for marine and non-marine environments.

    2. Large localized areas greater than 0.1 ft^2 with exposed substrate shall require the Contractor to submit a detailed repair procedure to the Engineer for review and approval.

- Repair methods for areas where the substrate has not been exposed shall be mutually agreed upon between the Contractor and TSC Contractor as approved by the Engineer.

7.0 TWELVE MONTH OBSERVATION PERIOD

All TSC materials applied under the Thermal Sprayed Coatings (Metallization) Program shall be evaluated twelve (12) months after project acceptance for defective materials and workmanship.

8.0 BASIS OF PAYMENT

The contract price bid for the metal component to which the TSC is applied will be full compensation for the thermal sprayed coating.

EXPANSION JOINT SEALS (9-30-11)

1.0 GENERAL

The work covered by this Special Provision consists of furnishing and installing the expansion joint seals as shown on the contract drawings. All materials, labor, equipment and incidentals necessary for the proper installation of the expansion joint seals are included.

2.0 MATERIAL

Provide expansion joint seals capable of accommodating a total movement measured parallel to the centerline of the roadway as shown on plans.

Provide an elastomeric component for each expansion joint seal that is a continuous unit for the entire length of the joint. Do not field splice the elastomeric component. Only vulcanized shop splicing of the elastomeric component is permitted. The minimum length of an elastomeric component before shop splicing is 20 feet. However, one piece shorter than 20 feet is permitted. Provide an elastomeric component that is clearly shop marked to indicate the top side and joint location of the elastomeric component. On skewed bridges, or under unsymmetrical conditions, clearly mark the left side of the elastomeric component. Left is defined as being on the left when facing in the direction of increasing station. Inspect the seals upon receipt to ensure that the marks are clearly visible upon installation.

Make sure the convolution of the gland does not project above the top of the hold-down plates when the joint opening is in the most compressed condition. Use either elastic polychloroprene (neoprene) or ethyl propylene diene monomer (EPDM) for the elastomer that meets the following minimum properties:

	ASTM TEST METHOD	REQUIREMENTS
Hardness, Durometer - Shore A	D2240	60 ± 5, Neoprene (upward corrugated shape - fabric reinforced) 75 ± 5, EPDM and Neoprene (upward non-corrugated shape) 80 ± 5, EPDM (upward corrugated shape-fabric reinforced)
Tensile Strength	D412	2000 psi (min.)
Elongation at Break	D412	250% (min.)
Width of Gland in Relaxed Condition	N/A	10" ± 0.25"

Thickness of Upturned portion of gland	N/A	0.25" non-corrugated shape, -0.032" to +0.032"
Thickness of Upturned portion of gland	N/A	0.1875" corrugated shape, -0.032" to +0.032"
Thickness of Flat portion of gland	N/A	0.1563", -0.032" to +0.032"

For fabric reinforced glands, submit one unreinforced sample per lot number, up to 500 feet of Expansion Joint Seal, to the Engineer for testing.

Only field splice hold-down plates at crown points, at abrupt changes in the deck slab cross slope, and on lane lines. Splicing within travel lanes is not permitted and splicing on edge lines is not required. Field splice hold-down plates between the edge line and gutter upturn and where necessary for proper installation and alignment is permitted. Show all splice locations on the working drawings for approval. For the location of lane markings at the expansion joint seal, see the Structure plans. At the splice locations, locate the hold-down bolts 3 inches from the end of the hold-down plate. At splice locations where changes in deck slab cross slope occur, cut the ends of hold-down plates parallel to the bridge centerline for skews less than 80° and greater than 100°.

Do not use welded shop splices in hold-down plates.

3.0 SHOP DRAWINGS

Submit nine sets of working drawings to the Engineer for review, comments and acceptance. Show complete details drawn to scale and include:

- The proposed template details including the makeup of the template
- The proposed method of holding the base angle assembly in place while concrete is cast around it
- The proposed procedure to correct for the effects of beam movement and rotation when setting width of joint opening
- The proposed chronology of installation including the sequence and direction of the concrete casting
- The details of cross connectors between base angles, such as steel bars with slots bolted to angles, to maintain evenness between the adjacent base angles while accommodating movement that occurs when concrete is cast. Indicate when bolts are loosened to allow movement.
- The proposed method for removing the hold-down plate
- A section detail through the joint showing horizontal offset dimensions of the base angles from the centerline joint. This detail is required when the vertical face of the joint opening is not perpendicular to the roadway surface (e.g. when the roadway grade is significant).

Have someone other than the one who prepares the drawing check all detailed drawings and include the signatures of both the drafter and checker on each sheet of the drawings. The Engineer returns unchecked drawings to the Contractor. Provide all completed drawings well in advance of the scheduled installation time for the expansion joint seal.

4.0 INSTALLATION

Provide supports for the base angle assembly at a maximum spacing of 9 feet. Place supports near field splices of base angles to ensure that field splices are straight and even. Provide base angles with ½" diameter weep holes at 12 inch centers to allow bleeding of trapped air and/or water. Do not obstruct the weep holes with falsework. Make the bottom of the trough parallel to grade and the sides parallel to the sides of the expansion joint seal.

For damaged areas, depressions, spalls, cracks, or irregularities of curbs or decks adjacent to the expansion joint, submit a proposed method of repair and repair material specifications for approval.

If the Engineer deems any aspects of the expansion joint seals unacceptable, make necessary corrections.

5.0 INSPECTION

When concrete is cast, use a non-aluminum, 10 foot, true to line straight edge to check and grade the top of the slab on each side of the joint to ensure smooth transition between spans.

Watertight Integrity Test

- Upon completion of an expansion joint seal, perform a water test on the top surface to detect any leakage. Cover the roadway section of the joint from curb to curb, or barrier rail to barrier rail, with water, either ponded or flowing, not less than 1 inch above the roadway surface at all points. Block sidewalk sections and secure an unnozzled water hose delivering approximately 1 gallon of water per minute to the inside face of the bridge railing, trained in a downward position about 6 inches above the sidewalks, such that there is continuous flow of water across the sidewalk and down the curb face of the joint.
- Maintain the ponding or flowing of water on the roadway and continuous flow across sidewalks and curbs for a period of 5 hours. At the conclusion of the test, the underside of the joint is closely examined for leakage. The expansion joint seal is considered watertight if no obvious wetness is visible on the Engineer’s finger after touching a number of underdeck areas. Damp concrete that does not impart wetness to the finger is not a sign of leakage.
- If the joint system leaks, locate the place(s) of leakage and take any repair measures necessary to stop the leakage at no additional cost to the Department. Use repair measures recommended by the manufacturer and approved by the Engineer prior to beginning corrective work.

- If measures to eliminate leakage are taken, perform a subsequent water integrity test subject to the same conditions as the original test. Subsequent tests carry the same responsibility as the original test and are performed at no extra cost to the Department.

6.0 BASIS OF PAYMENT

Basis of payment for all expansion joint seals will be at the lump sum contract price for "Expansion Joint Seals" which price and payment will be full compensation for furnishing all material, including any steel accessory plates for sidewalks, medians and rails, labor, tools, and incidentals necessary for installing the expansion joint seal in place and including all materials, labor, tools and incidentals for performing the original watertight integrity test.

STRIP SEAL EXPANSION JOINTS (06-25-2020)

1.0 GENERAL

This Special Provision covers furnishing and installing strip seal expansion joints as shown on the contract drawings and in accordance with this Special Provision, the Standard Specifications and the manufacturer's recommendation. All materials, labor, equipment, and incidentals necessary for proper installation of the strip seal expansion joints are included.

2.0 MATERIALS

Provide strip seal expansion joints capable of accommodating a total movement measured parallel to the centerline of the roadway as shown on plans. The components of the expansion joint include steel retainer rails and a neoprene seal gland.

The steel retainer rails shall consist of a "P" shape profile configuration with anchor studs welded to the concrete face. The rails shall have a minimum height of 8 inches, a minimum thickness of ½ inch and a maximum top surface (at the riding surface) width of 2 inches. Use AASHTO M270 Grade 36 or Grade 50 steel for the steel retainer rails.

The neoprene gland shall be extruded synthetic rubber with virgin polychloroprene as the only polymer. The gland manufacturer shall provide a Type 4 certification, in accordance with the Standard Specifications, attesting the gland has been tested and meets the following minimum properties:

PHYSICAL PROPERTY	TEST METHOD	REQUIREMENTS
Tensile Strength, psi (min.)	ASTM D412	2000
Elongation at break, % (min.)	ASTM D412	250
Hardness, Type A durometer, points	ASTM D2240 Modified	60 ± 10
Oven aging, 70h @ 212°F Tensile strength, % change (max.) Elongation, % change (max.) Hardness, points change (max.)	ASTM D573	 –20 –20 0 to +10
Oil Swell, ASTM Oil No. 3, 70h @ 212°F Weight change, % (max.)	ASTM D471	45
Ozone resistance 20% strain, 300 pphm in air 70h @ 104°F	ASTM D1149 Modified	No cracks
Low temperature stiffening, 7 days @ 14°F Hardness, Type A durometer, points change	ASTM D2240	0 to +15

Compression Set, 70h @ 212°F (max.)	ASTM D395 Method B (modified)	40%

3.0 SHOP DRAWINGS

Submit a set of complete shop drawings to the Engineer via email for review, comments and acceptance and carbon copy (cc) the Structures Management Unit Working Drawing Review Group (SMU-wdr@ncdot.gov). Send the drawings well in advance of the scheduled installation time for the strip seal expansion joint rail. Prior to submitting the shop drawings, have someone, other than the draftsman who prepares the drawings, check all detailed drawings and include the signatures of both the draftsman and checker on each sheet of the drawings. The Engineer returns unchecked drawings to the Contractor.

Steel retainer rails shall consist of one-piece construction including upturns. Welding two or more components to obtain the required cross-sectional shape is not permitted. Show all dimensions, anchor stud locations, welded splice details, splice locations and any other details or data necessary to fabricate the joint on the shop drawings. Include the joint model number and joint movement range. Draw all details to scale. Identify, in detail, welding procedures to be performed in fabricating the joint. As a minimum, also show the following on the drawings:

- All field splice locations. Steel retainer rail field splices are only permitted at crown points, locations with abrupt changes in the deck slab cross slope, and at travel lane lines. Splices within travel lanes are not permitted and splicing on edge lines is not required. For the location of travel lane markings at the strip seal expansion joint, see the structure plans. At the field splice locations, locate the horizontal stud anchors 3 inches from the centerline of the splice.
- Details of the shipping device for the steel retainer rail assemblies. Ensure the device is capable of resisting shipping and handling forces without causing damage to the steel retainer rail assemblies or metallized coating.
- The method of supporting steel retainer rails horizontally and vertically during joint installation and placement of concrete to ensure stability and proper alignment. Ensure the method is capable of resisting construction forces without causing damage to the steel retainer rail assemblies or metalized coating and are adjustable to account for variable temperature settings. Place supports near field splices of steel retainer rails to ensure that splices are straight and even.
- The proposed procedure to correct for the effects of beam movement and rotation when setting width of joint opening.
- The proposed installation procedure including the sequence and suggested direction of the concrete pour(s).
- The proposed mechanism to allow joint translation after the deck pour.

- A section through the joint detail showing horizontal offset dimensions of the steel retainer rails from the centerline of the joint. This detail is required when the vertical face of the joint opening is not perpendicular to the roadway surface (e.g. when the roadway grade is significant).

4.0 FABRICATION

Fabricate the strip seal joint components in accordance with the approved shop drawings and the plans.

Splice sections of steel retainer rail in the shop to obtain required lengths. Do not use short pieces of steel retainer rail less than 6 feet 0 inches long unless required at curbs, sidewalks or staged construction locations. Splices in an individual steel retainer rail are only permitted where a construction joint is specifically required by the plans, joint segment length exceeds 50 feet, or approved by the Engineer in writing.

At splice locations where changes in deck slab cross slope occur, cut the ends of steel retainer rails parallel to the bridge centerline for skews less than 80^{o} and greater than 100^{o}.

Provide a neoprene gland that is compatible with the steel retainer rail. Produce a single continuous neoprene gland for the entire length of the joint. When necessary, only vulcanized splicing of the gland in the shop is permitted. Ensure the convolution(s) of the gland does not project above the top of the steel retainer rails when the ambient temperature results in the minimum joint opening.

5.0 SHIPMENT

Bolt the steel retainer rails together in the shop to form matching pairs. Clearly mark each pair to identify where they are to be placed. Ship the neoprene gland(s) together with the steel retainer rail(s) and clearly mark them to identify where they are to be placed.

6.0 INSTALLATION

Install the strip seal expansion joint in accordance with the plan details, this Special Provision, the Standard Specifications, and the manufacturer's recommended installation procedures. Have a manufacturer's representative present during installation of the joint.

Install the steel retainer rail assemblies at proper grade and alignment. See contract drawings for width of joint opening.

Bolt, weld or clamp steel retainer rail assemblies in position using temporary or sacrificial brackets as required. Do not use temporary or sacrificial support brackets, bolts, clamps, etc. between the faces of the steel retainer rails. Do not weld within 2 inches of steel retainer rail surfaces exposed in the completed structure. Do not weld strip seal expansion joint components to reinforcing steel or structural steel.

For staged construction, install steel retainer rail assemblies in a given subsequent stage to align with those installed in an adjacent prior stage after deflection and rotation due to deck casting of adjoining spans has occurred.

Protect metalized steel retainer rail assemblies during screeding operations per the manufacturer's recommendations. Provide temporary blocking material in the steel retainer rail seal cavities to prevent concrete intrusion during deck pour and finishing.

Loosen any temporary or sacrificial support brackets, bolts, clamps, etc. that span across the joint after initial set of concrete, but not more than two hours after conclusion of concrete placement.

Install the neoprene gland after completion of deck casting. Use a single continuous neoprene gland for the entire length of the joint. Field splicing of the neoprene gland is not permitted. Remove all joint form material and blocking material prior to installing the gland. Field install the gland in accordance with manufacturer's recommendations. Thoroughly coat all contact surfaces between the gland and the steel retainer rail seal cavities with an adhesive lubricant before setting the gland in place. Use lubricant adhesive that conforms to ASTM D4070 and is compatible with manufacture's strip seal expansion joint to attach neoprene gland to the steel retainer rails.

7.0 INSPECTION

The Engineer inspects the joint system for proper alignment and proper stud placement and attachment. If any aspect of the strip seal expansion joint is deemed unacceptable, make the necessary corrections.

When concrete is cast, use a non-aluminum, 10 foot, true-to-line straight-edge to check and grade the top of the slab on each side of the joint to ensure smooth transition between spans.

Watertight Integrity Test

- Upon completion of each strip seal expansion joint, perform a watertight integrity test on the top surface to detect any leakage. Cover the roadway section of the joint from curb to curb, or barrier rail to barrier rail, with water, either ponded or flowing, not less than 1 inch above the roadway surface at all points. Block sidewalk sections and secure an unnozzled water hose delivering approximately 1 gallon of water per minute to the inside face of the bridge railing, trained in a downward position about 6 inches above the sidewalk, such that there is continuous flow of water across the sidewalk and down the curb face of the joint.
- Maintain the ponding or flowing of water on the roadway and continuous flow across sidewalks and curbs for a period of 5 hours. At the conclusion of the test, the underside of the joint is closely examined for leakage. The strip seal expansion joint is considered watertight if no obvious wetness is visible on the Engineer's finger after touching a number of underdeck areas. Damp concrete that does not impart wetness to the finger is not considered a sign of leakage.

- If the joint system leaks, locate the place(s) of leakage and take any repair measures necessary to stop the leakage at no additional cost to the Department. Use repair measures recommended by the manufacturer and approved by the Engineer prior to beginning corrective work.
- If measures to eliminate leakage are taken, perform a subsequent watertight integrity test subject to the same conditions as the original test. Subsequent tests carry the same responsibility as the original test and are performed at no additional cost to the Department.

8.0 BASIS OF PAYMENT

Basis of payment for all strip seal expansion joints will be at the lump sum contract price for "Strip Seal Expansion Joints." Payment will be full compensation for furnishing all material, including any steel accessory plates for sidewalks, medians and rails, labor, tools, and incidentals necessary for installing the strip seal expansion joint in place and including all materials, labor, tools and incidentals for performing the original watertight integrity test.

SOUND BARRIER WALL (8-29-19)

1.0 DESCRIPTION

This work consists of furnishing precast panels with an architectural surface treatment, structural steel, concrete, handling, transporting, fabricating, galvanizing, storing materials, furnishing erection drawings, pile excavation, backfilling, erecting and installing the sound barrier wall members and all other materials as required by the plans, Standard Specifications and this Special Provision.

Precast panels with an architectural surface treatment shall be constructed using form lining materials and patterns to match the appearance (size, shape, color, texture, pattern, and relief) of the textured finish as specified on the plans and approved by the Engineer.

The contractor is required to use the same form liner and coloration contractor to construct the precast panels with an architectural surface treatment.

The Standard Plans allow pile spacing of 10, 15 or 20 feet. Pile spacing greater than 15 feet will not be allowed for the precast concrete panels detailed in the standard plans. Provide consistent pile spacing for the entire length of the wall. Use odd pile spacing, if necessary, only at the ends of the wall and at turning points as approved by the Engineer. Architectural surface treatment shall not be applied to piles. Piles shall have a smooth, non-textured finish, and remain unstained in their natural color.

A maximum one foot drop or rise in elevation between wall sections is permitted. Elevation changes greater than one foot, if necessary, will be allowed only at the end of the wall. Top of wall elevation changes that result in a jagged appearance will not be allowed.

2.0 QUALIFICATIONS

Prior to beginning work the contractor shall submit the following qualifications to the Engineer for approval:

A. Architectural Surface Treatment Construction

The Contractor shall have a minimum of three years of experience in architectural concrete surface treatment construction on similar types of projects. The Contractor shall furnish to the Engineer 3 references who were responsible for supervision of similar projects. Include name, address, telephone number, and specific type of application.

B. Form Liners and Coloring System

The manufacturer of form liners for the standard textured finishes and coloring system shall have at least five years of experience making molds and color stains to create formed concrete surfaces to match the specified textured finish and colors. The Contractor shall schedule a pre-installation conference with a form liner manufacturer

representative and the Engineer to assure understanding of simulated textured finish form liner use, color application, requirements for construction of sample panel(s), and to coordinate the work. The Contractor shall be required to disclose their source of form liner manufacturer and final coloration contractor prior to the Preconstruction Conference.

3.0 ALTERNATE PILE SPACING FOR STANDARD PRECAST PANELS

As an alternate, the Contractor may submit plans for pile spacings greater than 10 feet and less than 15 feet for review and approval. The pile excavation diameter, excavation depth and reinforcing steel shall be equal to the amount shown on the existing plans for the 15 feet pile spacing. A variance in the reinforcing steel will be allowed for the length of horizontal and number of vertical reinforcement bars in the precast panel for the alternate pile spacing.

Submit two sets of detailed plans for review. Include all details in the plans, including the size and spacing of required reinforcement necessary to fabricate the precast panels. Have a North Carolina registered Professional Engineer check, seal and date the plans. After the plans are reviewed and, if necessary, corrections made, submit one set of reproducible tracings on 22" x 34" sheets to become part of the contract plans.

4.0 ALTERNATE WALL TYPE

Walls that have been assigned "Approved" or "Approved for Provisional Use" status by the Product Evaluation Program will be considered for substitution to the detailed Standard Sound Barrier Wall only when noted on the plans. Alternate wall types, piles and pile spacing must meet the design and construction requirements of the project. Pile spacing greater than 20 feet will not be permitted. Alternate pile and wall structural stability and connection details shall conform to the current edition of the AASHTO LRFD Bridge Design Specifications.

Prior to submittal of Working Drawings, as described herein, submit a copy of the signed NCDOT Product Status Notification Letter and two sets of preliminary plans for review and approval. Include material specifications for all components. Once preliminary plans are approved, submit Working Drawings in accordance with all applicable portions of the requirements herein, including details necessary to fabricate and construct the proposed alternate.

Have a North Carolina registered Professional Engineer check, seal and date the plans and, when requested, provide calculations. After the plans are reviewed and, if necessary, corrections made, submit one set of reproducible tracings on 22" x 34" sheets to become part of the contract plans.

5.0 WORKING DRAWINGS

Submit precast panel casting drawings in accordance with Article 1077-2 of the Standard Specifications prior to casting. Show the inserts, method of handling, and support details

used for transportation on the casting drawings. Submit fabrication drawings for approval prior to fabrication of wall components. Submit an erection plan and precast panel placing plan, including location of various heights of panels, for review and acceptance prior to fabrication of forms. Submit five sets of detail drawings on 22" x 34" sheets.

Submit for review and acceptance, wall plan and elevation views and details showing overall simulated textured pattern, joint locations, and end, edge or other special conditions. The drawings should include typical cross sections of precast panels, joints, corners, texture relief, texture size, pitch/working line, mortar joint and bed depths. If necessary, the Contractor shall revise the working drawings until the proposed form liner patterns and arrangement have been accepted by the Engineer. Working drawings should be of sufficient scale to show the detail of all textured finishes and joint patterns. Shop drawings shall be reviewed and approved prior to fabrication of form liners.

6.0 MATERIALS AND FABRICATION OF STANDARD PRECAST PANELS

Provide materials and fabricate members in accordance with the requirements of Division 10 of the Standard Specifications for Roads and Structures. Provide precast panels 4 inches ± ¼ inch thick, excluding relief for a textured finish. Architectural surface treatment shall consist of a standard textured finish and a single color of stain applied to both faces of the precast panels as specified on the plans and approved by the Engineer. Relief of any texture is not to exceed an average depth of 1 inch. No textured finish or stain shall be applied on the uppermost foot of each wall segment and along the vertical edges of the panels. These areas shall have a smooth, non-textured finish, and remain in its natural concrete color.

Furnish three 12" x 12" samples for approval which establish the acceptable variations in color, texture, and uniformity. After the color, texture, and uniformity of the furnished samples are approved, produce a full scale panel unit meeting design requirements. This mock-up and the furnished samples establish the standard quality for determining acceptance of the panels. When producing the final installed panels, use fine and coarse aggregate, retarder, and cement from the same source as those used in the approved sample panels.

The standard textured finish shall be constructed using form lining materials. The form liner shall be a high quality, re-useable product manufactured of high strength urethane rubber or other approved material which attaches easily to the form work system, and shall not compress more than ¼ inch when concrete is poured at a rate of 10 vertical feet per hour. The form liners shall be removable without causing deterioration of the surface or underlying concrete.

The form liner shall be patterned such that long continuous horizontal or vertical lines do not occur on the finished exposed surface. The line pattern shall be random in nature and shall conceal construction joint lines.

Prior to each concrete pour, the form liners shall be clean and free of build-up. Each liner shall be visually inspected for blemishes and tears. Repairs shall be made in accordance with the manufacturer's recommendations. Repairs shall be accepted by the Engineer before being used. Form liner panels that do not perform as intended or are no longer repairable shall be replaced.

Form liners shall be securely attached to forms in accordance with the manufacturer's recommendations, with less than a ¼ inch seam. Blend form liner butt joints into the textured surface pattern and finish off the final concrete surface. Create no visible vertical or horizontal seams or conspicuous form liner butt joint marks. At locations where the form liners are joined, carefully blend to match the balance of the textured finish.

Form liners shall be installed to withstand anticipated concrete placement pressures without leakage and without causing physical or visual defects.

When the approved textured finish requires simulated grout pattern joints, construct grout pattern joints to simulate the appearance of mortared joints produced in laid up masonry work. Grout pattern joints shall be produced in accordance with the form liner / concrete color system manufacturer.

The Contractor shall have a technical representative from the form liner manufacturer on site for technical supervision during the installation and removal of form liners. Unless directed by the Engineer, installation and removal of form liners shall not be permitted if the technical representative is not present.

Form release agent shall be a non-staining petroleum distillate free from water, asphaltic, and other insoluble residue, or an equivalent product and shall be applied in accordance with the manufacturer's recommendations. The form release agent shall be compatible with the form liner material, the concrete coloring system, any special surface finish and in accordance with this Special Provision. Form release agent should be worked into all areas, especially pattern recesses.

All form defects in finished uncolored surface shall be filled or repaired within 48 hours of form removal. Use patching materials and procedures in accordance with the manufacturer's recommendations.

Precast concrete shall be finished in accordance with the Standard Specifications, except that curing of concrete should been done to accommodate the application of coloring and surface finish treatment.

7.0 SURFACE COLORING

All surfaces that are to receive coloring agent application shall be free of all laitance, dirt, dust, grease, efflorescence, paint or any other foreign material prior to the application of coloring agent. Cleaning of surfaces to be accomplished by pressure washing with water set at 3,000 psi to remove laitance. The fan nozzle shall be held perpendicular to the surface at a distance of 1 to 2 feet. Sandblasting will not be permitted.

Surface coloring shall be achieved using an approved stain suitable for the purpose intended and applied in a manner consistent with the design intent of the project. Color system shall be a single color of stain in brown or gray tones as specified on the plans and approved by the Engineer. The approved sample panel shall be the basis for determining the appropriate stain application.

The coloring agent shall be a penetrating stain mix or other approved coloring system designed for exterior application on old or new concrete with field evidence of resistance to moisture, acid or alkali, mildew, mold or fungus discoloration or degradation. The coloring agent shall be breathable, allowing moisture and vapor transmission. Final coloring system and color of stain are subject to approval by the Engineer.

Application of coloring/staining agent to finished precast concrete and patches shall occur at a minimum of 30 days after form liners are removed. Maintain the concrete temperature between 40°F and 85°F during color/stain application and for 48 hours after color/stain application. Consult the manufacturer's recommendations for preparation, application, curing, and storage of coloring agents/stains. The contractor shall provide a Color Application Artist who is experienced in producing realistic surface appearances. Treated surfaces located adjacent to exposed soil or pavement shall be temporarily covered to prevent dirt or soil splatter from rain.

Final surface shall be free of blemishes, discolorations, surface voids, and other irregularities. All patterns should be continuous without visual disruption. Linear butt joints shall be carefully blended into the approved pattern and finished off the final concrete surface. No visible vertical or horizontal seams or conspicuous form marks created by butt joining will be permitted.

Following the completion of all work, repairs of any damage made by other construction operations shall be made to the form lined and colored surfaces as directed by the Engineer.

8.0 CONSTRUCTION METHODS

Complete the final survey of existing ground profile after clearing the wall area but prior to submitting any working drawings. Submit the final groundline survey with the working drawings.

If the Department is responsible for the survey, the Engineer field verifies the existing ground profile along the sound barrier wall. Contact the Engineer to obtain the survey information. Otherwise, complete the existing ground survey prior to submittal of working drawings.

Excavate holes with the diameters shown on the plans. Perform pile excavation to the depths shown on the plans and install piles as shown on the plans or in the accepted submittals with a tolerance of ½ inch per foot from vertical. Backfill excavations with concrete after placing piles.

A. Pile Excavation

Use equipment of adequate capacity and capable of drilling through soil and non-soil including rock, boulders, debris, man-made objects and any other materials encountered. Blasting is not permitted to advance the excavation. Blasting for core removal is only permitted when approved by the Engineer. Dispose of drilling spoils in accordance with Section 802 of the Standard Specifications and as directed by the Engineer. Drilling spoils consist of all excavated material including water removed from the excavation either by pumping or drilling tools.

If unstable, caving or sloughing soils are anticipated or encountered, stabilize excavations with either slurry or steel casing. When using slurry, submit slurry details including product information, manufacturer's recommendations for use, slurry equipment information and written approval from the slurry supplier that the mixing water is acceptable before beginning drilling. When using steel casing, use either the sectional type or one continuous corrugated or non-corrugated piece. Steel casings should consist of clean watertight steel of ample strength to withstand handling and driving stresses and the pressures imposed by concrete, earth or backfill. Use steel casings with an outside diameter equal to the hole size and a minimum wall thickness of ¼ inch.

B. Concrete Placement

Before placing concrete, center and support the pile in the excavation and check the water inflow rate in the excavation after any pumps have been removed. If the inflow rate is less than 6 inches per half hour, remove any water and free fall the concrete into the excavation. Ensure that concrete flows completely around the pile. If the water inflow rate is greater than 6 inches per half hour, propose a concrete placement procedure to the Engineer. The Engineer shall approve the concrete placement procedure before placing concrete.

Fill the excavation with Class A concrete in accordance with Section 1000 of the Standard Specifications except as modified herein. Provide concrete with a slump of 6 to 8 inches. Use an approved high-range water reducer to achieve this slump. Place concrete in a continuous manner and remove all casings.

9.0 METHOD OF MEASUREMENT

The quantity of form liner textured finish and coloring stain to be paid for will be the actual square feet of architectural surface treatment that has been incorporated into the completed and accepted work. The area of architectural surface treatment will be measured by the area of treated panels. Do not include the uppermost foot of each wall segment, panel vertical edges without architectural surface treatment, or piles in the measurement. Area of sample panels shall not be included in the measurement of architectural surface treatment.

The quantity of sound barrier wall to be paid for will be the actual square feet of completed and accepted wall. In any individual section of sound barrier wall or in comparably dimensioned sections, the wall height is from the bottom of the bottom panel to the top of

the top panel and the width is the distance between the centerline of the piles at the ends of the section. Include the full width of the piles at the ends of the wall.

10.0 BASIS OF PAYMENT

The quantity of sound barrier wall and architectural surface treatment, measured as provided above, will be paid for at the contract unit price bid per square foot.

The unit price bid per square foot for "Sound Barrier Wall" will be full compensation for work covered by this Special Provision including, but not limited to, furnishing precast panels, steel or concrete piles, miscellaneous structural steel, concrete, and all other materials; handling, transporting, fabricating, galvanizing, and storing materials; furnishing erection drawings, backfilling, pile excavation including any casing or slurry, and erecting and installing the sound barrier wall members.

The unit price bid per square foot for "Architectural Surface Treatment" will be full compensation for the architectural treatment covered by this Special Provision including, but not limited to, furnishing architectural detail drawings, sample panels; the construction, finishing, and removal of all equipment, materials, labor, and incidentals necessary for furnishing and use of all form liners to produce approved textured finish and application of approved surface coloring.

Payment will be made under:

Sound Barrier Wall..... Square Foot

Architectural Surface Treatment (Sound Barrier Wall) ..... Square Foot

FALSEWORK AND FORMWORK (2-14-22)

1.0 DESCRIPTION

Use this Special Provision as a guide to develop temporary works submittals required by the Standard Specifications or other provisions; no additional submittals are required herein. Such temporary works include, but are not limited to, falsework and formwork.

Falsework is any temporary construction used to support the permanent structure until it becomes self-supporting. Formwork is the temporary structure or mold used to retain plastic or fluid concrete in its designated shape until it hardens. Access scaffolding is a temporary structure that functions as a work platform that supports construction personnel, materials, and tools, but is not intended to support the structure. Scaffolding systems that are used to temporarily support permanent structures (as opposed to functioning as work platforms) are considered to be falsework under the definitions given. Shoring is a component of falsework such as horizontal, vertical, or inclined support members. Where the term "temporary works" is used, it includes all of the temporary facilities used in bridge construction that do not become part of the permanent structure.

Design and construct safe and adequate temporary works that will support all loads imposed and provide the necessary rigidity to achieve the lines and grades shown on the plans in the final structure.

2.0 MATERIALS

Select materials suitable for temporary works; however, select materials that also ensure the safety and quality required by the design assumptions. The Engineer has authority to reject material on the basis of its condition, inappropriate use, safety, or nonconformance with the plans. Clearly identify allowable loads or stresses for all materials or manufactured devices on the plans. Revise the plan and notify the Engineer if any change to materials or material strengths is required.

3.0 DESIGN REQUIREMENTS

A. Working Drawings

Provide working drawings for items as specified in the contract, or as required by the Engineer, with design calculations and supporting data in sufficient detail to permit a structural and safety review of the proposed design of the temporary work.

On the drawings, show all information necessary to allow the design of any component to be checked independently as determined by the Engineer.

When concrete placement is involved, include data such as the drawings of proposed sequence, rate of placement, direction of placement, and location of all construction joints.

When required, have the drawings and calculations prepared under the guidance of, and sealed by, a North Carolina Registered Professional Engineer who is knowledgeable in temporary works design.

If requested by the Engineer, submit with the working drawings manufacturer's catalog data listing the weight of all construction equipment that will be supported on the temporary work. Show anticipated total settlements and/or deflections of falsework and forms on the working drawings. Include falsework footing settlements, joint take-up, and deflection of beams or girders.

As an option for the Contractor, overhang falsework hangers may be uniformly spaced, at a maximum of 36 inches, provided the following conditions are met:

Member Type (PCG)	Member Depth, (inches)	Max. Overhang Width, (inches)	Max. Slab Edge Thickness, (inches)	Max. Screed Wheel Weight, (lbs.)	Bracket Min. Vertical Leg Extension, (inches)
II	36	39	14	2000	26
III	45	42	14	2000	35
IV	54	45	14	2000	44
MBT	63	51	12	2000	50
MBT	72	55	12	1700	48

Overhang width is measured from the centerline of the girder to the edge of the deck slab. For Type II, III & IV prestressed concrete girders (PCG), 45-degree cast-in-place half hangers and rods must have a minimum safe working load of 6,000 lbs.

For MBT prestressed concrete girders, 45-degree angle holes for falsework hanger rods shall be cast through the girder top flange and located, measuring along the top of the member, 1'-2 ½" from the edge of the top flange. Hanger hardware and rods must have a minimum safe working load of 6,000 lbs.

For links slabs, the tops of girders directly beneath the link slab shall be free of overhang falsework attachments or other hardware. Submit calculations and working drawings for overhang falsework in the link slab region.

The overhang bracket provided for the diagonal leg shall have a minimum safe working load of 3,750 lbs. The vertical leg of the bracket shall extend to the point that the heel bears on the girder bottom flange, no closer than 4 inches from the bottom of the member. However, for 72-inch members, the heel of the bracket shall bear on the web, near the bottom flange transition.

Provide adequate overhang falsework and determine the appropriate adjustments for deck geometry, equipment, casting procedures and casting conditions.

If the optional overhang falsework spacing is used, indicate this on the falsework submittal and advise the girder producer of the proposed details. Failure to notify the

Engineer of hanger type and hanger spacing on prestressed concrete girder casting drawings may delay the approval of those drawings.

Falsework hangers that support concentrated loads and are installed at the edge of thin top flange concrete girders (such as bulb tee girders) shall be spaced so as not to exceed 75% of the manufacturer's stated safe working load. Use of dual leg hangers (such as Meadow Burke HF-42 and HF-43) are not allowed on concrete girders with thin top flanges. Design the falsework and forms supporting deck slabs and overhangs on girder bridges so that there will be no differential settlement between the girders and the deck forms during placement of deck concrete.

When staged construction of the bridge deck is required, detail falsework and forms for screed and fluid concrete loads to be independent of any previous deck pour components when the mid-span girder deflection due to deck weight is greater than ¾".

Note on the working drawings any anchorages, connectors, inserts, steel sleeves or other such devices used as part of the falsework or formwork that remains in the permanent structure. If the plan notes indicate that the structure contains the necessary corrosion protection required for a Corrosive Site, epoxy coat, galvanize or metalize these devices. Electroplating will not be allowed. Any coating required by the Engineer will be considered incidental to the various pay items requiring temporary works.

Design falsework and formwork requiring submittals in accordance with the 1995 AASHTO *Guide Design Specifications for Bridge Temporary Works* except as noted herein.

1. Wind Loads

   Table 2.2 of Article 2.2.5.1 is modified to include wind velocities up to 110 mph. In addition, Table 2.2A is included to provide the maximum wind speeds by county in North Carolina.

Table 2.2 - Wind Pressure Values

Height Zone feet above ground	Pressure, lb/ft^2 for Indicated Wind Velocity, mph				
	70	80	90	100	110
0 to 30	15	20	25	30	35
30 to 50	20	25	30	35	40
50 to 100	25	30	35	40	45
over 100	30	35	40	45	50

2. Time of Removal

   The following requirements replace those of Article 3.4.8.2.

   Do not remove forms until the concrete has attained strengths required in Article 420-16 of the Standard Specifications and these Special Provisions.

   Do not remove forms until the concrete has sufficient strength to prevent damage to the surface.

Table 2.2A - Steady State Maximum Wind Speeds by Counties in North Carolina

COUNTY	25 YR (mph)	COUNTY	25 YR (mph)	COUNTY	25 YR (mph)
Alamance	70	Franklin	70	Pamlico	100
Alexander	70	Gaston	70	Pasquotank	100
Alleghany	70	Gates	90	Pender	100
Anson	70	Graham	80	Perquimans	100
Ashe	70	Granville	70	Person	70
Avery	70	Greene	80	Pitt	90
Beaufort	100	Guilford	70	Polk	80
Bertie	90	Halifax	80	Randolph	70
Bladen	90	Harnett	70	Richmond	70
Brunswick	100	Haywood	80	Robeson	80
Buncombe	80	Henderson	80	Rockingham	70
Burke	70	Hertford	90	Rowan	70
Cabarrus	70	Hoke	70	Rutherford	70
Caldwell	70	Hyde	110	Sampson	90
Camden	100	Iredell	70	Scotland	70
Carteret	110	Jackson	80	Stanley	70
Caswell	70	Johnston	80	Stokes	70
Catawba	70	Jones	100	Surry	70
Cherokee	80	Lee	70	Swain	80
Chatham	70	Lenoir	90	Transylvania	80
Chowan	90	Lincoln	70	Tyrell	100
Clay	80	Macon	80	Union	70
Cleveland	70	Madison	80	Vance	70
Columbus	90	Martin	90	Wake	70
Craven	100	McDowell	70	Warren	70
Cumberland	80	Mecklenburg	70	Washington	100
Currituck	100	Mitchell	70	Watauga	70
Dare	110	Montgomery	70	Wayne	80
Davidson	70	Moore	70	Wilkes	70
Davie	70	Nash	80	Wilson	80
Duplin	90	New Hanover	100	Yadkin	70
Durham	70	Northampton	80	Yancey	70
Edgecombe	80	Onslow	100		
Forsyth	70	Orange	70		

B. Review and Approval

The Engineer is responsible for the review and approval of temporary works' drawings.

Submit the working drawings sufficiently in advance of proposed use to allow for their review, revision (if needed), and approval without delay to the work.

The time period for review of the working drawings does not begin until complete drawings and design calculations, when required, are received by the Engineer.

Do not start construction of any temporary work for which working drawings are required until the drawings have been approved. Such approval does not relieve the Contractor of the responsibility for the accuracy and adequacy of the working drawings.

4.0 CONSTRUCTION REQUIREMENTS

All requirements of Section 420 of the Standard Specifications apply.

Construct temporary works in conformance with the approved working drawings. Ensure that the quality of materials and workmanship employed is consistent with that assumed in the design of the temporary works. Do not weld falsework members to any portion of the permanent structure unless approved. Show any welding to the permanent structure on the approved construction drawings.

Provide tell-tales attached to the forms and extending to the ground, or other means, for accurate measurement of falsework settlement. Make sure that the anticipated compressive settlement and/or deflection of falsework does not exceed 1 inch. For cast-in-place concrete structures, make sure that the calculated deflection of falsework flexural members does not exceed 1/240 of their span regardless of whether or not the deflection is compensated by camber strips.

A. Maintenance and Inspection

Inspect and maintain the temporary work in an acceptable condition throughout the period of its use. Certify that the manufactured devices have been maintained in a condition to allow them to safely carry their rated loads. Clearly mark each piece so that its capacity can be readily determined at the job site.

Perform an in-depth inspection of an applicable portion(s) of the temporary works, in the presence of the Engineer, not more than 24 hours prior to the beginning of each concrete placement. Inspect other temporary works at least once a month to ensure that they are functioning properly. Have a North Carolina Registered Professional Engineer inspect the cofferdams, shoring, sheathing, support of excavation structures, and support systems for load tests prior to loading.

B. Foundations

Determine the safe bearing capacity of the foundation material on which the supports for temporary works rest. If required by the Engineer, conduct load tests to verify proposed bearing capacity values that are marginal or in other high-risk situations.

The use of the foundation support values shown on the contract plans of the permanent structure is permitted if the foundations are on the same level and on the same soil as those of the permanent structure.

Allow for adequate site drainage or soil protection to prevent soil saturation and washout of the soil supporting the temporary works supports.

If piles are used, the estimation of capacities and later confirmation during construction using standard procedures based on the driving characteristics of the pile is permitted. If preferred, use load tests to confirm the estimated capacities; or, if required by the Engineer conduct load tests to verify bearing capacity values that are marginal or in other high risk situations.

The Engineer reviews and approves the proposed pile and soil bearing capacities.

5.0 REMOVAL

Unless otherwise permitted, remove and keep all temporary works upon completion of the work. Do not disturb or otherwise damage the finished work.

Remove temporary works in conformance with the contract documents. Remove them in such a manner as to permit the structure to uniformly and gradually take the stresses due to its own weight.

6.0 METHOD OF MEASUREMENT

Unless otherwise specified, temporary works will not be directly measured.

7.0 BASIS OF PAYMENT

Payment at the contract unit prices for the various pay items requiring temporary works will be full compensation for the above falsework and formwork.

SUBMITTAL OF WORKING DRAWINGS (2-14-22)

1.0 GENERAL

Submit working drawings in accordance with Article 105-2 of the *Standard Specifications* and this provision. For this provision, "submittals" refers to only those listed in this provision. The list of submittals contained herein does not represent a list of required submittals for the project. Submittals are only necessary for those items as required by the contract. Make submittals that are not specifically noted in this provision directly to the Engineer. Either the Structures Management Unit or the Geotechnical Engineering Unit or both units will jointly review submittals.

If a submittal contains variations from plan details or specifications or significantly affects project cost, field construction or operations, discuss the submittal with and submit all copies to the Engineer. State the reason for the proposed variation in the submittal. To minimize review time, make sure all submittals are complete when initially submitted. Provide a contact name and information with each submittal. Direct any questions regarding submittal requirements to the Engineer, Structures Management Unit contacts or the Geotechnical Engineering Unit contacts noted below.

To facilitate in-plant inspection by NCDOT and approval of working drawings, provide the name, address and telephone number of the facility where fabrication will actually be done if different than shown on the title block of the submitted working drawings. This includes, but is not limited to, precast concrete items, prestressed concrete items and fabricated steel or aluminum items.

2.0 ADDRESSES AND CONTACTS

For submittals to the Structures Management Unit, use the following addresses:

Via Email: SMU-wdr@ncdot.gov (do not cc SMU Working Drawings staff)

Via US mail:

Mr. B. C. Hanks, P. E.
State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1581 Mail Service Center
Raleigh, NC 27699-1581

Attention: Mr. J. L. Bolden, P. E.

Via other delivery service:

Mr. B. C. Hanks, P. E.
State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1000 Birch Ridge Drive
Raleigh, NC 27610

Attention: Mr. J. L. Bolden, P. E.

For submittals to the Geotechnical Engineering Unit, use the following addresses:

For projects in Divisions 1-7, use the following Eastern Regional Office addresses:

Via Email: EastGeotechnicalSubmittal@ncdot.gov

Via US mail:

Mr. David Hering, L.G., P. E.
Assistant State Geotechnical
Engineer – Eastern Region
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
1570 Mail Service Center
Raleigh, NC 27699-1570

Via other delivery service:

Mr. David Hering, L.G., P. E.
Assistant State Geotechnical
Engineer – Eastern Region
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
3301 Jones Sausage Road, Suite 100
Garner, NC 27529

For projects in Divisions 8-14, use the following Western Regional Office addresses:

Via Email: WestGeotechnicalSubmittal@ncdot.gov

Via US mail or other delivery service:

Mr. Eric Williams, P. E.
Assistant State Geotechnical
Engineer – Western Region
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Western Regional Office
5253 Z Max Boulevard
Harrisburg, NC 28075

The status of the review of structure-related submittals sent to the Structures Management Unit can be viewed from the Unit's website, via the "Drawing Submittal Status" link.

The status of the review of geotechnical-related submittals sent to the Geotechnical Engineering Unit can be viewed from the Unit's website, via the "Geotechnical Construction Submittals" link.

Direct any questions concerning submittal review status, review comments or drawing markups to the following contacts:

Primary Structures Contact: James Bolden (919) 707 – 6408
jlbolden@ncdot.gov

Secondary Structures Contacts: Emmanuel Omile (919) 707 – 6451
eomile@ncdot.gov

Madonna Rorie (919) 707 – 6508
mrorie@ncdot.gov

Eastern Regional Geotechnical Contact (Divisions 1-7):
David Hering (919) 662 – 4710
dthering@ncdot.gov

Western Regional Geotechnical Contact (Divisions 8-14):
Eric Williams (704) 455 – 8902
ewilliams3@ncdot.gov

3.0 SUBMITTAL COPIES

Furnish one complete copy of each submittal, including all attachments, to the Engineer. At the same time, submit a copy of the same complete submittal directly to the Structures Management Unit and/or the Geotechnical Engineering Unit as specified in the tables below.

The first table below covers "Structure Submittals." The Engineer will receive review comments and drawing markups for these submittals from the Structures Management Unit. The second table in this section covers "Geotechnical Submittals." The Engineer will receive review comments and drawing markups for these submittals from the Geotechnical Engineering Unit.

Unless otherwise required, submit one set of supporting calculations to either the Structures Management Unit or the Geotechnical Engineering Unit unless both units require submittal copies in which case submit a set of supporting calculations to each unit. Provide additional copies of any submittal as directed.

STRUCTURE SUBMITTALS

Submittal	Submittal Required by Structures Management Unit?	Submittal Required by Geotechnical Engineering Unit?	Contract Reference Requiring Submittal [1]
Arch Culvert Falsework	Y	N	Plan Note, SN Sheet & "Falsework and Formwork"
Box Culvert Falsework [7]	Y	N	Plan Note, SN Sheet & "Falsework and Formwork"
Cofferdams	Y	Y	Article 410-4
Foam Joint Seals [6]	Y	N	"Foam Joint Seals"
Expansion Joint Seals (hold down plate type with base angle)	Y	N	"Expansion Joint Seals"
Expansion Joint Seals	Y	N	"Modular Expansion Joint

(modular)			Seals”
Expansion Joint Seals (strip seals)	Y	N	“Strip Seal Expansion Joints”
Falsework & Forms [2] (substructure)	Y	N	Article 420-3 & “Falsework and Formwork”
Falsework & Forms (superstructure)	Y	N	Article 420-3 & “Falsework and Formwork”
Girder Erection over Railroad	Y	N	Railroad Provisions
Maintenance and Protection of Traffic Beneath Proposed Structure	Y	N	“Maintenance and Protection of Traffic Beneath Proposed Structure at Station ___”
Metal Bridge Railing	Y	N	Plan Note
Metal Stay-in-Place Forms	Y	N	Article 420-3
Metalwork for Elastomeric Bearings [4,5]	Y	N	Article 1072-8
Miscellaneous Metalwork [4,5]	Y	N	Article 1072-8
Disc Bearings [4]	Y	N	“Disc Bearings”
Overhead and Digital Message Signs (DMS) (metalwork and foundations)	Y	N	Applicable Provisions
Placement of Equipment on Structures (cranes, etc.)	Y	N	Article 420-20
Prestressed Concrete Box Beam (detensioning sequences) [3]	Y	N	Article 1078-11
Precast Concrete Box Culverts	Y	N	“Optional Precast Reinforced Concrete Box Culvert at Station ___”
Prestressed Concrete Cored Slab (detensioning sequences) [3]	Y	N	Article 1078-11
Prestressed Concrete Deck Panels	Y	N	Article 420-3
Prestressed Concrete Girder (strand elongation and detensioning sequences)	Y	N	Articles 1078-8 and 1078-11
Removal of Existing Structure over Railroad	Y	N	Railroad Provisions

Revised Bridge Deck Plans (adaptation to prestressed deck panels)	Y	N	Article 420-3
Revised Bridge Deck Plans (adaptation to modular expansion joint seals)	Y	N	"Modular Expansion Joint Seals"
Sound Barrier Wall (precast items)	Y	N	Article 1077-2 & "Sound Barrier Wall"
Sound Barrier Wall Steel Fabrication Plans [5]	Y	N	Article 1072-8 & "Sound Barrier Wall"
Structural Steel [4]	Y	N	Article 1072-8
Temporary Detour Structures	Y	Y	Article 400-3 & "Construction, Maintenance and Removal of Temporary Structure at Station ____"
TFE Expansion Bearings [4]	Y	N	Article 1072-8

FOOTNOTES

1. References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Articles refer to the *Standard Specifications*.
2. Submittals for these items are necessary only when required by a note on plans.
3. Submittals for these items may not be required. A list of pre-approved sequences is available from the producer or the Materials & Tests Unit.
4. The fabricator may submit these items directly to the Structures Management Unit.
5. The two sets of preliminary submittals required by Article 1072-8 of the *Standard Specifications* are not required for these items.
6. Submittals for Fabrication Drawings are not required. Submittals for Catalogue Cuts of Proposed Material are required. See Section 5.A of the referenced provision.
7. Submittals are necessary only when the top slab thickness is 18" or greater.

GEOTECHNICAL SUBMITTALS

Submittal	Submittals Required by Geotechnical Engineering Unit	Submittals Required by Structures Management Unit	Contract Reference Requiring Submittal [1]
Drilled Pier Construction Plans [2]	Y	N	Subarticle 411-3(A)
Crosshole Sonic Logging (CSL) Reports [2]	Y	N	Subarticle 411-5(A)(2)
Pile Driving Equipment Data Forms [2,3]	Y	N	Subarticle 450-3(D)(2)
Pile Driving Analyzer (PDA) Reports [2]	Y	N	Subarticle 450-3(F)(3)
Retaining Walls [4]	Y; drawings and calculations	Y; drawings	Applicable Provisions
Temporary Shoring [4]	Y; drawings and calculations	Y; drawings	"Temporary Shoring" & "Temporary Soil Nail Walls"

FOOTNOTES

1. References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Subarticles refer to the *Standard Specifications*.

2. Submit one hard copy of submittal to the Engineer. Submit a second copy of submittal electronically (PDF via email), US mail or other delivery service to the appropriate Geotechnical Engineering Unit regional office. Electronic submission is preferred.

3. The Pile Driving Equipment Data Form is available from:
   https://connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
   See second page of form for submittal instructions.

4. Electronic copy of submittal is required. See referenced provision.

CRANE SAFETY (6-20-19)

Comply with the manufacturer specifications and limitations applicable to the operation of any and all cranes and derricks. Prime contractors, sub-contractors, and fully operated rental companies shall comply with the current Occupational Safety and Health Administration (OSHA) regulations.

Submit all items listed below to the Engineer prior to beginning crane operations. Changes in personnel or equipment must be reported to the Engineer and all applicable items listed below must be updated and submitted prior to continuing with crane operations.

CRANE SAFETY SUBMITTAL LIST

A. **Competent Person:** Provide the name and qualifications of the "Competent Person" responsible for crane safety and lifting operations. The named competent person will have the responsibility and authority to stop any work activity due to safety concerns.

B. **Riggers:** Provide the qualifications and experience of the persons responsible for rigging operations. Qualifications and experience should include, but not be limited to, weight calculations, center of gravity determinations, selection and inspection of sling and rigging equipment, and safe rigging practices.

C. **Crane Inspections:** Inspection records for all cranes shall be current and readily accessible for review upon request.

D. **Certifications:** Crane operators shall be certified by the National Commission for the Certification of Crane Operators (NCCCO) or the National Center for Construction Education and Research (NCCER). Other approved nationally accredited programs will be considered upon request. In addition, crane operators shall have a current CDL medical card. Submit a list of crane operator(s) and include current certification for each type of crane operated (small hydraulic, large hydraulic, small lattice, large lattice) and medical evaluations for each operator.

GROUT FOR STRUCTURES (12-1-17)

1.0 DESCRIPTION

This special provision addresses grout for use in pile blockouts, grout pockets, shear keys, dowel holes and recesses for structures. This provision does not apply to grout placed in post-tensioning ducts for bridge beams, girders, decks, end bent caps, or bent caps. Mix and place grout in accordance with the manufacturer's recommendations, the applicable sections of the Standard Specifications and this provision.

2.0 MATERIAL REQUIREMENTS

Unless otherwise noted on the plans, use a Type 3 Grout in accordance with Section 1003 of the Standard Specifications.

Initial setting time shall not be less than 10 minutes when tested in accordance with ASTM C266.

Construction loading and traffic loading shall not be allowed until the 3 day compressive strength is achieved.

3.0 SAMPLING AND PLACEMENT

Place and maintain components in final position until grout placement is complete and accepted. Concrete surfaces to receive grout shall be free of defective concrete, laitance, oil, grease and other foreign matter. Saturate concrete surfaces with clean water and remove excess water prior to placing grout.

4.0 BASIS OF PAYMENT

No separate payment will be made for "Grout for Structures". The cost of the material, equipment, labor, placement, and any incidentals necessary to complete the work shall be considered incidental to the structure item requiring grout.

PROJECT SPECIAL PROVISION

(10-18-95) (Rev. 3-21-17) Z-1a

PERMITS

The Contractor's attention is directed to the following permits, which have been issued to the Department of Transportation by the authority granting the permit.

PERMIT	AUTHORITY GRANTING THE PERMIT
Dredge and Fill and/or Work in Navigable Waters (404)	U. S. Army Corps of Engineers
Water Quality (401)	Division of Environmental Management, DEQ State of North Carolina

The Contractor shall comply with all applicable permit conditions during construction of this project. Those conditions marked by * are the responsibility of the Department and the Contractor has no responsibility in accomplishing those conditions.

Agents of the permitting authority will periodically inspect the project for adherence to the permits.

The Contractor's attention is also directed to Articles 107-10 and 107-13 of the *2018 Standard Specifications* and the following:

Should the Contractor propose to utilize construction methods (such as temporary structures or fill in waters and/or wetlands for haul roads, work platforms, cofferdams, etc.) not specifically identified in the permit (individual, general, or nationwide) authorizing the project it shall be the Contractor's responsibility to coordinate with the Engineer to determine what, if any, additional permit action is required. The Contractor shall also be responsible for initiating the request for the authorization of such construction method by the permitting agency. The request shall be submitted through the Engineer. The Contractor shall not utilize the construction method until it is approved by the permitting agency. The request normally takes approximately 60 days to process; however, no extensions of time or additional compensation will be granted for delays resulting from the Contractor's request for approval of construction methods not specifically identified in the permit.

Where construction moratoriums are contained in a permit condition which restricts the Contractor's activities to certain times of the year, those moratoriums will apply only to the portions of the work taking place in the restricted waters, wetlands or buffer zones, provided that activities outside those areas is done in such a manner as to not affect the restricted waters, wetlands or buffer zones.

P-2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

DATE: March 30, 2022

MEMORANDUM TO: Mr. H.L. Cox, P.E.
Division 6 Engineer

DocuSigned by:
Mack C. Rivenbark III
AAAD1248B309416...

FROM: for Philip S. Harris, III, P.E., Unit Head
Environmental Analysis Unit

SUBJECT: Environmental Permits for the I-295 Fayetteville Outer Loop. Cumberland and Hoke Counties. WBS 34817.1.FR7 and 34817.1.FR8, **TIP Nos. U-2519BA and U-2519BB**.

Attached are the U.S. Army Corps of Engineers Individual Permit and N.C. Division of Water Resources (NCDWR) Individual Water Quality Certification. A permit modification request was submitted to the regulatory agencies on March 7, 2022 which included minor revisions to proposed jurisdictional resource impacts for U-2519BA. The modified permits will be distributed once received.

A copy of this permit package will be posted on the NCDOT website at:
https://xfer.services.ncdot.gov/pdea/PermIssued/

ec: w/o attachment (see website for attachments)

Mr. Ron Davenport, P.E. State Contract Officer
Mr. Greg Price, Division 6 Environmental Officer
Dr. Majed Al-Ghandour, P.E., Programming and TIP
Mrs. Jennifer Evans, P.E. Project Management Unit
Mr. Byron Sanders, Jr., P.E., Utilities
Mr. Stephen Morgan, P.E., Hydraulics
Mr. Brian Hanks, P.E., Structures Management
Mr. Mark Staley, Roadside Environmental
Mr. Lamar Sylvester, P.E., State Construction Engineer

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL ANALYSIS UNIT
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

Telephone: (919) 707-6000
Fax: (919) 212-5785
Customer Service: 1-877-368-4968
Website: www.ncdot.gov

Location:
1000 BIRCH RIDGE DRIVE
RALEIGH NC 27610

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

July 26, 2018

Regulatory Division/1200A

Action ID: SAW-2008-01413
NC DOT TIP No.: U-2519 BA and BB
Corps Modification # 5

Mr. Philip S. Harris, III, P.E., CPM
Natural Environment Section Head-PDEA
N.C. Department of Transportation
1598 Mail Service Center
Raleigh, NC 27699-1598

Dear Mr. Harris:

Reference the Department of the Army (DA) permit issued on October 23, 2008, and subsequent modifications dated December 21, 2010, June 24, 2014, April 25, 2017, and March 12, 2018 for the discharge of fill material into waters and wetlands adjacent to various creeks, and their tributaries in order to construct Section CA of TIP# U-2519 (Fayetteville Outer Loop TIP Nos. X-0002 B&C, and U-2519 AA, AB, BA, BB, CA, CB, DA, & E), in Cumberland County, North Carolina. Reference is also made to your permit modification request dated May 31, 2018, in which you requested construction authorization for Sections BA and BB. This request would amount to 7.67 acres of permanent fill, excavation, and mechanized land clearing in wetlands and 1,463 linear feet of stream channel permanently impacted in association with the road project. Under the conditions of the DA permit, this permit modification is reliant upon submittal of final plans showing further avoidance/minimization as well as a final mitigation plan to offset unavoidable impacts associated with these Sections. This required information was included within your May, 2018 request.

Since these impacts were evaluated within our original assessment, I have determined that the proposed project modifications described above are not contrary to the public interest and are consistent with the 404 (B) (1) Guidelines and therefore, the DA permit is hereby modified for U-2519 Sections BA and BB with one additional condition addressing mitigation needs. The authorized work shall be completed in accordance with the attached revised drawings. All other conditions of the original permit and previous modifications remain applicable. The permit expiration date remains December 31, 2021.

Additional Special Condition:

1. In order to compensate for additional impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the attached Compensatory Mitigation Responsibility Transfer Form. The requirements of this form, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit modification authorization.

This approved modification should be attached to the original permit and will be utilized for future compliance reviews of the project. If you have questions, please contact Liz Hair of the Wilmington Regulatory Field Office, at telephone (910) 251-4049.

FOR THE COMMANDER

Monte Matthews

for/ Robert J. Clark
Colonel, U.S. Army
District Commander

Enclosures:

1) 401 Water Quality Certification Modification dated June 21, 2018

2) Wetland and Stream Impact Drawings revisions dated March 2, 2018 (section BA) and April 11, 2018 (section BB)

Copies Furnished (electronic):

Ms. Joanne Steenhuis, NCDEQ-DWR
Mr. Chris Rivenbark, NCDOT
Mr. Jim Rerko, NCDOT
Mr. Chris Militscher, EPA
Mr. Gary Jordan, USFWS
Mr. Travis Wilson, NC WRC

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

January 9, 2019

Regulatory Division

Action ID. SAW-2008-01413

SUBJECT: NC DOT TIP No. U-2519 Corps Modification # 6

Mr. Philip S. Harris, III, P.E., CPM
Natural Environment Section Head-PDEA
N.C. Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Harris:

Reference the Department of the Army (DA) permit issued on October 23, 2008, and subsequent modifications dated December 21, 2010, June 24, 2014, April 25, 2017, March 12, 2018, and July 26, 2018 for the discharge of fill material into waters and wetlands adjacent to various creeks, and their tributaries in order to construct TIP# U-2519 (Fayetteville Outer Loop TIP Nos. X-0002 B&C, and U-2519 AA, AB, BA, BB, CA, CB, DA, & E), in Cumberland County, North Carolina. This was a phased permit, which only authorized work on selected sections. Other sections were not authorized to commence until final designs were completed, impacts to waters and wetlands were minimized to the extent practicable, and all modified plans including, but not limited to, a compensatory mitigation plan were submitted and approved by the US Army Corps of Engineers (Corps).

Also reference your permit modification request dated September 18, 2018, for construction authorization on Sections AA and AB. This modification request includes: 1) 9.23 acres of permanent fill, excavation, and mechanized land clearing in wetlands; 2) 0.41 acre temporary wetland fill; 3) 0.96 acre hand clearing in wetlands; 4) 4,719 linear feet of permanent stream channel impact; and 5) 1,049 linear feet of temporary stream channel impact associated with the road project. This modification presents the final design impacts and a proposed compensatory mitigation plan for these specific sections (AA and AB) of the Fayetteville Outer Loop.

After review of the information you submitted and the inclusion of the following special conditions, we have determined that the proposed project modifications described above are not contrary to the public interest and are consistent with the 404(b)(1) Guidelines. Therefore, the

DA permit is hereby modified for U-2519 section AA and AB with following additional special conditions. Please be aware that all other conditions of the original permit and previous modifications remain applicable. Per your request, the permit expiration date is hereby extended to December 31, 2022.

Additional Special Conditions:

January 9, 2019 Mod. SC1 - In order to compensate for additional impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the attached Compensatory Mitigation Responsibility Transfer Form. The requirements of this form, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit modification authorization.

January 9, 2019 Mod. SC2 - All work authorized by this permit must be performed in strict compliance with the originally approved application and plans, and/or any plans previously approved through the subsequent permit modifications. This includes those received on September 18, 2018, and authorized through this permit modification.

This approved modification should be attached to the original permit and will be utilized for future compliance reviews of the project. If you have questions, please contact Liz Hair of the Wilmington Regulatory Field Office, at telephone (910) 251-4049.

FOR THE COMMANDER

for/ Robert J. Clark
Colonel, U.S. Army
District Commander

Enclosures
1) 401 Water Quality Certification Modification dated October 18, 2018
2) Wetland and Stream Impact Drawings revisions dated September 5, 2018
3) Compensatory Mitigation Responsibility Transfer Form

Copies Furnished (electronic):

Ms. Joanne Steenhuis, NCDEQ-DWR
Mr. Chris Rivenbark, NCDOT
Mr. Jim Rerko, NCDOT
Mr. Chris Militscher, EPA
Mr. Gary Jordan, USFWS
Mr. Travis Wilson, NC WRC

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1890
WILMINGTON. NORTH CAROLINA 28402-1890

November 4, 2008

REPLY TO
ATTENTION OF:

Regulatory Division

Action ID SAW-200801413

Dr. Gregory J. Thorpe, PhD, Manager
Project Development and Environmental Analysis Branch
N.C. Department of Transportation
Division of Highways
1589 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Dr. Thorpe:

Enclosed is a Department of the Army permit to directly discharge dredged and/or fill material into jurisdictional wetlands to facilitate the construction of Fayetteville Outer Loop, Transportation Improvements Project X-0002B & C and U-2159, State Project Number 8.2441301 and 8.T441302, Cumberland, Hoke and Robeson Counties, North Carolina. The proposed 27.8 mile controlled-access freeway is located beginning at an interchange with I-95 just south of SR 1718 (Green Spring Road) in Robeson County, continues north through Cumberland County, turns eastward along the southern boundary of the Fort Bragg Military Reservation, and ends just west of US 401 (Ramsey Street).

Any deviation in the authorized work will likely require modification of this permit. If a change in the authorized work is necessary, you should promptly submit revised plans to the Corps showing the proposed changes. You may not undertake the proposed changes until the Corps notifies you that your permit has been modified.

Carefully read your permit. The general and special conditions are important. Your failure to comply with these conditions could result in a violation of Federal law. Certain significant conditions require that:

a. You must complete construction before December 31, 2011.

b. You must allow representatives from this office to make periodic visits to your worksite as deemed necessary to assure compliance with permit plans and conditions.

You must notify this office in advance as to when you intend to commence and complete work.

You should address all questions regarding this authorization to Richard K. Spencer, Wilmington Regulatory Field Office at (910) 251-4172.

Sincerely,

Jefferson M. Ryscavage
Colonel, U.S. Army
District Commander

Enclosures

Copy Furnished (with enclosures):

Chief, Source Data Unit
NOAA/National Ocean Service
ATTN: Sharon Tear N/CS261
1315 East-West Hwy., Rm 7316
Silver Spring, Maryland 20910-3282

Copies Furnished (with special conditions and plans):

Mr. Ronald J. Mikulak, Chief
Wetlands Regulatory Section
61 Forsyth Street
Atlanta, Georgia 30303

Mr. Pete Benjamin
U.S. Fish and Wildlife Service
Fish and Wildlife Enhancement
Post Office Box 33726
Raleigh, North Carolina 27636-3726

Mr. Ron Sechler
National Marine Fisheries Service
Pivers Island
Beaufort, North Carolina 28516

Mr. Doug Huggett
Division of Coastal Management
N.C. Department of Environment
and Natural Resources
400 Commerce Avenue
Morehead City, North Carolina 28557

Mr. David Rackley
National Marine Fisheries Service
219 Fort Johnson Road
Charleston, South Carolina 29412-9110

DEPARTMENT OF THE ARMY PERMIT

Permittee **NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**

Permit No. **2008-01413**

Issuing Office **USAED, Wilmington**

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: **Directly discharge dredged or fill material into waters of the United States associated with construction of the Fayetteville Outer Loop from I-95 South of Fayetteville to NC 24/87 in Cumberland and Robeson Counties, North Carolina.**

Project Location: **In the Lumber River, Hydrologic Cataloging Unit 03040203 and the Cape Fear River, Hydrologic Cataloging Unit 03030004. The project is more specifically located starting at Latitude 34.89727 N, Longitude 78.95899 W and ending at Latitude 35.11051, Longitude 78.97456.**

a. Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on **December 31, 2011.** If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit,

Special Conditions:

SEE ATTACHED SPECIAL CONDITIONS

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit, Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

E. P. Lusk for Dr. Gregory J. Thorpe, PhD 10.29.08

(PERMITTEE) **NORTH CAROLINA DEPARTMENT OF TRANSPORTATION** *(DATE)*

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

S. Kenneth Jolly for 11-4-08

(DISTRICT ENGINEER) **JEFFERSON M. RYSCAVAGE, COLONEL** *(DATE)*

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE) *(DATE)*

*U.S. GOVERNMENT PRINTING OFFICE: 1986 - 717-425

SPECIAL CONDITIONS
2008-01413

SPECIAL CONDITIONS (Action ID. 2008-01413, Fayetteville Outer Loop, Transportation Improvements Project . X-0002B & C and U-2519, State Project Number 8.2441301 and 8.T441302

1. Failure to institute and carry out the details of the following special conditions below will result in a directive to cease all ongoing and permitted work within waters of the United States, including wetlands, associated with the permitted project, or such other remedies and/or fines as the U.S. Army Corps of Engineers District Commander or his authorized representatives may seek.

2. All work authorized by this permit must be preformed in strict compliance with the attached plans, which are a part of this permit.

3. The permittee shall schedule a preconstruction meeting between its representatives, the contractor's representatives, and the Corps of Engineers, Mr. Richard Spencer, Wilmington Regulatory Field Office, prior to any work within jurisdictional waters and wetlands to ensure that there is a mutual understanding of all of the terms and conditions contained within this Department of the Army Permit. The permittee shall notify the Corps of Engineers Project Manager a minimum of thirty (30) days in advance of the scheduled meetings in order to provide that individual with ample opportunity to schedule and participate in the required meetings. One copy of the final half-size construction drawings shall be furnished to the Corps of Engineers, Mr. Richard Spencer, Wilmington Regulatory Field Office prior to the pre-construction meeting.

* 4. The permittee shall ensure that the construction design plans for this project do not deviate from the permit plans attached to this authorization. Written verification shall be provided that the final construction drawings comply with the attached permit drawings prior to any active construction in waters of the United States, including wetlands. Any deviation in the construction design plans will be brought to the attention of the Corps of Engineers, Mr. Richard Spencer, Wilmington Regulatory Field Office prior to any active construction in waters or wetlands.

5. The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit and any authorized modifications. Copies of this permit and any modifications authorized by the USACE shall be available for review at the construction site at all times. All violations, including non-compliance of these conditions, of the authorized permit shall be reported to the District Engineer within 24 hours of the violation.

6. Compensatory mitigation for the unavoidable impacts to 34.84 acres of riparian wetlands and 13.59 acres of non-riparian wetlands associated with the proposed project shall be provided by

debiting 104.52 acres of riparian wetlands and 40.77 acres of non-riparian wetlands from the Privateer Farms Mitigation Site. Compensatory mitigation for the unavoidable impacts to 12,346 linear feet of important stream reach associated with the proposed project shall be provided by debiting 18,519 linear feet of stream reach from the Privateer Farms Mitigation Site. The permittee shall maintain the Privateer Farms Mitigation Site in its natural condition, as altered by the mitigation plan, in perpetuity. Except as authorized or required by the mitigation plan, prohibited activities on the mitigation property include, but are not limited to, filling; grading; excavating; earth moving of any kind; construction of roads, walkways, buildings signs, or any other structure; any activity that may alter the drainage patterns on the property; destruction, mowing, or other alteration of vegetation on the property; disposal or storage of any garbage trash, or other waste material. In addition, the permittee shall take no action, whether on or off the mitigation property, which will adversely impact the wetlands on the mitigation property. This condition above, runs with the land. The permittee shall not sell, lease, or otherwise convey any interest in the mitigation property without subjecting the property to legally enforceable restrictions on the use of the property, to ensure its preservation, approved in writing by the Wilmington District Corps of Engineers.

7. Except as authorized by this permit or any USACE approved modification to this permit, no excavation, fill, or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands, or shall any activities take place that cause the degradation of waters or wetlands. There shall be no excavation from, waste disposal into, or degradation of, jurisdictional wetlands or waters associated with this permit without appropriate modification of this permit, including appropriate compensatory mitigation. This prohibition applies to all borrow and fill activities connected with this project. In addition, except as specified in the plans attached to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within, into, or out of waters or wetlands or to reduce the reach of waters or wetlands.

8. This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area.

9. To ensure that all borrow and waste activities occur on high ground and do not result in loss or the degradation of adjacent wetlands and streams, except as authorized by this permit, the permittee shall require its contractors and/or agents to identify all areas to be used to borrow material, or to dispose of dredged, fill, or waste material. The permittee shall ensure that all such areas comply with the preceding condition (#7) of this permit, and shall require and maintain documentation of the location and characteristics of all borrow and disposal sites associated with this project. This information will include data regarding soils, vegetation and hydrology sufficient to clearly demonstrate compliance with the preceding condition (#7). All information will be available to the Corps of Engineers upon request. NCDOT shall require its contractors to complete and execute reclamation plans for each waste and borrow site and provide written documentation that the reclamation plans have been implemented and all work is completed. This documentation will be provided to the Corps of Engineers within 30 days of the completion of the reclamation work.

10. The permittee shall comply with the conditions specified in the water quality certification, No. 3758, issued by the North Carolina Division of Water Quality on 6 October 2008.

11. The permittee shall abide by the conservation measures identified in the Biological Assessment prepared for the Red-cockaded Woodpecker, *Piocoides borealis*, dated 9 September 2004 and the conservation measures identified by the US Fish and Wildlife Service in the Biological Opinion dated 28 April 2005.

12. This Corps permit does not authorize you to take an endangered species, in particular the Red Cockaded Woodpecker. In order to legally take a listed species, you must have separate authorization under the ESA. (e.g., an ESA Section 10 permit, or a BO under the ESA Section 7, with "incidental take" provisions with which you must comply). The enclosed USFWS Biological Opinion, dated 28 April 2005, contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the BO. Your authorization under this Corps permit is conditional upon your compliance with all the mandatory terms and conditions associated with incidental take of the attached BO, which terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BO, where a take of the listed species occurs, would constitute non-compliance with your Corps permit. The USFWS is the appropriate authority to determine compliance with the terms and conditions of its BO, and the ESA.

13. The permittee shall continue coordination of design for U-2519 Sections AA, AB, BA, BB, CA and CB through the NEPA/Section 404 Merger 01 Process – Concurrence points 2A, 4B and 4C. The final design shall incorporate appropriate avoidance, minimization and mitigation of aquatic resource impacts to the fullest extent practicable. The applicant shall not commence any work within waters of the United States within U-2519 Sections AA, AB, BA, BB, CA and CB until after the submittal of a modified application with final design plans reflecting the appropriate avoidance, minimization and mitigation within these sections and has received final approval from Wilmington District Corps of Engineers

14. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in disequilibrium of wetlands or streambeds or banks, adjacent to, upstream or downstream of the structures. Riprap armoring of streams at culvert outlets shall be minimized above the ordinary high water elevation in favor of bioengineering techniques such as bank sloping, erosion control matting and revegetation with deep-rooted, woody plants.

15. The permittee shall use appropriate sediment and erosion control practices which equal or exceed those outlined in the most recent version of the "North Carolina Sediment and Erosion Control Planning and Design Manual" to assure compliance with the appropriate turbidity water quality standard. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such

Best Management Practices in order to assure compliance with the appropriate turbidity water quality standards. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project must remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4). Adequate sedimentation and erosion control measures must be implemented prior to any ground disturbing activities to minimize impacts to downstream aquatic resources. These measures must be inspected and maintained regularly, especially following rainfall events. All fill material must be adequately stabilized at the earliest practicable date to prevent sediment from entering into adjacent waters or wetlands.

16. The permittee shall take appropriate measure to control any bottom sediment that may be sluiced by the draining of impacted ponds on the project site. Sediment sluicing from ponds is not authorized by this permit.

17. The permittee shall remove all sediment and erosion control measures placed in wetlands or waters, and shall restore natural grades in those areas, at project completion.

18. The permittee shall take measures to prevent live or fresh concrete from coming into contact with any surface waters until the concrete has hardened.

19. The permittee shall install barrier fencing or other acceptable forms of barrier around all wetlands that are not to be disturbed to make them readily visible and prevent construction equipment from inadvertently entering and disturbing the wetland areas that are to remain undisturbed.

20. All mechanized equipment will be regularly inspected and maintained to prevent contamination of waters and wetlands from fuels, lubricants, hydraulic fluids, or other toxic materials. No equipment staging or storage of construction material will occur in wetlands. Hydro-seeding equipment will not be discharged or washed out into any surface waters or wetlands. In the event of a spill of petroleum products or any other hazardous waste, the permittee shall immediately report it to the N.C. Division of Water Quality at (919) 733-5083 or (800) 662-7956 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act will be followed.

21. The permittee shall abide by all project commitments identified in the FHWA/NCDOT EIS and ROD.

22. The permittee shall abide by all stipulations identified in the Memorandum of Agreement between the North Carolina Department of Transportation and the North Carolina State Historic Preservation Officer, executed 12 April 2005, and the stipulations identified in the Concurrence Form for Assessment of Effects, executed 11 January 2005.

23. If the permittee discovers any previously unknown historic or archeological sites while accomplishing the authorized work, he shall immediately stop work and notify the Wilmington District Engineer who will initiate the required State/Federal coordination.

24. The permittee shall maintain the authorized work in good condition and in conformance with the terms and conditions of this permit. The permittee is not relieved of this requirement if he abandons the permitted activity without transferring it to a third party.

25. Unless otherwise authorized by this permit, all fill material placed in waters or wetlands shall be generated from an upland source and will be clean and free of any pollutants except in trace quantities. Metal products, organic materials (including debris from land clearing activities), or unsightly debris will not be used.

26. This Department of the Army permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.

27. In issuing this permit, the Federal Government does not assume any liability for:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future Federal activities initiated on behalf of the general public.

c. Damages to other permitted or un-permitted activities or structures caused by the authorized activity.

d. Design and construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

Environmental Quality

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

LINDA CULPEPPER
Interim Director

June 21, 2018

Mr. Philip S. Harris, III, P.E., CPM
Natural Environment Section Head
Project Development and Environmental Analysis
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina, 27699-1598

Subject: Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS for Proposed improvements to Fayetteville Outer Loop (FaOL) from I-95 South of Fayetteville to NC 24-87, in Cumberland, Hoke and Robeson Counties, Federal Aid Project No. NHP-0620(031), State Project No. 34817.3.13, TIP Nos. X-0002 B&C, and U-2519 AA, AB, BA, BB, CA, DA, and E.
NCDWR Project No. 20080737 v.9

Dear Mr. Harris:

Attached hereto is a modification of Certification No.3758 issued to The North Carolina Department of Transportation (NCDOT) dated October 6, 2008, and modifications dated June 3, 2010, December 16, 2010, May 22, 2014, June 24, 2014, January 19, 2017, March 29, 2017, April 28, 2017, May 5, 2017and January 29, 2018. This modification is for the impacts to U-2519 Fayetteville Outer Loop's BA and BB sections. Section BA is approximately a 3.77 mile section of the FaOL that begins south of SR 1003 (Camden Road) and extends to south of SR 1104 (Strickland Bridge Road) and the BB portion is a 1.25 mile section that begins south of SR 1104 (Strickland Bridge Road) and extends to south of US 401.

If we can be of further assistance, do not hesitate to contact us.

Sincerely,

Linda Culpepper, Interim Director
Division of Water Resources

Attachments

Electronic copy only distribution:
Liz Hair, US Army Corps of Engineers, Wilmington Field Office
Jim Rerko, Division 6 Environmental Officer
Tyler Stanton, NC Department of Transportation
Chris Rivenbark, NC Department of Transportation
Chris Militscher, US Environmental Protection Agency
Gary Jordan, US Fish and Wildlife Service
Travis Wilson, NC Wildlife Resources Commission
Joanne Steenhuis, NC Division of Water Resources Wilmington Regional Office
File Copy

P-19

Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Resources (NCDWR) Regulations in 15 NCAC 2H .0500 and 15A NCAC 2B. This certification authorizes the NCDOT to impact an additional 8.29 acres of jurisdictional wetlands, 1730 linear feet of streams and 0.422 acres of open waters. The project shall be constructed pursuant to the modification dated received June 1, 2018. The authorized impacts are as described below:

Wetland Impacts in the Cape Fear River Basin

Site	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Area under Bridge (ac)	Total Wetland Impact (ac)
1(BA) [Z60]	1.746			0.103			1.849
2A (BA) [Z59]	2.818			0.085			2.903
2B (BA) [Z 59]	0.115			0.046			0.161
3(BA) [Z57]	0.513		0.192	0.104			0.809
4 (BA) [Z56]	0.003	0.008		0.016	0.604		0.631
5 (BA) [Z55]	0.023			0.017			0.040
6 (BA) [Z55/pond Z55A]	0.815		0.004	0.109			0.928
7 (BA) [WB]	0.364			0.027			0.391
1 (BB) [Z9]	0.085			0.037			0.122
2 (BB) [Z9]	0.287			0.052			0.339
4 (BB) [Z7]	0.046			0.033	0.015		0.094
5 (BB) [WA]			0.003	0.020			0.023
Total	**6.815**	**0.008**	**0.199**	**0.649**	**0.619**		**8.29**

Total Wetland Impact for (Site/Modification): 8.29 acres.

Stream Impacts in the Cape Fear River Basin

Site	Permanent Fill in Intermittent stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	Total Stream Impacts (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
1 (BA) L330+46 – 333+76			494 lf 25 lf	13 lf 12 lf	**507** **37**	**494** **25**
2 (BB) [Z9]	100	20			**120**	**100**
3 (BB) [BC]	145	60			**205**	**145**
4 (BB) [Z7]	364	35			**399**	**364**
5 (BB) [SA]			11		**11**	**11**
7 (BB) [Z9]	126	36			**162**	**126**
8 (BB) [Z9]	199	45			**244**	**199**
9 (BB) [Z9]		45			**45**	
TOTAL	**934**	**241**	**530**	**25**	**1730**	**1464**

Total Stream Impacts for Project (Site Modification): 1730 linear feet

Open Water Impacts in the Cape Fear Basin

Site	Permanent Fill in Open Waters (ac)	Temporary Fill in Open Waters (ac)	Total Fill in Open Waters (ac)
1 (BA) Z60 pipe	0.030	0.002	0.032
1 (BA) Z60 bank stabilization	0.001	0.001	0.001
6 (BA) Z 55/pond Z55a	0.097	0.037	0.134
2 (BB) Z9	0.010	0.001	0.011
3 (BB) BC	0.011	0.002	0.013
4 (BB) Z7	0.020	0.001	0.021
5 (BB) SA	0.001		0.001
6 (BB) Z9	0.174		0.174
7 (BB) Z9	0.012	0.002	0.014
8 (BB) Z9	0.016	0.002	0.018
9 (BB) Z9		0.003	0.003
TOTAL	0.372	0.050	0.422

Total Open Water Impact for Project: 0.422 acres

The application provides adequate assurance that the discharge of fill material into the wetlands of the Cape Fear River Basin in conjunction with the proposed development will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the State of North Carolina certifies that this activity will not violate the applicable portions of Sections 301, 302, 303, 306, 307 of PL 92-500 and PL 95-217 if conducted in accordance with the application and conditions hereinafter set forth.

This approval is only valid for the purpose and design that you submitted in your modified application dated received June 1, 2018. All the authorized activities and conditions of certification associated with the original Water Quality Certification dated October 6, 2008 and modifications dated June 3, 2010, December 16, 2010, May 22, 2014, June 24, 2014, January 19, 2017, March 29, 2017, April 28, 2017, May 5, 2017 and January 29, 2018 still apply except where superceded by this certification. Should your project change, you are required to notify the NCDWR and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

Condition(s) of Certification:

1. **Add Project Specific Conditions** This modification is applicable only to the additional proposed activities. All of the authorized activities and conditions of certification associated with the original Water Quality Certification dated October 6, 2008 and subsequent modifications dated June 3, 2010, December 16, 2010, May 22, 2014, June 24, 2014, January 19, 2017, March 29, 2017, April 28, 2017, May 5, 2017, and January 29, 2018 still apply except where superseded by this certification.

Violations of any condition herein set forth may result in revocation of this Certification and may result in criminal and/or civil penalties. This Certification shall become null and void unless the above conditions are made conditions of the Federal 404 and/or Coastal Area Management Act Permit. This Certification shall expire upon the expiration of the 404 or CAMA permit.

If you wish to contest any statement in the attached Certification you must file a petition for an administrative hearing. You may obtain the petition form from the office of Administrative hearings. You must file the petition with the office of Administrative Hearings within sixty (60) days of receipt of this notice. A petition is considered filed when it is received in the office of Administrative Hearings during normal office hours. The Office of Administrative Hearings accepts filings Monday through Friday between the hours of 8:00am and 5:00pm, except for official state holidays. The original and one (1) copy of the petition must be filed with the Office of Administrative Hearings.

The petition may be faxed-provided the original and one copy of the document is received by the Office of Administrative Hearings within five (5) business days following the faxed transmission.
The mailing address for the Office of Administrative Hearings is:

Office of Administrative Hearings
6714 Mail Service Center
Raleigh, NC 27699-6714
Telephone: (919) 431-3000, Facsimile: (919) 431-3100

A copy of the petition must also be served on DEQ as follows:

Mr. Bill F. Lane, General Counsel
Department of Environmental Quality
1601 Mail Service Center
Raleigh, NC 27699

This the 21st day of June 2018

DIVISION OF WATER RESOURCES

Linda Culpepper, Interim Director

WQC No. 3758

William G Ross Jr , Secretary
North Carolina Department of Environment and Natural Resources

Coleen Sullins, Director
Division of Water Quality

October 6, 2008

Dr Greg Thorpe, PhD , Manager
Planning and Environmental Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina, 27699-1548

Subject 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water with ADDITIONAL CONDITIONS for Proposed Fayetteville Outer Loop in Cumberland, Hoke and Robeson Counties, Federal Aid Project No NHF-DPR-0100(001), State Project No 8 2441301, TIP Nos X-002 B&C and U-2519
DWQ Project No 20080737

Dear Dr Thorpe

Attached hereto is a copy of Certification No 3758 issued to The North Carolina Department of Transportation dated October 6, 2008

If we can be of further assistance, do not hesitate to contact us

Sincerely,

Coleen Sullins,
Director

Attachments

cc Richard Spencer, US Army Corps of Engineers, Wilmington Field Office
Tyler Stanton, NCDOT NEU
Jim Rerko, DOT Division 6 Environmental Officer
Kathy Matthews, Environmental Protection Agency
Travis Wilson, NC Wildlife Resources Commission
Beth Harmon, Ecosystem Enhancement Program
Ken Averitte, DWQ Fayetteville Regional Office
File Copy

Transportation Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
2321 Crabtree Boulevard, Suite 250 Raleigh, North Carolina 27604
Phone 919-733-1786 / FAX 919-733-6893 / Internet http //h2o enr state nc us/ncwetlands

North Carolina Department of Environment and Natural Resources
Coleen Sullins, Director
Division of Water Quality

401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality (DWQ) Regulations in 15 NCAC 2H 0500 This certification authorizes the NCDOT to impact 57 08 acres of jurisdictional wetlands and 13,232 linear feet of jurisdictional streams in Cumberland, Hoke and Robeson Counties The project shall be constructed pursuant to the application dated received April 25, 2008 The authorized impacts are as described below

Section X-0002 B Stream Impacts in the Cape Fear River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Impacts to Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Impacts to Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
2	0	0	213	0	213	213
Total	**0**	**0**	**213**	**0**	**213**	**213**

Total Stream Impact for Section X-0002 B 213 linear feet

Section X-0002 C Stream Impacts in the Cape Fear River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Impacts to Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Impacts to Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
1	0	0	279	0	279	279
3	0	0	775	0	775	775
5	0	0	361	0	361	361
6	0	0	479	0	479	479
7	0	0	213	0	213	213
8	0	0	509	0	509	509
9	0	0	98	0	98	98
Total	**0**	**0**	**2714**	**0**	**2714**	**2714**

Total Stream Impact for Section X-0002 C : 2,714 linear feet

Section U-2519 E Stream Impacts in the Cape Fear River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Impacts to Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Impacts to Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
2	886	0	0	0	886	0
Total	**886**	**0**	**0**	**0**	**886**	**0**

Total Stream Impact for Section U-2519 E: 886 linear feet

Transportation Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
2321 Crabtree Boulevard, Suite 250, Raleigh, North Carolina 27604
Phone 919-733-1786 / FAX 919-733-6893 / Internet http //h2o enr state nc us/ncwetlands

North Carolina Department of Environment and Natural Resources
Coleen Sullins, Director
Division of Water Quality

This approval is only valid for the purpose and design that you submitted in your application dated received April 25, 2008 Should your project change, you are required to notify the DWQ and submit a new application If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H 0506 (h) (6) and (7) For this approval to remain valid, you are required to comply with all the conditions listed below In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit

Conditions of Certification

1 This Water Quality Certification authorizes impacts to wetlands, streams and open waters to sections X-0002 B and C, and U-2519 DA and E only When final design plans are completed for U-2519 Sections AA, AB, BA, BB, CA, and CB, modifications to the 401 Water Quality Certification shall be submitted with four copies and fees to the NC Division of Water Quality Final designs shall reflect all appropriate avoidance, minimization, and mitigation for impacts to wetlands, streams, and other surface waters, and buffers No construction activities that impact any wetlands, streams, or surface waters, located in U-2519 Sections AA, AB, BA, BB, CA or CB shall begin until after the permittee applies for, and receives a written modification of the 401 Water Quality Certification from the NC Division of Water Quality

2 Compensatory mitigation for 12,346 linear feet of impact to streams is required We understand that you have chosen to debit mitigation from the Privateer Farm Mitigation Bank This certification gives approval to the debiting of 12,346 linear feet of stream mitigation from the Privateer Farms Mitigation Site in order to satisfy the mitigation requirements of this project

3 Compensatory mitigation for 48 4 acres of wetlands is required at a 2 5 1 ratio We understand that you have chosen to debit mitigation from the Privateer Farm Mitigation Bank This certification gives approval to the debiting of 121 0 acres of wetland mitigation from the Privateer Farms Mitigation Site in order to satisfy the mitigation requirements of this project

4 At locations where ponds will be drained, proper measures will be taken to drain the pond with limited impact to upstream and downstream channel stability as well as to native aquatic species Proper measures will be taken to avoid sediment release and/or sediment accumulation downstream as a result of pond draining If typical pond draining techniques will create significant disturbance to native aquatic species, additional measures such as collection and relocation may be necessary to prevent a significant fish kill NCDOT shall consult with NC Wildlife Resources staff to determine if there are any sensitive species, and the most appropriate measures to limit impacts to these species The permittee shall observe any natural channel re-establishment, or utilize natural channel construction techniques, to ensure that the jurisdictional stream channel above and below the drained pond remain stable, and that no additional impacts occur within the natural stream channel as a result of draining the pond

5 The post-construction removal of any temporary bridge structures must return the project site to its preconstruction contours and elevations The impacted areas shall be revegetated with appropriate native species

6 Strict adherence to the most recent version of NCDOT's Best Management Practices For Bridge Demolition and Removal approved by the US Army Corps of Engineers is a condition of the 401 Water Quality Certification

7 Bridge deck drains shall not discharge directly into the stream Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc) before entering the stream Please refer to the most current version of *Stormwater Best Management Practices*

North Carolina Department of Environment and Natural Resources
Coleen Sullins, Director
Division of Water Quality

8 For any streams being impacted due to site dewatering activties, the site shall be graded to its preconstruction contours and revegetated with appropriate native species

9 Placement of culverts and other structures in waters, streams, and wetlands shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and down stream of the above structures The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by DWQ If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact the NC DWQ for guidance on how to proceed and to determine whether or not a permit modification will be required

10 If multiple pipes or barrels are required, they shall be designed to mimic natural stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate Widening the stream channel should be avoided Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage

11 Riprap shall not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage Bioengineering boulders or structures should be properly designed, sized and installed

12 One copy of the final construction drawings shall be furnished to NCDWQ Central Office, and one copy to the NCDWQ Fayetteville Regional Office, prior to the pre-construction meeting The permittee shall provide written verification that the final construction drawings comply with the permit drawings contained in the application dated received April 25, 2008 Any deviations from the approved drawings are not authorized unless approved by the NC Division of Water Quality

13 If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills

14 During the construction of the project, no staging of equipment of any kind is permitted in waters of the U S , or protected riparian buffers

15 The dimension, pattern and profile of the stream above and below the crossing shall not be modified Disturbed floodplains and streams shall be restored to natural geomorphic conditions

16 The use of rip-rap above the Normal High Water Mark shall be minimized Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage

* 17 The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval

18 All work in or adjacent to stream waters shall be conducted in a dry work area Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water

19 Heavy equipment shall be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the introduction of other pollutants into the stream

20 All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials

Transportation Permitting Unit
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2321 Crabtree Boulevard, Suite 250, Raleigh, North Carolina 27604
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North Carolina Department of Environment and Natural Resources
Coleen Sullins, Director
Division of Water Quality

21 No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification

22 Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited

23 The permittee and its authorized agents shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act) and any other appropriate requirements of State and Federal law If DWQ determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, DWQ may reevaluate and modify this certification

24 All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3 1, unless otherwise authorized by this certification

25 A copy of this Water Quality Certification shall be maintained on site at the construction site at all times In addition, the Water Quality Certification and all subsequent modifications, if any, shall be maintained with the Division Engineer and the on-site project manager

26 The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization shall be clearly marked by highly visible fencing prior to any land disturbing activities Impacts to areas within the fencing are prohibited unless otherwise authorized by this certification

27 The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i e local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc

28 The Permittee shall report any violations of this certification to the Division of Water Quality within 24 hours of discovery

* 29 Upon completion of the project (including any impacts at associated borrow or waste site), the NCDOT Division Engineer shall complete and return the enclosed "Certification of Completion Form" to notify DWQ when all work included in the 401 Certification has been completed

30 Native woody riparian vegetation (i e , trees and shrubs native to your geographic region) must be reestablished within the construction limits of the project by the end of the growing season following completion of construction

31 There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities

32 Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface waters standards

a The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*

Transportation Permitting Unit
1650 Mail Service Center, Raleigh North Carolina 27699-1650
2321 Crabtree Boulevard, Suite 250, Raleigh, North Carolina 27604
Phone 919-733-1786 / FAX 919-733-6893 / Internet http //h2o enr state nc us/ncwetlands

North Carolina Department of Environment and Natural Resources
Coleen Sullins, Director
Division of Water Quality

b The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual* The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project

c For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*

d The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act

33 Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification

Violations of any condition herein set forth may result in revocation of this Certification and may result in criminal and/or civil penalties This Certification shall become null and void unless the above conditions are made conditions of the Federal 404 and/or Coastal Area Management Act Permit This Certification shall expire upon the expiration of the 404 or CAMA permit

If this Certification is unacceptable to you have the right to an adjudicatory hearing upon written request within sixty (60) days following receipt of this Certification This request must be in the form of a written petition conforming to Chapter 150B of the North Carolina General Statutes and filed with the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, N C 27699-6714 If modifications are made to an original Certification, you have the right to an adjudicatory hearing on the modifications upon written request within sixty (60) days following receipt of the Certification Unless such demands are made, this Certification shall be final and binding

This the 6th day of October 2008

DIVISION OF WATER QUALITY

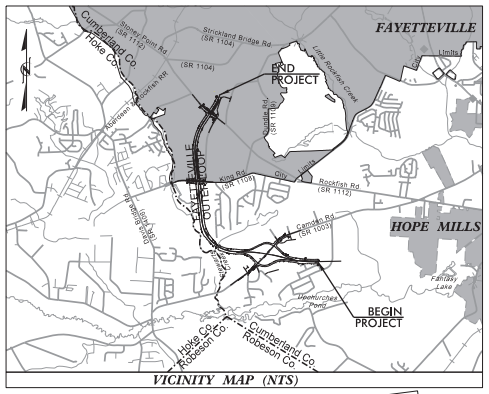
Coleen Sullins
Director

WQC No 3758

Transportation Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
2321 Crabtree Boulevard, Suite 250, Raleigh, North Carolina 27604
Phone 919-733-1786 / FAX 919-733-6893 / Internet http //h2o enr state nc us/ncwetlands

CONTRACT: TIP PROJECT: U-2519BA

See Sheet 1A For Index of Sheets



VICINITY MAP (NTS)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY

NAD 83/95

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2519BA	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34817.1.FR7	NHF-0100(24)	P.E.
34817.2.FR14	NHF-0100(24)	UTILITIES & R/W

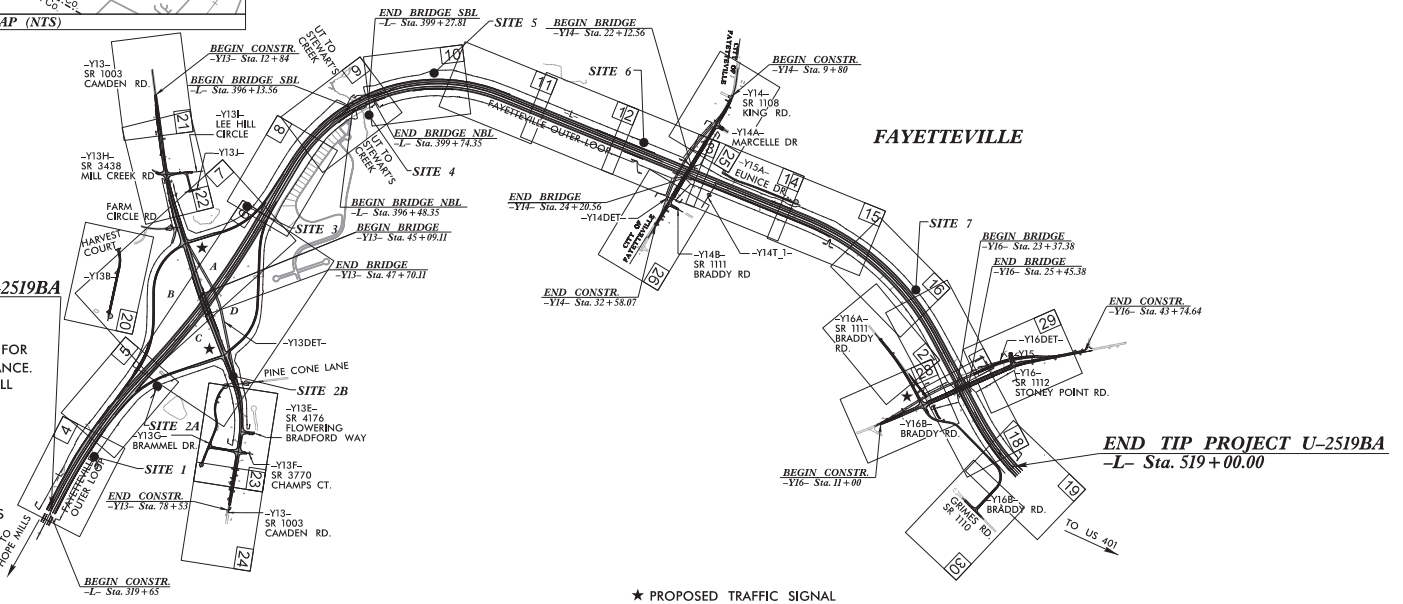
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 1 OF 39

LOCATION: FAYETTEVILLE OUTER LOOP FROM SOUTH OF SR 1003 (CAMDEN ROAD) TO SOUTH OF SR 1104 (STRICKLAND BRIDGE ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNALS SIGNING, STRUCTURES, & NOISE WALLS

WETLAND AND STREAM IMPACTS



BEGIN TIP PROJECT U-2519BA
–L– Sta. 320+00.00

END TIP PROJECT U-2519BA
–L– Sta. 519+00.00

NOTES:
1. DESIGN EXCEPTION IS REQUIRED FOR HORIZONTAL STOPPING SIGHT DISTANCE.
2. CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.
3. THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.
4. A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF FAYETTEVILLE.

★ PROPOSED TRAFFIC SIGNAL

GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2018 = 27,300
ADT 2038 = 34,000
K = 8%
D = 55%
T = 12% *
V = 70 MPH

FUNC CLASS = INTERSTATE
* (TTST 4% + DUAL 8%)
STATEWIDE TIER

PROJECT LENGTH (NB LANE)

LENGTH ROADWAY TIP PROJECT U-2519BA.....3.707 miles
LENGTH STRUCTURES TIP PROJECT U-2519BA.....0.062 miles
TOTAL LENGTH OF TIP PROJECT U-2519BA.....3.769 miles

PREPARED IN THE OFFICE OF:
RK&K
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS
RIGHT OF WAY DATE: SEPTEMBER 16, 2016
LETTING DATE: SEPTEMBER 18, 2018

B. KEITH SKINNER, PE
PROJECT ENGINEER RK&K, LLP

MICHAEL T. MERRITT, PE
PROJECT DESIGN ENGINEER RK&K, LLP

NCDOT CONTACT: GARY LOVERING, PE
PROJECT ENGINEER – ENGR. COORD.

HYDRAULICS ENGINEER
P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER
P.E.
SIGNATURE:

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

03/08/99

3/2/2018
R:\Hydraulics\PERMITS_Environmental\Drawings\MC\U2519BA_PERM_WET_tsh.dgn
Plotted:

PROJECT REFERENCE NO.	SHEET NO.
U-2915BA	2D-1

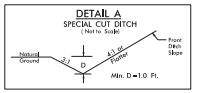
HYDRAULIC DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 2 OF 39

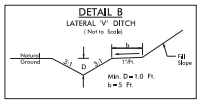
P-29

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)



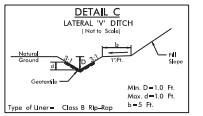
-L- STA. 422+00 TO STA. 424+00 RT
-L- STA. 469+50 TO STA. 472+50 RT
-Y13- STA. 31+66 TO STA. 34+50 RT
-Y13- STA. 52+50 TO STA. 53+70 LT
-Y13- STA. 56+00 TO STA. 57+45 RT
-Y13- STA. 77+50 TO STA. 78+00 RT
-Y13B- STA. 20+00 TO STA. 20+50 LT
-Y13_CUL1- STA. 13+50 TO STA. 14+50 LT
-Y13"CUL1- STA. 13+50 TO STA. 14+80 RT
-Y13"CUL3- STA. 12+00 TO STA. 13+35 LT
-Y13"CUL3- STA. 12+00 TO STA. 13+46 RT
-Y13DET- STA. 14+00 TO STA. 16+50 RT
-Y13DET- STA. 30+50 TO STA. 33+50 RT
-Y16DET- STA. 31+50 TO STA. 34+50 LT
-Y13G- STA. 10+36 TO STA. 13+50 LT
-Y13J- STA. 13+25 TO STA. 13+75 LT
-Y13RPD- STA. 22+50 TO STA. 23+50 LT
-Y14- STA. 12+00 TO STA. 14+00 LT
-Y14- STA. 29+18 TO STA. 32+00 LT
-Y14B- STA. 10+59 TO STA. 11+50 RT
-Y14B- STA. 10+75 TO STA. 11+50 LT
-Y16- STA. 12+00 TO STA. 13+35 RT
-Y16A- STA. 11+00 TO STA. 13+00 LT
-Y16A- STA. 16+17 TO STA. 20+00 LT
-Y16A- STA. 11+00 TO STA. 16+50 RT
-Y16B- STA. 27+00 TO STA. 29+50 LT

DETAIL B
LATERAL "V" DITCH
(Not to Scale)



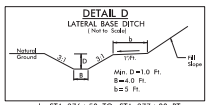
-L- STA. 379+00 TO STA. 379+50 LT
-L- STA. 456+00 TO STA. 457+00 LT
-L- STA. 462+50 TO STA. 464+20 RT
-L- STA. 468+00 TO STA. 469+00 RT
-L- STA. 472+50 TO STA. 475+00 RT
-L- STA. 472+95 TO STA. 477+00 LT
-L- STA. 495+00 TO STA. 496+00 LT
-L- STA. 517+50 TO STA. 519+00 LT
-Y13- STA. 28+00 TO STA. 31+66 RT
-Y13- STA. 49+50 TO STA. 52+50 LT
-Y13B- STA. 12+17 TO STA. 13+00 LT
-Y13F- STA. 10+58 TO STA. 11+50 RT
-Y13I- STA. 11+50 TO STA. 13+25 LT
-Y13I- STA. 13+35 TO STA. 13+75 RT
-Y13RPD- STA. 19+50 TO STA. 22+00 RT
-Y14- STA. 24+18 TO STA. 26+00 LT
-Y14- STA. 26+90 TO STA. 29+50 RT
-Y16- STA. 13+35 TO STA. 17+00 RT
-Y16- STA. 18+74 TO STA. 20+12 LT
-Y16A- STA. 16+50 TO STA. 18+50 RT
-Y16A- STA. 20+00 TO STA. 22+24 LT
-Y16DET- STA. 34+70 TO STA. 35+65 LT
-Y16DET- STA. 21+17 TO STA. 23+00 LT

DETAIL C
LATERAL "V" DITCH
(Not to Scale)



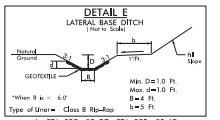
Type of Liner= Class B Rip-Rap
-L- STA. 420+27 TO STA. 421+50 RT
-Y13B- STA. 10+50 TO STA. 12+17 LT

DETAIL D
LATERAL BASE DITCH
(Not to Scale)



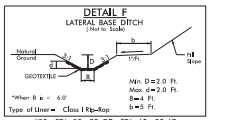
-L- STA. 376+50 TO STA. 377+00 RT
-L- STA. 390+50 TO STA. 394+00 LT
-Y13RPD- STA. 19+00 TO STA. 20+50 LT
-Y14- STA. 24+65 TO STA. 26+90 RT

DETAIL E
LATERAL BASE DITCH
(Not to Scale)



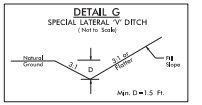
Type of Liner= Class B Rip-Rap
-L- STA. 327+50 TO STA. 332+50 LT
-L- STA. 348+00 TO STA. 349+50 LT
-L- STA. 395+58 TO STA. 397+19 RT
-L- STA. 399+60 TO STA. 403+00 RT
-L- STA. 406+00 TO STA. 415+00 RT
-L- STA. 419+50 TO STA. 420+27 RT
-Y13RPA- STA. 22+00 TO STA. 23+50 RT
-Y13RPD- STA. 20+50 TO STA. 22+00 LT
-Y13B- STA. 18+00 TO STA. 18+80 RT

DETAIL F
LATERAL BASE DITCH
(Not to Scale)



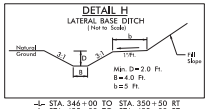
Type of Liner= Class I Rip-Rap
-Y13- STA. 58+22 TO STA. 60+00 LT
-Y13RPB- STA. 23+00 TO STA. 23+50 RT

DETAIL G
SPECIAL LATERAL "V" DITCH
(Not to Scale)



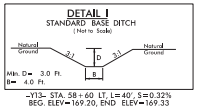
-L- STA. 456+00 TO STA. 456+65 RT
-Y16- STA. 37+00 TO STA. 44+25 LT
-Y16- STA. 37+50 TO STA. 44+06.22 RT
-Y16A- STA. 18+50 TO STA. 20+00 RT
-Y16C- STA. 11+00 TO STA. 12+13 LT
-Y14DET- STA. 14+50 TO STA. 27+00 LT
-Y16DET- STA. 30+50 TO STA. 31+84 LT
-Y16DET- STA. 33+50 TO STA. 34+25 LT

DETAIL H
LATERAL BASE DITCH
(Not to Scale)



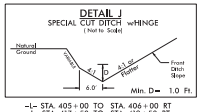
-L- STA. 346+00 TO STA. 350+50 RT
-L- STA. 485+00 TO STA. 489+00 RT
-Y13- STA. 57+50 TO STA. 58+22 LT
-Y13- STA. 69+00 TO STA. 78+53 LT

DETAIL I
STANDARD BASE DITCH
(Not to Scale)



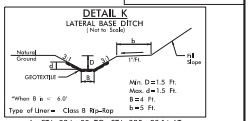
-Y13- STA. 58+60 LT, L=40', S=0.32%
BEG. ELEV=169.20, END ELEV=169.33

DETAIL J
SPECIAL CUT DITCH w/HINGE
(Not to Scale)



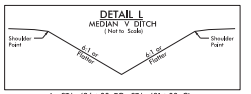
-L- STA. 405+00 TO STA. 406+00 RT
-L- STA. 417+50 TO STA. 419+50 RT
-L- STA. 422+00 TO STA. 422+50 LT
-L- STA. 426+00 TO STA. 431+00 RT
-L- STA. 428+50 TO STA. 431+00 LT
-L- STA. 454+00 TO STA. 456+00 RT
-L- STA. 454+00 TO STA. 456+00 LT

DETAIL K
LATERAL BASE DITCH
(Not to Scale)



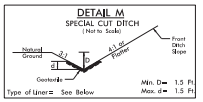
Type of Liner= Class B Rip-Rap
-L- STA. 394+00 TO STA. 395+93.14
-L- STA. 398+96 TO STA. 399+60 RT
-L- STA. 489+00 TO STA. 493+50 RT
-Y13RPA- STA. 20+00 TO STA. 22+00 RT
-Y13RPD- STA. 16+50 TO STA. 19+00 LT

DETAIL L
MEDIAN "V" DITCH
(Not to Scale)



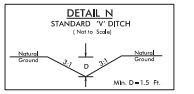
-L- STA. 426+00 TO STA. 431+00 CL
-L- STA. 518+50 TO STA. 519+00 CL

DETAIL M
SPECIAL CUT DITCH
(Not to Scale)



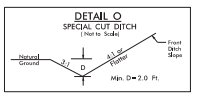
Type of Liner= See Below
-L- STA. 457+18 TO STA. 458+00 LT, CL I
-L- STA. 463+50 TO STA. 465+50 LT, CL B
-Y13B- STA. 19+50 TO STA. 20+00 LT, CL B
-Y13RPB- STA. 23+50 TO STA. 24+50 RT, CL B
-Y14- STA. 10+50 TO STA. 13+00 RT, CL I
-Y15A- STA. 12+17 TO STA. 13+00 RT, CL I
-Y15A- STA. 19+12 TO STA. 21+00 LT, CL B
-Y16A- STA. 18+50 TO STA. 19+50 RT, CL B

DETAIL N
STANDARD "V" DITCH
(Not to Scale)



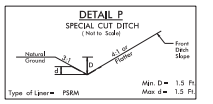
-Y13- STA. 34+00 TO STA. 36+22 RT, L=222', S=0.32%, BEG. ELEV=178.00, END ELEV=176.70
-Y13CUL1- STA. 14+50 TO STA. 15+06 LT, L=56', S=0.96%, BEG. ELEV=177.05, END ELEV=176.51
-Y13CUL1- STA. 14+80 TO STA. 15+14 RT, L=34', S=0.79%, BEG. ELEV=176.97, END ELEV=176.70
-Y14- STA. 8+20 TO STA. 9+87 RT, L=170', S=2.38%, BEG. ELEV=161.96, END ELEV=166.0
-Y14B- STA. 11+50 TO 12+05 LT, L=55', S=1.2%, BEG. ELEV=196.95, END ELEV=196.29
-Y14B- STA. 11+50 TO STA. 12+40 RT, L=90', S=0.67%, BEG. ELEV=196.52, END ELEV=195.92
-Y14T- STA. 12+00 LT, L=110', S=1.71%
BEG. ELEV=190.17, END ELEV=188.29
-Y14T- STA. 12+25 RT, L=135', S=1.67%
BEG. ELEV=189.21, END ELEV=186.95
-Y15- STA. 10+70 RT, L=31', S=2.58%
BEG. ELEV=214.20, END ELEV=215.00
-Y16- STA. 13+65 RT, L=48', S=0.3%
BEG. ELEV=212.14, END ELEV=212.00
-Y16- STA. 44+25 LT, L=105', S=0.45%
BEG. ELEV=213.12, END ELEV=212.65

DETAIL O
SPECIAL CUT DITCH
(Not to Scale)



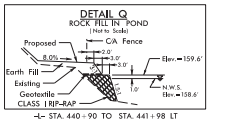
-Y13- STA. 21+00 TO STA. 25+50 RT
-Y13CUL2- STA. 10+96 TO STA. 12+12 LT
-Y13 CUL2- STA. 11+25 TO STA. 12+71 RT
-Y13RPA- STA. 27+00 TO STA. 28+29 RT
-Y16- STA. 35+00 TO STA. 37+50 RT
-Y16B- STA. 29+50 TO STA. 33+00 LT

DETAIL P
SPECIAL CUT DITCH
(Not to Scale)



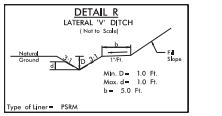
Type of Liner= PSRM
-L- STA. 415+00 TO STA. 415+50 RT
-L- STA. 436+80 TO STA. 438+00 RT
-Y13- STA. 12+91 TO STA. 14+00 LT
-Y13- STA. 12+84 TO STA. 14+00 RT
-Y13DET- STA. 36+15 TO STA. 37+50 LT
-Y14- STA. 10+00 TO STA. 11+00 LT
-Y14DET- STA. 11+78 TO STA. 14+50 RT
-Y15A- STA. 12+30 TO STA. 13+00 LT

DETAIL Q
ROCK FILL IN POND
(Not to Scale)



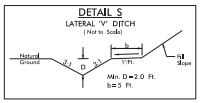
-L- STA. 440+90 TO STA. 441+98 LT

DETAIL R
LATERAL "V" DITCH
(Not to Scale)



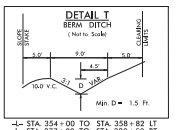
-Y13F- STA. 10+61 TO STA. 11+50 LT

DETAIL S
LATERAL "V" DITCH
(Not to Scale)



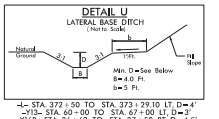
-L- STA. 506+00 TO STA. 513+00 RT
-Y13- STA. 31+66 TO STA. 36+25 LT
-Y14- STA. 15+00 TO STA. 18+67 RT
-Y13DET- STA. 15+50 TO STA. 16+50 LT
-Y13DET- STA. 34+00 TO STA. 34+70 LT
-Y14DET- STA. 14+50 TO STA. 19+20 RT
-Y16- STA. 21+27 TO STA. 23+56 RT

DETAIL T
BERM DITCH
(Not to Scale)



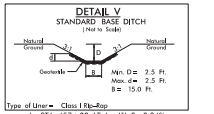
-L- STA. 354+00 TO STA. 358+82 LT
-L- STA. 377+00 TO STA. 380+50 RT
-L- STA. 431+00 TO STA. 435+50 RT
-L- STA. 450+90 TO STA. 451+79 RT
-Y13RPB- STA. 23+50 TO STA. 36+00 RT

DETAIL U
LATERAL BASE DITCH
(Not to Scale)



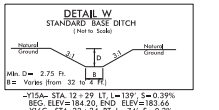
-L- STA. 372+50 TO STA. 373+29.10 LT, D=4'
-Y13- STA. 60+00 TO STA. 67+00 LT, D=3'
-Y16B- STA. 26+62 TO STA. 27+50 RT, D=4.5'

DETAIL V
STANDARD BASE DITCH
(Not to Scale)



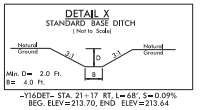
Type of Liner= Class I Rip-Rap
-L- STA. 457+08, LT, L=41', S=0.34%
BEG. ELEV=184.72, END ELEV=184.58

DETAIL W
STANDARD BASE DITCH
(Not to Scale)



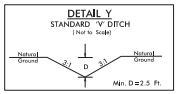
-Y15A- STA. 12+29 LT, L=139', S=0.39%
BEG. ELEV=184.20, END ELEV=183.66
-Y16C- STA. 13+24 RT, L=74', S=0.3%
BEG. ELEV=206.10, END ELEV=205.88
-Y13B- STA. 13+75 LT, L=145', S=0.9%
BEG. ELEV=175.85, END ELEV=175.08

DETAIL X
STANDARD BASE DITCH
(Not to Scale)



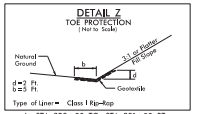
-Y16DET- STA. 21+17 RT, L=68', S=0.09%
BEG. ELEV=213.70, END ELEV=213.64

DETAIL Y
STANDARD "V" DITCH
(Not to Scale)



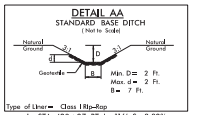
-Y13CUL2- STA. 12+12 LT, L=832', S=0.3%
BEG. ELEV=169.77 END ELEV=172.25
-Y13CUL2- STA. 10+96 LT, L=30', S=0.3%
BEG. ELEV=169.42, END ELEV=169.33

DETAIL Z
TOE PROTECTION
(Not to Scale)



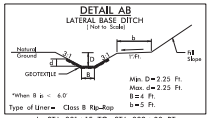
-L- STA. 328+00 TO STA. 331+50 RT
-L- STA. 331+50 TO STA. 334+50 LT
-L- STA. 392+27 TO STA. 393+50 RT
-L- STA. 440+50 TO STA. 443+35 RT
-L- STA. 440+50 TO STA. 443+50 LT
-Y13RPB- STA. 20+00 TO STA. 23+00 LT
-Y13RPC- STA. 17+00 TO STA. 19+00 RT

DETAIL AA
STANDARD BASE DITCH
(Not to Scale)



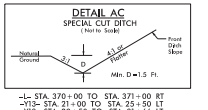
Type of Liner= Class I Rip-Rap
-L- STA. 420+27 RT, L=116', S=3.82%
BEG. ELEV=175.20, END ELEV=179.63

DETAIL AB
LATERAL BASE DITCH
(Not to Scale)



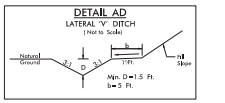
Type of Liner= Class B Rip-Rap
-L- STA. 331+15 TO STA. 332+00 RT
-Y13- STA. 67+00 TO STA. 69+00 LT
-Y13RPA- STA. 16+75 TO STA. 20+00 RT
-Y13RPD- STA. 12+53 TO STA. 16+50 LT

DETAIL AC
SPECIAL CUT DITCH
(Not to Scale)



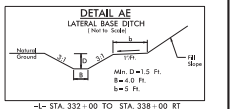
-L- STA. 370+00 TO STA. 371+00 RT
-Y13- STA. 21+00 TO STA. 25+50 LT
-Y13- STA. 29+50 TO STA. 31+66 LT
-Y13- STA. 59+00 TO STA. 67+50 RT
-Y13DET- STA. 1+00 TO STA. 15+50 LT
-Y13DET- STA. 30+50 TO STA. 34+00 LT
-Y13B- STA. 16+25 TO STA. 18+00 LT
-Y13B- STA. 15+00 TO STA. 18+00 RT
-Y13G- STA. 10+20 TO STA. 13+50 RT
-Y13RPB- STA. 28+50 TO STA. 40+50 RT
-Y14- STA. 14+00 TO STA. 15+00 RT
-Y16A- STA. 13+00 TO STA. 16+17 LT
-Y16DET- STA. 12+95 TO STA. 14+00 RT
-Y16DET- STA. 31+00 TO STA. 33+50 RT

DETAIL AD
LATERAL "V" DITCH
(Not to Scale)



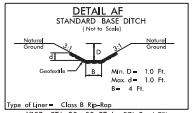
-L- STA. 371+00 TO STA. 371+61 RT
-L- STA. 375+40 TO STA. 379+00 LT
-L- STA. 464+20 TO STA. 468+00 RT
-L- STA. 490+00 TO STA. 496+00 LT
-Y13- STA. 37+38 TO STA. 45+00 RT
-Y13- STA. 67+50 TO STA. 76+50 RT
-Y13B- STA. 10+15 TO STA. 11+56 LT
-Y13J- STA. 10+50 TO STA. 12+50 LT
-Y13RPA- STA. 18+59 TO STA. 22+00 LT
-Y13RPD- STA. 16+15 TO STA. 19+50 RT
-Y13DET- STA. 16+50 TO STA. 30+50 RT
-Y15- STA. 11+00 TO STA. 11+50 RT
-Y16- STA. 29+00 TO STA. 32+00 LT
-Y16B- STA. 23+00 TO STA. 25+00 LT
-Y16DET- STA. 14+00 TO STA. 16+00 RT
-Y16DET- STA. 18+75 TO STA. 21+17 LT

DETAIL AE
LATERAL BASE DITCH
(Not to Scale)



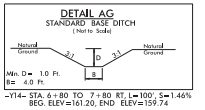
-L- STA. 332+00 TO STA. 338+00 RT
-L- STA. 373+35 TO STA. 376+50 RT
-L- STA. 489+39 TO STA. 490+00 LT

DETAIL AF
STANDARD BASE DITCH
(Not to Scale)



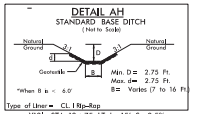
Type of Liner= Class B Rip-Rap
-Y13B- STA. 20+50 RT, L=57', S=4.9%
BEG. ELEV=154.81, END ELEV=152.00
-L- STA. 376+92 RT, L=60', S=8.3%
BEG. ELEV=154.50, END ELEV=149.55
-Y13RPD- 18+89 LT, L=44', S=8.3%
BEG. ELEV=160.20, END ELEV=156.57
-Y13B- STA. 18+80 RT, L=50', S=7.4%
BEG. ELEV=156.70, END ELEV=153.00

DETAIL AG
STANDARD BASE DITCH
(Not to Scale)



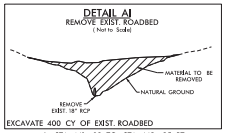
-Y14- STA. 6+80 TO 7+80, RT, L=100', S=1.46%
BEG. ELEV=161.20, END ELEV=159.74

DETAIL AH
STANDARD BASE DITCH
(Not to Scale)



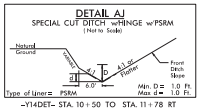
Type of Liner= CL I Rip-Rap
-Y13L- STA. 13+75 LT, L=15', S=0.5%
BEG. ELEV=175.08, END ELEV=175.00
-Y15A- STA. 12+20 LT, L=61', S=0.39%
BEG. ELEV=184.44, END ELEV=184.20

DETAIL AI
REMOVE EXIST. ROADBED
(Not to Scale)



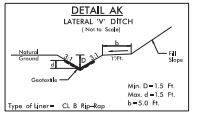
EXCAVATE 400 CY OF EXIST. ROADBED
-L- STA. 441+93 TO STA. 443+35 RT

DETAIL AJ
SPECIAL CUT DITCH w/HINGE w/PSRM
(Not to Scale)



Type of Liner= PSRM
-Y14DET- STA. 10+50 TO STA. 11+78 RT

DETAIL AK
LATERAL "V" DITCH
(Not to Scale)



Type of Liner= CL B Rip-Rap
-L- STA. 379+00 TO STA. 379+50 LT

6/2/20

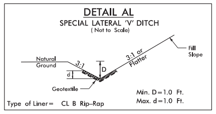
3/2/2018
P:\Projects\PERMITS\Environmental\Drawings\4C\U2915BA_PRM_WET_Hyd_Det.dgn
Users

PROJECT REFERENCE NO.	SHEET NO.
U-2915BA	2D-2

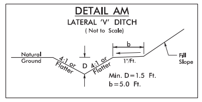
HYDRAULIC DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

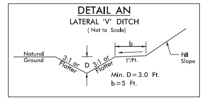
PERMIT DRAWING
SHEET 3 OF 39



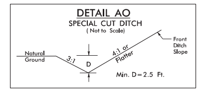
-Y16C- STA. 13+28 TO STA. 14+00 LT



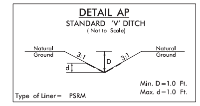
-Y16- STA. 18+80 TO STA. 20+50 RT



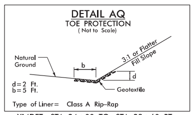
-L- STA. 513+00 TO STA. 519+00 RT
-Y16B- STA. 10+92 TO STA. 13+50 LT



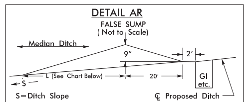
-Y16B- STA. 13+50 TO STA. 15+28 LT
-Y16B- STA. 23+00 TO STA. 26+62 RT



-Y16DET- STA. 18+62 LT, L=75', S=3.99%
BEG. ELEV=217.79, END ELEV=214.80
-Y16DET- STA. 19+07, L=75', S=2.92%
BEG. ELEV=216.85, END ELEV=214.66

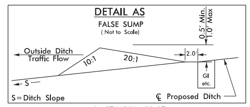


-Y14DET- STA. 24+00 TO STA. 28+60 RT

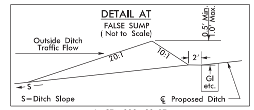


Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

-L- STA. 322+00 MED
-L- STA. 327+50 MED
-L- STA. 334+00 MED
-L- STA. 339+00 MED
-L- STA. 341+00 MED
-L- STA. 347+50 MED
-L- STA. 350+50 MED
-L- STA. 356+50 MED LT
-L- STA. 356+50 MED RT
-L- STA. 364+50 MED
-L- STA. 368+00 MED
-L- STA. 371+50 MED
-L- STA. 375+37 MED
-L- STA. 380+00 MED
-L- STA. 385+00 MED
-L- STA. 387+50 MED
-L- STA. 390+50 MED
-L- STA. 400+00 MED
-L- STA. 405+00 MED
-L- STA. 413+50 MED
-L- STA. 419+50 MED
-L- STA. 422+00 MED
-L- STA. 434+00 MED
-L- STA. 437+00 MED
-L- STA. 440+00 MED
-L- STA. 443+00 MED
-L- STA. 444+00 MED
-L- STA. 451+80 MED LT
-L- STA. 451+80 MED RT
-L- STA. 456+87 MED
-L- STA. 462+00 MED
-L- STA. 464+23 MED
-L- STA. 472+50 MED
-L- STA. 482+00 MED
-L- STA. 485+00 MED
-L- STA. 489+72 MED
-L- STA. 496+50 MED
-L- STA. 499+50 MED
-L- STA. 506+50 MED LT
-L- STA. 506+50 MED RT



-L- STA. 354+00 LT
-L- STA. 356+50 LT
-L- STA. 358+00 LT
-L- STA. 361+50 LT
-L- STA. 364+50 LT
-L- STA. 368+00 LT
-L- STA. 372+00 LT
-L- STA. 377+50 RT
-L- STA. 380+50 RT
-L- STA. 385+00 RT
-L- STA. 387+50 RT
-L- STA. 390+50 RT
-L- STA. 417+50 RT
-L- STA. 422+00 RT
-L- STA. 425+00 RT
-L- STA. 434+00 LT
-L- STA. 444+00 RT
-L- STA. 446+50 RT
-L- STA. 449+00 RT
-L- STA. 451+80 RT
-L- STA. 454+00 LT
-Y13- STA. 57+00 LT
-Y13RPA- STA. 22+50 LT
-Y13RPD- STA. 22+50 RT
-Y13RPD- STA. 23+50 LT
-Y13RPD- STA. 31+00 RT
-Y13RPD- STA. 34+67 RT
-Y13RPC- STA. 20+00 LT
-Y13RPC- STA. 20+50 RT
-Y13CUL_2- STA. 12+00 RT



-L- STA. 339+00 RT
-L- STA. 341+00 RT
-L- STA. 343+36 RT
-L- STA. 354+00 RT
-L- STA. 355+50 RT
-L- STA. 356+50 RT
-L- STA. 380+00 LT
-L- STA. 385+00 LT
-L- STA. 422+00 LT
-L- STA. 435+00 RT
-L- STA. 437+00 RT
-L- STA. 440+00 RT
-L- STA. 444+00 LT
-L- STA. 446+50 LT
-L- STA. 451+80 LT
-L- STA. 454+00 LT
-L- STA. 454+00 RT
-L- STA. 496+50 LT
-Y13RPB- STA. 24+50 LT
-Y13B- STA. 17+27 LT

PLANS PREPARED BY :
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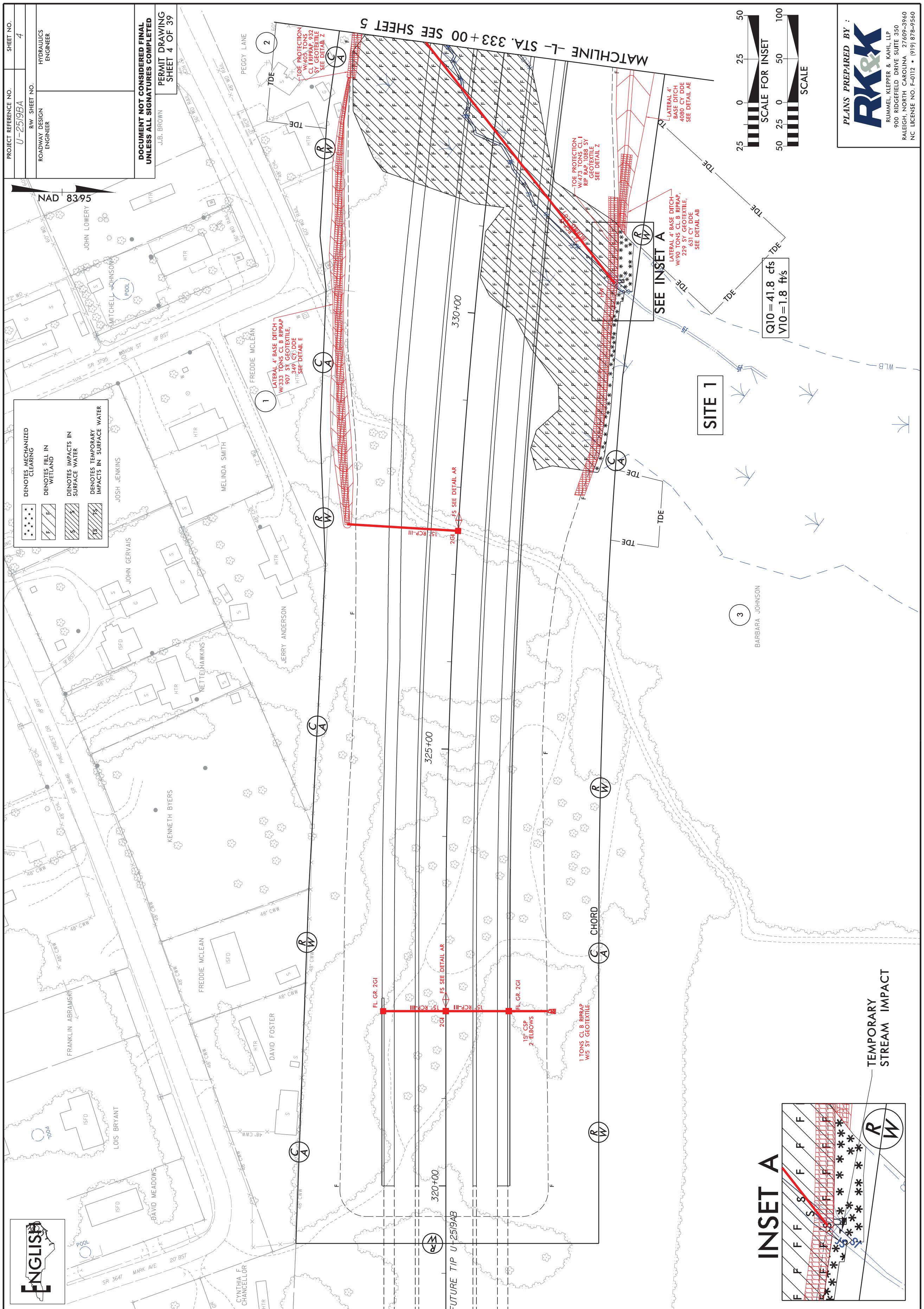
PROJECT REFERENCE NO. U-2519BA
SHEET NO. 4
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
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NAD 83/95
MATCHLINE -L- STA. 333+00 SEE SHEET 5
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
SEE INSET A
SITE 1
Q10=41.8 cfs
V10=1.8 ft/s
SCALE FOR INSET
SCALE
INSET A
TEMPORARY STREAM IMPACT
PLANS PREPARED BY:
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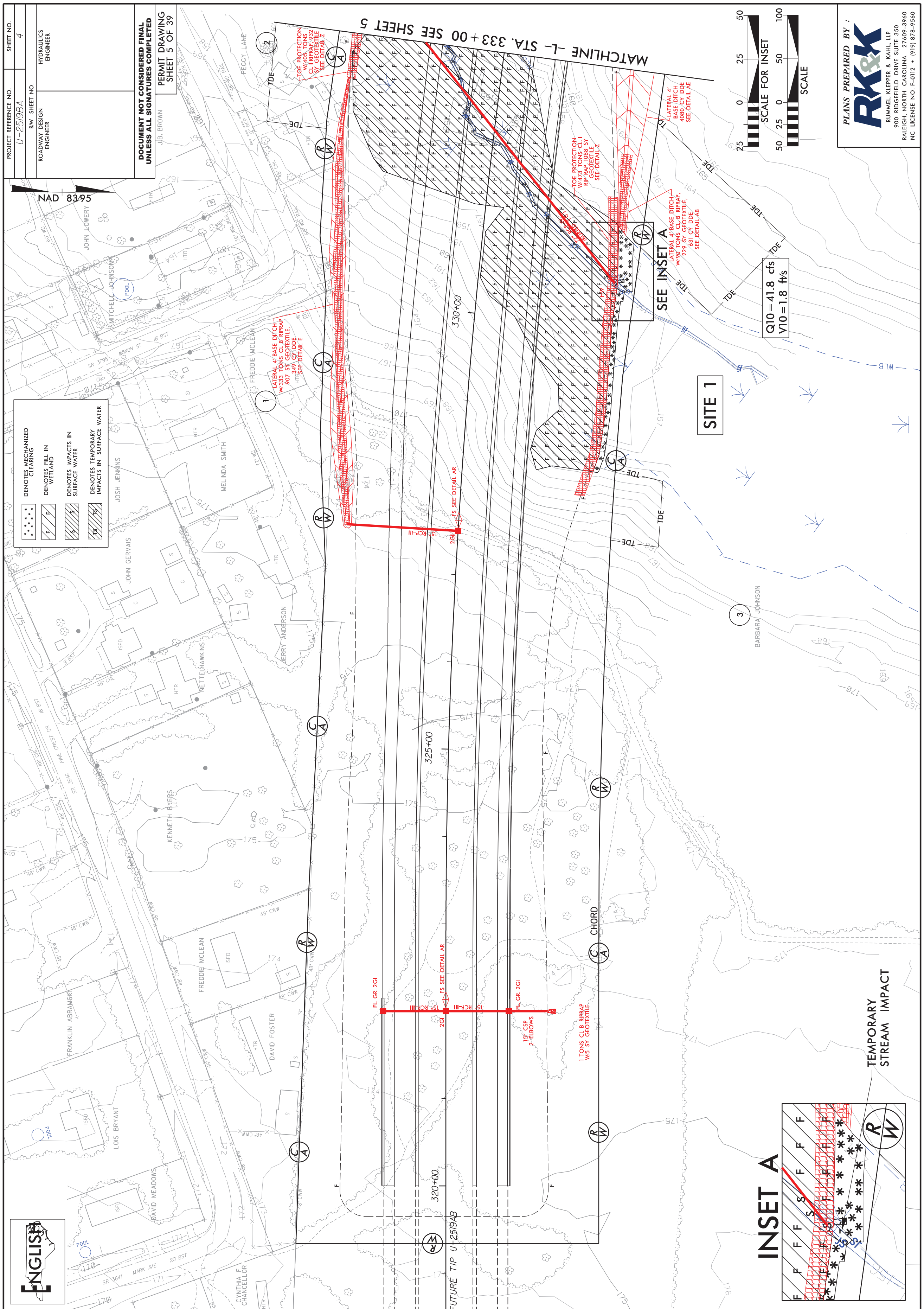
ENGLISH
8/17/99


PROJECT REFERENCE NO.
U-2519BA
SHEET NO.
4
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 5 OF 39
NAD 83/95
MATCHLINE -L- STA. 333+00 SEE SHEET 5
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
SEE INSET A
SITE 1
Q10=41.8 cfs
V10=1.8 ft/s
SCALE FOR INSET
SCALE
PLANS PREPARED BY:
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
INSET A
TEMPORARY STREAM IMPACT
330+00
325+00
320+00
FUTURE TIP U-2519AB
CHORD
ENGLISH
8/17/99

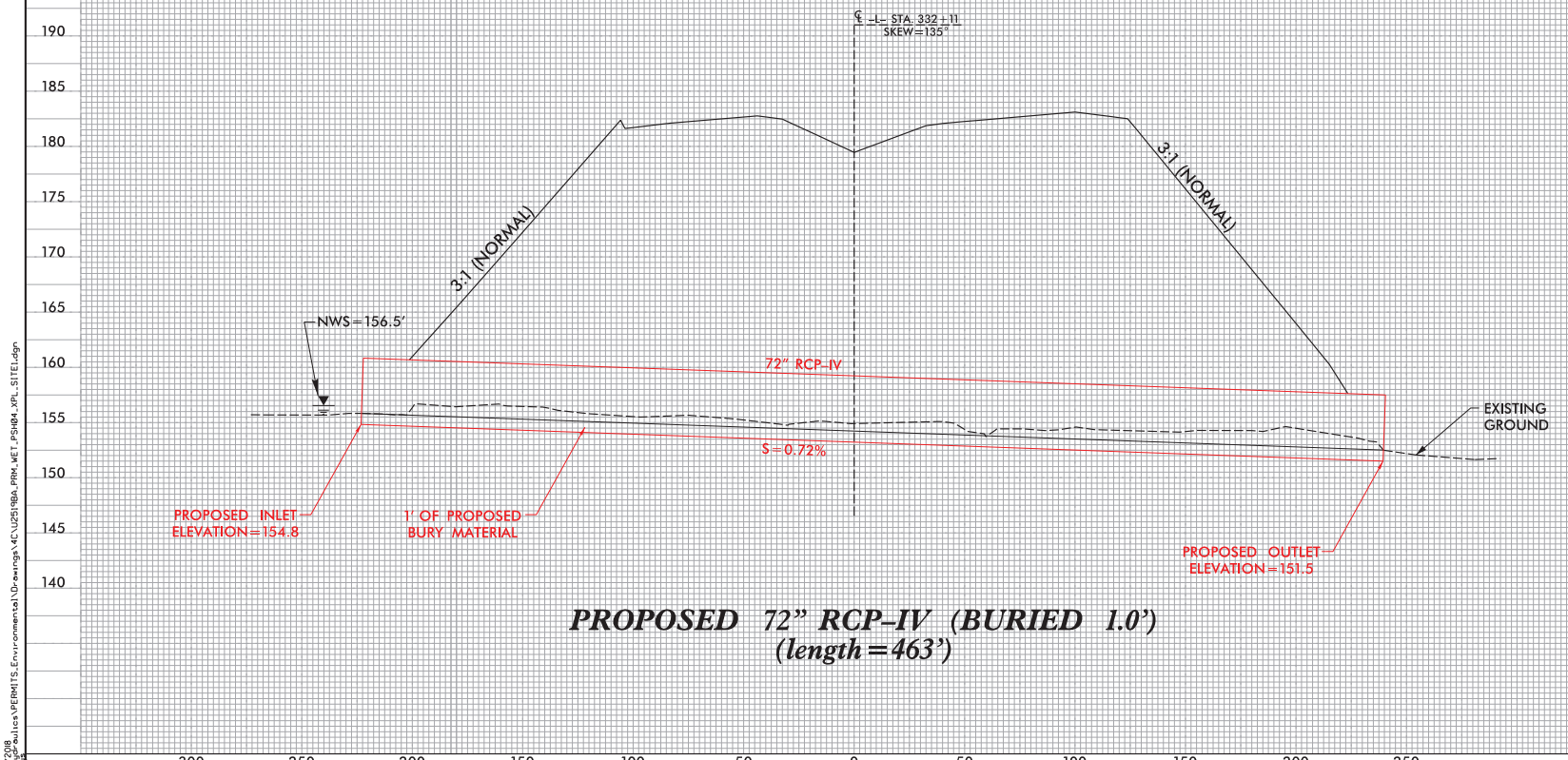
PROJECT REFERENCE NO.	SHEET NO.
U-2519BA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGLISH

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 6 OF 39

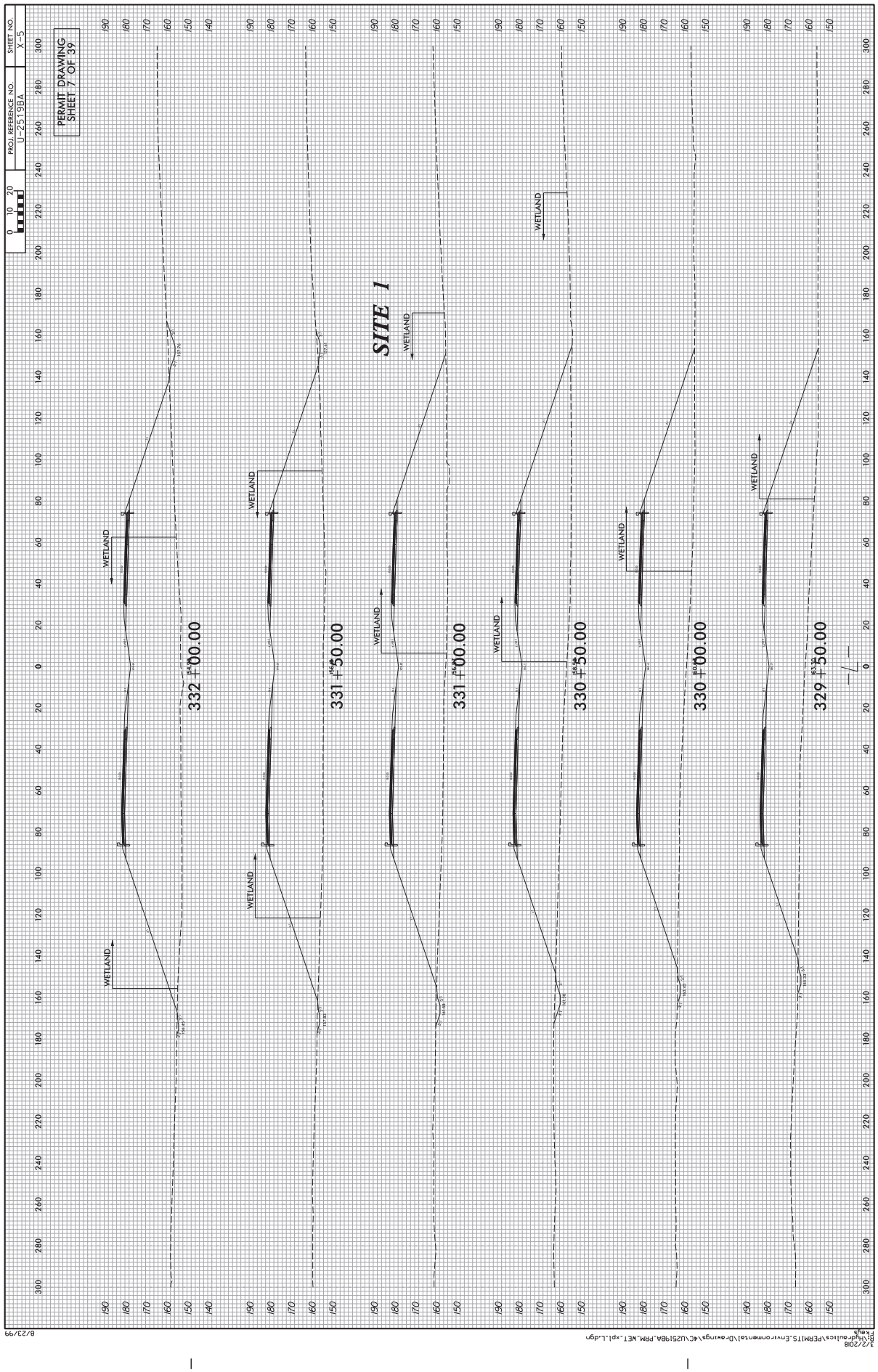
SITE 1
-L- 332+11

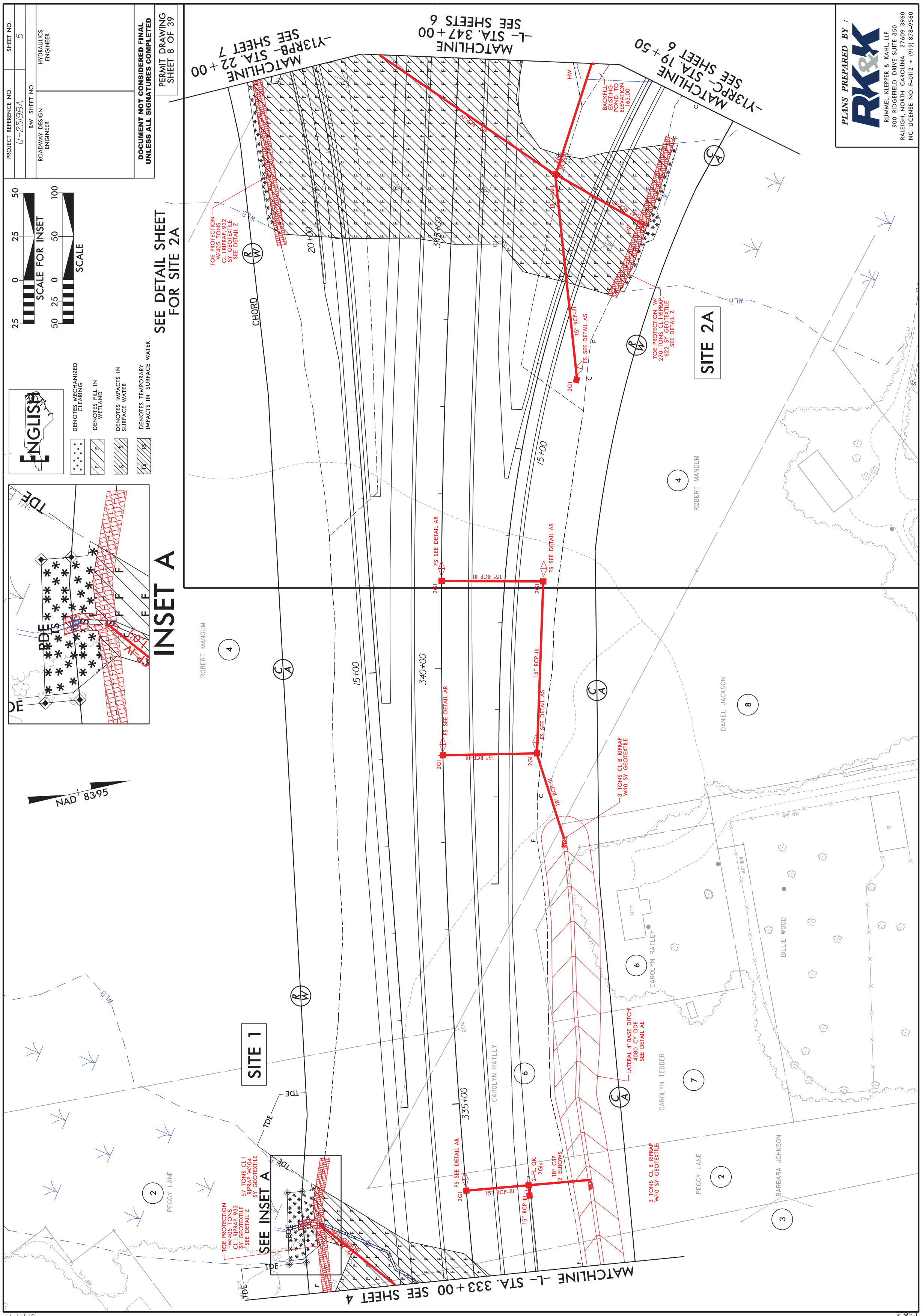


PROPOSED 72" RCP-IV (BURIED 1.0')
(length=463')

5/14/99

3/2/2018
R:\Hydraulics\PERMITS\Environmental\Drawings\4C\U2519BA_PRM_WET_PSH04.XPL_SITE1.dgn
jfields


PROJ. REFERENCE NO.
U-2519BA
SHEET NO.
X-5
PERMIT DRAWING
SHEET 7 OF 39
SITE 1
WETLAND
332+00.00
331+50.00
331+00.00
330+50.00
330+00.00
329+50.00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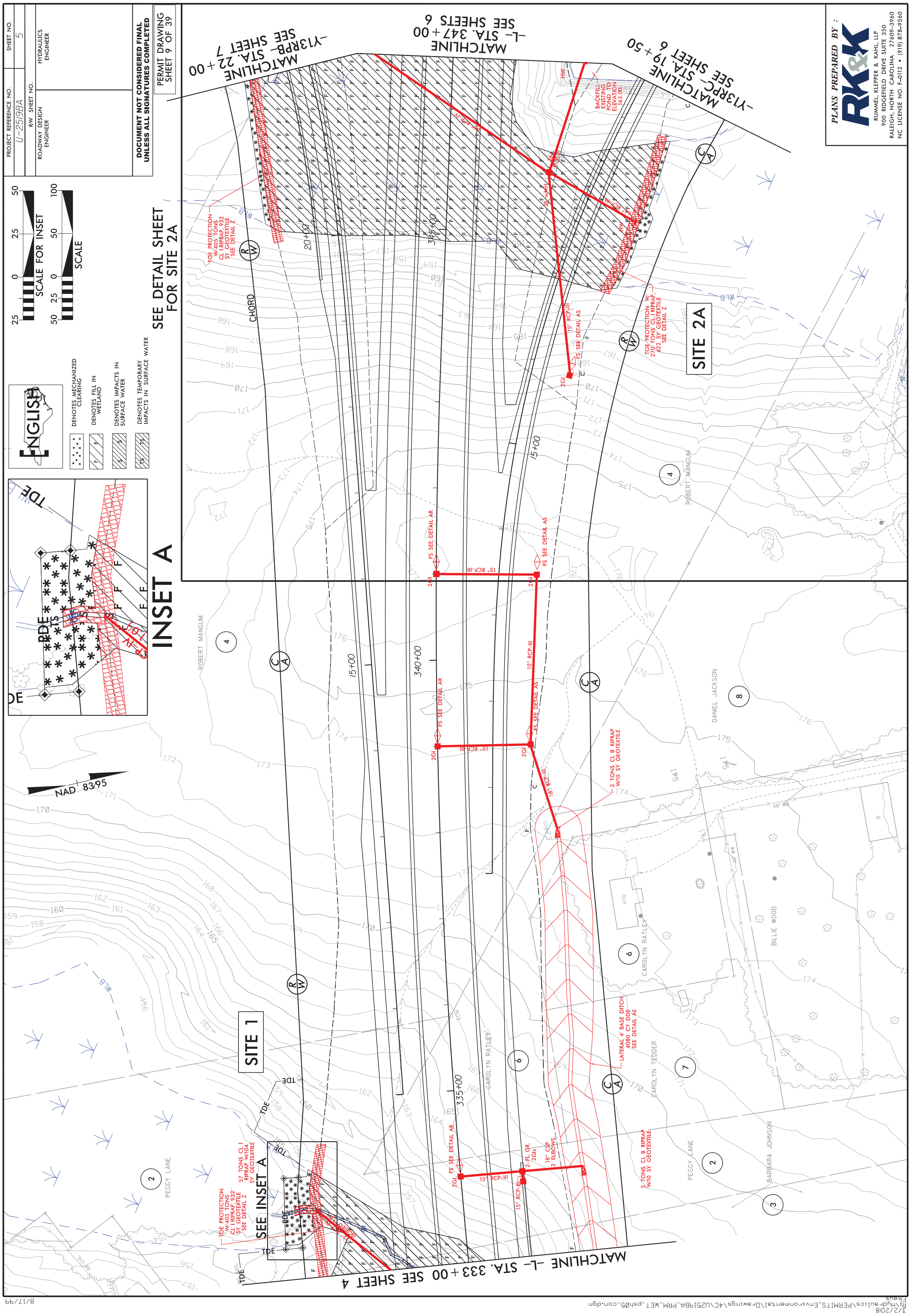
U-2519BA
SHEET NO.
5
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 8 OF 39
SCALE FOR INSET
SCALE
SEE DETAIL SHEET FOR SITE 2A
ENGLISH
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
INSET A
NAD 83/95
MATCHLINE -Y13RPB- STA. 22+00 SEE SHEET 7
MATCHLINE -L- STA. 347+00 SEE SHEETS 6
MATCHLINE -Y13RPC- STA. 19+50 SEE SHEET 6
MATCHLINE -L- STA. 333+00 SEE SHEET 4
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
SITE 2A
SITE 1
SEE INSET A
ROBERT MANGUM
DANIEL JACKSON
CAROLYN RATLEY
CAROLYN TEDDER
BILLIE WOOD
BARBARA JOHNSON
PEGGY LANE
CHORD
BACKFILL EXISTING POND TO ELEVATION 163.00
TOE PROTECTION W/405 TONS CL I RIPRAP 932 SY GEOTEXTILE SEE DETAIL Z
TOE PROTECTION W/270 TONS CL I RIPRAP 622 SY GEOTEXTILE SEE DETAIL Z
3 TONS CL B RIPRAP W10 SY GEOTEXTILE
LATERAL V BASE DITCH 4080 CY DDE SEE DETAIL AE
57 TONS CL I RIPRAP W104 SY GEOTEXTILE
FS SEE DETAIL AR
FS SEE DETAIL AS
15" RCP-III
18" CSP
2GI
20+00
15+00
335+00
340+00
345+00
TDE
PDE
3/2/2018
8/17/99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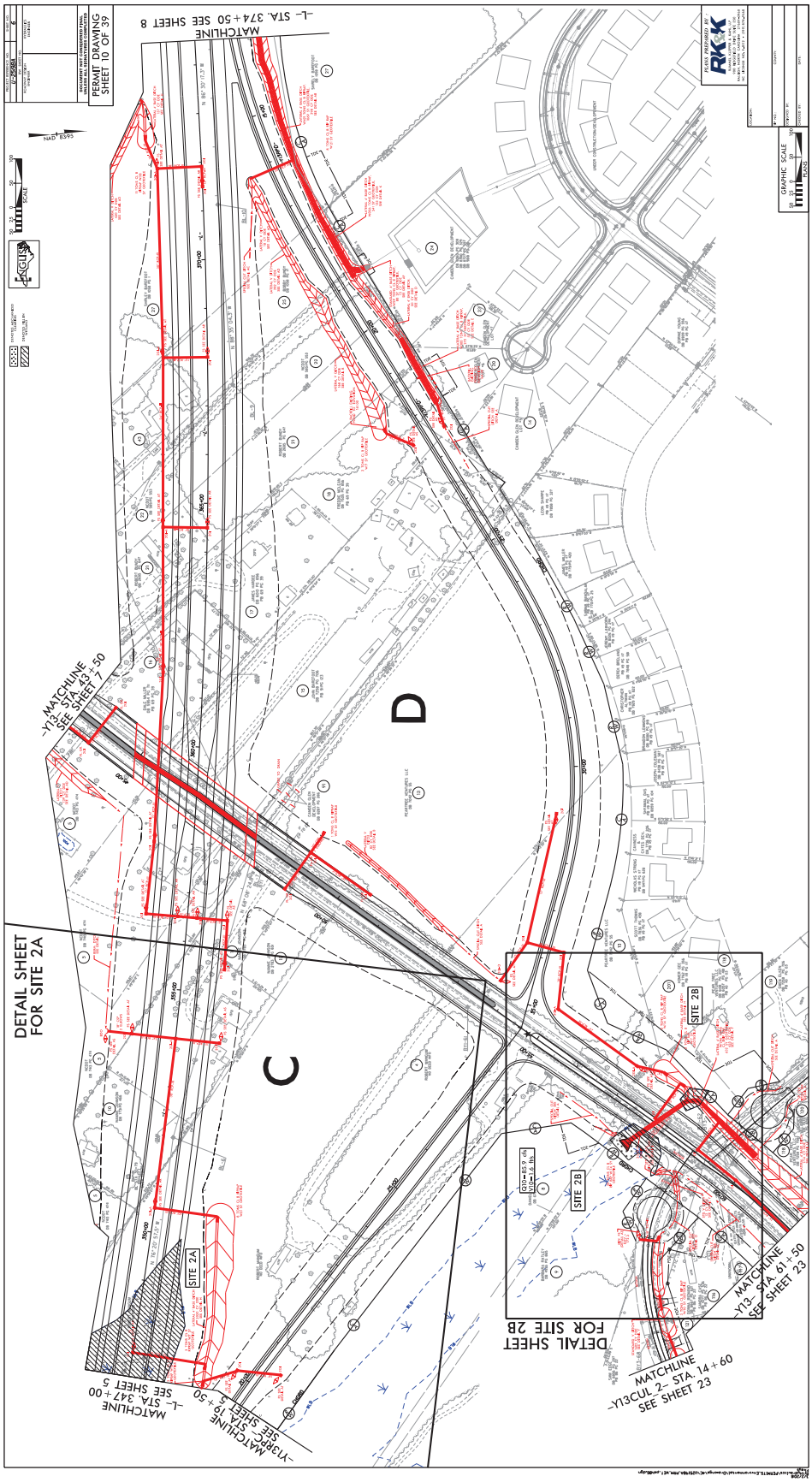
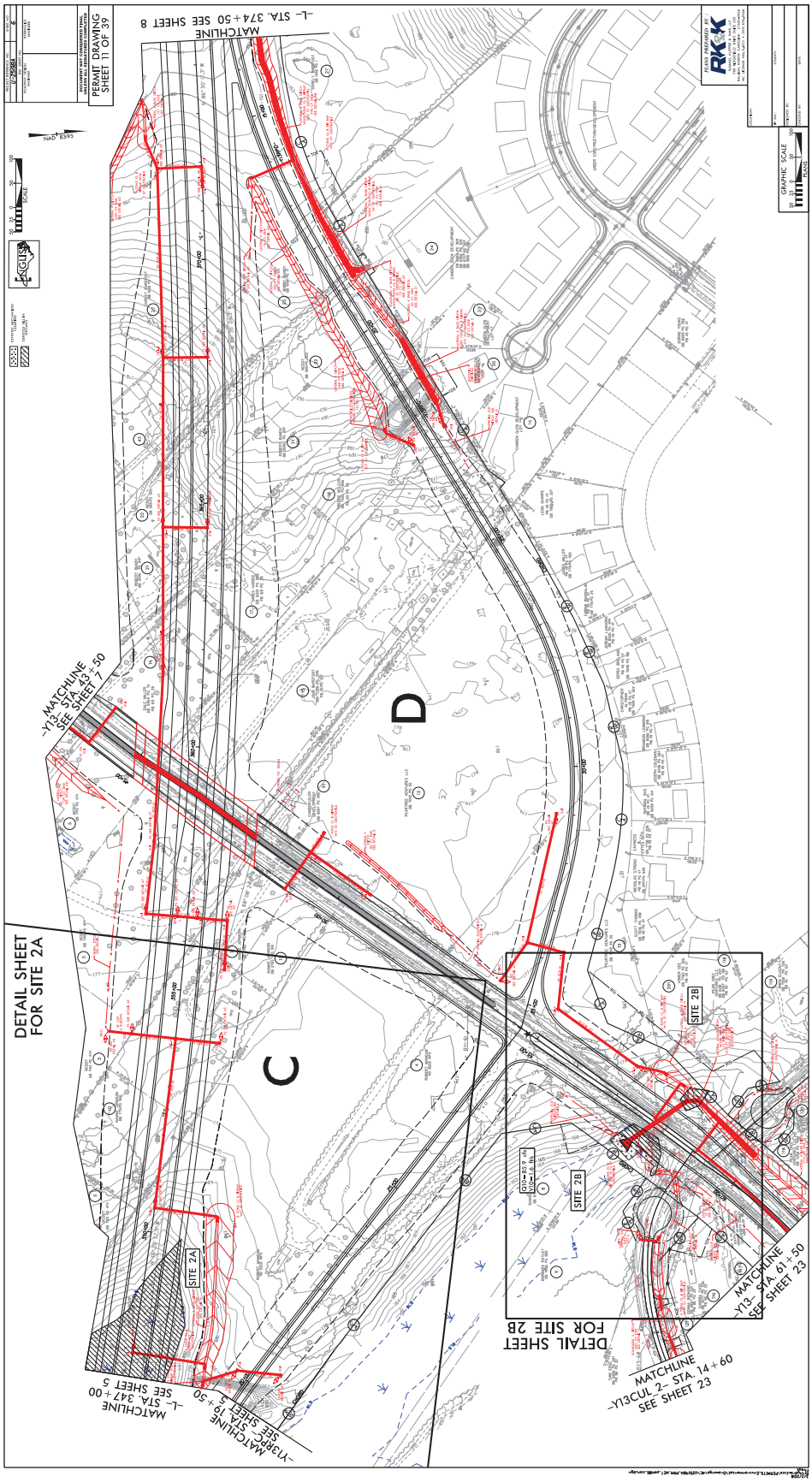
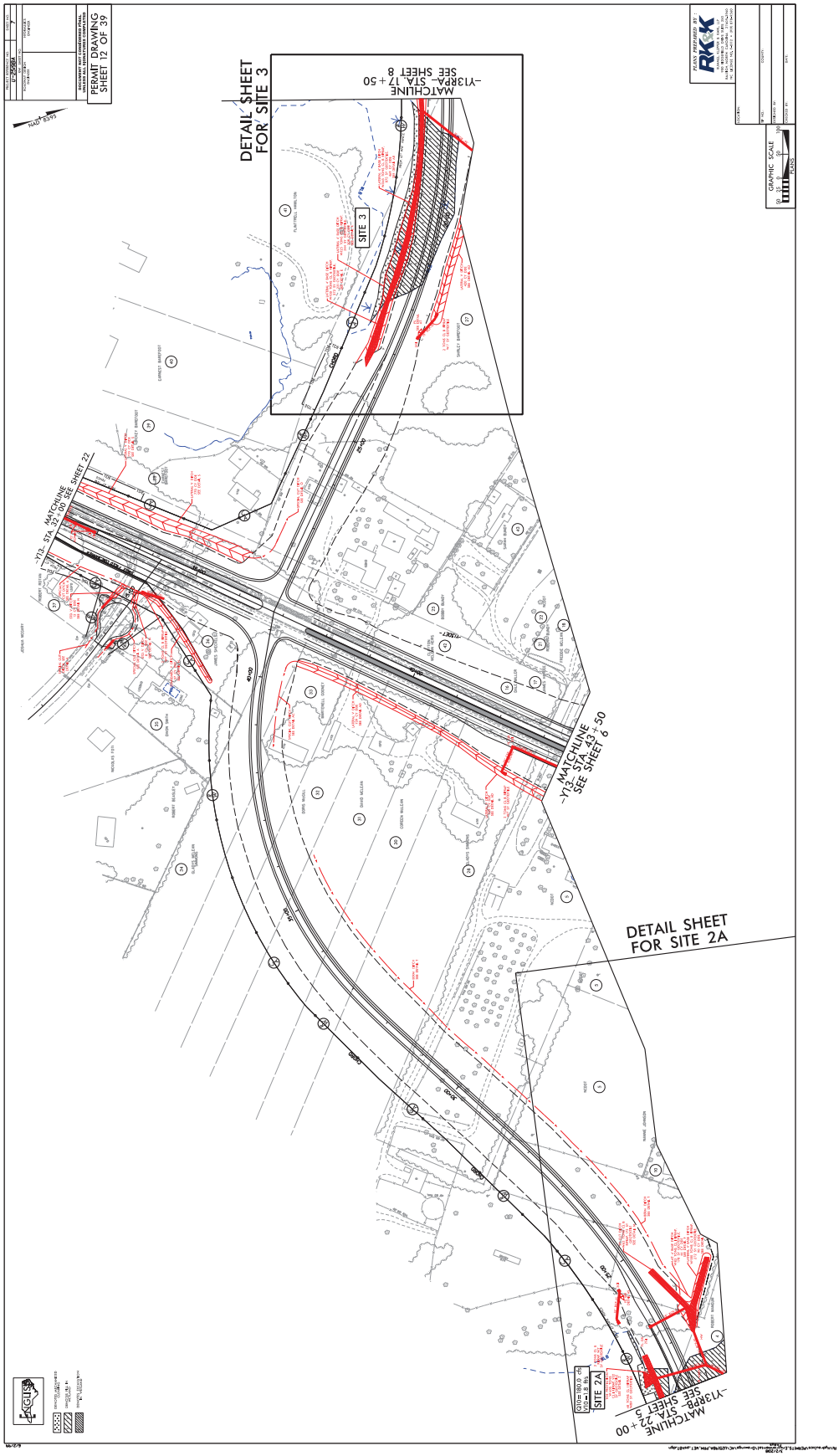
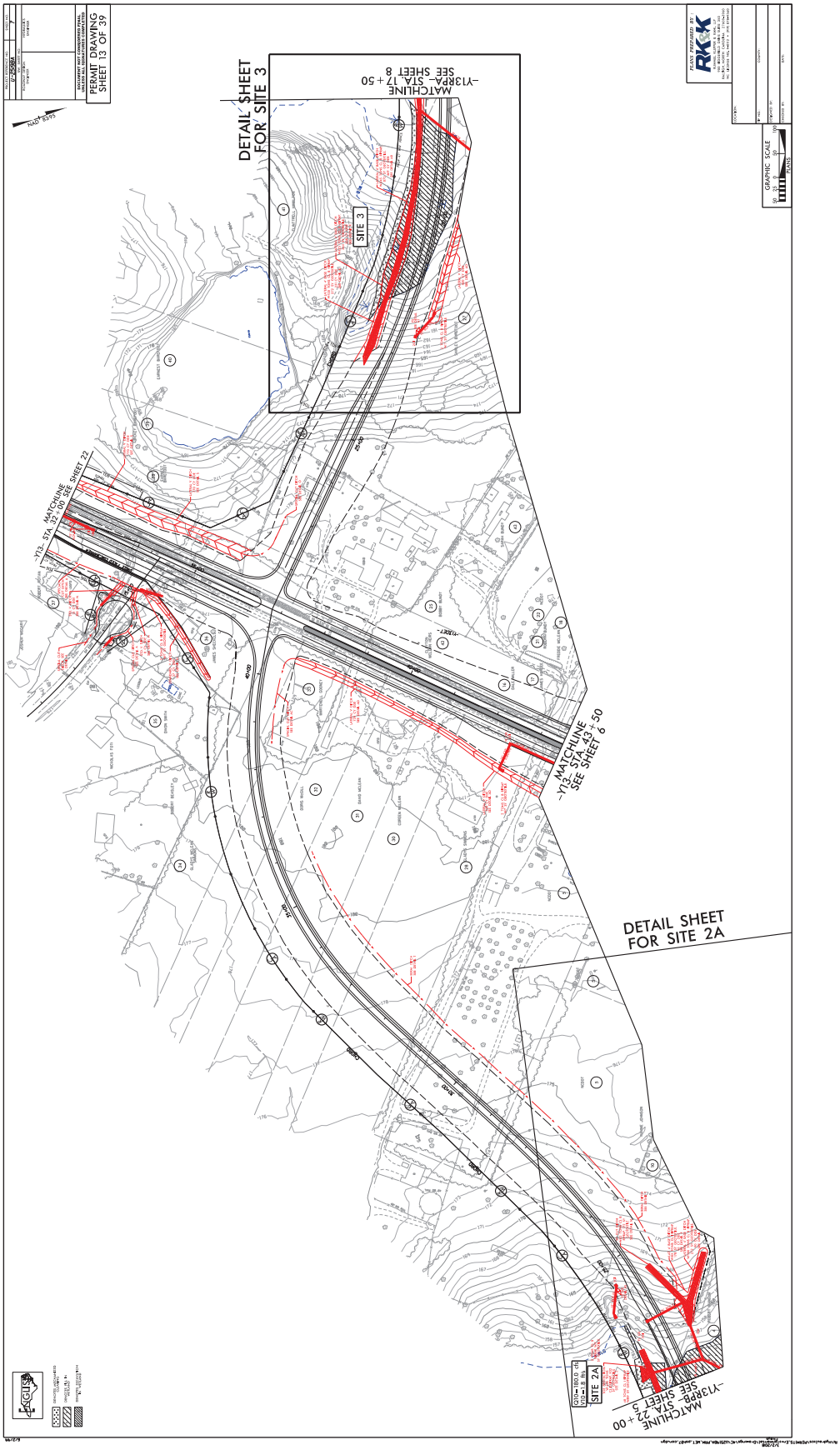
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 9 OF 39
SCALE FOR INSET
SCALE
ENGLISH
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
INSET A
SEE DETAIL SHEET FOR SITE 2A
SITE 2A
SITE 1
SEE INSET A
NAD 83/95
MATCHLINE -L- STA. 333+00 SEE SHEET 4
MATCHLINE -L- STA. 347+00 SEE SHEETS 6
MATCHLINE -Y13RPB- STA. 22+00 SEE SHEET 7
MATCHLINE -Y13RPC- STA. 19+50 SEE SHEET 6
PLANS PREPARED BY:
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
8/17/99
3/2/2018

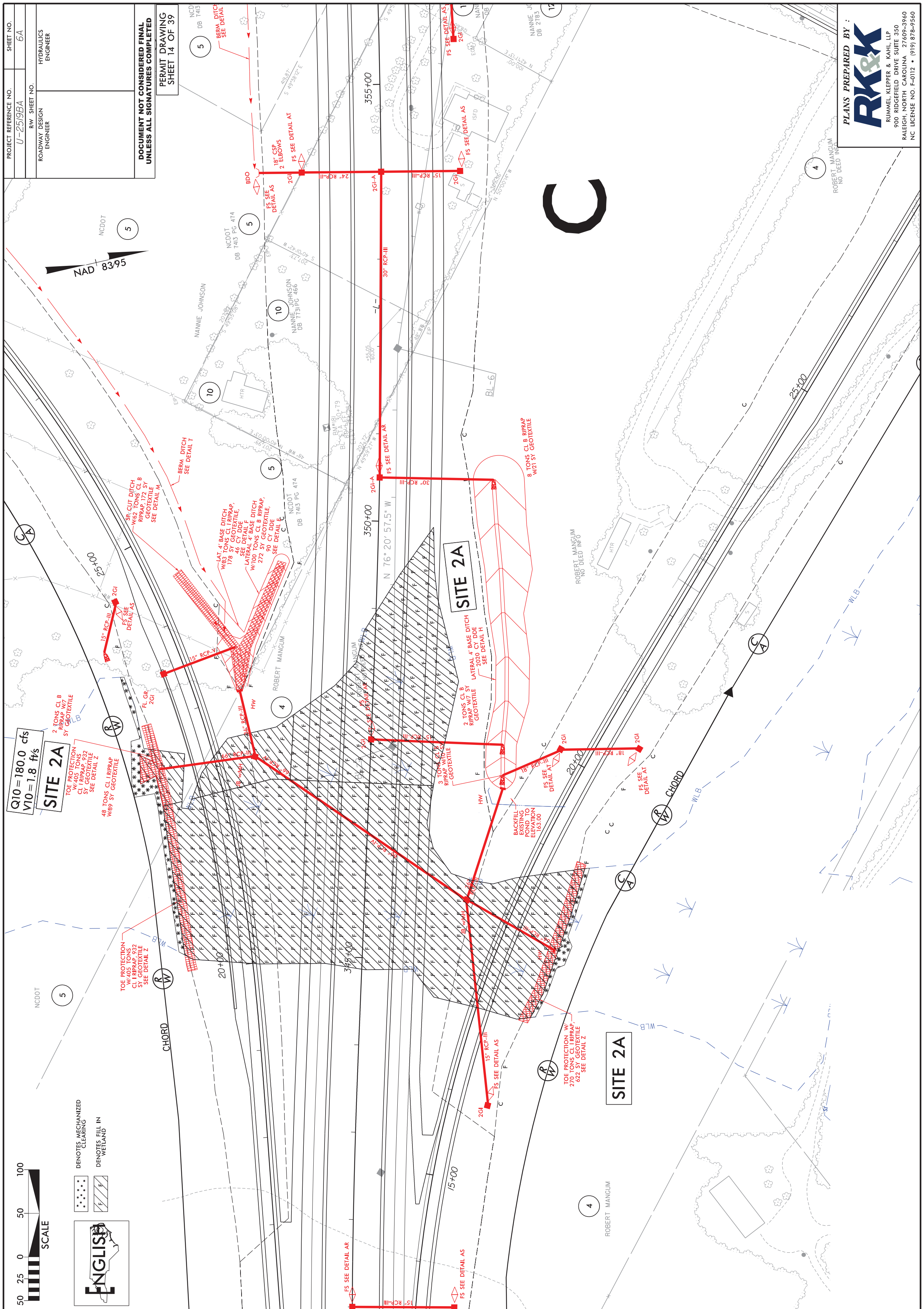

PERMIT DRAWING
SHEET 10 OF 39
MATCHLINE
–L– STA. 374+50 SEE SHEET 8
MATCHLINE
–Y13 STA. 43+50
SEE SHEET 7
DETAIL SHEET
FOR SITE 2A
SITE 2A
SITE 2B
DETAIL SHEET
FOR SITE 2B
MATCHLINE
–L– STA. 347+00
SEE SHEET 5
MATCHLINE
–Y13RC STA. 19+50
SEE SHEET 5
MATCHLINE
–Y13CUL 2– STA. 14+60
SEE SHEET 23
MATCHLINE
–Y13 STA. 61+50
SEE SHEET 23
C
D
GRAPHIC SCALE

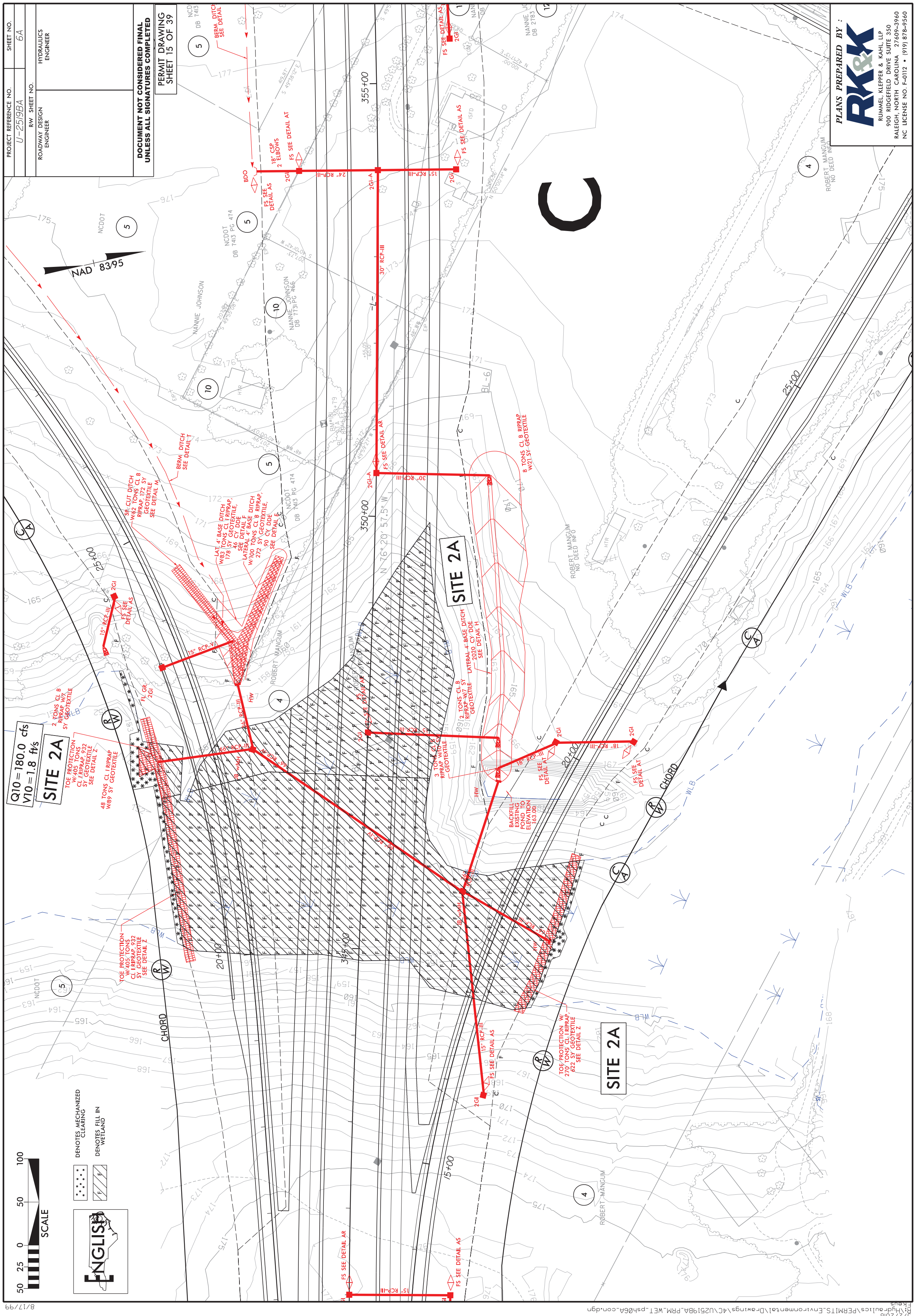

PERMIT DRAWING
SHEET 11 OF 39
MATCHLINE
-L- STA. 374+50 SEE SHEET 8
MATCHLINE
-Y13- STA. 43+50
SEE SHEET 7
DETAIL SHEET
FOR SITE 2A
SITE 2A
SITE 2B
SITE 2B
DETAIL SHEET
FOR SITE 2B
MATCHLINE
-Y13CUL 2- STA. 14+60
SEE SHEET 23
MATCHLINE
-Y13- STA. 61+50
SEE SHEET 23
MATCHLINE
-Y13RPC- STA. 19+50
SEE SHEET 5
MATCHLINE
-L- STA. 347+00
SEE SHEET 5
C
D
GRAPHIC SCALE

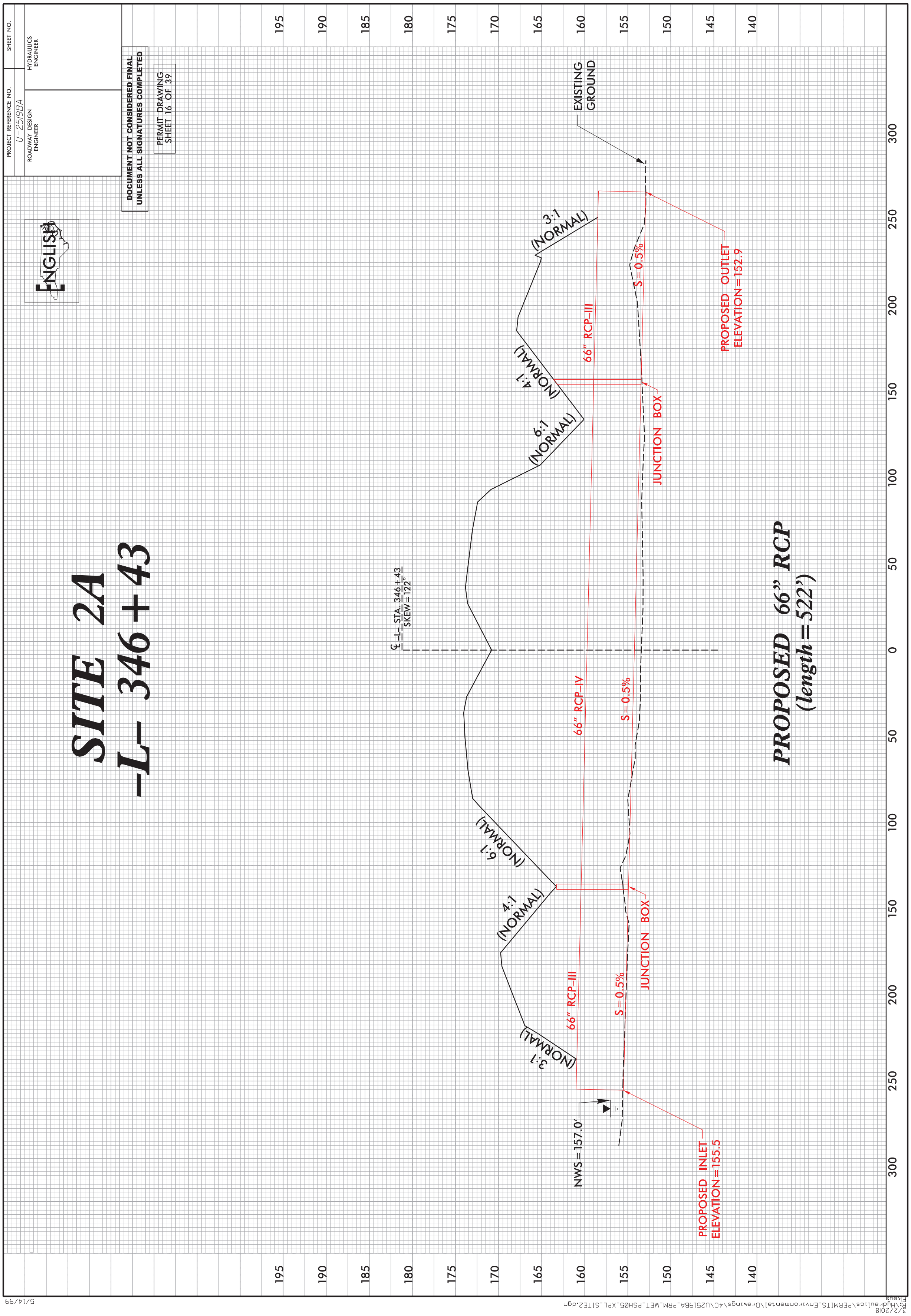

PERMIT DRAWING
SHEET 12 OF 39
DETAIL SHEET
FOR SITE 3
MATCHLINE
-Y13RPA- STA 17+50
SEE SHEET 8
SITE 3
-Y13- STA 13+00
SEE SHEET 22
MATCHLINE
-Y13- STA 43+50
SEE SHEET 6
DETAIL SHEET
FOR SITE 2A
MATCHLINE
-Y13RPB- STA 22+00
SEE SHEET 5
SITE 2A
GRAPHIC SCALE
PLAN PREPARED BY:
RK&K

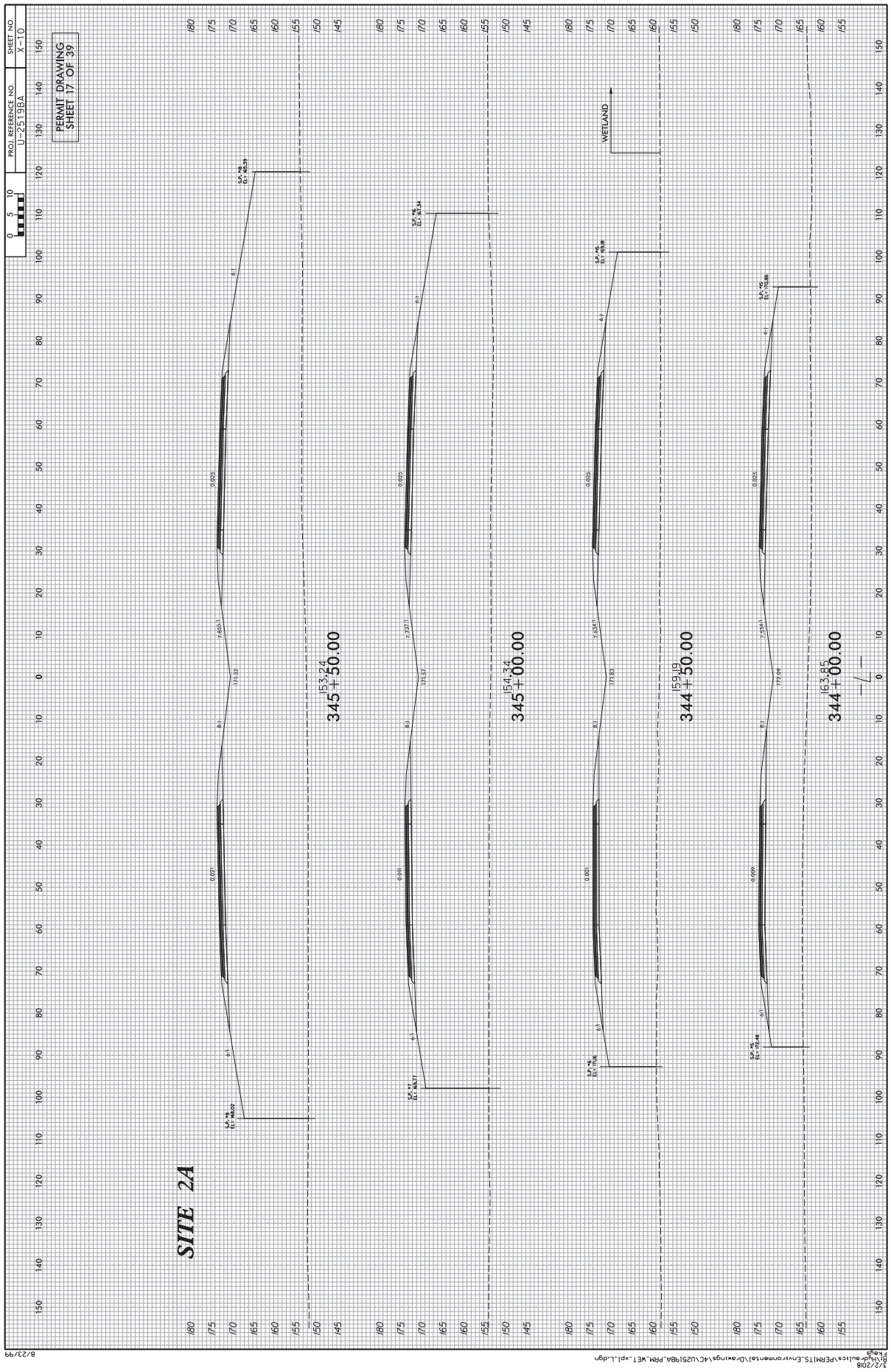

PERMIT DRAWING
SHEET 13 OF 39
NAD 1983
DETAIL SHEET
FOR SITE 3
MATCHLINE
-Y13RPA- STA. 17+50
SEE SHEET 8
SITE 3
MATCHLINE
-Y13- STA. 13+00
SEE SHEET 22
MATCHLINE
-Y13- STA. 43+50
SEE SHEET 6
DETAIL SHEET
FOR SITE 2A
MATCHLINE
-Y13RPE- STA. 22+00
SEE SHEET 5
SITE 2A
GRAPHIC SCALE
1" = 200'

P-41

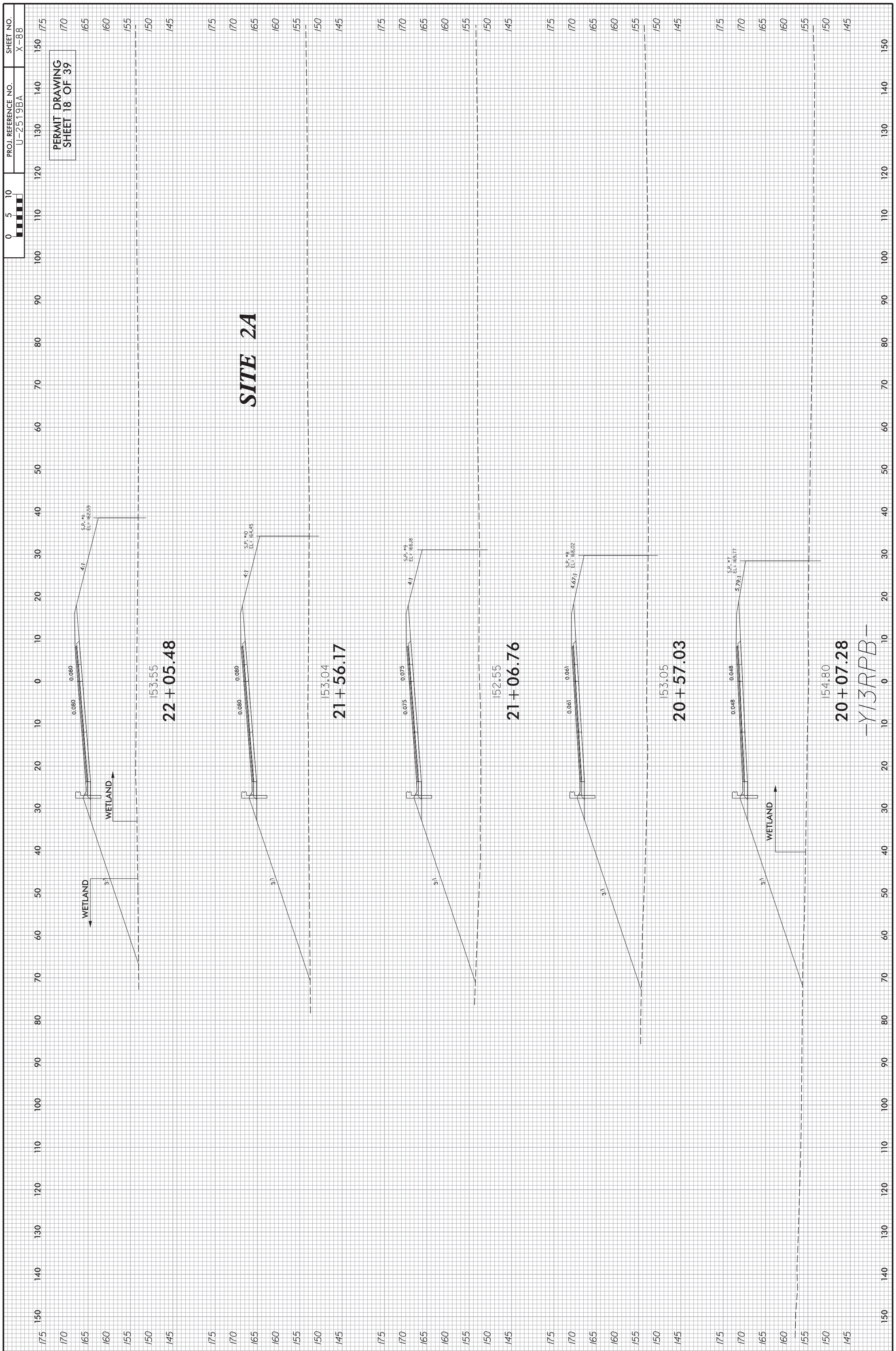

PROJECT REFERENCE NO. U-2519BA
SHEET NO. 6A
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 14 OF 39
PLANS PREPARED BY:
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
NAD 83/95
SITE 2A
Q10 = 180.0 cfs
V10 = 1.8 ft/s
N 76° 20' 57.5" W
ROBERT MANGUM
NANNIE JOHNSON
NCDOT
CHORD
SCALE
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
8/17/99

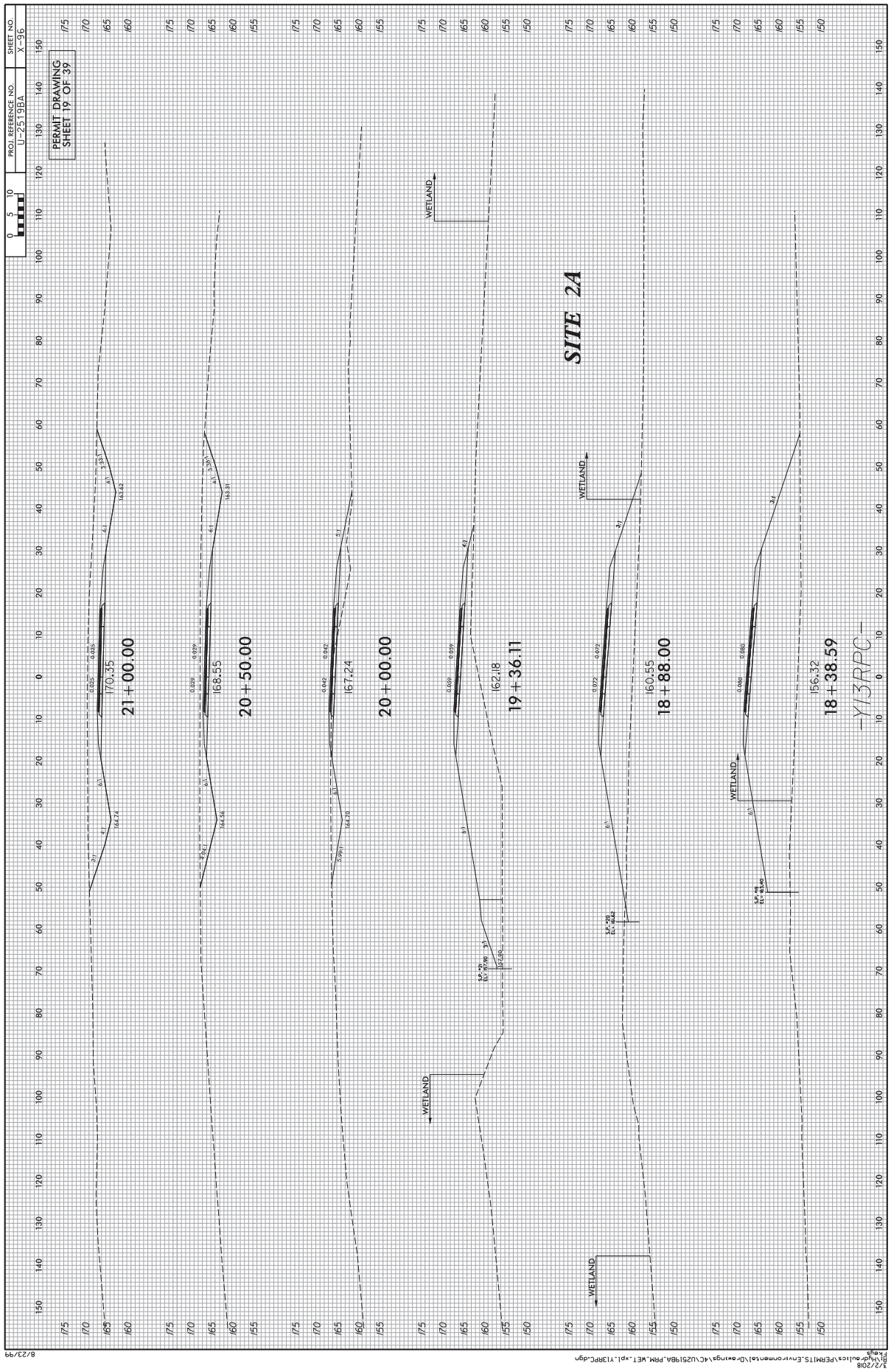

PROJECT REFERENCE NO.
U-2519BA
SHEET NO.
6A
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 15 OF 39
NAD 83/95
SITE 2A
Q10 = 180.0 cfs
V10 = 1.8 ft/s
PLANS PREPARED BY:
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
SCALE
50 25 0 50 100
ENGLISH
ROBERT MANGUM
NANNIE JOHNSON
NCDOT
8/17/99

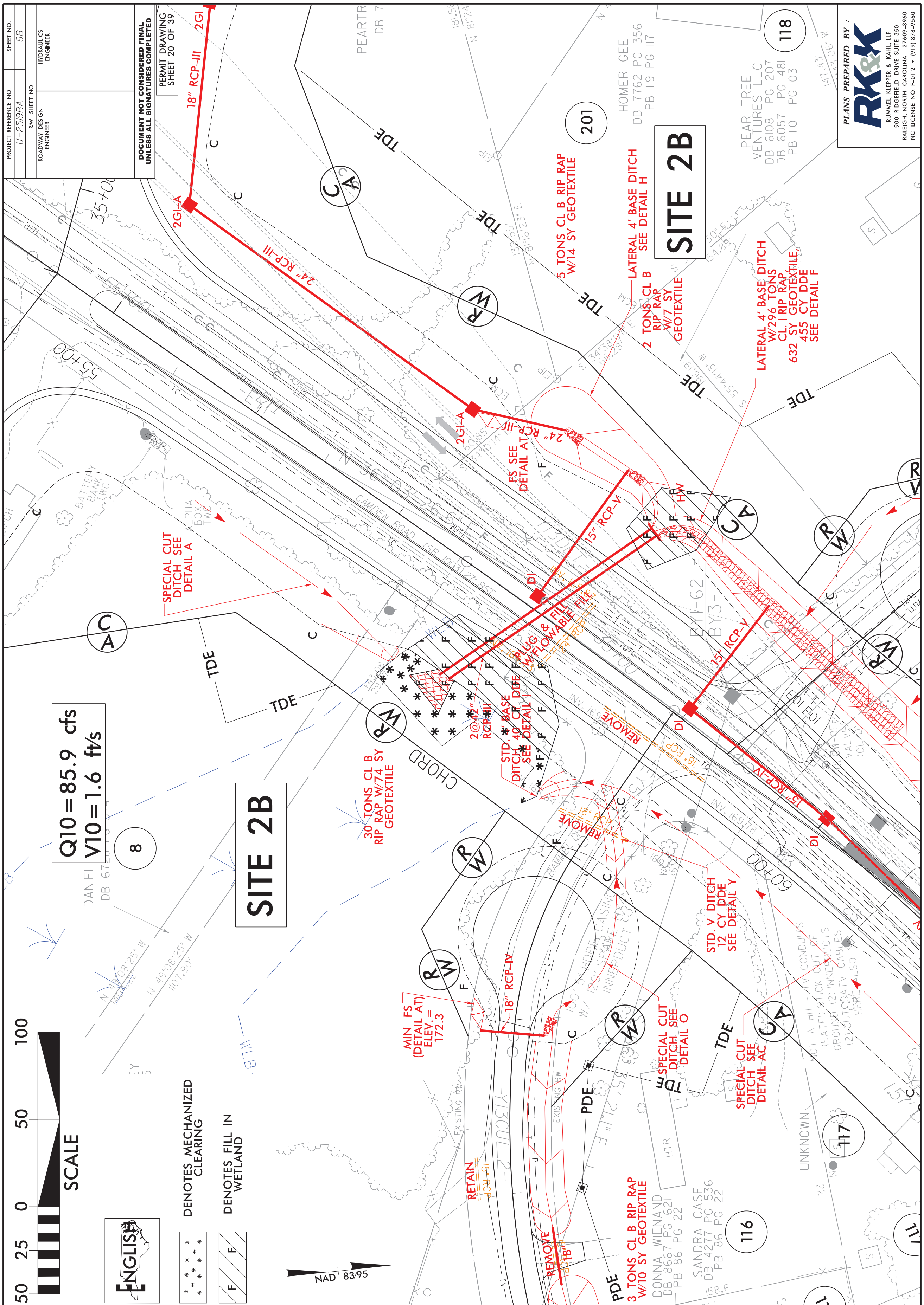

PROJECT REFERENCE NO.
U-2519BA
SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 16 OF 39
ENGLISH
SITE 2A
-L- 346+43
PROPOSED 66" RCP
(length=522')
EXISTING GROUND
3:1 (NORMAL)
4:1 (NORMAL)
6:1 (NORMAL)
PROPOSED OUTLET ELEVATION=152.9
PROPOSED INLET ELEVATION=155.5
S=0.5%
66" RCP-III
66" RCP-IV
JUNCTION BOX
℄ -L- STA. 346+43
SKEW=122°
NWS=157.0'
195
190
185
180
175
170
165
160
155
150
145
140
300
250
200
150
100
50
0
5/14/99


SITE 2A
PERMIT DRAWING
SHEET 17 OF 39
PROJ. REFERENCE NO.
U-2519BA
SHEET NO.
X-10
0 5 10
WETLAND
345+50.00
345+00.00
344+50.00
344+00.00
153.24
154.34
159.19
163.85
8/23/99
3/2/2018

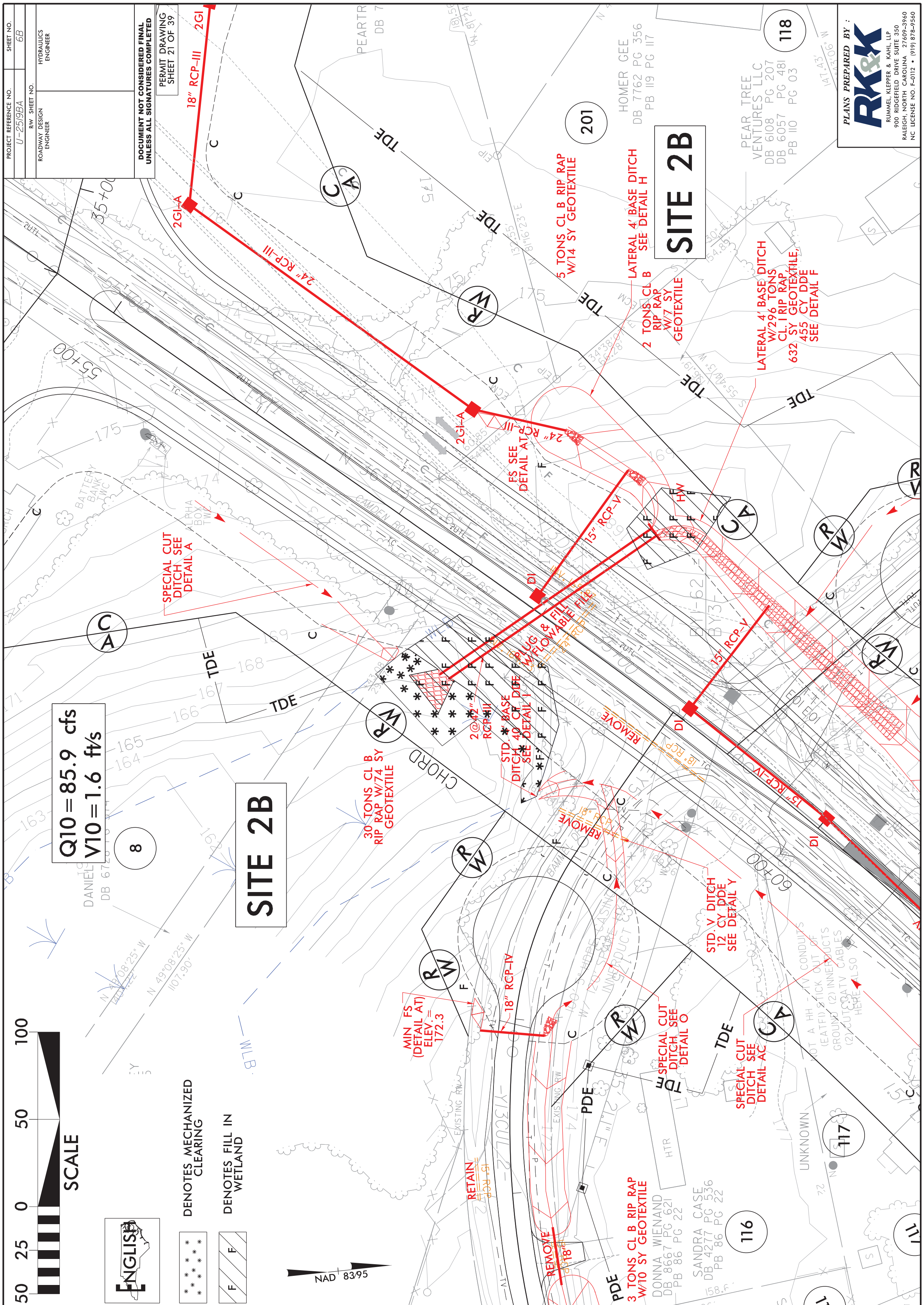
P-45


PROJ. REFERENCE NO.
U-2519BA
SHEET NO.
X-88
PERMIT DRAWING
SHEET 18 OF 39
SITE 2A
WETLAND
WETLAND
153.55
22+05.48
153.04
21+56.17
152.55
21+06.76
153.05
20+57.03
154.80
20+07.28
-Y13RPB-

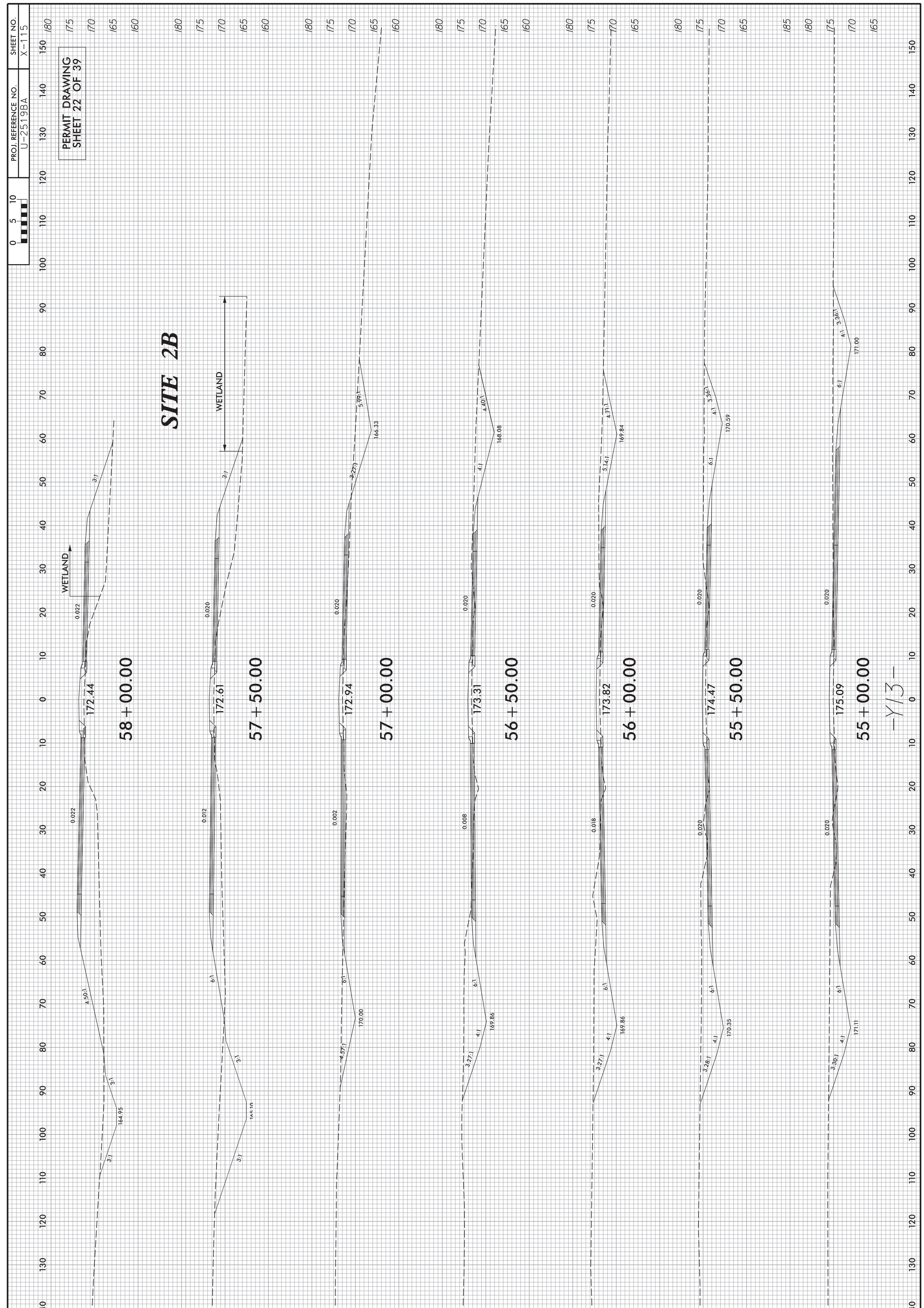

PERMIT DRAWING
SHEET 19 OF 39
PROJ. REFERENCE NO.
U-2519BA
SHEET NO.
X-96
SITE 2A
WETLAND
WETLAND
WETLAND
WETLAND
21+00.00
20+50.00
20+00.00
19+36.11
18+88.00
18+38.59
170.35
168.55
167.24
162.18
160.55
156.32

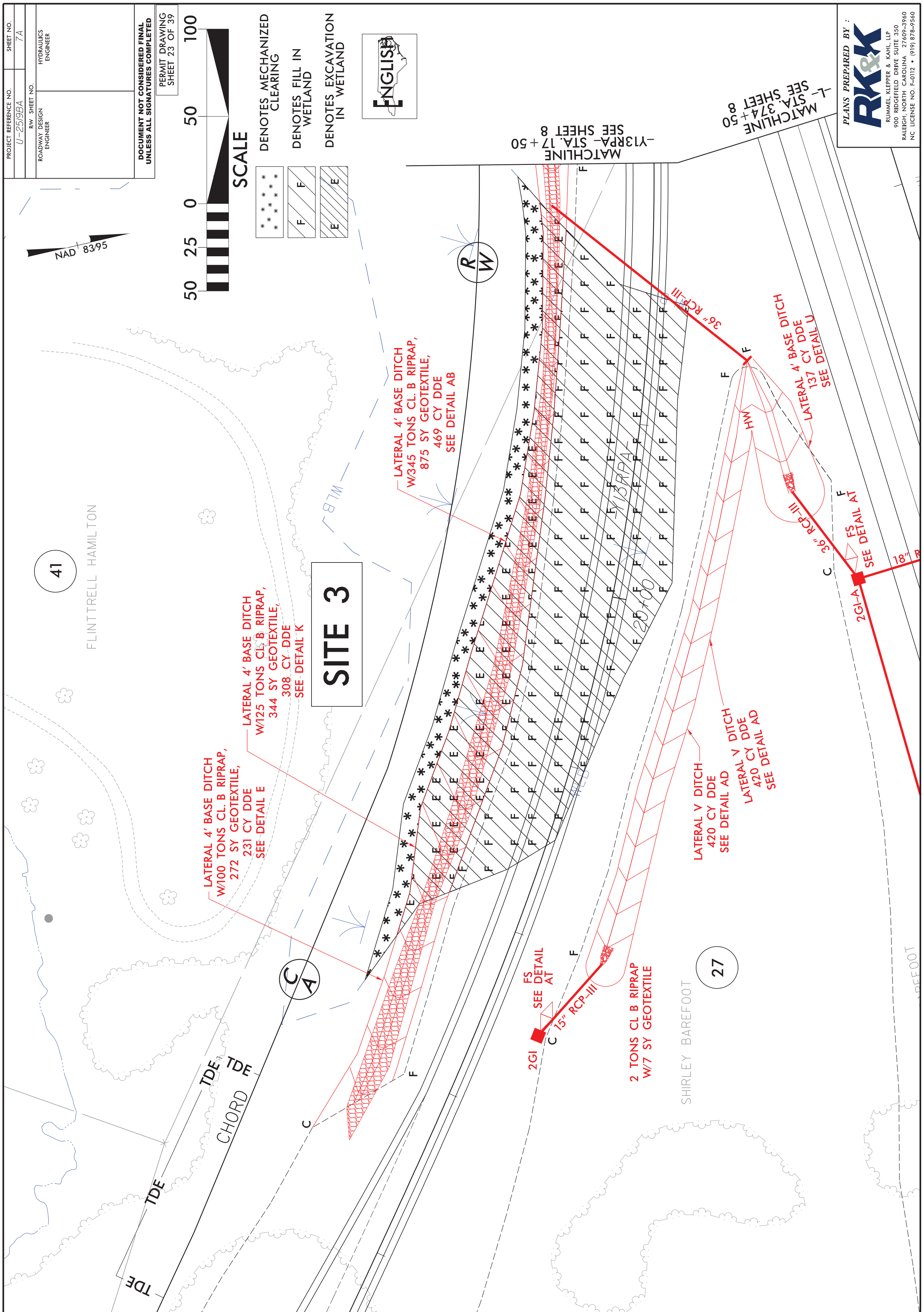

PROJECT REFERENCE NO.
U-2519BA
SHEET NO.
6B
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 20 OF 39
PLANS PREPARED BY:
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
SITE 2B
Q10 = 85.9 cfs
V10 = 1.6 ft/s
5 TONS CL B RIP RAP W/14 SY GEOTEXTILE
LATERAL 4' BASE DITCH SEE DETAIL H
2 TONS CL B RIP RAP W/7 SY GEOTEXTILE
LATERAL 4' BASE DITCH W/296 TONS CL I RIP RAP 632 SY GEOTEXTILE 455 CY DDE SEE DETAIL F
SPECIAL CUT DITCH SEE DETAIL A
30 TONS CL B RIP RAP W/74 SY GEOTEXTILE
STD. BASE DITCH 40 CY DDE SEE DETAIL Y
STD. V DITCH 12 CY DDE SEE DETAIL Y
SPECIAL CUT DITCH SEE DETAIL O
SPECIAL CUT DITCH SEE DETAIL AC
MIN FS (DETAIL AT) ELEV = 172.3
FS SEE DETAIL AT
3 TONS CL B RIP RAP W/10 SY GEOTEXTILE
24" RCP-III
18" RCP-III
15" RCP-V
15" RCP-IV
18" RCP-IV
2@42" RCP-III
PLUG & FILL W/FLOWABLE FILL
REMOVE
RETAIN
CAMDEN ROAD (SR 1003)
HOMER GEE DB 7762 PG 356 PB 119 PG 117
PEAR TREE VENTURES LLC DB 6108 PG 207 DB 6057 PG 481 PB 110 PG 03
DONNA WIENAND DB 8667 PG 621 PB 86 PG 22
SANDRA CASE DB 4277 PG 336 PB 86 PG 22
DANIEL
UNKNOWN
201
118
8
116
117
TDE
PDE
SCALE
ENGLISH
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
NAD 83/95
8/17/99

P-48

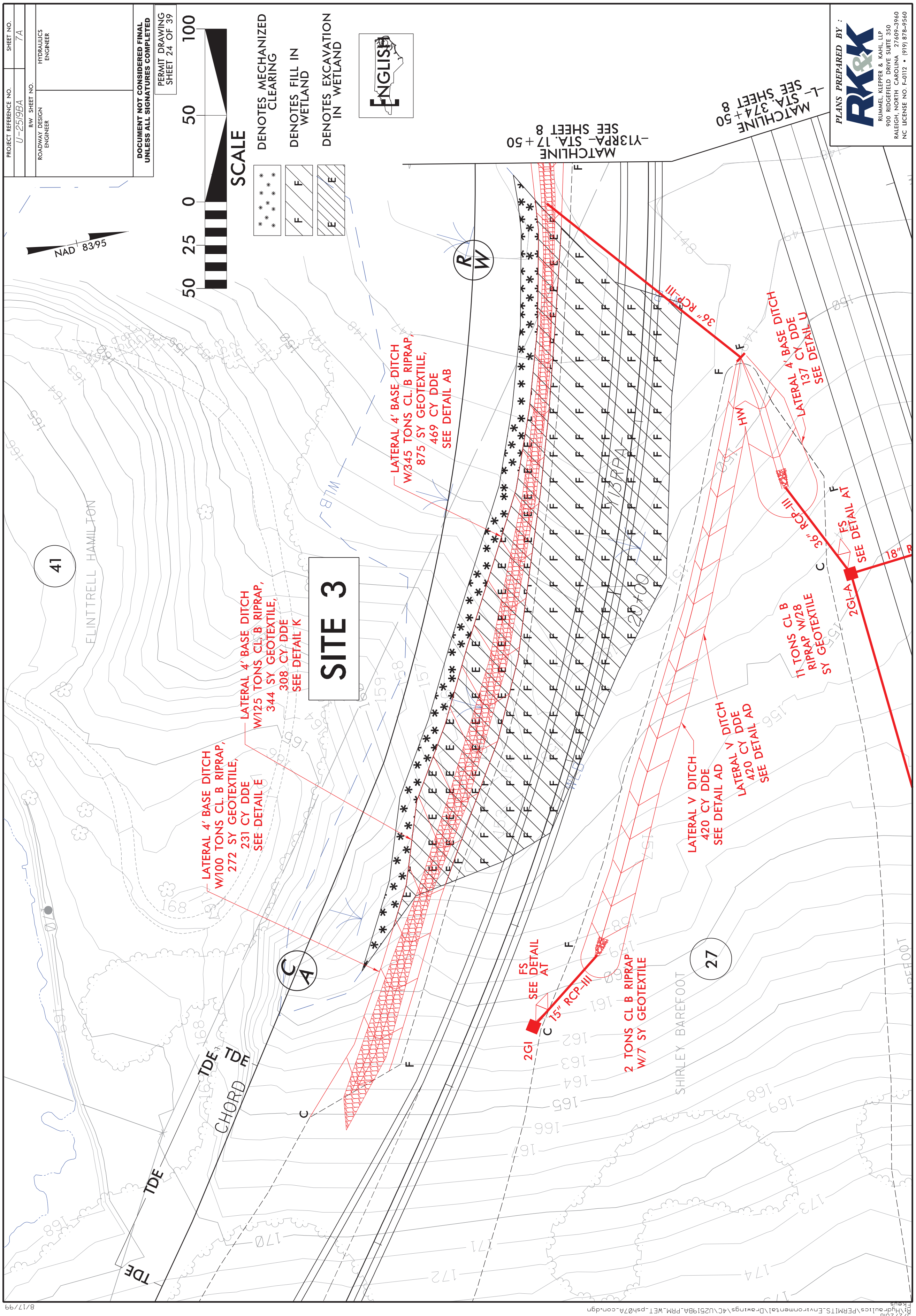


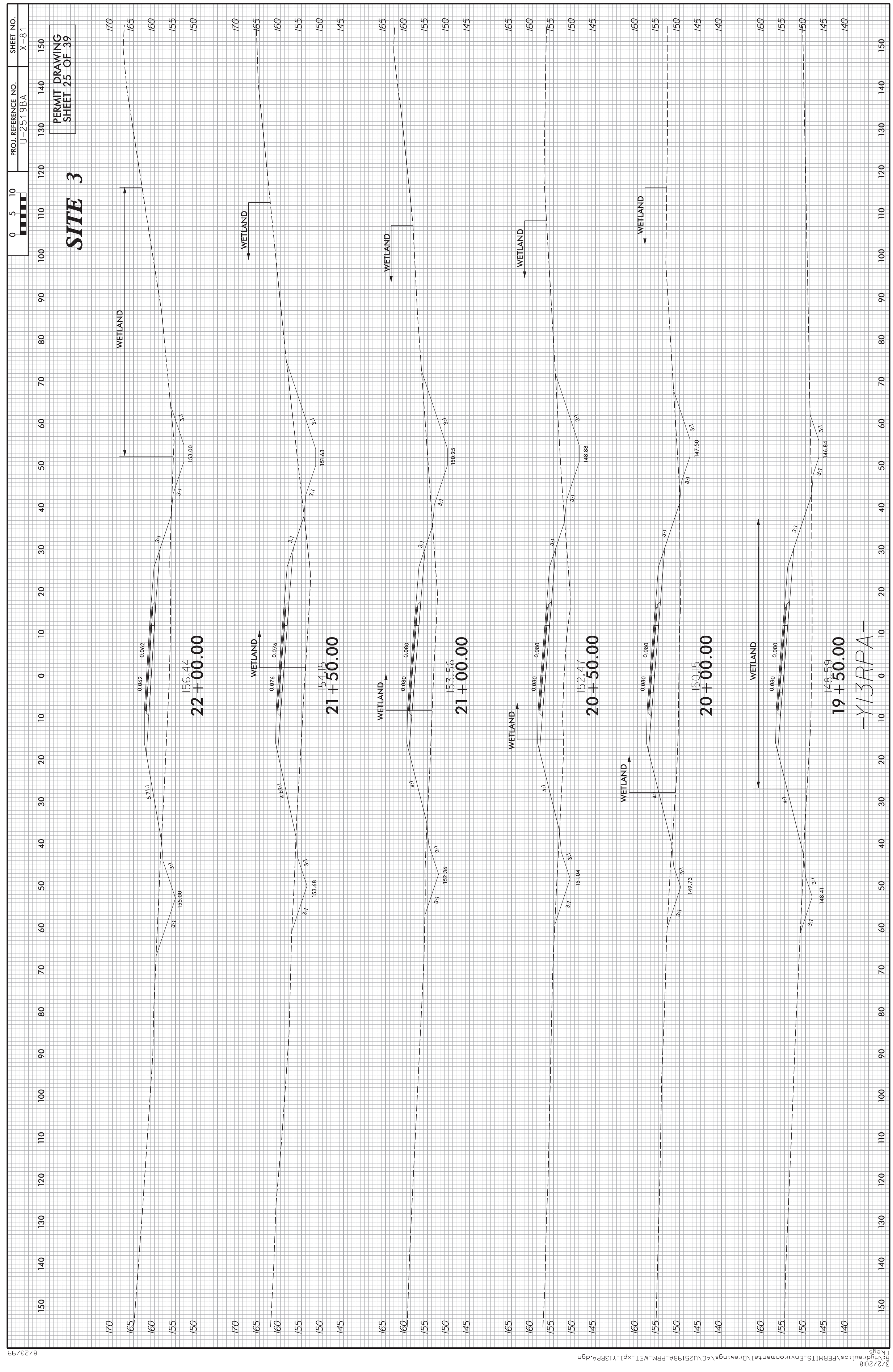
PROJECT REFERENCE NO. U-2519BA
SHEET NO. 6B
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 21 OF 39
PLANS PREPARED BY:
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
SITE 2B
Q10 = 85.9 cfs
V10 = 1.6 ft/s
SCALE
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
NAD 83/95
ENGLISH
5 TONS CL B RIP RAP W/14 SY GEOTEXTILE
LATERAL 4' BASE DITCH SEE DETAIL H
2 TONS CL B RIP RAP W/7 SY GEOTEXTILE
LATERAL 4' BASE DITCH W/296 TONS CL I RIP RAP 632 SY GEOTEXTILE 455 CY DDE SEE DETAIL F
SPECIAL CUT DITCH SEE DETAIL A
30 TONS CL B RIP RAP W/74 SY GEOTEXTILE
STD. V BASE DITCH 40 CY DDE SEE DETAIL Y
STD. V DITCH 12 CY DDE SEE DETAIL Y
SPECIAL CUT DITCH SEE DETAIL O
SPECIAL CUT DITCH SEE DETAIL AC
MIN FS (DETAIL AT) ELEV = 172.3
3 TONS CL B RIP RAP W/10 SY GEOTEXTILE
24" RCP-III
18" RCP-III
15" RCP-V
15" RCP-IV
18" RCP-IV
2@42" RCP-III
HOMER GEE DB 7762 PG 356 PB 119 PG 117
PEAR TREE VENTURES LLC DB 6108 PG 207 DB 6057 PG 481 PB 110 PG 03
DONNA WIENAND DB 8667 PG 621 PB 86 PG 22
SANDRA CASE DB 4277 PG 356 PB 86 PG 22
UNKNOWN
CAMDEN ROAD
TDE
PDE


PROJ. REFERENCE NO.
U-2519BA
SHEET NO.
X-115
PERMIT DRAWING
SHEET 22 OF 39
SITE 2B
WETLAND
WETLAND
172.44
58+00.00
172.61
57+50.00
172.94
57+00.00
173.31
56+50.00
173.82
56+00.00
174.47
55+50.00
175.09
55+00.00
-Y13-
8/23/99

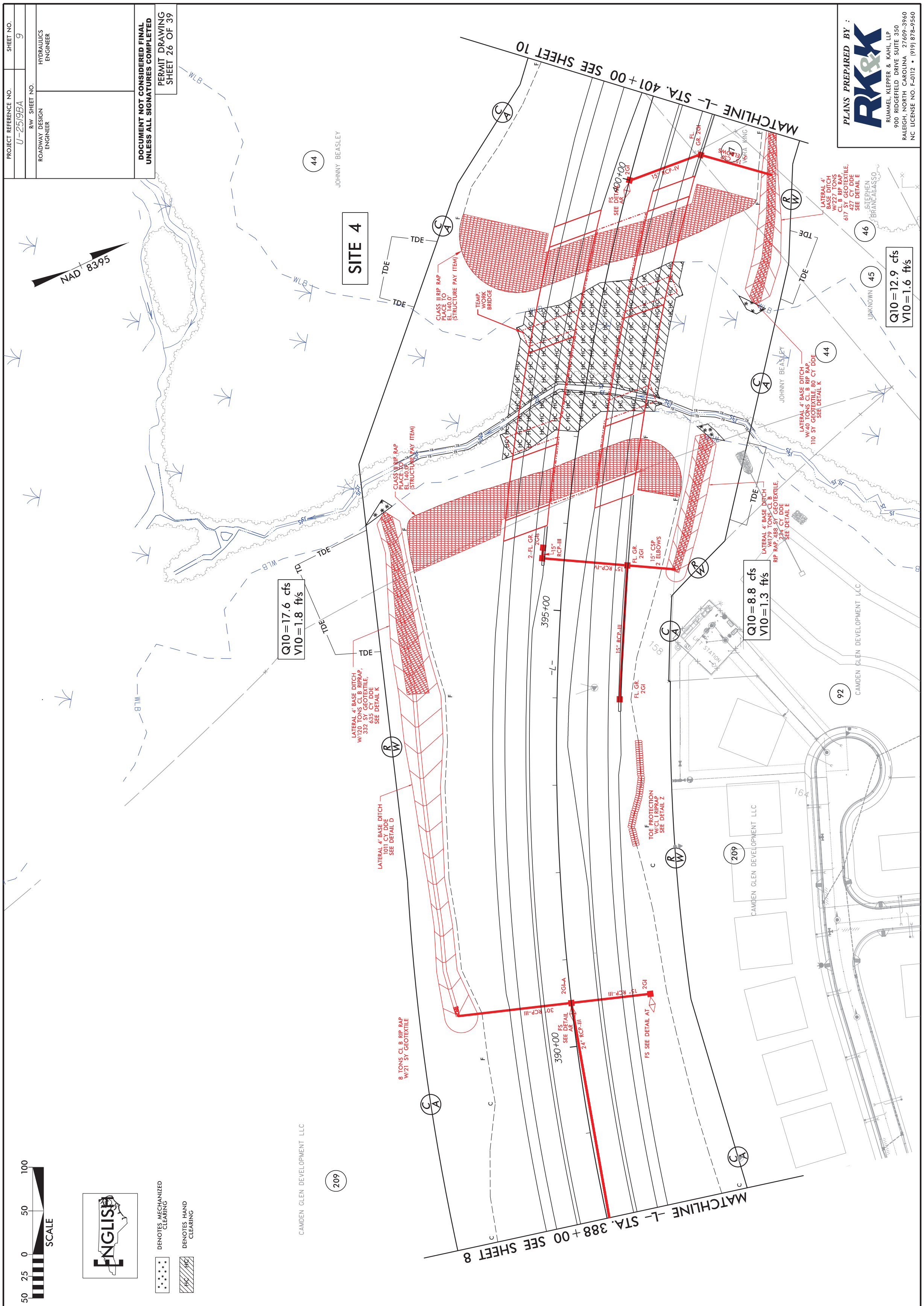

PROJECT REFERENCE NO.
U-2519BA
SHEET NO.
7A
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 23 OF 39
SCALE
50 25 0 50 100
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
ENGLISH
NAD 83/95
MATCHLINE -Y13RPA- STA. 17+50 SEE SHEET 8
MATCHLINE -L- STA. 374+50 SEE SHEET 8
PLANS PREPARED BY:
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
SITE 3
41
FLINTTRELL HAMILTON
27
SHIRLEY BAREFOOT
LATERAL 4' BASE DITCH W/345 TONS CL. B RIPRAP, 875 SY GEOTEXTILE, 469 CY DDE SEE DETAIL AB
LATERAL 4' BASE DITCH W/125 TONS CL. B RIPRAP, 344 SY GEOTEXTILE, 308 CY DDE SEE DETAIL K
LATERAL 4' BASE DITCH W/100 TONS CL. B RIPRAP, 272 SY GEOTEXTILE, 231 CY DDE SEE DETAIL E
LATERAL 4' BASE DITCH 137 CY DDE SEE DETAIL U
LATERAL V DITCH 420 CY DDE SEE DETAIL AD
LATERAL V DITCH 420 CY DDE SEE DETAIL AD
2 TONS CL B RIPRAP W/7 SY GEOTEXTILE
FS SEE DETAIL AT
FS SEE DETAIL AT
36" RCP-III
36" RCP-III
15" RCP-III
18"
2GI-A
2GI
HW
-Y13RPA-
20+00
WLB
CHORD
TDE
8/17/99

P-51


PROJECT REFERENCE NO.
U-2519BA
SHEET NO.
7A
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 24 OF 39
SCALE
50 25 0 50 100
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
ENGLISH
PLANS PREPARED BY:
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
MATCHLINE -Y13RPA- STA. 17+50 SEE SHEET 8
MATCHLINE -L- STA. 374+50 SEE SHEET 8
NAD 83/95
SITE 3
FLINTTRELL HAMILTON
SHIRLEY BAREFOOT
LATERAL 4' BASE DITCH W/345 TONS CL.B RIPRAP, 875 SY GEOTEXTILE, 469 CY DDE SEE DETAIL AB
LATERAL 4' BASE DITCH W/125 TONS CL.B RIPRAP, 344 SY GEOTEXTILE, 308 CY DDE SEE DETAIL K
LATERAL 4' BASE DITCH W/100 TONS CL. B RIPRAP, 272 SY GEOTEXTILE, 231 CY DDE SEE DETAIL E
LATERAL 4' BASE DITCH 137 CY DDE SEE DETAIL U
LATERAL V DITCH 420 CY DDE SEE DETAIL AD
LATERAL V DITCH 420 CY DDE SEE DETAIL AD
11 TONS CL B RIPRAP W/28 SY GEOTEXTILE
2 TONS CL B RIPRAP W/7 SY GEOTEXTILE
36" RCP-III
36" RCP-III
15" RCP-III
18" RCP
FS SEE DETAIL AT
FS SEE DETAIL AT
2GI-A
2GI
HW
WLB
CHORD
TDE
-Y13RPA-
20+00
41
27
R/W
C/A
8/17/99


PROJ. REFERENCE NO.
U-2519BA
SHEET NO.
X-81
PERMIT DRAWING
SHEET 25 OF 39
SITE 3
WETLAND
156.44
22+00.00
154.15
21+50.00
153.56
21+00.00
152.47
20+50.00
150.15
20+00.00
148.59
19+50.00
-Y13RPA-
8/23/99
3/2/2018

P-53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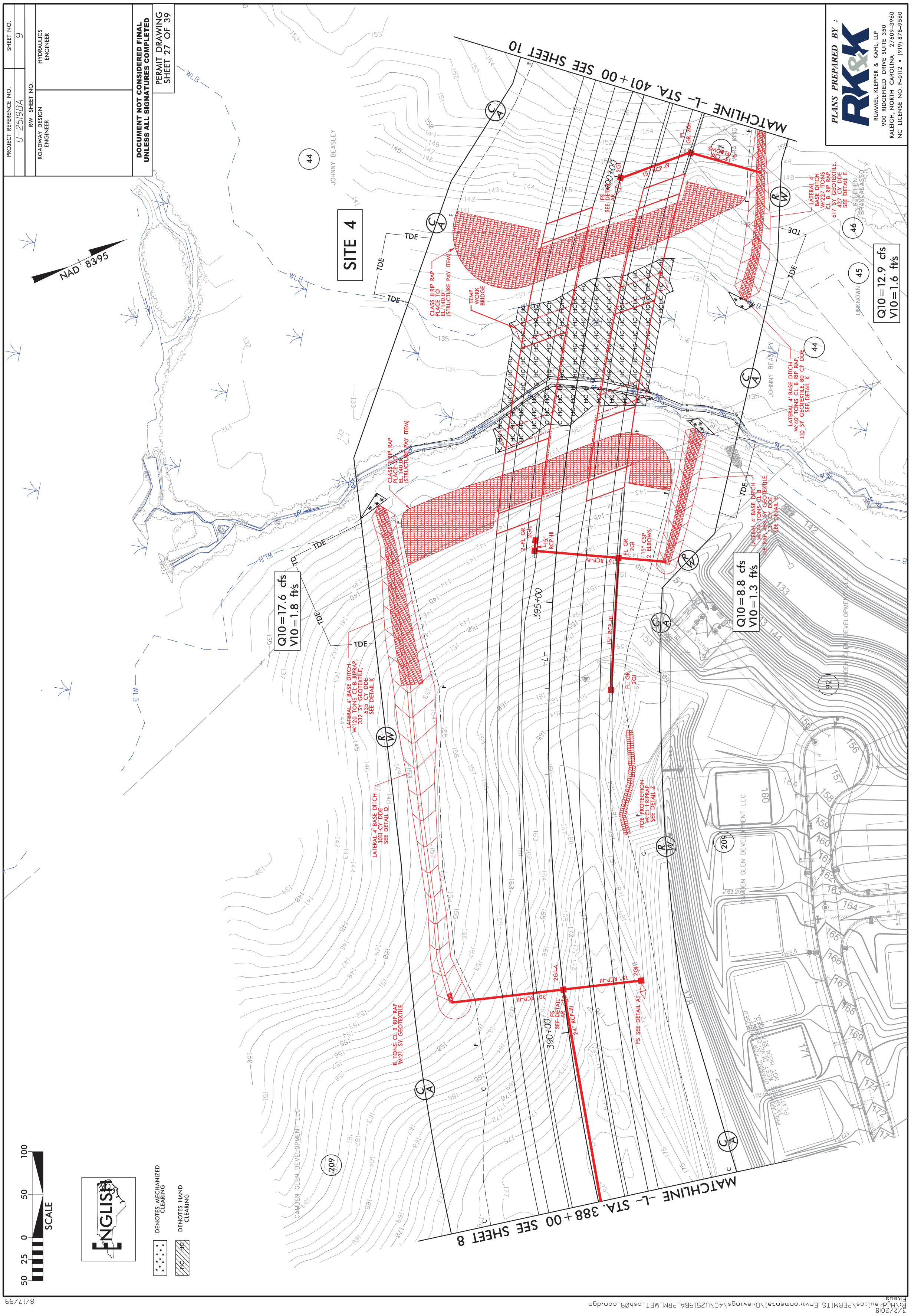
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 26 OF 39
PLANS PREPARED BY:
RKK
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
MATCHLINE -L- STA. 401+00 SEE SHEET 10
MATCHLINE -L- STA. 388+00 SEE SHEET 8
NAD 83/95
SITE 4
Q10=17.6 cfs
V10=1.8 ft/s
Q10=12.9 cfs
V10=1.6 ft/s
Q10=8.8 cfs
V10=1.3 ft/s
JOHNNY BEASLEY
CAMDEN GLEN DEVELOPMENT LLC
395+00
390+00
-L-
TDE
WLB
DENOTES MECHANIZED CLEARING
DENOTES HAND CLEARING
SCALE
0 25 50 100
ENGLISH

8/17/99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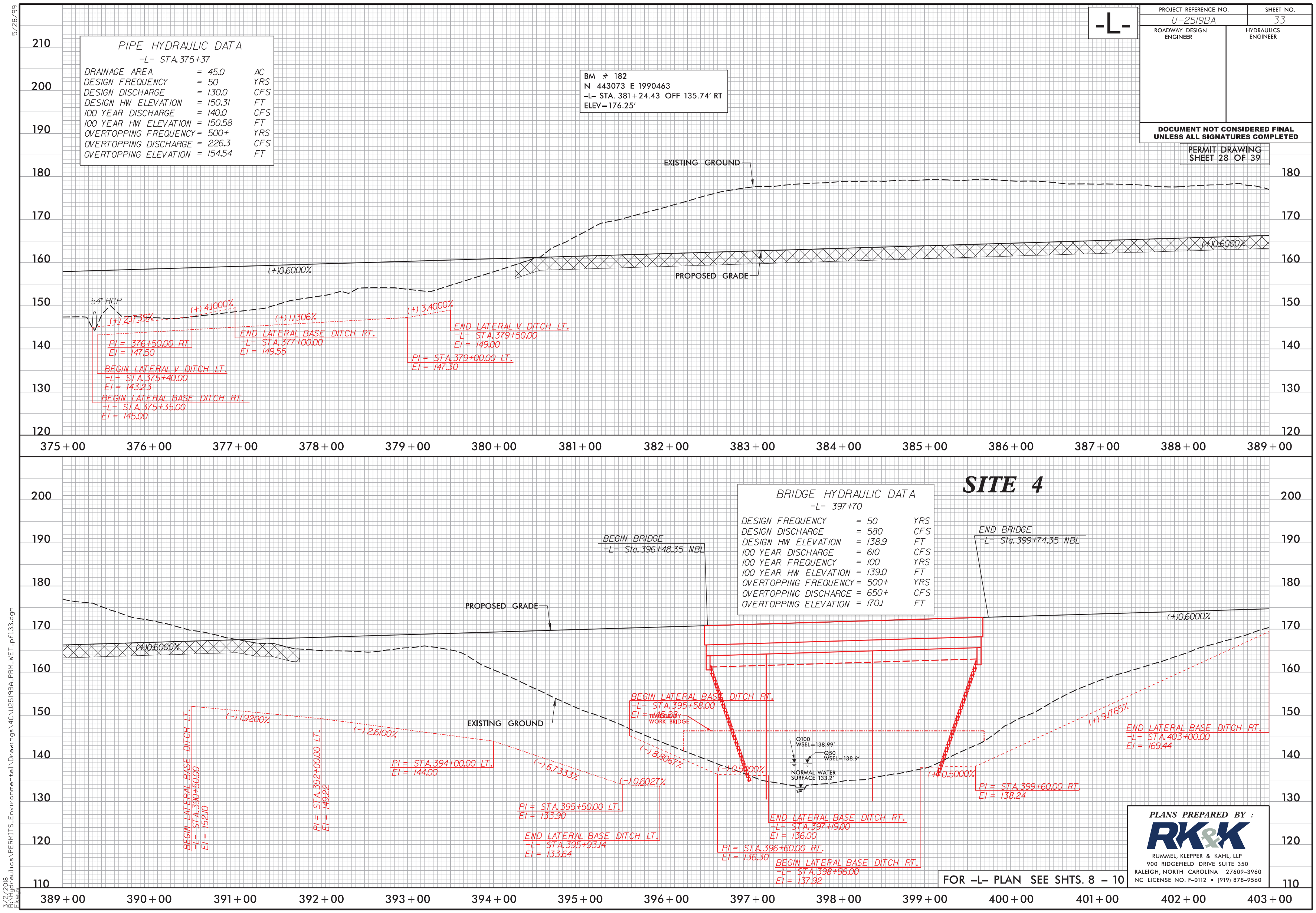
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 27 OF 39
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
MATCHLINE -L- STA. 401+00 SEE SHEET 10
MATCHLINE -L- STA. 388+00 SEE SHEET 8
SITE 4
NAD 83/95
JOHNNY BEASLEY
CAMDEN GLEN DEVELOPMENT LLC
TEMP. WORK BRIDGE
CLASS II RIP RAP PLACE TO EL 140 (STRUCTURE PAY ITEM)
Q10=17.6 cfs
V10=1.8 ft/s
Q10=12.9 cfs
V10=1.6 ft/s
Q10=8.8 cfs
V10=1.3 ft/s
395+00
390+00
TOE PROTECTION W/ CL I RIPRAP SEE DETAIL Z
DENOTES MECHANIZED CLEARING
DENOTES HAND CLEARING
ENGLISH
SCALE
50 25 0 50 100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PROJECT REFERENCE NO.
U-2519BA
SHEET NO.
33
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 28 OF 39
PIPE HYDRAULIC DATA
-L- STA.375+37
DRAINAGE AREA = 45.0 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 130.0 CFS
DESIGN HW ELEVATION = 150.31 FT
100 YEAR DISCHARGE = 140.0 CFS
100 YEAR HW ELEVATION = 150.58 FT
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING DISCHARGE = 226.3 CFS
OVERTOPPING ELEVATION = 154.54 FT
BM # 182
N 443073 E 1990463
-L- STA. 381+24.43 OFF 135.74' RT
ELEV=176.25'
EXISTING GROUND
PROPOSED GRADE
(+)0.6000%
54" RCP
(+) 2.1739%
(+) 4.1000%
(+) 1.1306%
(+) 3.4000%
PI = 376+50.00 RT.
El = 147.50
BEGIN LATERAL V DITCH LT.
-L- STA.375+40.00
El = 143.23
BEGIN LATERAL BASE DITCH RT.
-L- STA.375+35.00
El = 145.00
END LATERAL BASE DITCH RT.
-L- STA.377+00.00
El = 149.55
PI = STA.379+00.00 LT.
El = 147.30
END LATERAL V DITCH LT.
-L- STA.379+50.00
El = 149.00
SITE 4
BRIDGE HYDRAULIC DATA
-L- 397+70
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 580 CFS
DESIGN HW ELEVATION = 138.9 FT
100 YEAR DISCHARGE = 610 CFS
100 YEAR FREQUENCY = 100 YRS
100 YEAR HW ELEVATION = 139.0 FT
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING DISCHARGE = 650+ CFS
OVERTOPPING ELEVATION = 170.1 FT
BEGIN BRIDGE
-L- Sta.396+48.35 NBL
END BRIDGE
-L- Sta.399+74.35 NBL
BEGIN LATERAL BASE DITCH LT.
-L- STA.390+50.00
El = 152.10
(-) 1.9200%
PI = STA.392+00.00 LT.
El = 149.22
(-) 2.6100%
PI = STA.394+00.00 LT.
El = 144.00
(-) 6.7333%
(-) 1.0627%
PI = STA.395+50.00 LT.
El = 133.90
END LATERAL BASE DITCH LT.
-L- STA.395+93.14
El = 133.64
BEGIN LATERAL BASE DITCH RT.
-L- STA.395+58.00
El = 145.28
TEMPORARY WORK BRIDGE
(-) 8.8067%
(-) 0.5000%
Q100 WSEL=138.99'
Q50 WSEL=138.9'
NORMAL WATER SURFACE 133.2'
PI = STA.396+60.00 RT.
El = 136.30
END LATERAL BASE DITCH RT.
-L- STA.397+19.00
El = 136.00
BEGIN LATERAL BASE DITCH RT.
-L- STA.398+96.00
El = 137.92
(+) 0.5000%
PI = STA.399+60.00 RT.
El = 138.24
(+) 9.1765%
END LATERAL BASE DITCH RT.
-L- STA.403+00.00
El = 169.44
FOR -L- PLAN SEE SHTS. 8 - 10
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
5/28/99
3/2/2018
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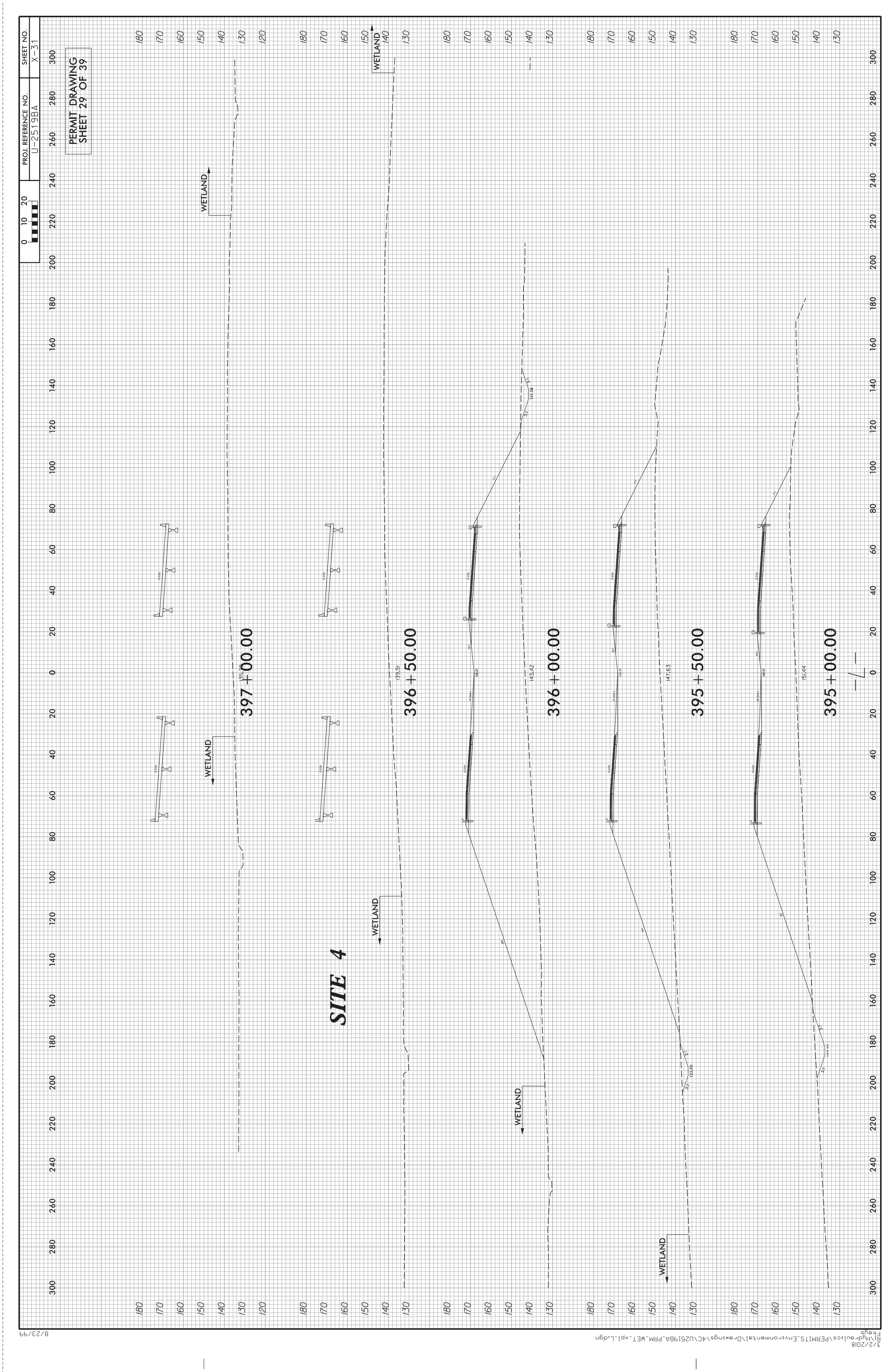
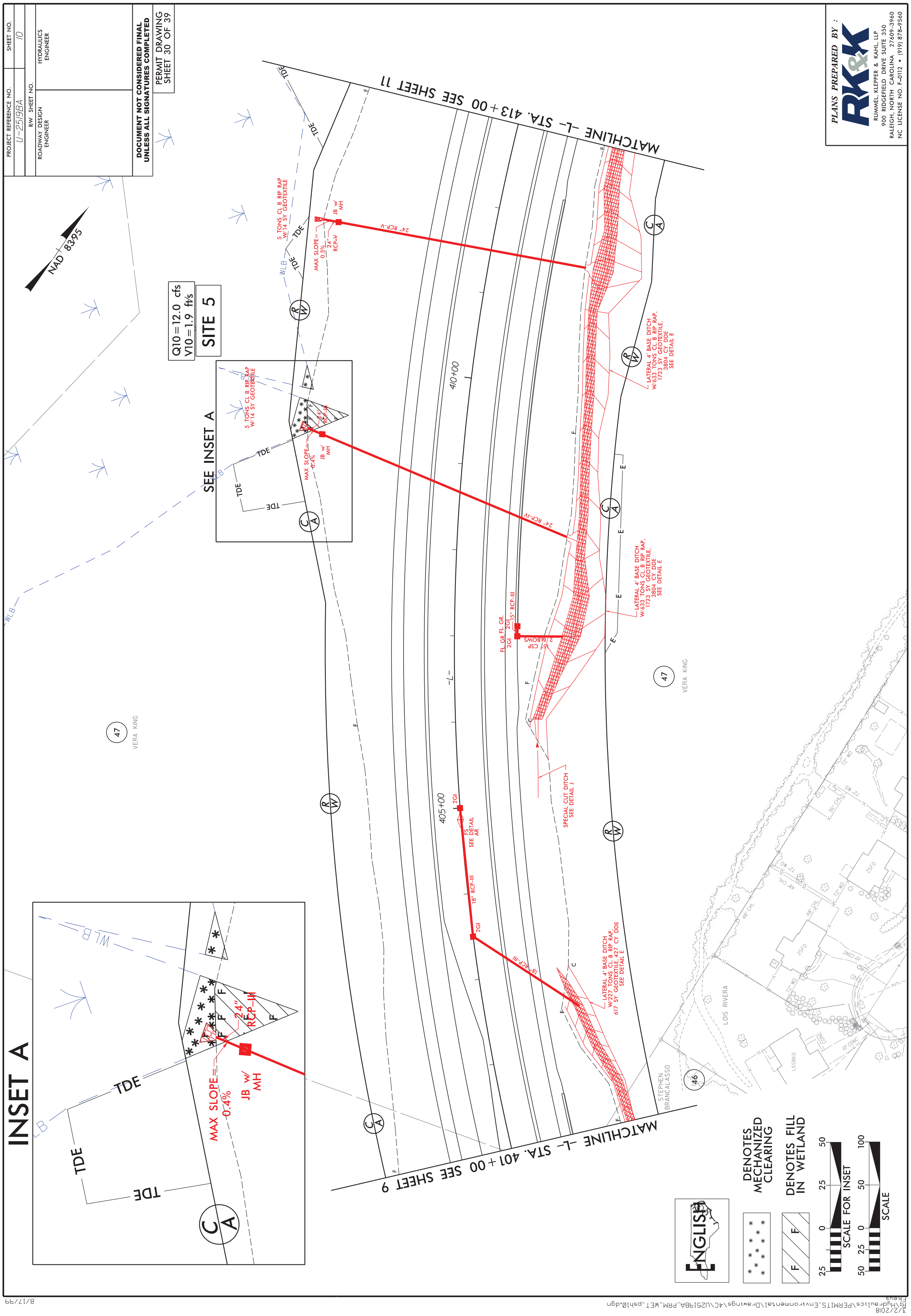


PROJ. REFERENCE NO.
U-2519BA
SHEET NO.
X-31
PERMIT DRAWING
SHEET 29 OF 39
SITE 4
397+00.00
396+50.00
396+00.00
395+50.00
395+00.00
WETLAND
8/23/99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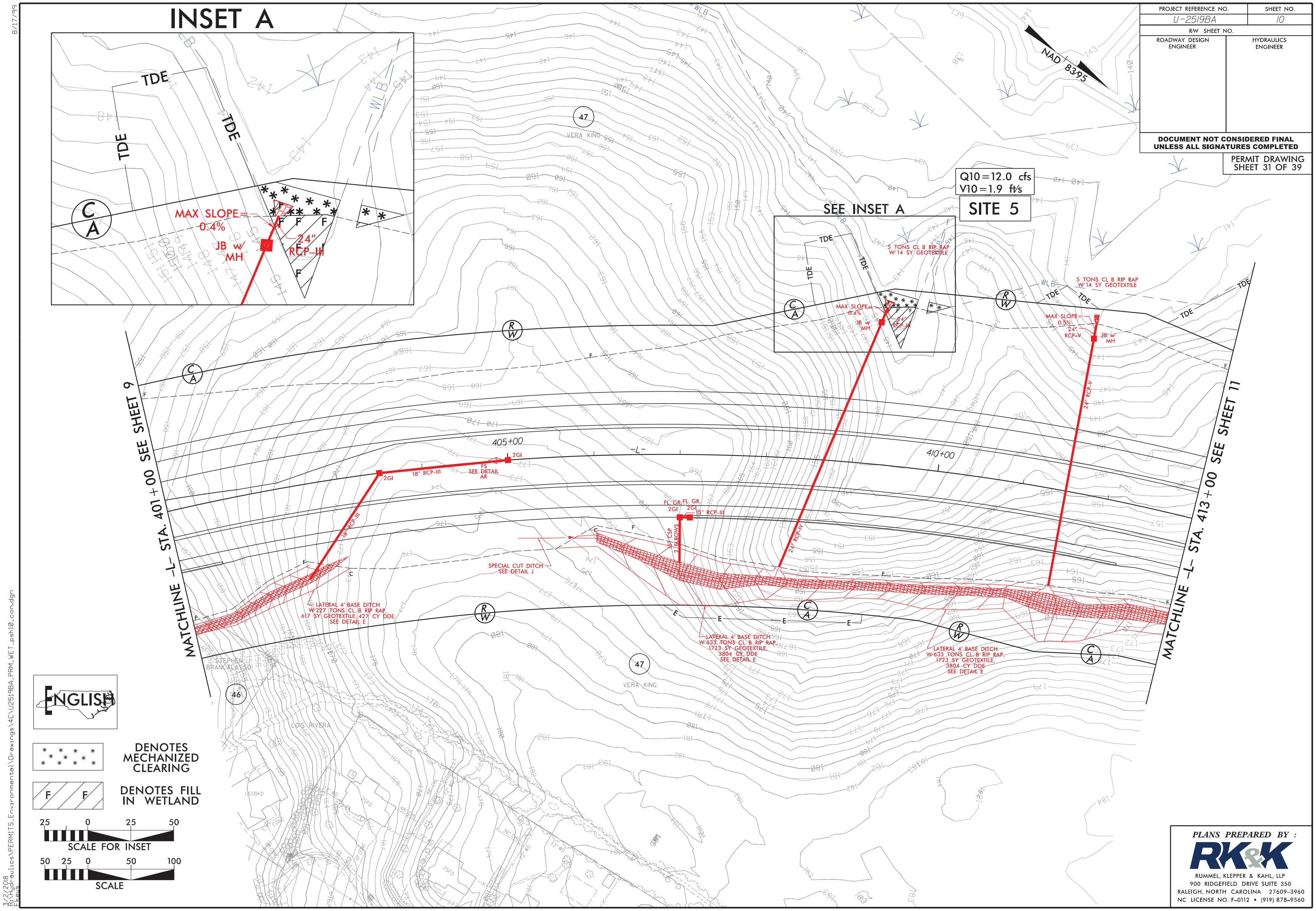
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 30 OF 39
NAD 83/95
Q10=12.0 cfs
V10=1.9 ft/s
SITE 5
SEE INSET A
MATCHLINE -L- STA. 413+00 SEE SHEET 11
MATCHLINE -L- STA. 401+00 SEE SHEET 9
410+00
405+00
-L-
5 TONS CL B RIP RAP W/ 14 SY GEOTEXTILE
MAX SLOPE= 0.5%
JB w/ MH
24" RCP-V
24" RCP-IV
18" RCP-III
15" RCP-III
LATERAL 4' BASE DITCH W/653 TONS CL B RIP RAP, 1723 SY GEOTEXTILE, 3804 CY DDE SEE DETAIL E
LATERAL 4' BASE DITCH W/227 TONS CL B RIP RAP, 617 SY GEOTEXTILE, 427 CY DDE SEE DETAIL E
SPECIAL CUT DITCH SEE DETAIL J
SEE DETAIL AR
2GI
VERA KING
47
STEPHEN BRANCALASSO
46
LOIS RIVERA
INSET A
MAX SLOPE= 0.4%
JB w/ MH
24" RCP-III
TDE
WLB
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
SCALE FOR INSET
SCALE
ENGLISH
PLANS PREPARED BY:
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
8/17/99


PROJECT REFERENCE NO.
U-2519BA
SHEET NO.
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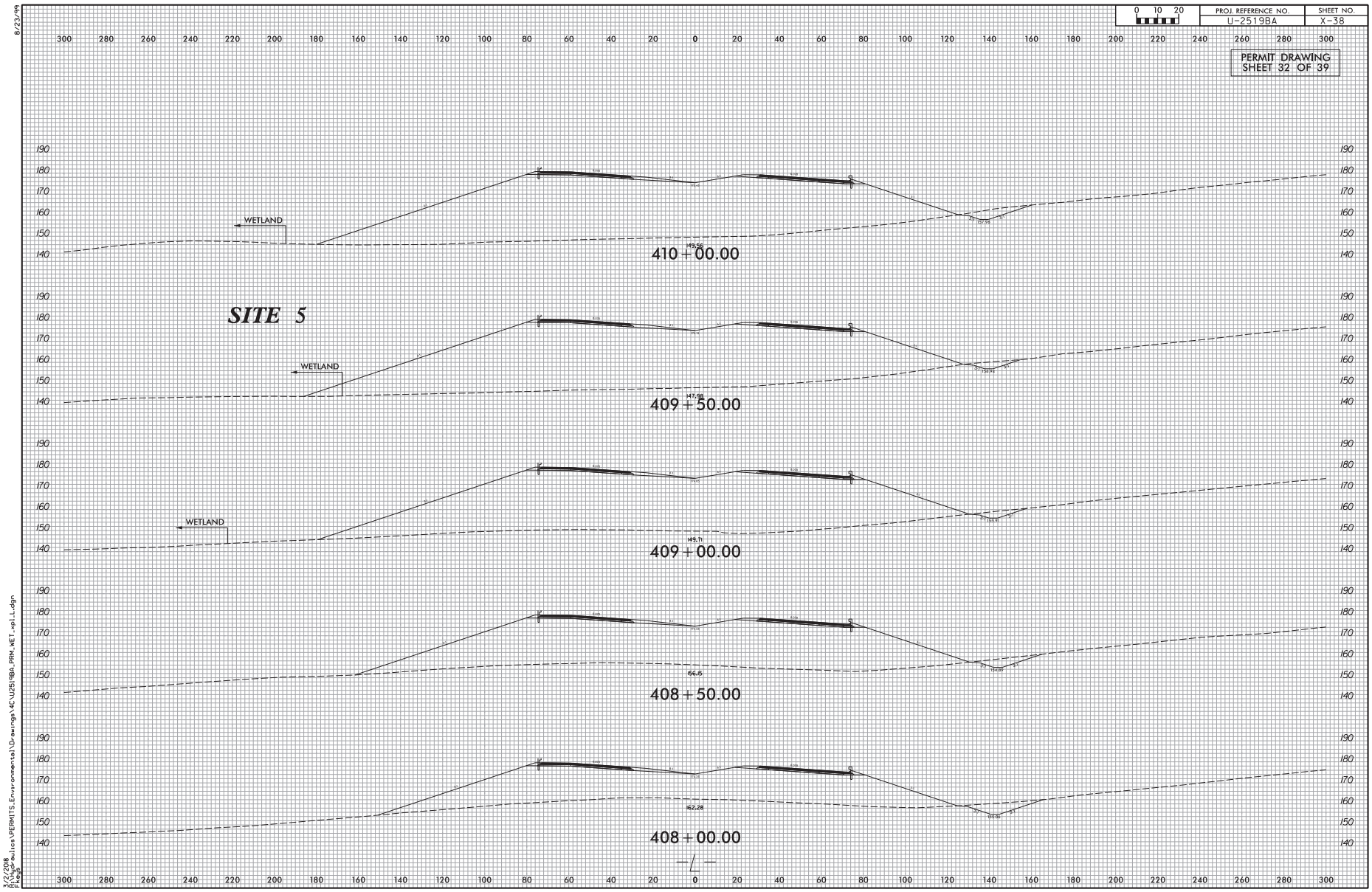
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 31 OF 39
NAD 83/95
INSET A
TDE
MAX SLOPE=0.4%
JB w/ MH
24" RCP-III
SEE INSET A
Q10=12.0 cfs
V10=1.9 ft/s
SITE 5
5 TONS CL B RIP RAP W/14 SY GEOTEXTILE
MAX SLOPE=0.5%
24" RCP-V
JB w/ MH
MATCHLINE -L- STA. 401+00 SEE SHEET 9
MATCHLINE -L- STA. 413+00 SEE SHEET 11
405+00
410+00
-L-
2GI
18" RCP-III
FS SEE DETAIL AR
FL GR 2GI
15" RCP-III
2 ELBOWS
SPECIAL CUT DITCH SEE DETAIL J
LATERAL 4' BASE DITCH W/227 TONS CL B RIP RAP, 617 SY GEOTEXTILE, 427 CY DDE SEE DETAIL E
LATERAL 4' BASE DITCH W/633 TONS CL B RIP RAP, 1723 SY GEOTEXTILE, 3804 CY DDE SEE DETAIL E
VERA KING
STEPHEN BRANCALASSO
LOIS RIVERA
ENGLISH
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
SCALE FOR INSET
SCALE
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
8/17/99
3/2/2018


PROJ. REFERENCE NO.
U-2519BA
SHEET NO.
X-38
PERMIT DRAWING
SHEET 32 OF 39
SITE 5
WETLAND
410+00.00
WETLAND
409+50.00
WETLAND
409+00.00
408+50.00
408+00.00
8/23/99
3/2/2018
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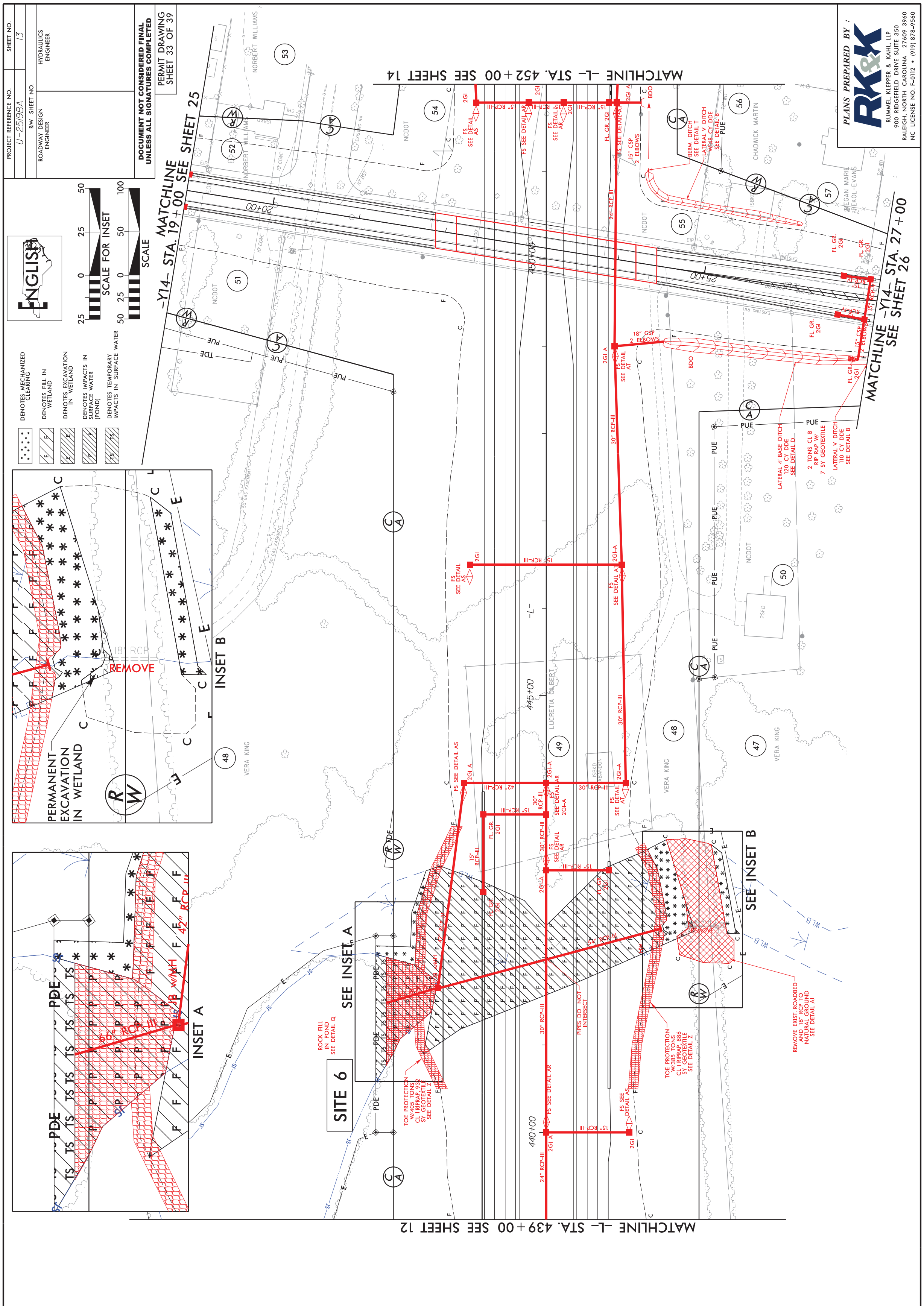
eagle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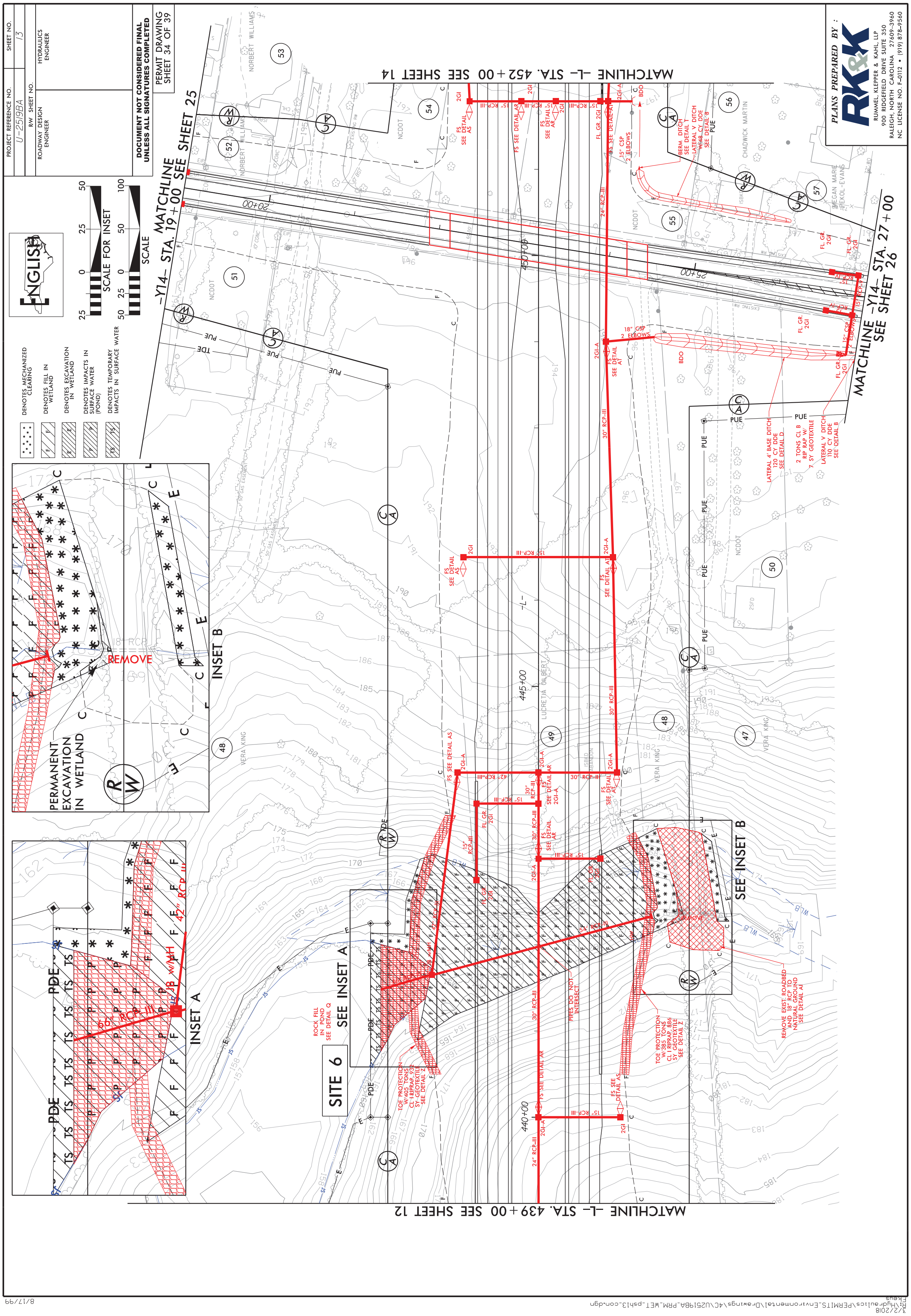
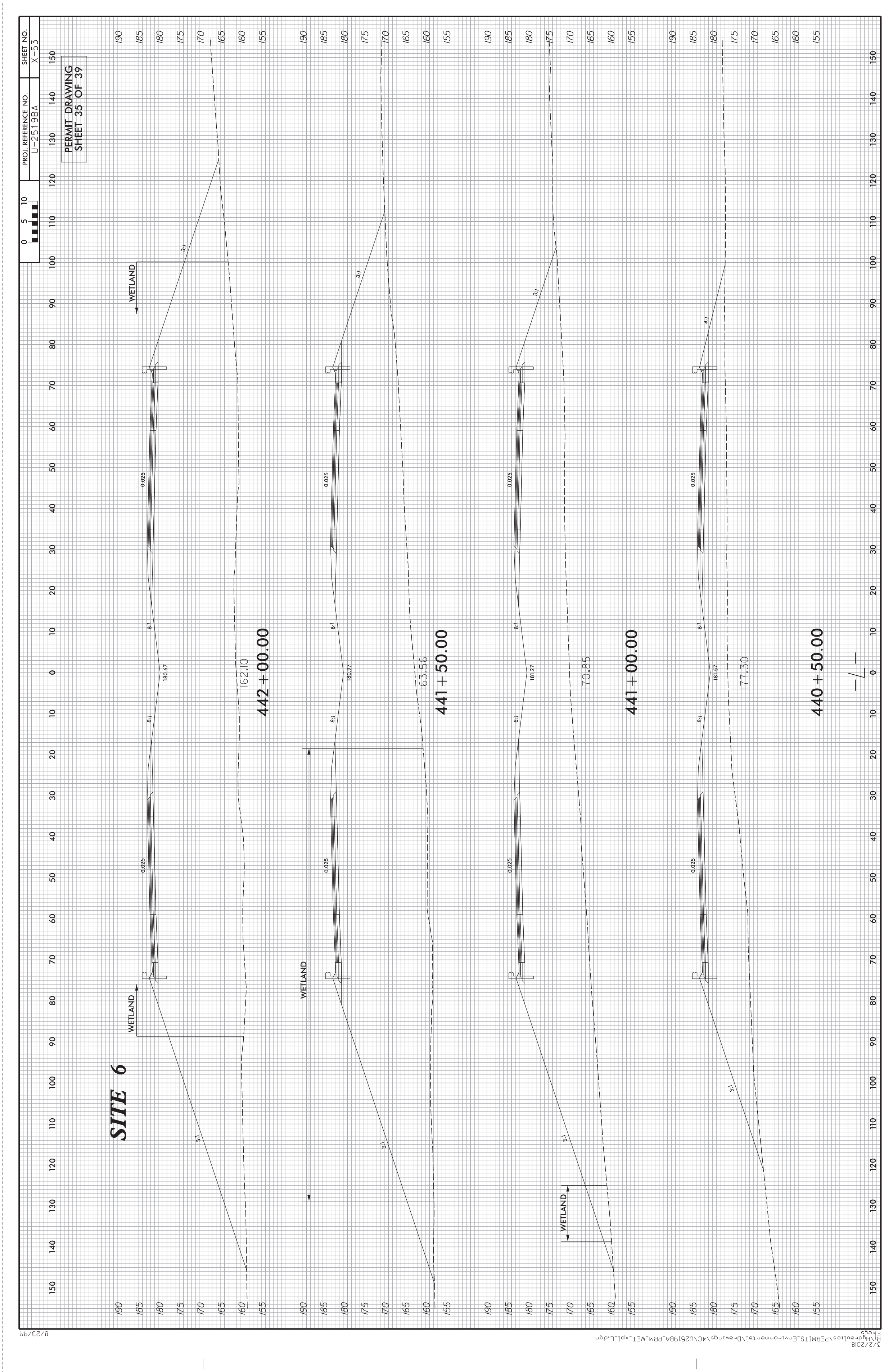
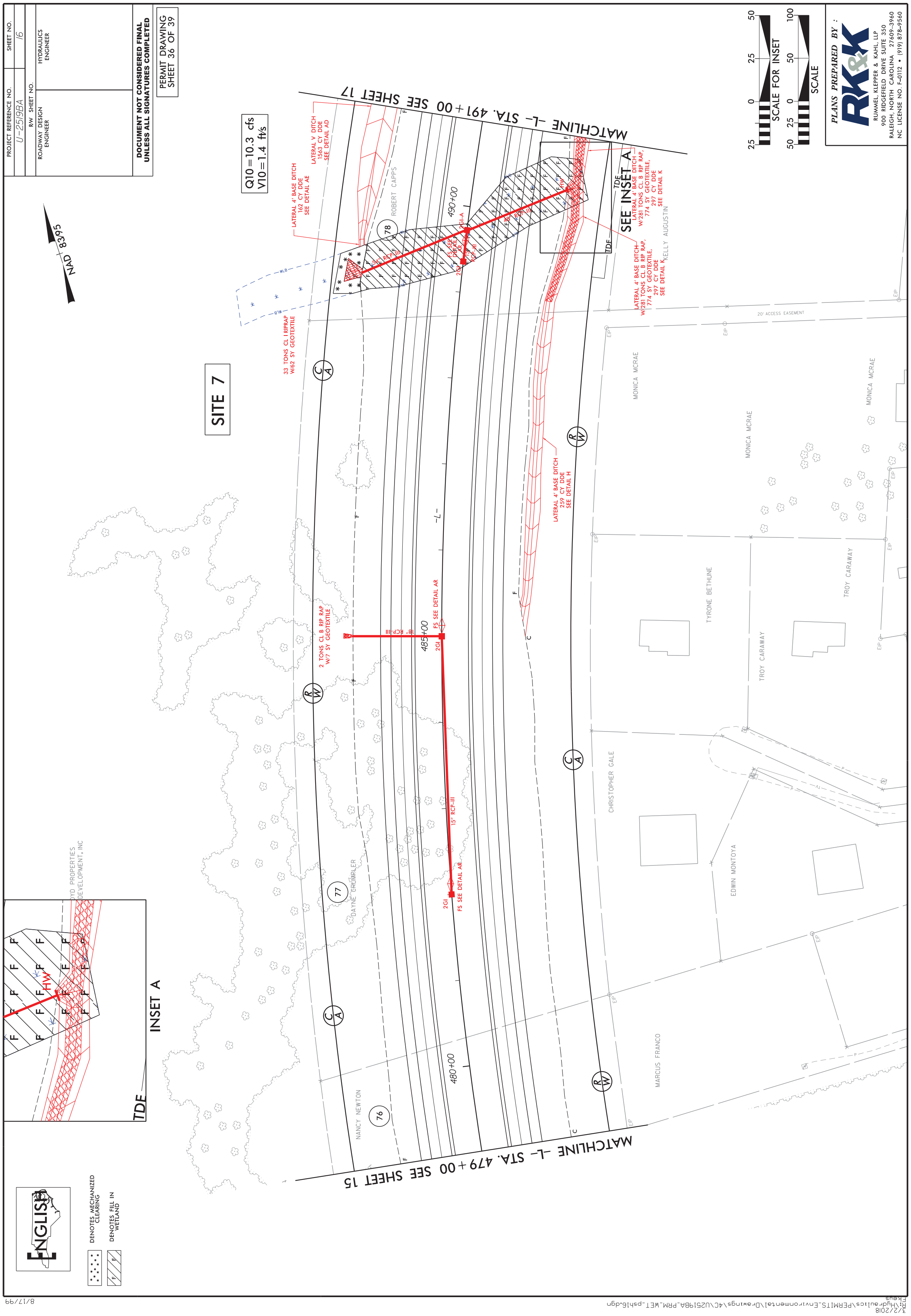
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 33 OF 39
ENGLISH
SCALE FOR INSET
SCALE
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES IMPACTS IN SURFACE WATER (POND)
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PLANS PREPARED BY :
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
MATCHLINE -L- STA. 452+00 SEE SHEET 14
MATCHLINE -L- STA. 439+00 SEE SHEET 12
MATCHLINE -Y14- STA. 19+00 SEE SHEET 25
MATCHLINE -Y14- STA. 27+00 SEE SHEET 26
SITE 6
SEE INSET A
SEE INSET B
INSET A
INSET B
PERMANENT EXCAVATION IN WETLAND
REMOVE
VERA KING
LUCRETIA GILBERT
NORBERT WILLIAMS
CHADWICK MARTIN
ROCK FILL IN POND SEE DETAIL Q
PIPES DO NOT INTERSECT
REMOVE EXIST ROADBED AND 18" RCP TO NATURAL GROUND SEE DETAIL AI

P-61


MATCHLINE -L- STA. 452+00 SEE SHEET 14
MATCHLINE -L- STA. 439+00 SEE SHEET 12
MATCHLINE -Y14- STA. 19+00 SEE SHEET 25
MATCHLINE -Y14- STA. 27+00 SEE SHEET 26
SITE 6
SEE INSET A
SEE INSET B
INSET A
INSET B
PERMANENT EXCAVATION IN WETLAND
REMOVE
PIPES DO NOT INTERSECT
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES IMPACTS IN SURFACE WATER (POND)
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
SCALE FOR INSET
SCALE
ENGLISH
PROJECT REFERENCE NO.
U-2519BA
SHEET NO.
13
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 34 OF 39
PLANS PREPARED BY:
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

P-62


PROJ. REFERENCE NO.
U-2519BA
SHEET NO.
X-53
PERMIT DRAWING
SHEET 35 OF 39
SITE 6
WETLAND
442+00.00
162.10
441+50.00
163.56
441+00.00
170.85
440+50.00
177.30
-L-
180.67
180.97
181.27
181.57
0.025
8:1
3:1
4:1
8/23/99
3/2/2018



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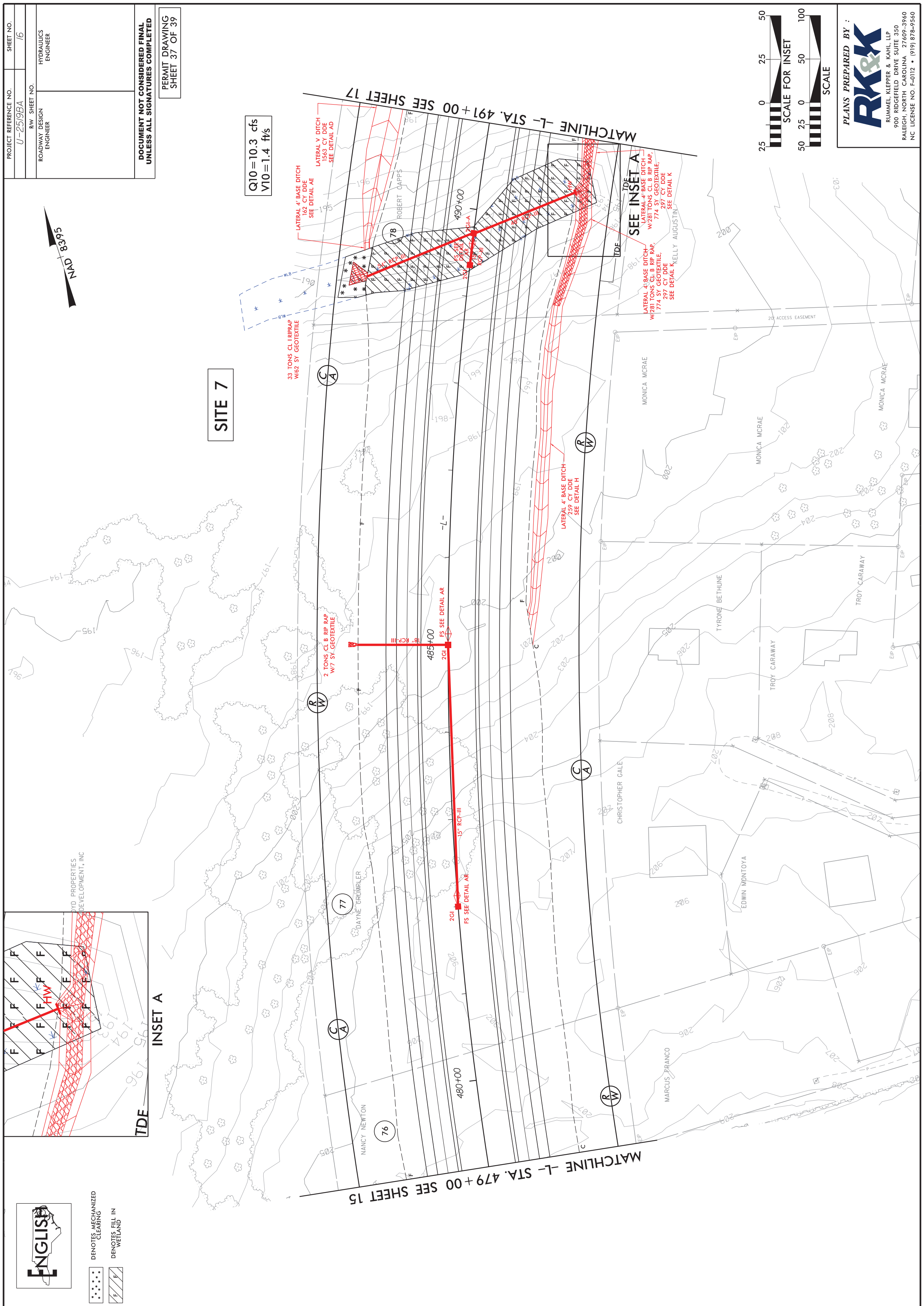
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 36 OF 39
SCALE FOR INSET
SCALE
PLANS PREPARED BY :
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
MATCHLINE -L- STA. 491+00 SEE SHEET 17
MATCHLINE -L- STA. 479+00 SEE SHEET 15
Q10=10.3 cfs
V10=1.4 ft/s
NAD 83/95
SITE 7
SEE INSET A
INSET A
TDE
LATERAL 4' BASE DITCH 162 CY DDE SEE DETAIL AE
LATERAL V DITCH 1563 CY DDE SEE DETAIL AD
33 TONS CL I RIPRAP W/62 SY GEOTEXTILE
LATERAL 4' BASE DITCH 259 CY DDE SEE DETAIL H
2 TONS CL B RIP RAP W/7 SY GEOTEXTILE
18" RCP-III
15" RCP-III
FS SEE DETAIL AR
20' ACCESS EASEMENT
ROBERT CAPPS
KELLY AUGUSTIN
MONICA MCRAE
TYRONE BETHUNE
TROY CARAWAY
CHRISTOPHER GALE
EDWIN MONTOYA
MARCUS FRANCO
NANCY NEWTON
DAYNE CRUMPLER
YO PROPERTIES DEVELOPMENT, INC
490+00
485+00
480+00
-L-
ENGLISH
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
8/17/99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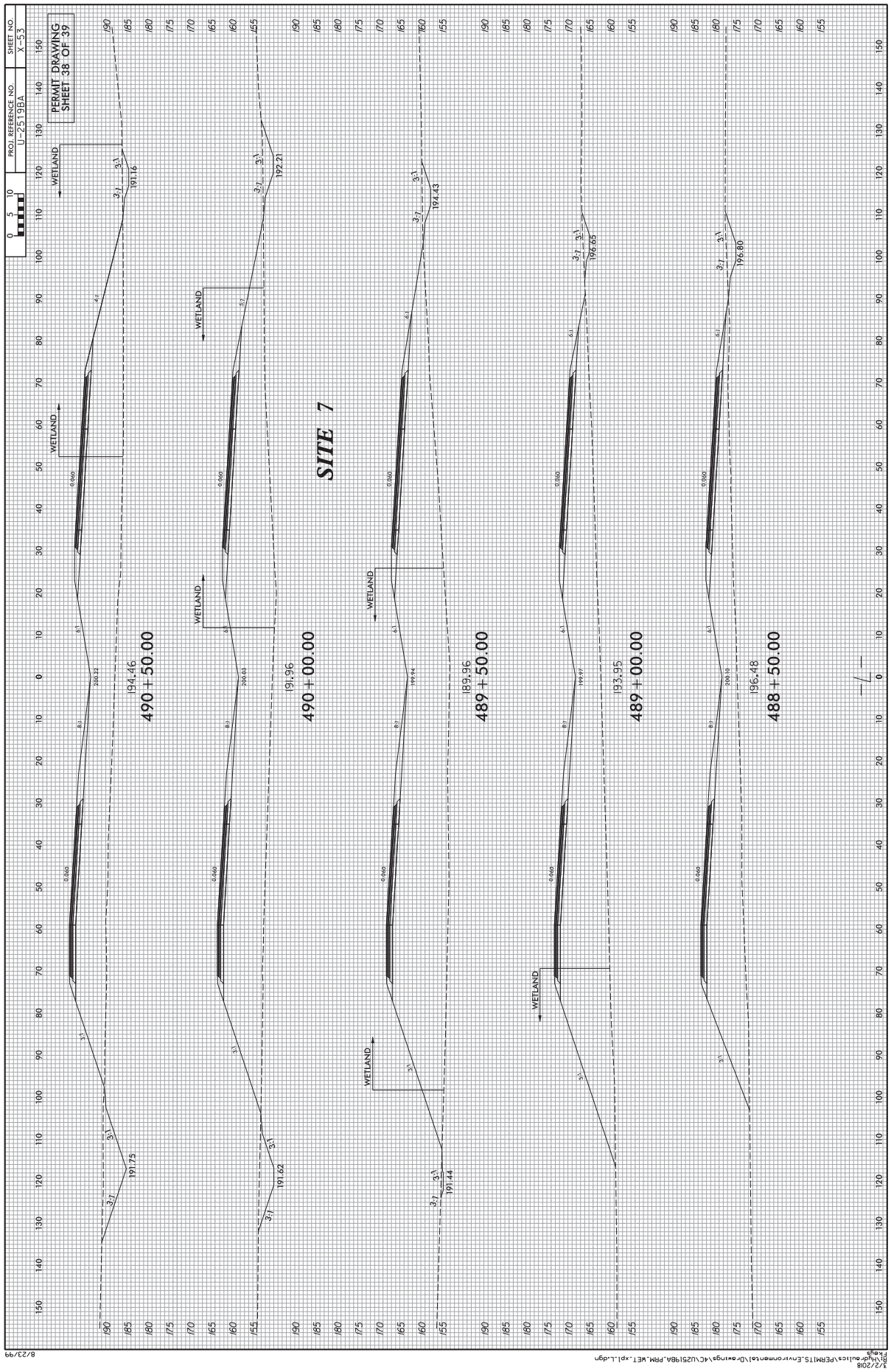
16
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING SHEET 37 OF 39
Q10=10.3 cfs
V10=1.4 ft/s
NAD 83/95
MATCHLINE -L- STA. 491+00 SEE SHEET 17
MATCHLINE -L- STA. 479+00 SEE SHEET 15
SITE 7
SEE INSET A
INSET A
TDE
-L-
480+00
485+00
490+00
SCALE FOR INSET
SCALE
PLANS PREPARED BY:
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
ENGLISH
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
ROBERT CAPPS
KELLY AUGUSTIN
MONICA MCRAE
TYRONE BETHUNE
TROY CARAWAY
CHRISTOPHER GALE
EDWIN MONTOYA
MARCUS FRANCO
NANCY NEWTON
DAYNE CRUMPLER
8/17/99


PERMIT DRAWING
SHEET 38 OF 39
PROJ. REFERENCE NO.
U-2519BA
SHEET NO.
X-53
SITE 7
490+50.00
490+00.00
489+50.00
489+00.00
488+50.00
WETLAND
194.46
191.96
189.96
193.95
196.48
191.75
191.62
191.44
191.16
192.21
191.43
196.65
196.80

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 330+46 - 333+76	72" RCP-IV						0.03	< 0.01	494	13	
		BANK STABILIZATION						< 0.01	< 0.01	25	12	
		FILL	1.75			0.10						
2A	-L- 344+86 - 348+95	66" RCP	2.82			0.09						
2B	-Y13- 57+42 - 58+60	2@42" RCP [1]	0.11			0.05						
3	-Y13RPA- 17+57 - 22+58 RT	FILL	0.51		0.19	0.10						
4	-L- 397+07 - 398+81	BRIDGE [2]	< 0.01	< 0.01		0.02	0.60					
5	-L- 409+08 - 409+92 LT	24" RCP	0.02			0.02						
6	-L- 441+57 - 443+35	54" RCP	0.82		< 0.01	0.11		0.10	0.04			
7	-L- 489+30 - 489+82	54" RCP	0.36			0.03						
TOTALS*:			6.40	< 0.01	0.20	0.51	0.60	0.13	0.04	518	26	0

*Rounded totals are sum of actual impacts

NOTES:
1. INCLUDES -Y13- DETOUR IMPACTS
2. SUMMARIZES BRIDGE & TEMPORARY WORK BRIDGE IMPACTS: PERMANENT FILL IN WETLAND
IMPACT DUE TO THE PROPOSED BENTS IS 130.7 SQ. FT (<0.01 ac) (INCUDED ABOVE)
TEMPORARY IMPACTS DUE TO THE TEMPORARY WORK BRIDGE is 350 SQ. FT (<0.01 ac) (INCLUDED ABOVE)

Revised 2013 10 24

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MARCH 2018
CUMBERLAND
U2519BA

SHEET 39 OF 39

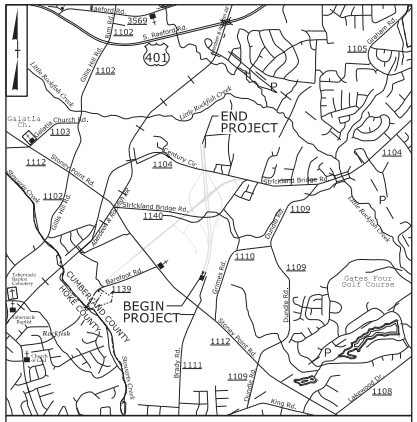
P-66

09/28/99

TIP PROJECT: U-2519BB

CONTRACT: C204110

See Sheet 1A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY

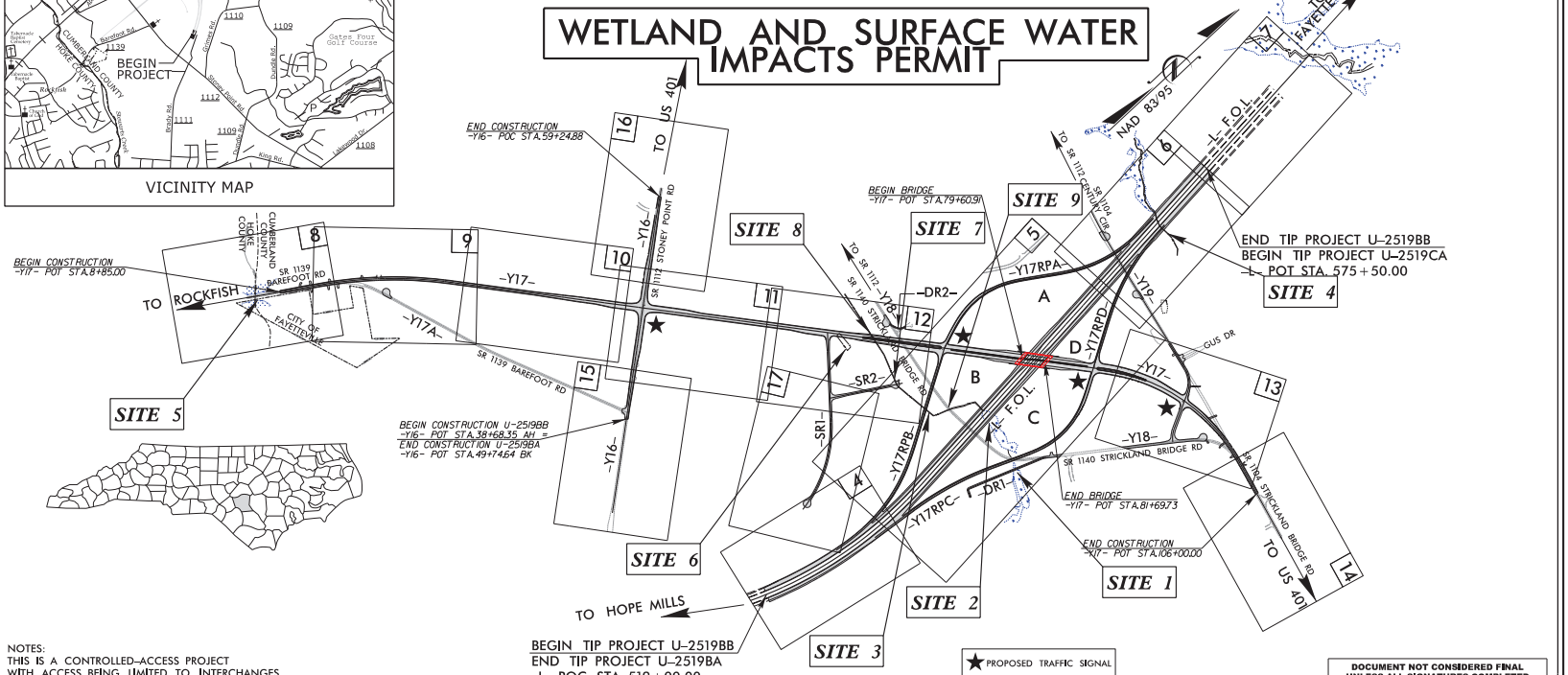
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2519BB	1	
STATE WBS NO.	F.A. PROJ. NO.	DESCRIPTION	
34817.1.FR8	NHF-0100(25)	PE	
34817.1.FR15	NHF-0100(25)	ROW, UTIL	
	NHF-0100(25)	CONST	

LOCATION: FAYETTEVILLE OUTER LOOP (F.O.L.) FROM SOUTH OF SR 1104 (STRICKLAND BRIDGE ROAD) TO SOUTH OF US 401

TYPE OF WORK: GRADING, PAVING, DRAINAGE, STRUCTURE, & SIGNALS

PERMIT DRAWING SHEET 1 OF 21

WETLAND AND SURFACE WATER IMPACTS PERMIT



★ PROPOSED TRAFFIC SIGNAL

NOTES:
THIS IS A CONTROLLED-ACCESS PROJECT
WITH ACCESS BEING LIMITED TO INTERCHANGES.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2018 = 37,400
ADT 2038 = 46,800
K = 8 %
D = 55 %
T = 12 % *
V = 70 MPH
* 4% TTST + 8% DUAL

FUNC CLASS = INTERSTATE
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-2519BB = 1.070 MILES

TOTAL LENGTH TIP PROJECT U-2519BB = 1.070 MILES

Prepared in the Office of:
CALYX Engineers & Consultants
(Formerly Mulkey Engineers and Consultants)
FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 29, 2016

LETTING DATE:
SEPTEMBER 18, 2018

JOHNNY BANKS
CALYX E & C PROJECT MANAGER

STEPHEN C. BROWDE, PE
CALYX E & C PROJECT DESIGN ENGINEER

NCDOT CONTACT: GARY LOVERING, PE
ROADWAY DESIGN - PROJECT ENGINEER

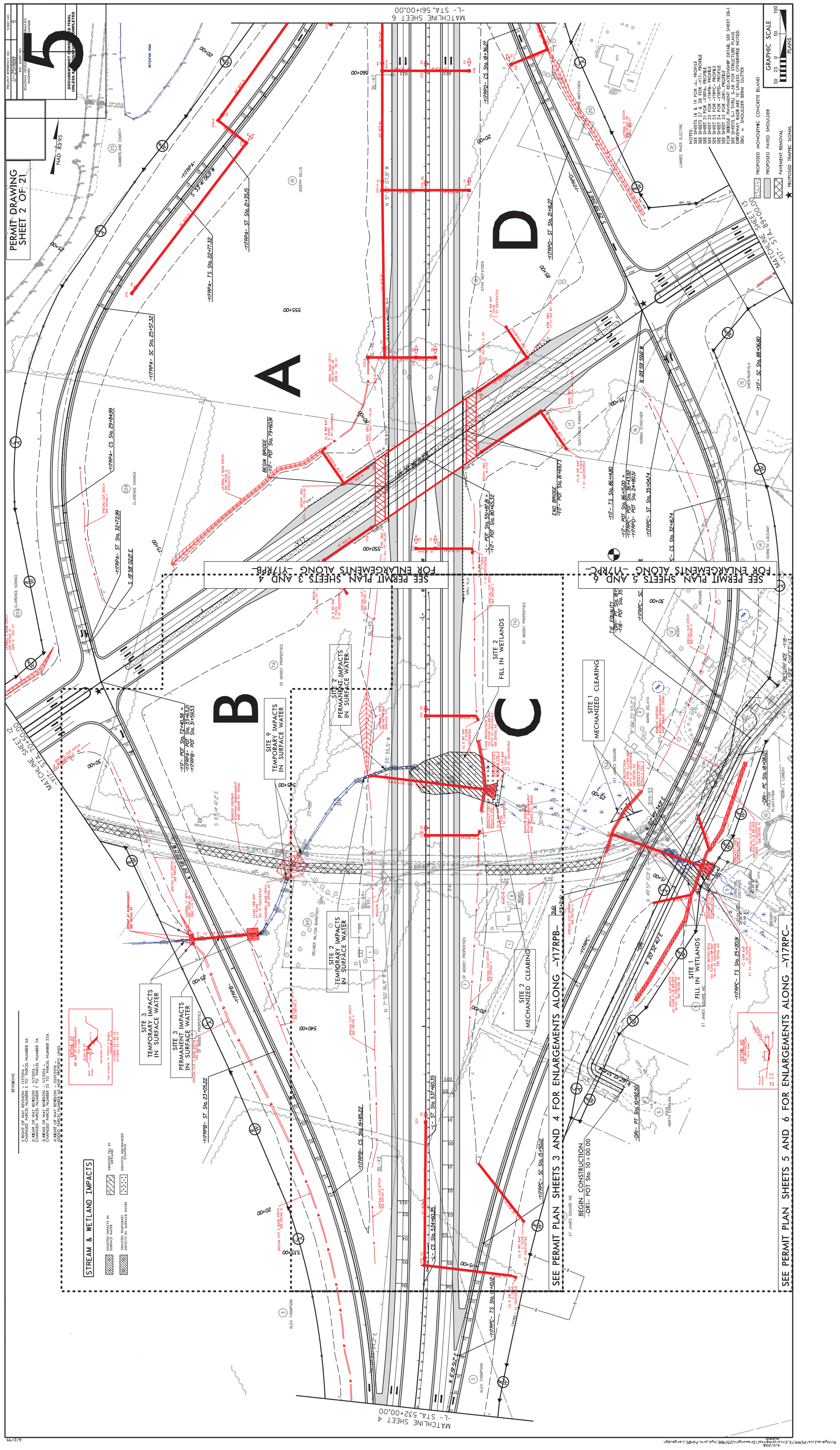
HYDRAULICS ENGINEER

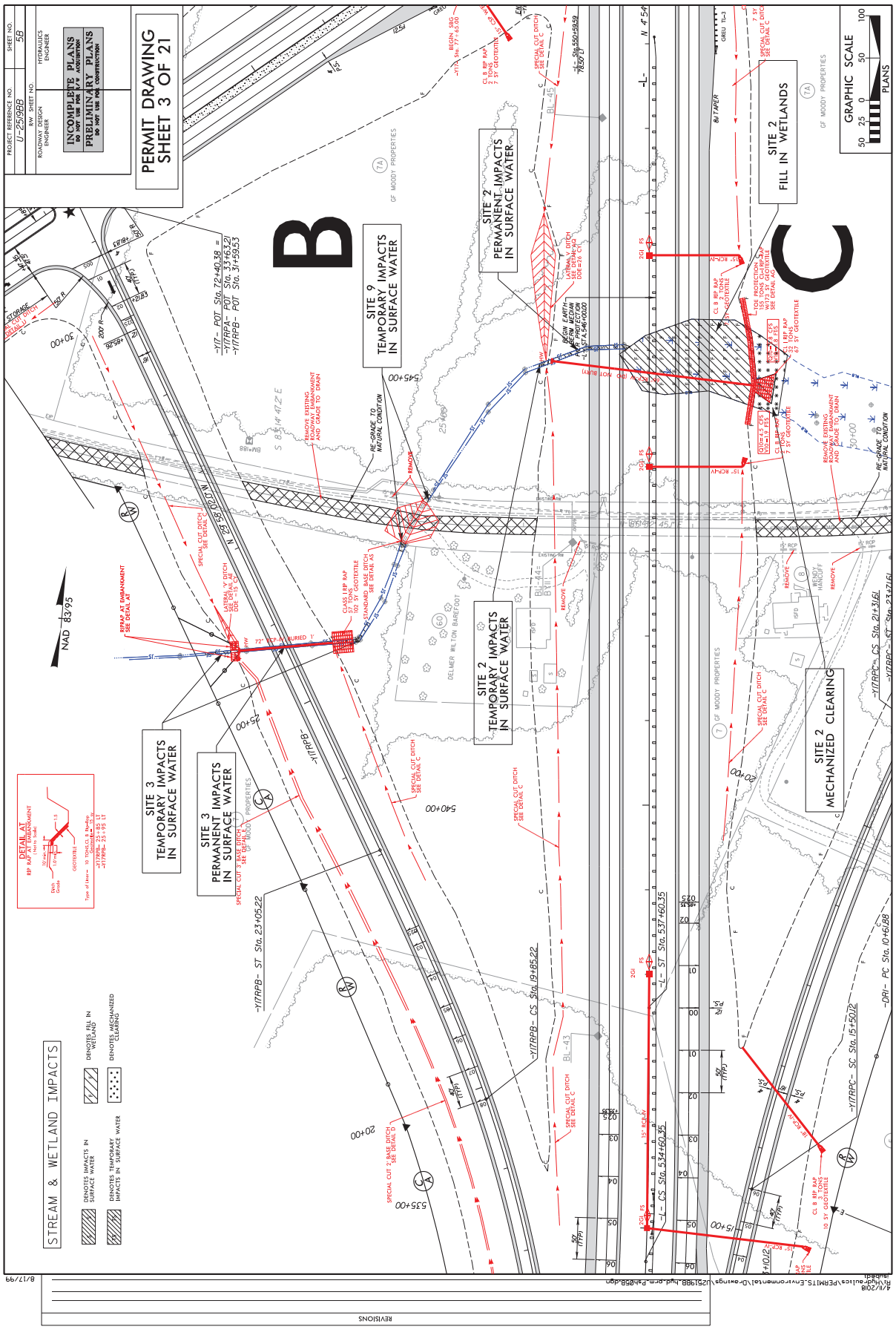
SIGNATURE: P.E.

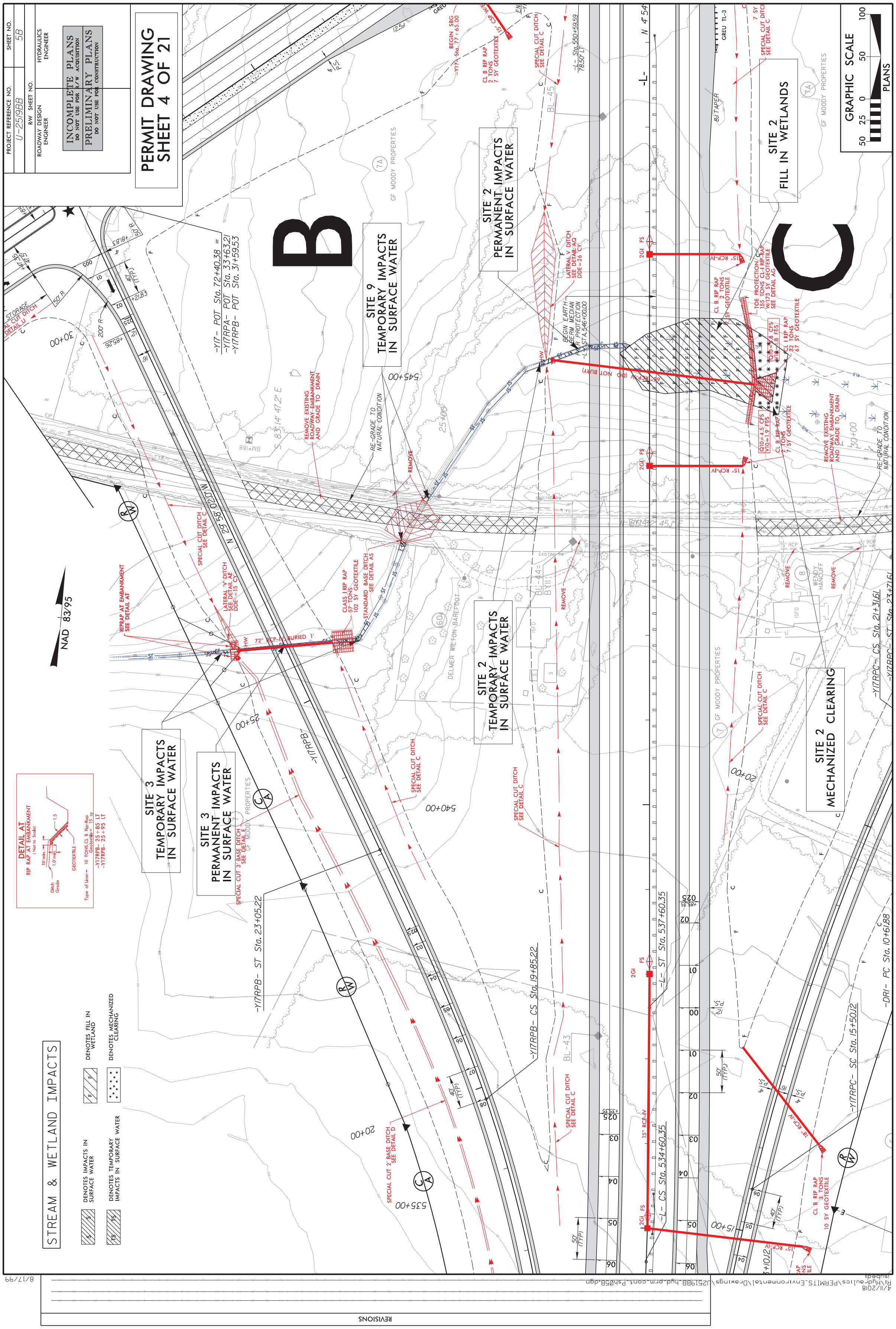
ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

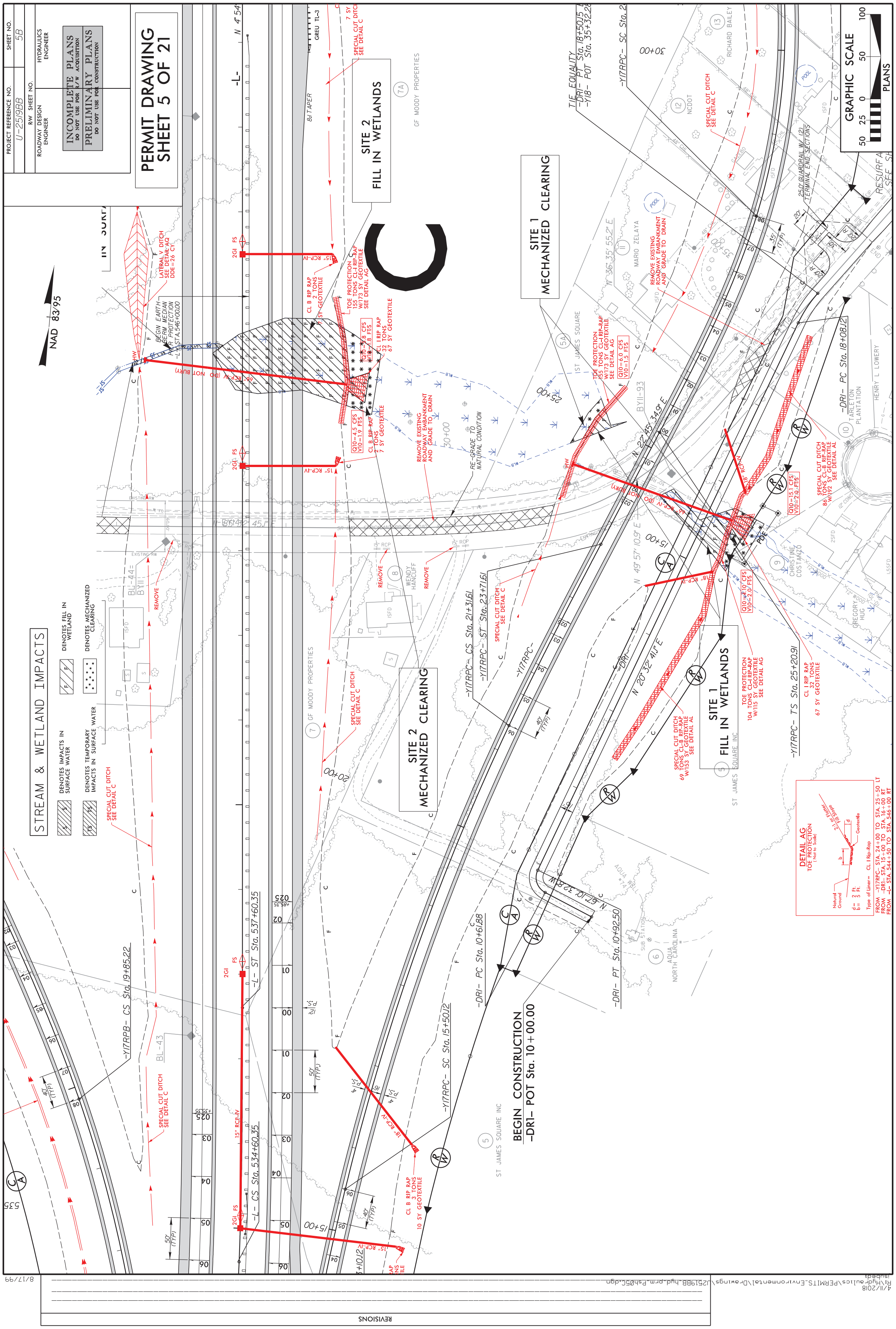
4/11/2018
R:\Hydraulics\PERMITS_Environmental\Drawings\U2519BB_hyd_prm_TSH.dgn
jsloper


PERMIT DRAWING SHEET 2 OF 21
5
A
B
C
D
SITE 9 TEMPORARY IMPACTS IN SURFACE WATER
SITE 2 PERMANENT IMPACTS IN SURFACE WATER
SITE 2 TEMPORARY IMPACTS IN SURFACE WATER
SITE 2 FILL IN WETLANDS
SITE 2 MECHANIZED CLEARING
SITE 1 MECHANIZED CLEARING
SITE 1 FILL IN WETLANDS
SITE 3 TEMPORARY IMPACTS IN SURFACE WATER
SITE 3 PERMANENT IMPACTS IN SURFACE WATER
STREAM & WETLAND IMPACTS
SEE PERMIT PLAN SHEETS 3 AND 4 FOR ENLARGEMENTS ALONG -Y17RPB-
SEE PERMIT PLAN SHEETS 5 AND 6 FOR ENLARGEMENTS ALONG -Y17RPC-
MATCHLINE SHEET 4 -L- STA. 532+00.00
MATCHLINE SHEET 6 -L- STA. 561+00.00
BEGIN BRIDGE
END BRIDGE
BEGIN CONSTRUCTION
GRAPHIC SCALE


PERMIT DRAWING
SHEET 3 OF 21
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
PROJECT REFERENCE NO. U-2519BB
SHEET NO. 5B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
GRAPHIC SCALE
PLANS
SITE 2 FILL IN WETLANDS
SITE 2 MECHANIZED CLEARING
SITE 2 PERMANENT IMPACTS IN SURFACE WATER
SITE 2 TEMPORARY IMPACTS IN SURFACE WATER
SITE 3 TEMPORARY IMPACTS IN SURFACE WATER
SITE 3 PERMANENT IMPACTS IN SURFACE WATER
SITE 9 TEMPORARY IMPACTS IN SURFACE WATER
B
C
STREAM & WETLAND IMPACTS
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DETAIL AT RIP RAP ENTRANCE
NAD 83/95
-Y1TRPA- POT Sta. 72+40.38
-Y1TRPB- POT Sta. 31+59.53
-Y1TRPB- ST Sta. 23+05.22
-Y1TRPB- CS Sta. 19+85.22
-L- ST Sta. 537+60.35
-L- CS Sta. 534+60.35
-Y1TRPC- CS Sta. 21+31.61
-Y1TRPC- ST Sta. 23+47.61
-DRI- PC Sta. 10+61.88
-Y1TRPC- SC Sta. 15+50.12
REVISIONS
8/17/99

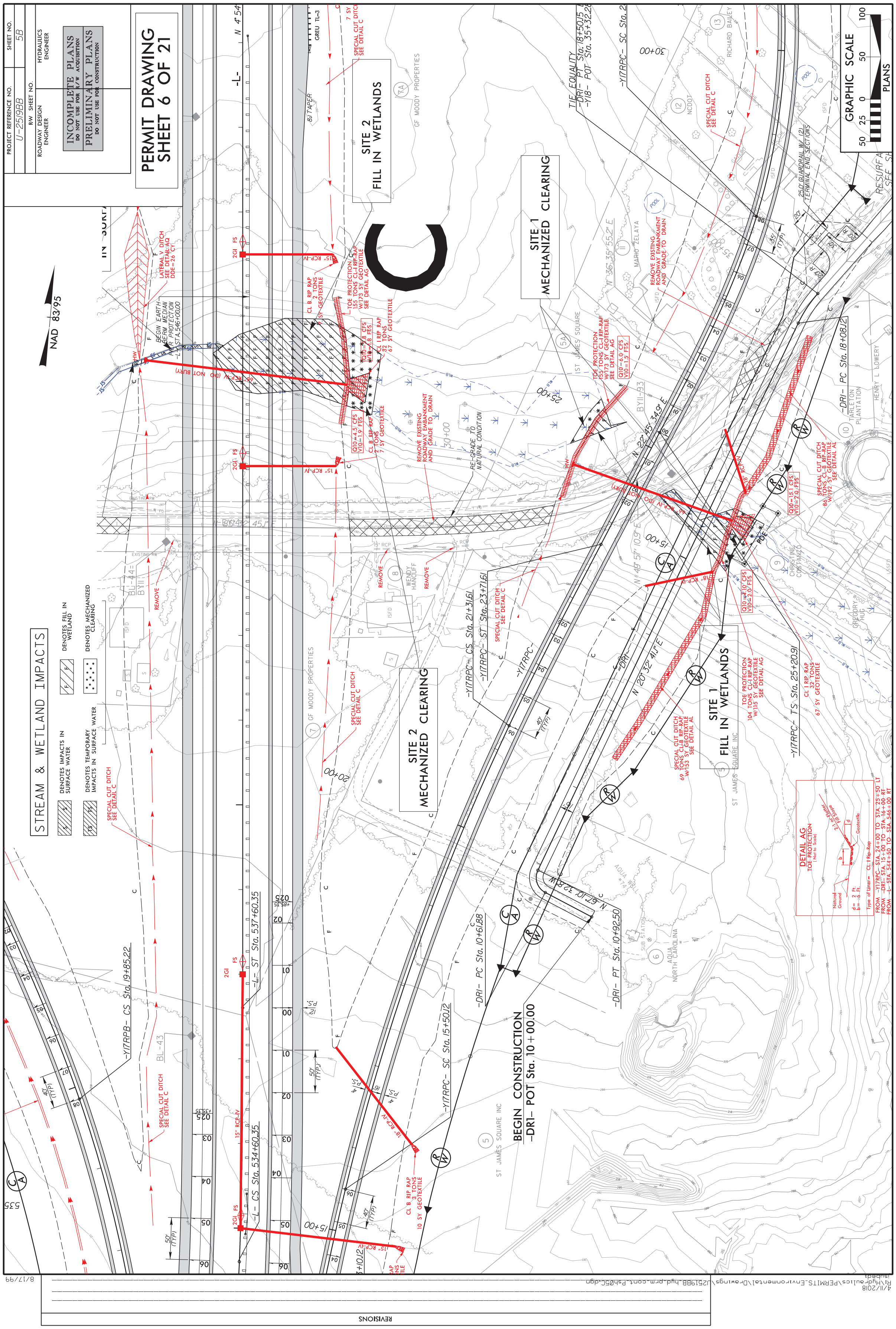

PERMIT DRAWING
SHEET 4 OF 21
PROJECT REFERENCE NO.
U-2519BB
SHEET NO.
5B
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
STREAM & WETLAND IMPACTS
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
GRAPHIC SCALE
PLANS
NAD 83/95
B
C
SITE 9
TEMPORARY IMPACTS
IN SURFACE WATER
SITE 2
PERMANENT IMPACTS
IN SURFACE WATER
SITE 2
TEMPORARY IMPACTS
IN SURFACE WATER
SITE 2
FILL IN WETLANDS
SITE 2
MECHANIZED CLEARING
SITE 3
TEMPORARY IMPACTS
IN SURFACE WATER
SITE 3
PERMANENT IMPACTS
IN SURFACE WATER
DETAIL AT
RIP RAP AT EMBANKMENT
GF MOODY PROPERTIES
DELMER WELTON BAREFOOT
REVISIONS
8/17/99

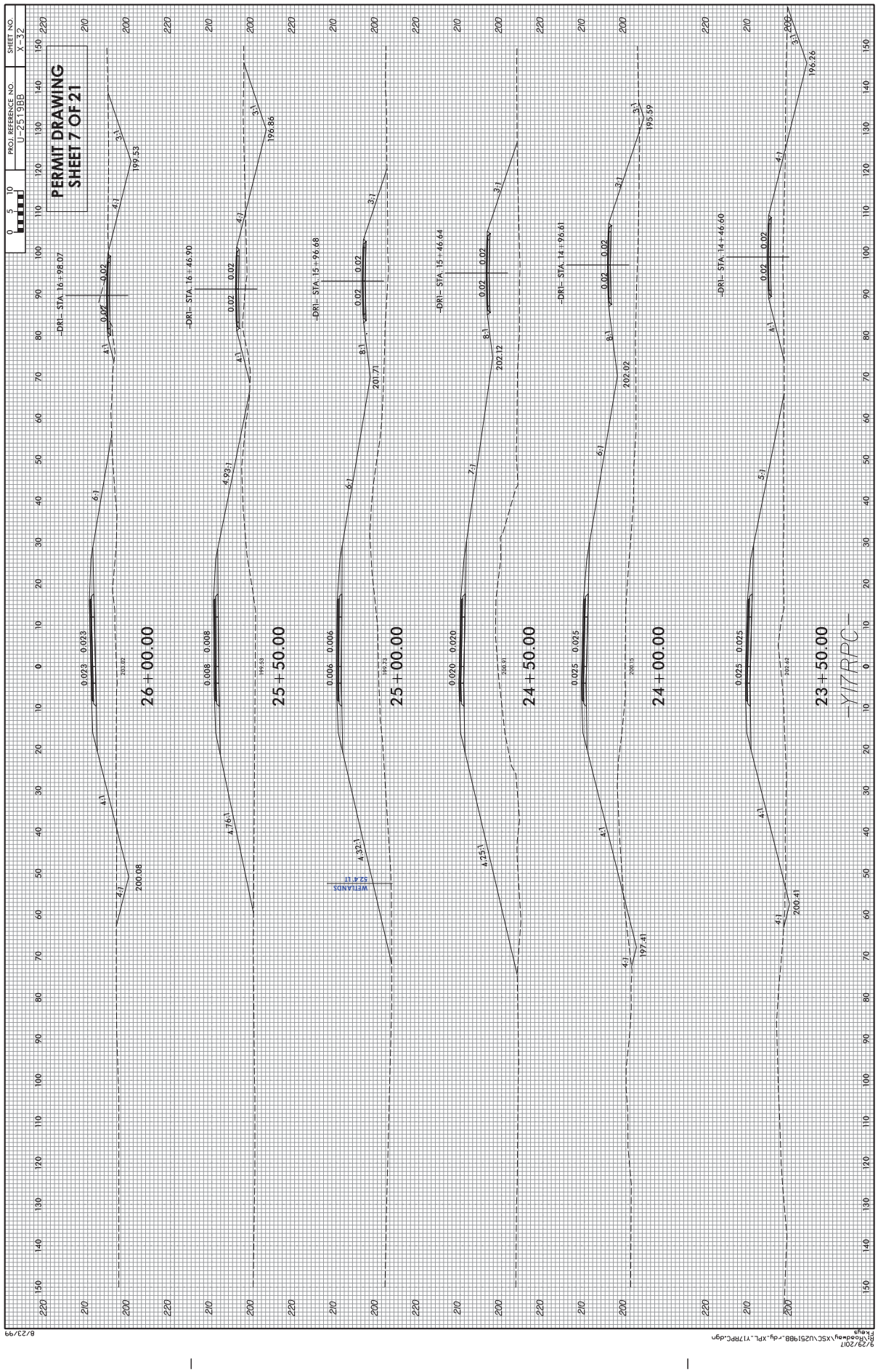
P-71



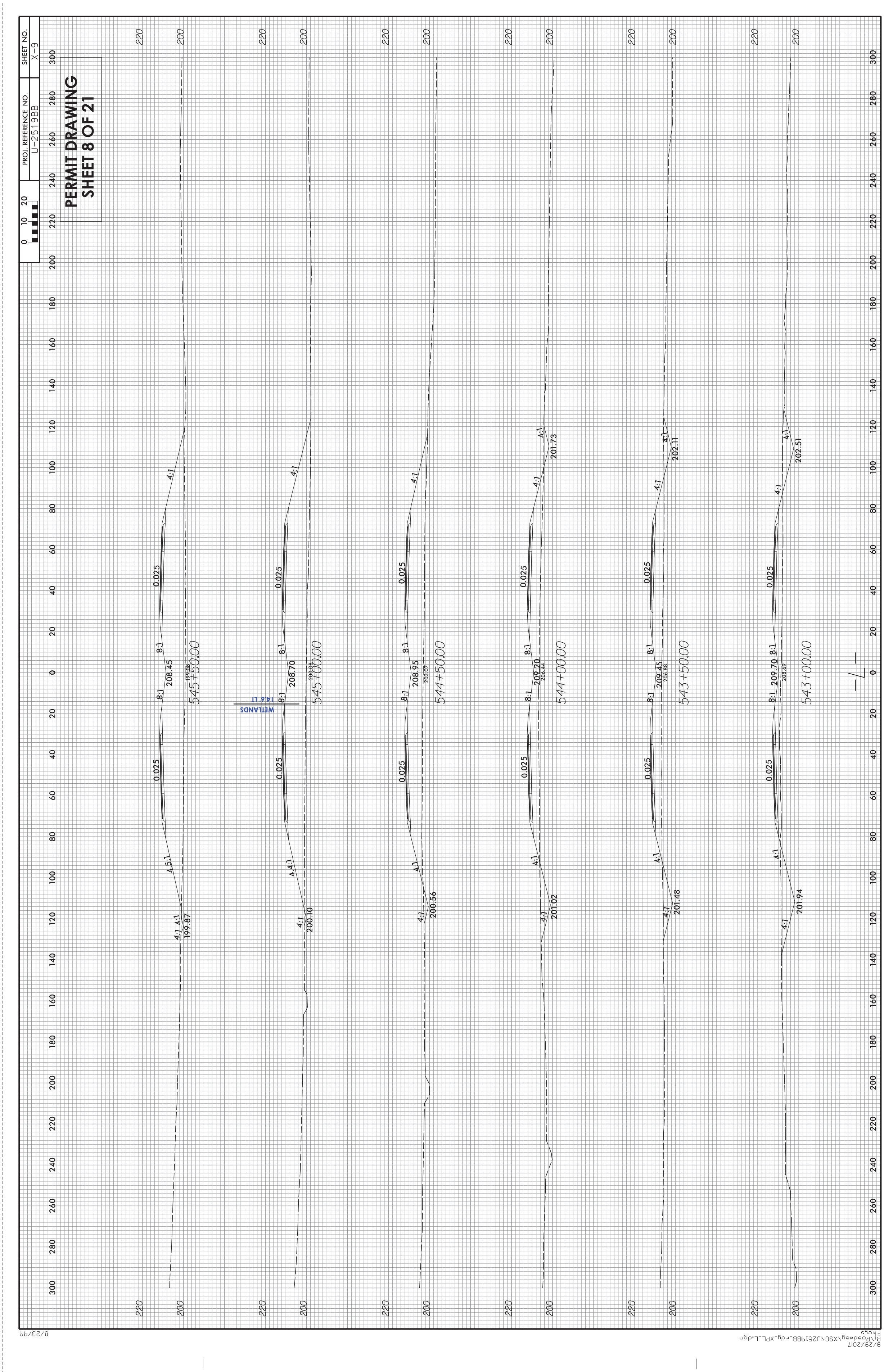
PERMIT DRAWING
SHEET 5 OF 21
PROJECT REFERENCE NO.
U-2519BB
SHEET NO.
5B
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
STREAM & WETLAND IMPACTS
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
NAD 83/95
SITE 2
FILL IN WETLANDS
SITE 1
MECHANIZED CLEARING
SITE 2
MECHANIZED CLEARING
SITE 1
FILL IN WETLANDS
BEGIN CONSTRUCTION
-DR1- POT Sta. 10+00.00
GRAPHIC SCALE
PLANS
DETAIL AG
TOE PROTECTION
REVISIONS

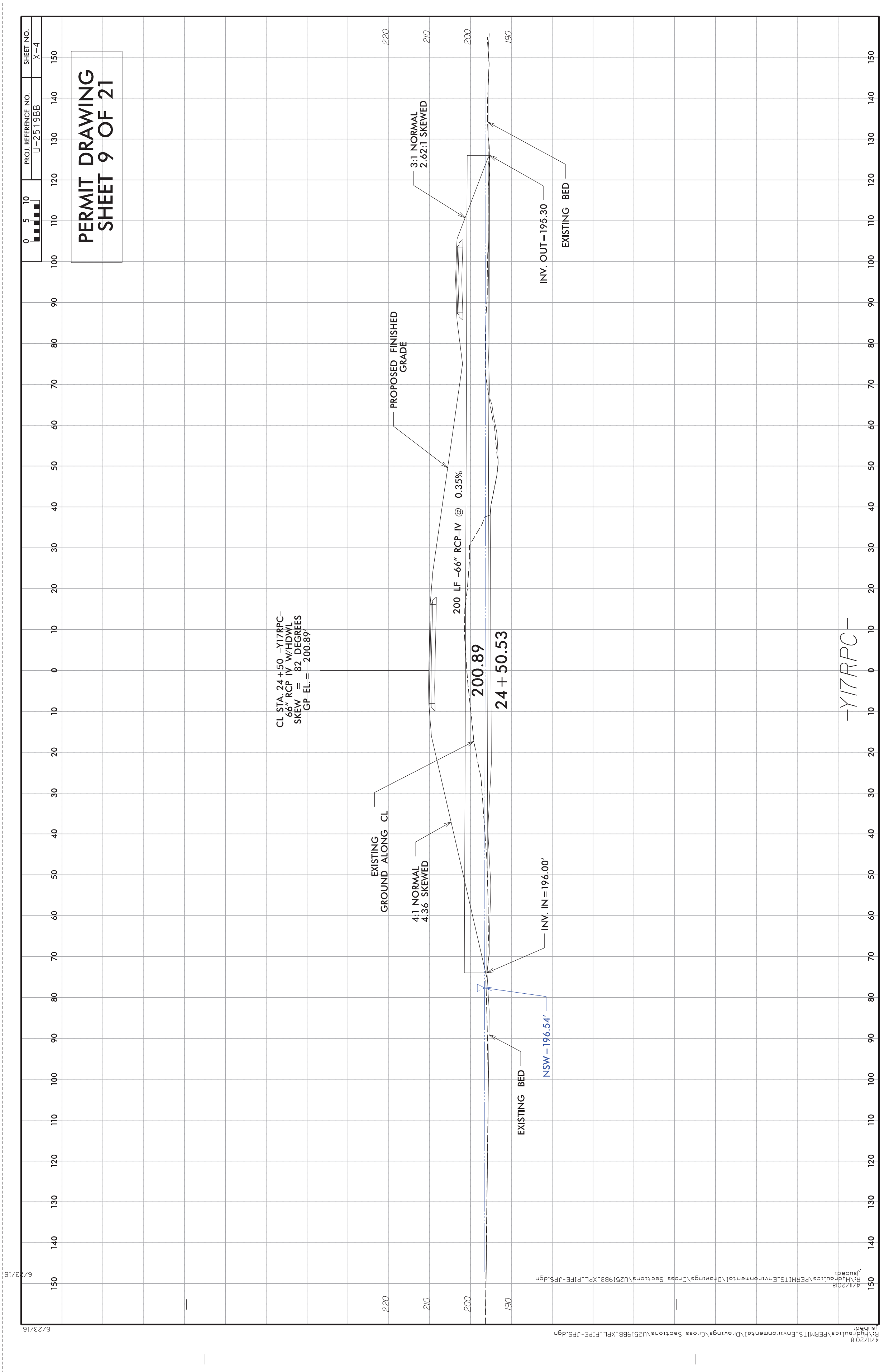
P-72


PROJECT REFERENCE NO. U-2519BB
SHEET NO. 5B
INCOMPLETE PLANS
PRELIMINARY PLANS
PERMIT DRAWING SHEET 6 OF 21
STREAM & WETLAND IMPACTS
SITE 2 FILL IN WETLANDS
SITE 1 MECHANIZED CLEARING
SITE 1 FILL IN WETLANDS
SITE 2 MECHANIZED CLEARING
BEGIN CONSTRUCTION -DR1- POT Sta. 10+00.00
GRAPHIC SCALE
PLANS
NAD 83/95
REVISIONS


PERMIT DRAWING
SHEET 7 OF 21
PROJ. REFERENCE NO.
U-2519BB
SHEET NO.
X-32
0 5 10
DRI- STA. 16+98.07
DRI- STA. 16+46.90
DRI- STA. 15+96.68
DRI- STA. 15+46.64
DRI- STA. 14+96.61
DRI- STA. 14+46.60
26+00.00
25+50.00
25+00.00
24+50.00
24+00.00
23+50.00
WETLANDS
52 A.I.T.
9/29/2017
8/23/99

P-74


PROJ. REFERENCE NO.
U-2519BB
SHEET NO.
X-9
PERMIT DRAWING
SHEET 8 OF 21
545+50.00
545+00.00
544+50.00
544+00.00
543+50.00
543+00.00
-L-
WETLANDS
14.6' LT
208.45
208.70
208.95
209.20
209.45
209.70
199.87
200.10
200.56
201.02
201.48
201.94
201.73
202.11
202.51
0.025
8:1
4:1
4.5:1
4.4:1
9/29/2017
8/23/99


PERMIT DRAWING
SHEET 9 OF 21
PROJ. REFERENCE NO.
U-2519BB
SHEET NO.
X-4
0 5 10
3:1 NORMAL
2.62:1 SKEWED
INV. OUT=195.30
EXISTING BED
PROPOSED FINISHED GRADE
200 LF -66" RCP-IV @ 0.35%
CL STA. 24+50 -Y17RPC-
66" RCP IV W/HDWL
SKEW = 82 DEGREES
GP EL. = 200.89'
200.89
24+50.53
-Y17RPC-
EXISTING GROUND ALONG CL
4:1 NORMAL
4.36 SKEWED
INV. IN=196.00'
NSW=196.54'
EXISTING BED
220
210
200
190
6/23/16
4/11/2018
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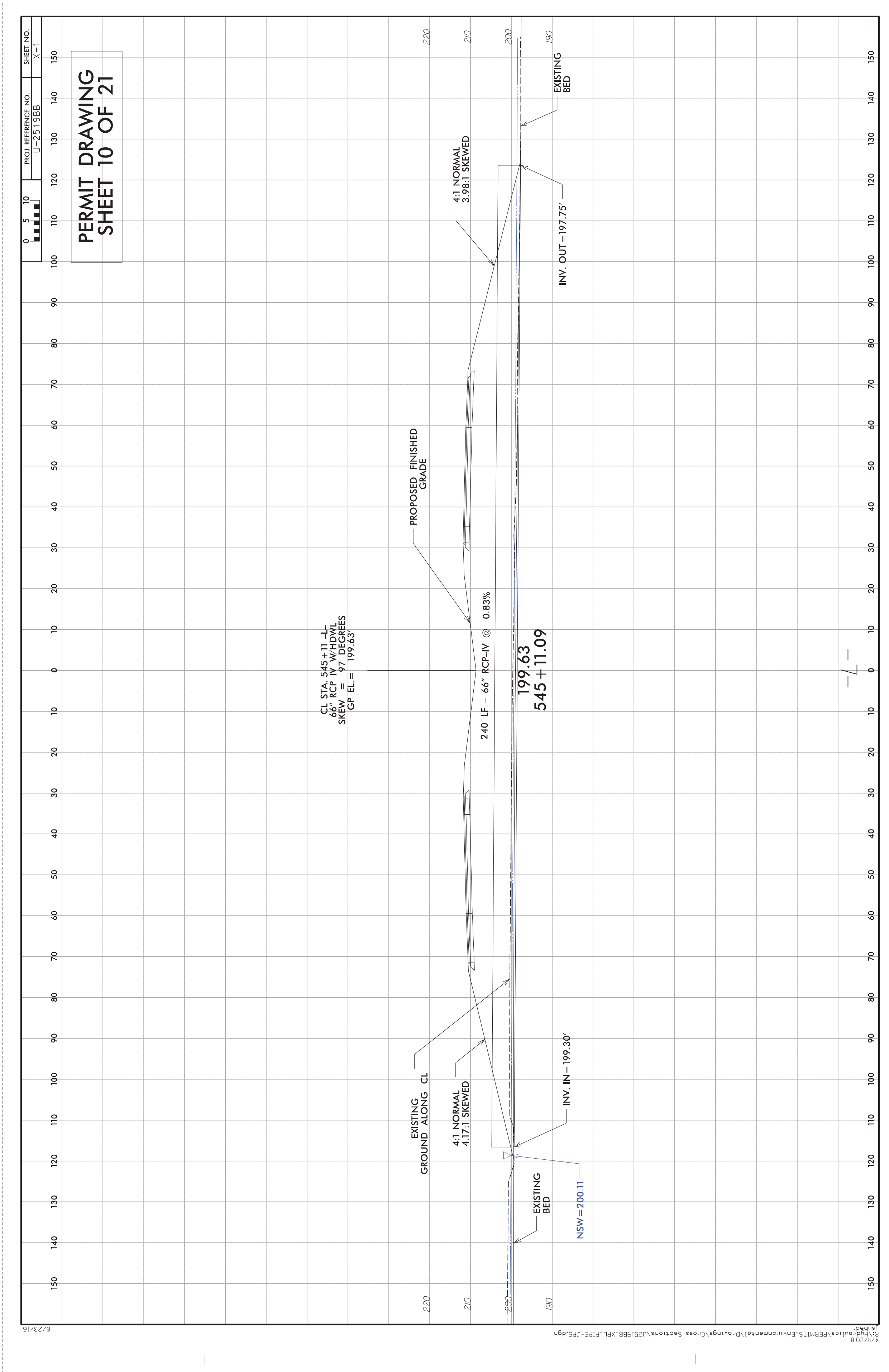
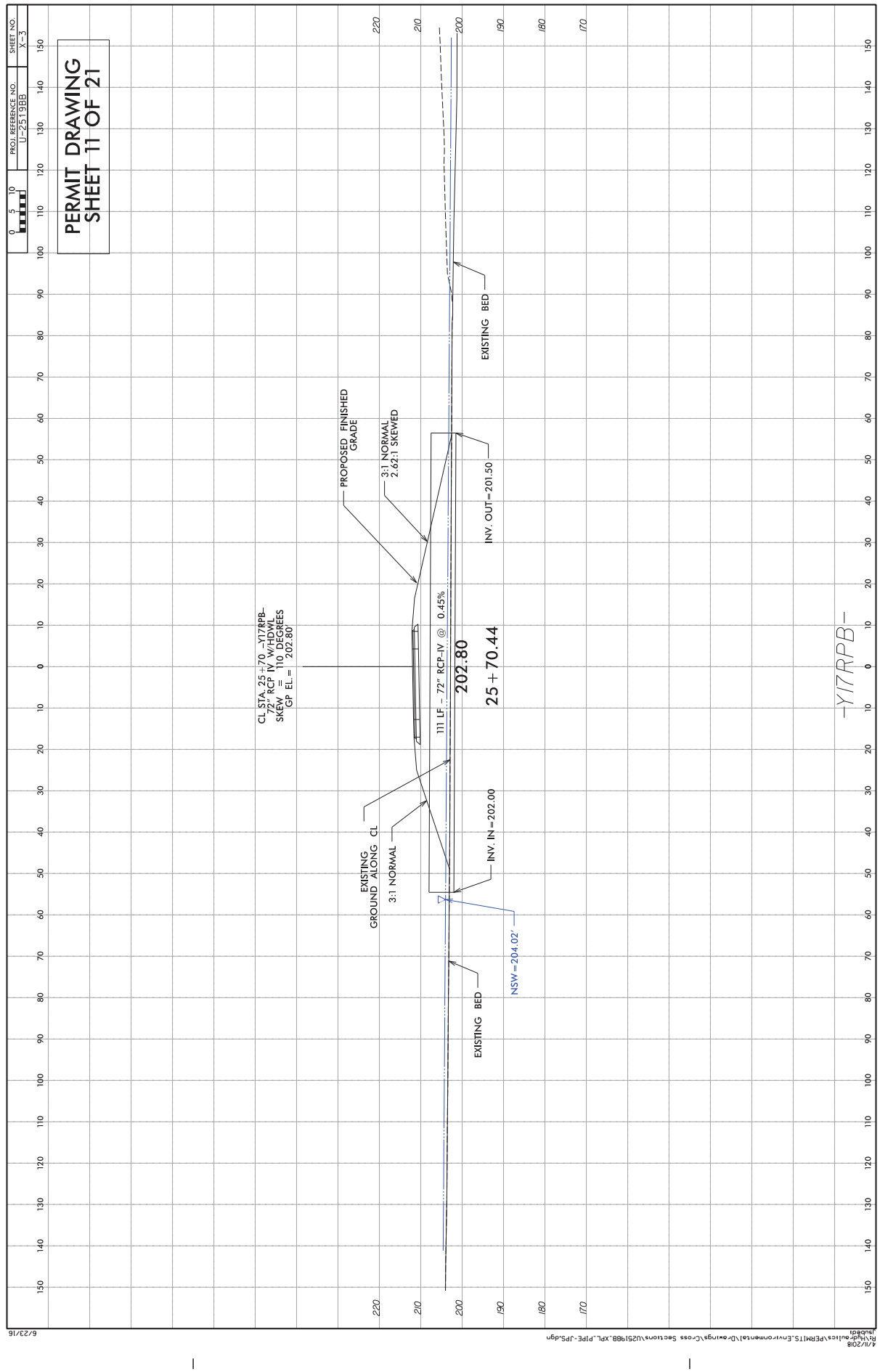
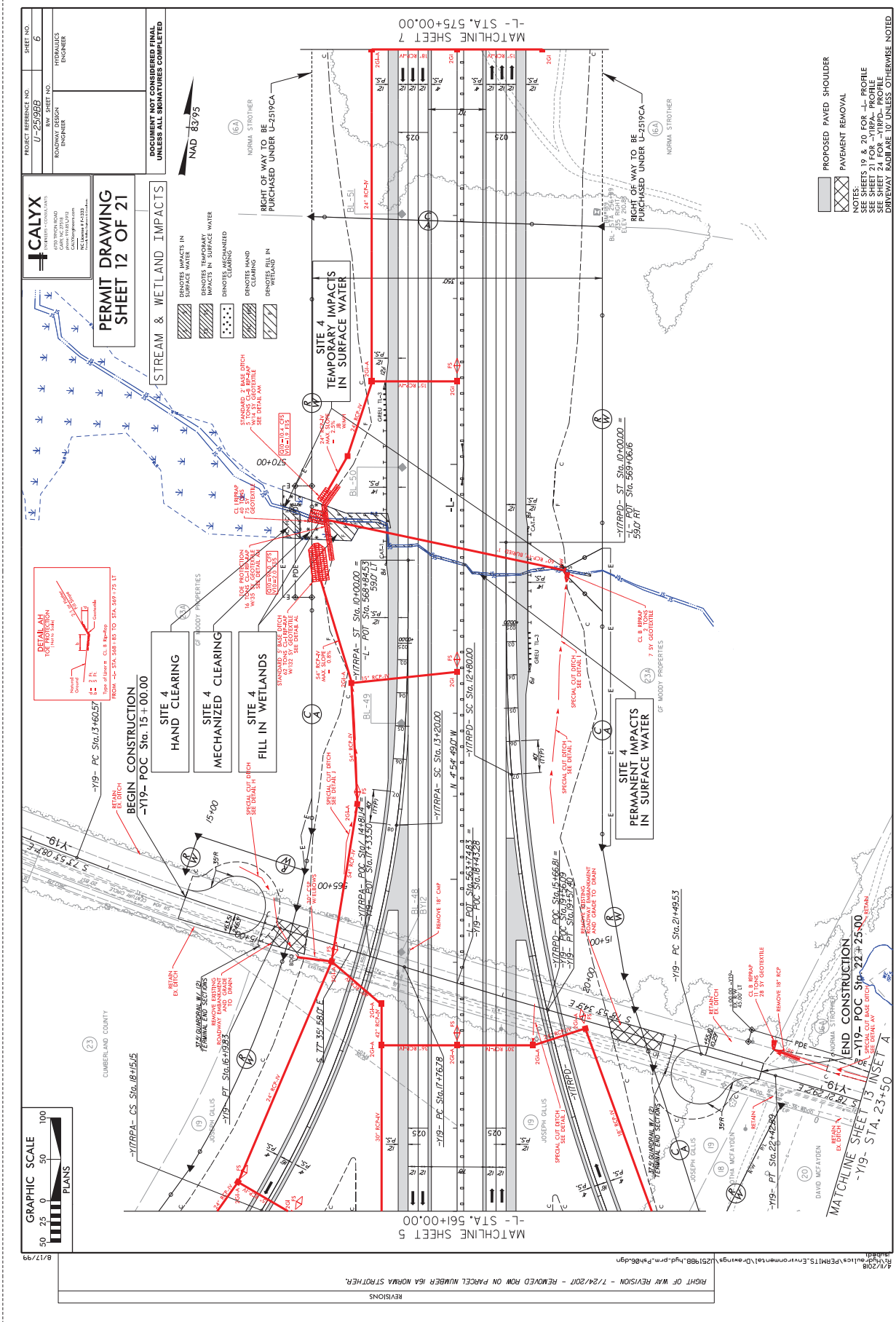
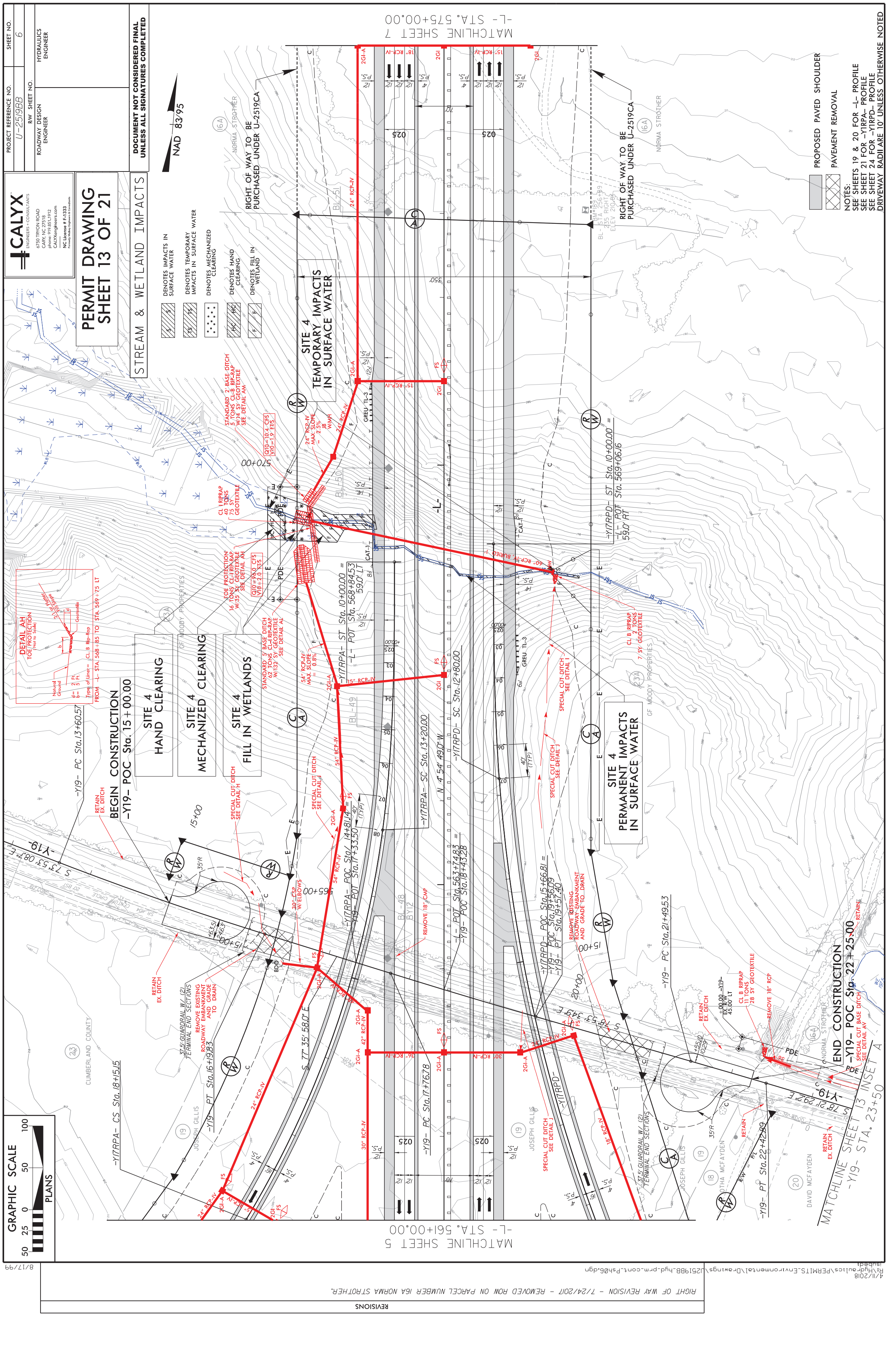
jsubedi

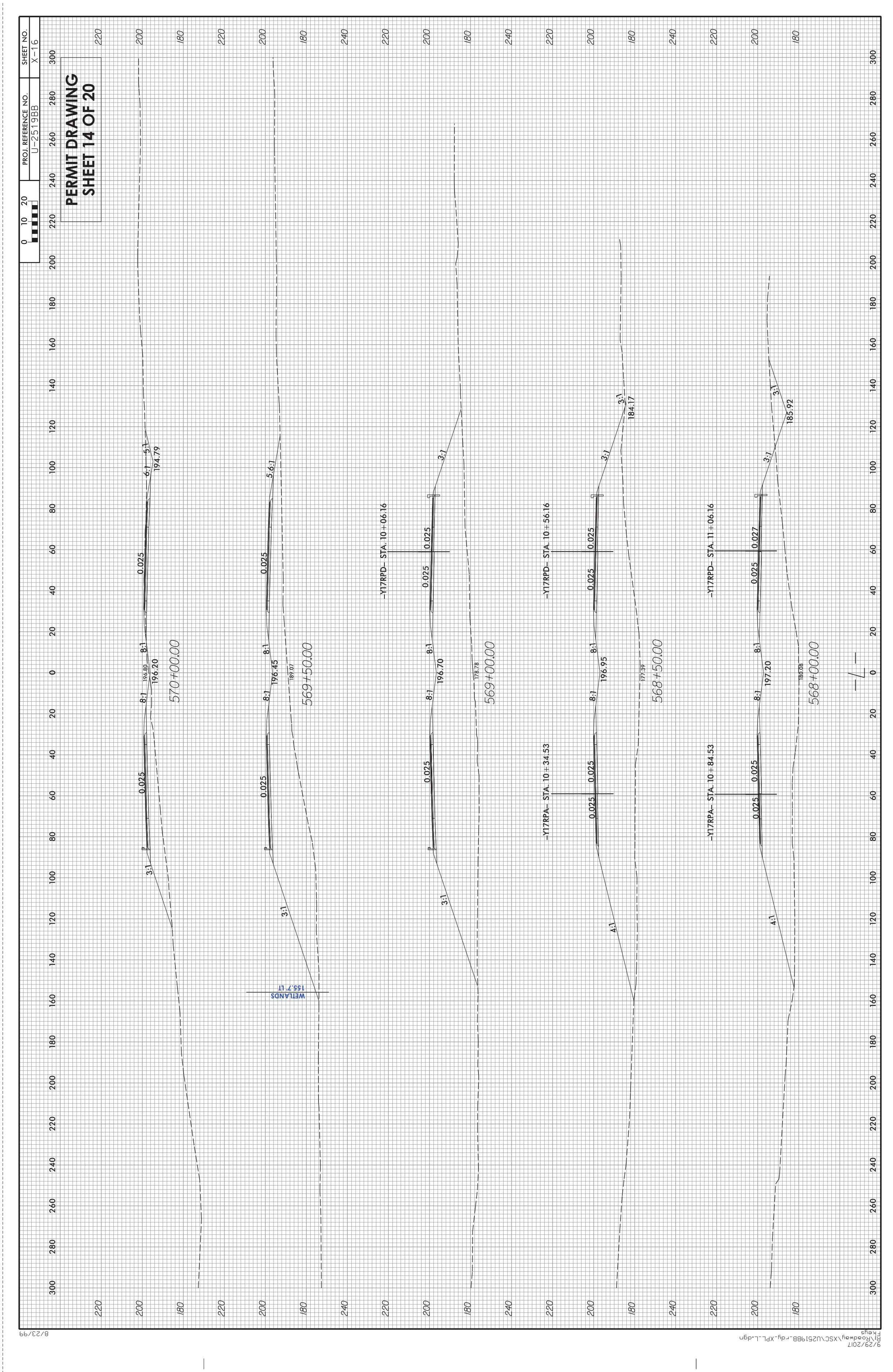
P-76

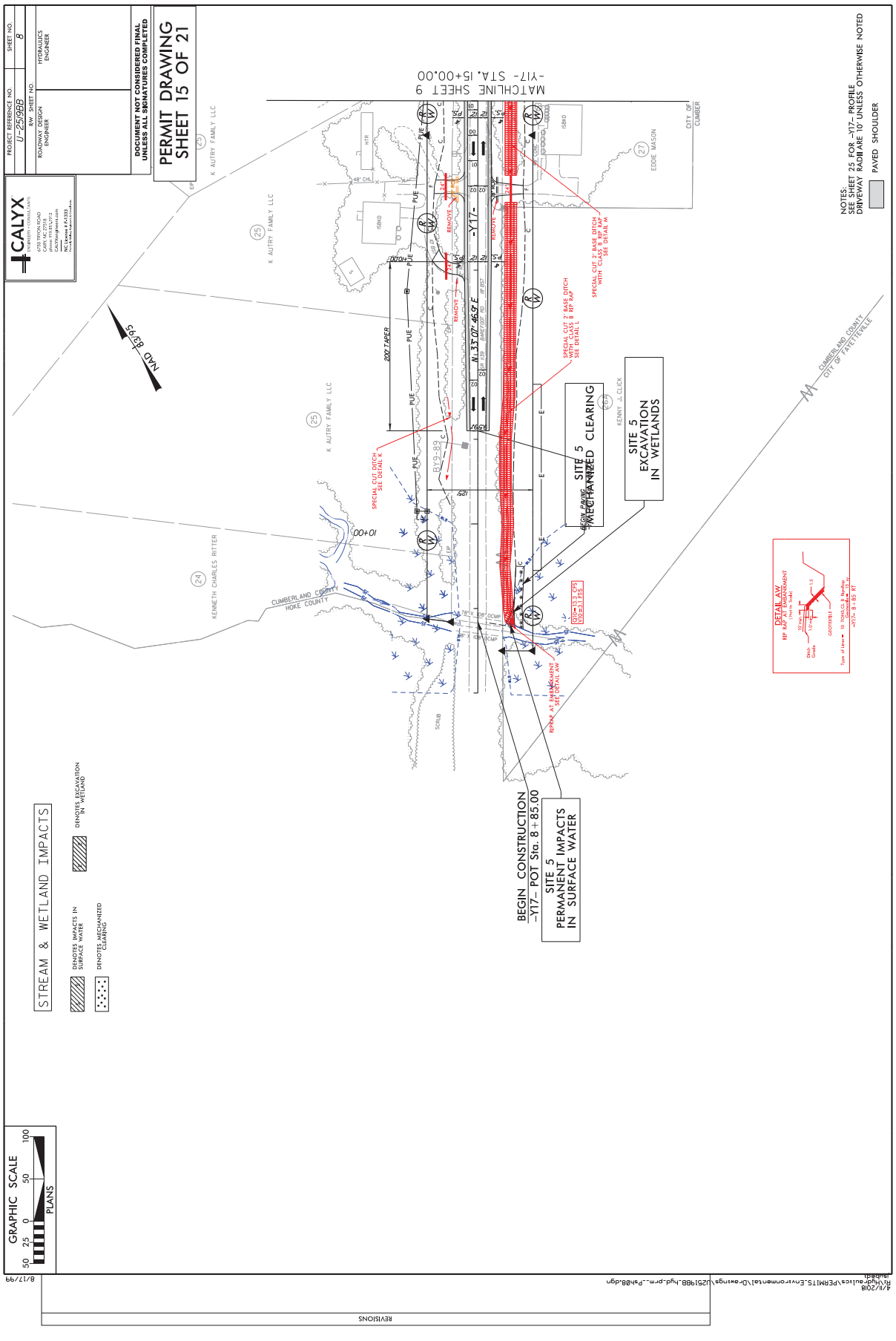

PERMIT DRAWING
SHEET 10 OF 21
PROJ. REFERENCE NO.
U-2519BB
SHEET NO.
X-1
0 5 10
EXISTING BED
4:1 NORMAL
3.98:1 SKEWED
INV. OUT=197.75'
PROPOSED FINISHED GRADE
CL STA. 545+11 -L-
66" RCP IV W/HDWL
SKEW = 97 DEGREES
GP EL.= 199.63'
240 LF - 66" RCP-IV @ 0.83%
199.63
545+11.09
-L-
EXISTING GROUND ALONG CL
4:1 NORMAL
4.17:1 SKEWED
INV. IN=199.30'
NSW=200.11
EXISTING BED
220
210
200
190
6/23/16
4/11/2018


PERMIT DRAWING
SHEET 11 OF 21
PROJ. REFERENCE NO.
U-2519BB
SHEET NO.
X-3
CL STA. 25+70 -Y17RPB-
72" RCP IV W/HDWL
SKEW = 110 DEGREES
GP EL.= 202.80'
PROPOSED FINISHED GRADE
3:1 NORMAL
2.62:1 SKEWED
EXISTING BED
INV. OUT=201.50
111 LF - 72" RCP-IV @ 0.45%
202.80
25+70.44
INV. IN=202.00
EXISTING GROUND ALONG CL
3:1 NORMAL
NSW=204.02'
EXISTING BED
-Y17RPB-
6/23/16


PERMIT DRAWING
SHEET 12 OF 21
STREAM & WETLAND IMPACTS
CALYX
PROJECT REFERENCE NO. U-2519BB
SHEET NO. 6
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
NAD 83/95
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES HAND CLEARING
DENOTES FILL IN WETLAND
RIGHT OF WAY TO BE PURCHASED UNDER U-2519CA
SITE 4 TEMPORARY IMPACTS IN SURFACE WATER
SITE 4 HAND CLEARING
SITE 4 MECHANIZED CLEARING
SITE 4 FILL IN WETLANDS
SITE 4 PERMANENT IMPACTS IN SURFACE WATER
BEGIN CONSTRUCTION -Y19- POC Sta. 15+00.00
END CONSTRUCTION -Y19- POC Sta. 22+25.00
MATCHLINE SHEET 7 -L- STA. 575+00.00
MATCHLINE SHEET 5 -L- STA. 561+00.00
MATCHLINE SHEET 13 INSET A -Y19- STA. 23+50
PROPOSED PAVED SHOULDER
PAVEMENT REMOVAL
GRAPHIC SCALE
PLANS
RIGHT OF WAY REVISION - 7/24/2017 - REMOVED ROW ON PARCEL NUMBER 16A NORMA STROTHER.
REVISIONS
8/17/99


PERMIT DRAWING
SHEET 13 OF 21
STREAM & WETLAND IMPACTS
CALYX ENGINEERS + CONSULTANTS
PROJECT REFERENCE NO. U-2519BB
SHEET NO. 6
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
NAD 83/95
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES HAND CLEARING
DENOTES FILL IN WETLAND
MATCHLINE SHEET 7 -L- STA. 575+00.00
MATCHLINE SHEET 5 -L- STA. 561+00.00
SITE 4 TEMPORARY IMPACTS IN SURFACE WATER
SITE 4 PERMANENT IMPACTS IN SURFACE WATER
SITE 4 HAND CLEARING
SITE 4 MECHANIZED CLEARING
SITE 4 FILL IN WETLANDS
BEGIN CONSTRUCTION -Y19- POC Sta. 15+00.00
END CONSTRUCTION -Y19- POC Sta. 22+25.00
RIGHT OF WAY TO BE PURCHASED UNDER U-2519CA
MATCHLINE SHEET 3 INSET A -Y19- STA. 23+50
PROPOSED PAVED SHOULDER
PAVEMENT REMOVAL
NOTES:
SEE SHEETS 19 & 20 FOR -L- PROFILE
SEE SHEET 21 FOR -Y17RPA- PROFILE
SEE SHEET 24 FOR -Y17RPD- PROFILE
DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
GRAPHIC SCALE
PLANS
REVISIONS
RIGHT OF WAY REVISION - 7/24/2017 - REMOVED ROW ON PARCEL NUMBER 16A NORMA STROTHER.
8/17/99


PROJ. REFERENCE NO.
U-2519BB
SHEET NO.
X-16
PERMIT DRAWING
SHEET 14 OF 20
570+00.00
569+50.00
569+00.00
568+50.00
568+00.00
-L-
WETLANDS
155.7' LT
-Y17RPD- STA. 10+06.16
-Y17RPD- STA. 10+56.16
-Y17RPD- STA. 11+06.16
-Y17RPA- STA. 10+34.53
-Y17RPA- STA. 10+84.53
194.79
196.80
196.20
196.45
189.07
196.70
178.78
196.95
184.17
177.39
197.20
185.92
180.08


PERMIT DRAWING
SHEET 15 OF 21
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO. U-2519BB
SHEET NO. 8
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CALYX
MATCHLINE SHEET 9
-Y17- STA. 15+00.00
NAD 83/95
N 33°07' 46.9" E
-Y17-
BEGIN CONSTRUCTION
-Y17- POT Sta. 8+85.00
SITE 5
PERMANENT IMPACTS
IN SURFACE WATER
SITE 5
EXCAVATION
IN WETLANDS
SITE 5
MECHANIZED CLEARING
SPECIAL CUT DITCH
SEE DETAIL K
SPECIAL CUT 2: BASE DITCH
WITH CLASS B RIP RAP
SEE DETAIL M
RIPRAP AT EMBANKMENT
SEE DETAIL AW
DETAIL AW
RIP RAP AT EMBANKMENT
CUMBERLAND COUNTY
HOKE COUNTY
CUMBERLAND COUNTY
CITY OF FAYETTEVILLE
K AUTRY FAMILY LLC
KENNETH CHARLES RITTER
EDDIE MASON
KENNY J.L. CLICK
CITY OF CUMBER
STREAM & WETLAND IMPACTS
DENOTES IMPACTS IN SURFACE WATER
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
GRAPHIC SCALE
PLANS
NOTES:
SEE SHEET 25 FOR -Y17- PROFILE
DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
PAVED SHOULDER
REVISIONS
8/17/99
4/1/2018
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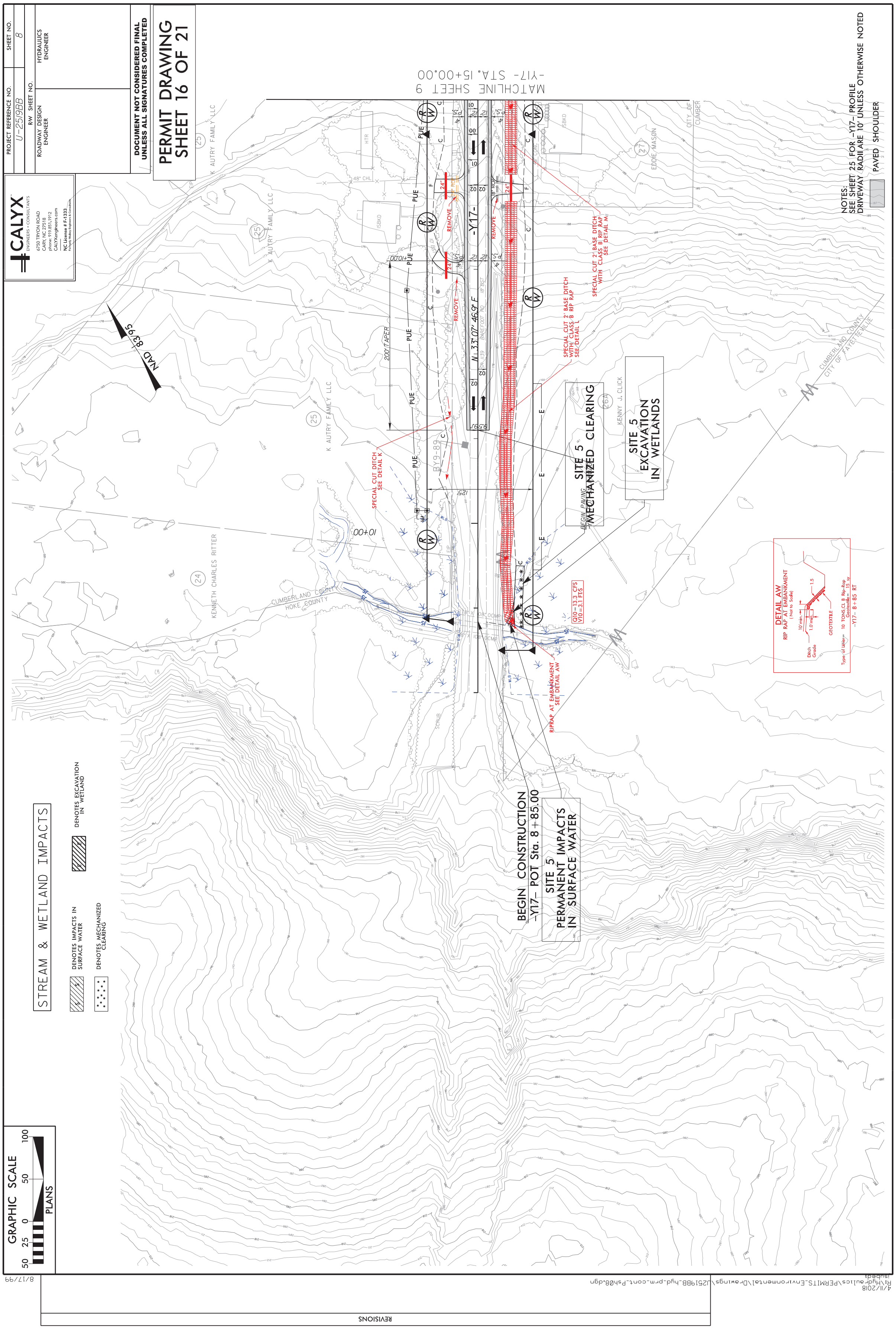
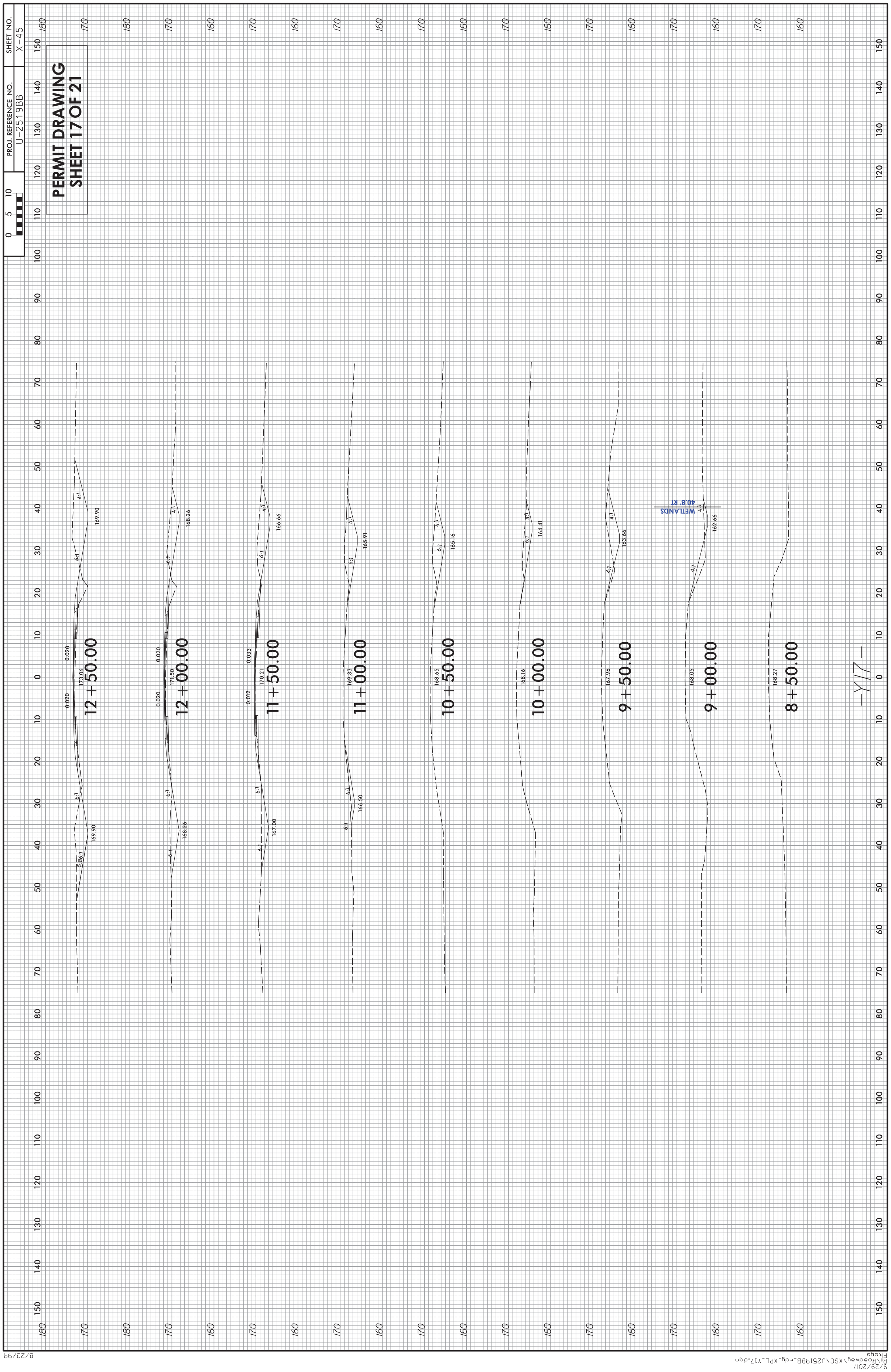
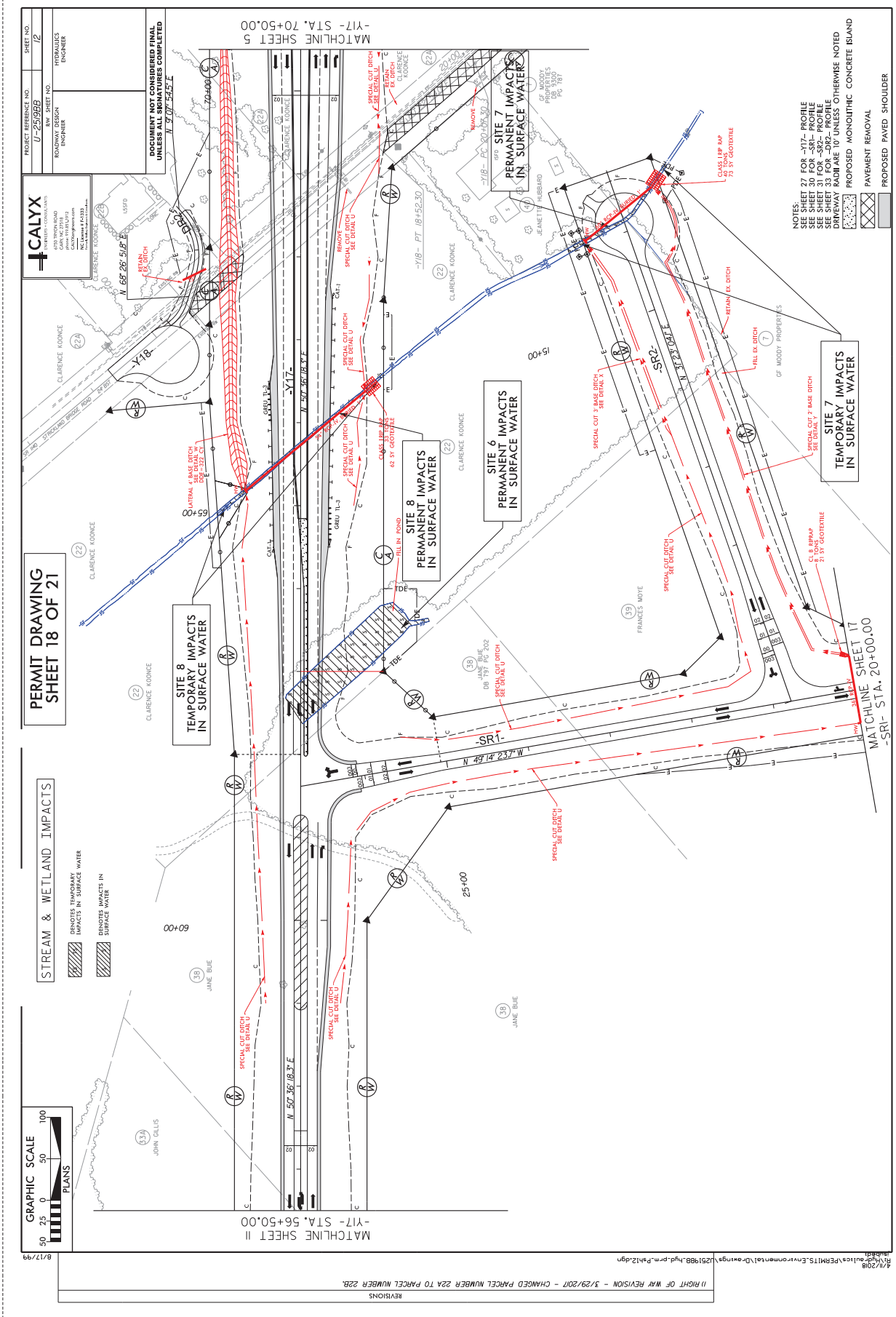
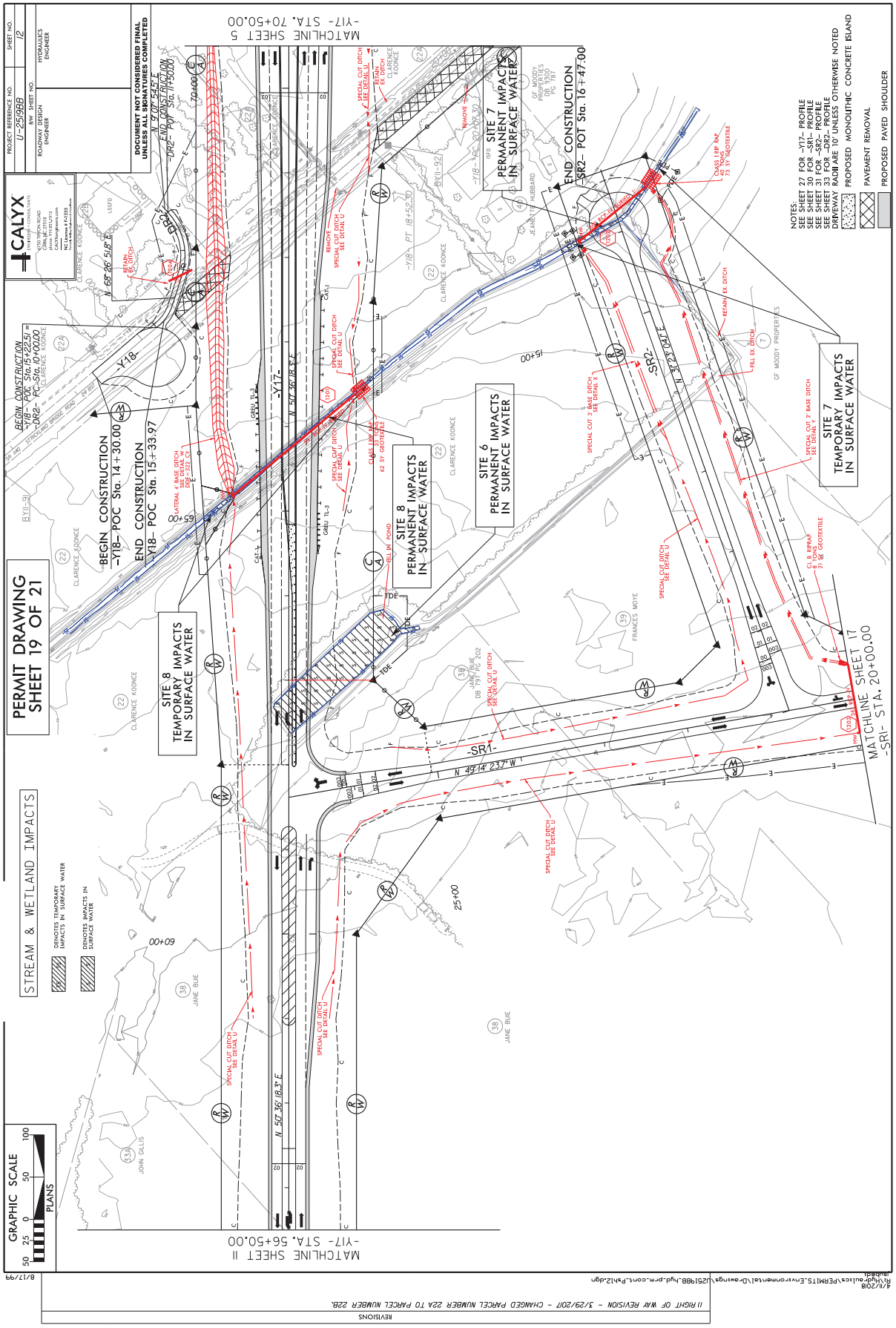
jaghadi


PERMIT DRAWING
SHEET 16 OF 21
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PROJECT REFERENCE NO.
U-2519BB
SHEET NO.
8
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CALYX
ENGINEERS + CONSULTANTS
MATCHLINE SHEET 9
-Y17- STA. 15+00.00
SITE 5
MECHANIZED CLEARING
SITE 5
EXCAVATION
IN WETLANDS
BEGIN CONSTRUCTION
-Y17- POT Sta. 8+85.00
SITE 5
PERMANENT IMPACTS
IN SURFACE WATER
STREAM & WETLAND IMPACTS
DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES EXCAVATION IN WETLAND
GRAPHIC SCALE
PLANS
NOTES:
SEE SHEET 25 FOR -Y17- PROFILE
DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
PAVED SHOULDER
DETAIL AW
RIP RAP AT EMBANKMENT
SPECIAL CUT DITCH SEE DETAIL K
SPECIAL CUT 2' BASE DITCH WITH CLASS B RIP RAP SEE DETAIL L
SPECIAL CUT 2' BASE DITCH WITH CLASS B RIP RAP SEE DETAIL M
RIPRAP AT EMBANKMENT SEE DETAIL AW
NAD 83/95
K AUTRY FAMILY LLC
KENNETH CHARLES RITTER
KENNY J. CLICK
EDDIE MASON
CUMBERLAND COUNTY
HOKE COUNTY
REVISIONS
8/17/99


PROJ. REFERENCE NO.
U-2519BB
SHEET NO.
X-45
PERMIT DRAWING
SHEET 17 OF 21
12+50.00
12+00.00
11+50.00
11+00.00
10+50.00
10+00.00
9+50.00
9+00.00
8+50.00
-Y17-
WETLANDS
40.8' RT
9/29/2017
8/23/99


PERMIT DRAWING
SHEET 18 OF 21
STREAM & WETLAND IMPACTS
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
GRAPHIC SCALE
PLANS
SITE 8
TEMPORARY IMPACTS
IN SURFACE WATER
SITE 8
PERMANENT IMPACTS
IN SURFACE WATER
SITE 6
PERMANENT IMPACTS
IN SURFACE WATER
SITE 7
PERMANENT IMPACTS
IN SURFACE WATER
SITE 7
TEMPORARY IMPACTS
IN SURFACE WATER
MATCHLINE SHEET 5
-Y17- STA. 70+50.00
MATCHLINE SHEET 11
-Y17- STA. 56+50.00
MATCHLINE SHEET 17
-SR1- STA. 20+00.00
-SR1-
-SR2-
-Y17-
-Y18-
N 50° 36' 18.3" E
N 49° 14' 23.7" W
N 9° 07' 55.1" E
N 65° 26' 5.8" E
PROJECT REFERENCE NO. U-2519B
SHEET NO. 12
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
CALYX
REVISIONS
1) RIGHT OF WAY REVISION - 3/29/2017 - CHANGED PARCEL NUMBER 22A TO PARCEL NUMBER 22B.
8/17/99
8/1/2018
R:\Hydraulics\PERMITS-Environmental\Drawings\U2519BB-hyd-prm-Psh12.dgn


PERMIT DRAWING
SHEET 19 OF 21
STREAM & WETLAND IMPACTS
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
GRAPHIC SCALE
PLANS
BEGIN CONSTRUCTION
-Y18- POC Sta. 14+30.00
END CONSTRUCTION
-Y18- POC Sta. 15+33.97
BEGIN CONSTRUCTION
-Y18- POC Sta.15+22.51
-DR2- PC Sta. 10+00.00
END CONSTRUCTION
-DR2- POT Sta. 11+50.00
END CONSTRUCTION
-SR2- POT Sta. 16+47.00
MATCHLINE SHEET 5
-Y17- STA. 70+50.00
MATCHLINE SHEET 11
-Y17- STA. 56+50.00
MATCHLINE SHEET 17
-SR1- STA. 20+00.00
SITE 8
TEMPORARY IMPACTS
IN SURFACE WATER
SITE 8
PERMANENT IMPACTS
IN SURFACE WATER
SITE 6
PERMANENT IMPACTS
IN SURFACE WATER
SITE 7
PERMANENT IMPACTS
IN SURFACE WATER
SITE 7
TEMPORARY IMPACTS
IN SURFACE WATER
NOTES:
SEE SHEET 27 FOR -Y17- PROFILE
SEE SHEET 30 FOR -SR1- PROFILE
SEE SHEET 31 FOR -SR2- PROFILE
SEE SHEET 33 FOR -DR2- PROFILE
DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
PROPOSED MONOLITHIC CONCRETE ISLAND
PAVEMENT REMOVAL
PROPOSED PAVED SHOULDER
CALYX
PROJECT REFERENCE NO. U-2519BB
SHEET NO. 12
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
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1) RIGHT OF WAY REVISION - 3/29/2017 - CHANGED PARCEL NUMBER 22A TO PARCEL NUMBER 22B.
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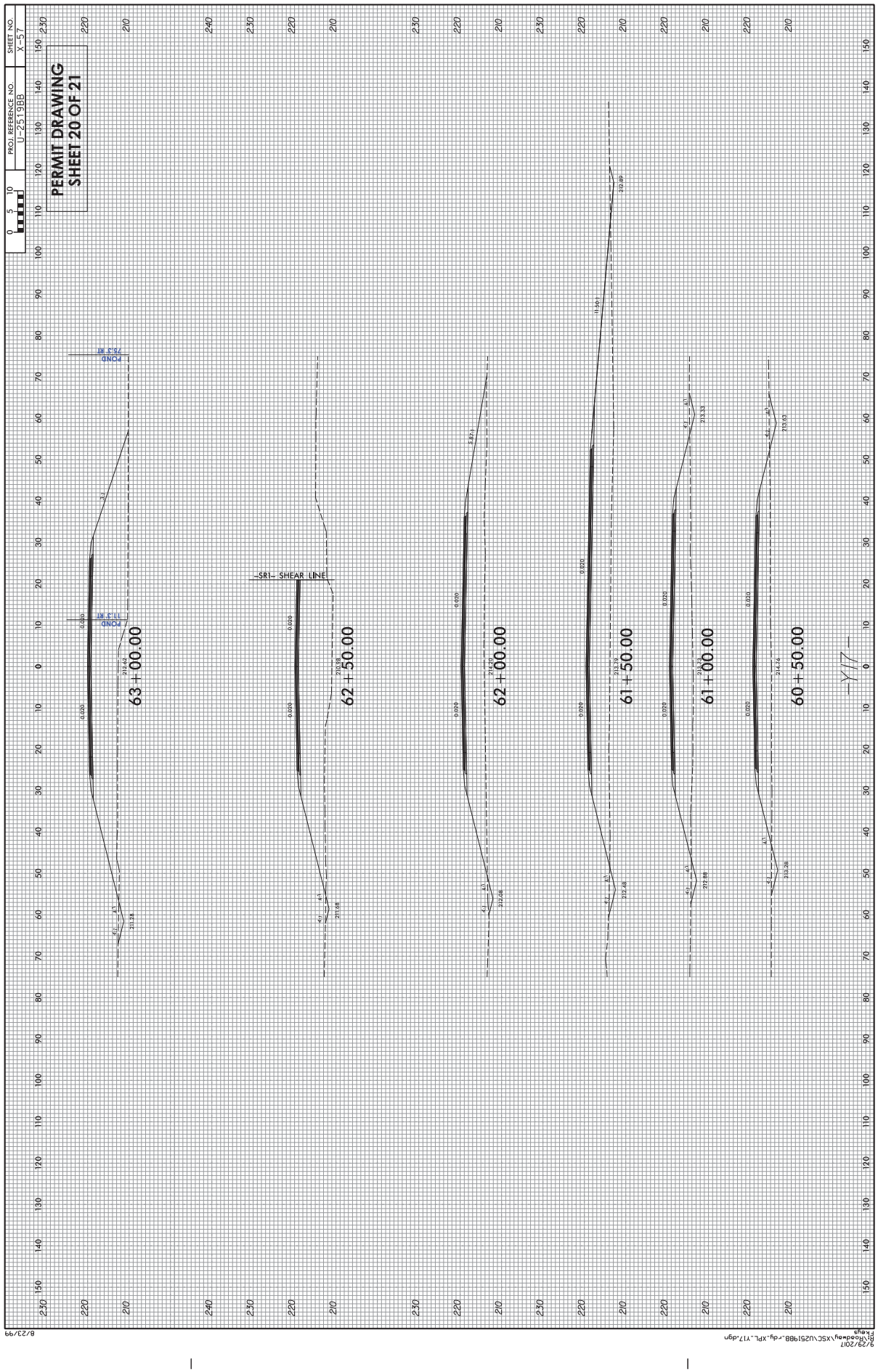
8/1/2018


PERMIT DRAWING
SHEET 20 OF 21
PROJ. REFERENCE NO.
U-2519BB
SHEET NO.
X-57
63+00.00
62+50.00
62+00.00
61+50.00
61+00.00
60+50.00
SR1 - SHEAR LINE
FOUND
75.3' RT
FOUND
11.3' RT

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
SITE #1	-Y17RPC- 24+50	66" RCP	0.09			0.04						
SITE #2	-L- 545+11	66" RCP	0.29			0.05		< 0.01	< 0.01	100	20	
SITE #3	-Y17RPB- 25+70	72" RCP						0.01	< 0.01	145	60	
SITE #4	-L- 569+00	60" RCP	0.05			0.03	0.02	0.02	< 0.01	364	35	
SITE #5	-Y17- 8+85	Ditch & Bank Stabilization			< 0.01	0.02		< 0.01		11		
SITE #6	-Y17- 62+85	Roadway Fill						0.17				
SITE #7	-SR2- 16+25	54" RCP						0.01	< 0.01	126	36	
SITE #8	-Y17- 65+80	60" RCP						0.02	< 0.01	199	45	
SITE #9	-Y18- 24+70	24" RCP Removal							< 0.01		45	
TOTALS*:			0.42		< 0.01	0.14	0.02	0.24	< 0.01	945	241	0

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
4/11/2018
CUMBERLAND COUNTY
34817.1.FR8 (U-2519BB)

2013 10 24

SHEET 21 OF 21

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
			ROADWAY ITEMS			
0001	0000100000-N	800	MOBILIZATION	Lump Sum	L.S.	
0002	0000400000-N	801	CONSTRUCTION SURVEYING	Lump Sum	L.S.	
0003	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	Lump Sum	L.S.	
0004	0008000000-E	200	SUPPLEMENTARY CLEARING & GRUBBING	9 ACR		
0005	0015000000-N	205	SEALING ABANDONED WELLS	30 EA		
0006	0022000000-E	225	UNCLASSIFIED EXCAVATION	805,620 CY		
0007	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ********** (23+16.56 -Y14-)	Lump Sum	L.S.	
0008	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ********** (397+90.00 -L- LT)	Lump Sum	L.S.	
0009	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ********** (397+90.00 -L- RT)	Lump Sum	L.S.	
0010	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ********** (46+43.11 -Y13-)	Lump Sum	L.S.	
0012	0029000000-N	SP	TYPE III REINFORCED APPROACH FILL, STATION ******* (80+65.32 -Y17-)	Lump Sum	L.S.	
0013	0036000000-E	225	UNDERCUT EXCAVATION	79,510 CY		
0014	0106000000-E	230	BORROW EXCAVATION	1,528,420 CY		
0015	0134000000-E	240	DRAINAGE DITCH EXCAVATION	39,260 CY		
0016	0141000000-E	240	BERM DITCH CONSTRUCTION	2,930 LF		
0017	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	39,690 SY		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0018	0177000000-E	250	BREAKING OF EXISTING ASPHALT PAVEMENT	18,540 SY		
0019	0192000000-N	260	PROOF ROLLING	103 HR		
0020	0195000000-E	265	SELECT GRANULAR MATERIAL	166,223 CY		
0021	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZATION	164,200 SY		
0022	0199000000-E	SP	TEMPORARY SHORING	840 SF		
0023	0220000000-E	SP	ROCK EMBANKMENTS	670 TON		
0024	0222000000-E	SP	GEOTEXTILE FOR ROCK EMBANKMENTS	480 SY		
0025	0225000000-E	SP	REINFORCED SOIL SLOPES	960 SY		
0026	0318000000-E	300	FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES	5,572 TON		
0027	0320000000-E	300	FOUNDATION CONDITIONING GEOTEXTILE	28,922 SY		
0028	0342000000-E	310	**" SIDE DRAIN PIPE (30")	196 LF		
0029	0342000000-E	310	**" SIDE DRAIN PIPE (36")	76 LF		
0030	0342000000-E	310	**" SIDE DRAIN PIPE (48")	44 LF		
0031	0343000000-E	310	15" SIDE DRAIN PIPE	1,676 LF		
0032	0344000000-E	310	18" SIDE DRAIN PIPE	196 LF		
0033	0345000000-E	310	24" SIDE DRAIN PIPE	416 LF		
0034	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (15", V)	892 LF		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0035	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (18", V)	20 LF		
0036	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (24", V)	448 LF		
0037	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (30", V)	188 LF		
0038	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (48", V)	196 LF		
0039	0366000000-E	310	15" RC PIPE CULVERTS, CLASS III	8,768 LF		
0040	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	1,976 LF		
0041	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	2,540 LF		
0042	0384000000-E	310	30" RC PIPE CULVERTS, CLASS III	2,212 LF		
0043	0390000000-E	310	36" RC PIPE CULVERTS, CLASS III	760 LF		
0044	0396000000-E	310	42" RC PIPE CULVERTS, CLASS III	580 LF		
0045	0402000000-E	310	48" RC PIPE CULVERTS, CLASS III	1,248 LF		
0046	0408000000-E	310	54" RC PIPE CULVERTS, CLASS III	1,292 LF		
0047	0420000000-E	310	66" RC PIPE CULVERTS, CLASS III	292 LF		
0048	0448000000-E	310	****" RC PIPE CULVERTS, CLASS IV (48")	436 LF		
0049	0448000000-E	310	****" RC PIPE CULVERTS, CLASS IV (54")	882 LF		
0050	0448000000-E	310	****" RC PIPE CULVERTS, CLASS IV (60")	400 LF		
0051	0448000000-E	310	****" RC PIPE CULVERTS, CLASS IV (66")	732 LF		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0052	0448000000-E	310	****" RC PIPE CULVERTS, CLASS IV (72")	576 LF		
0053	0448200000-E	310	15" RC PIPE CULVERTS, CLASS IV	4,416 LF		
0054	0448300000-E	310	18" RC PIPE CULVERTS, CLASS IV	2,784 LF		
0055	0448400000-E	310	24" RC PIPE CULVERTS, CLASS IV	4,044 LF		
0056	0448500000-E	310	30" RC PIPE CULVERTS, CLASS IV	1,592 LF		
0057	0448600000-E	310	36" RC PIPE CULVERTS, CLASS IV	1,232 LF		
0058	0448700000-E	310	42" RC PIPE CULVERTS, CLASS IV	356 LF		
0059	0570000000-E	310	6" CS PIPE CULVERTS, 0.064" THICK (SPRING BOX)	500 LF		
0060	0576000000-E	310	**" CS PIPE CULVERTS, *****" THICK (30", 0.064")	44 LF		
0061	0582000000-E	310	15" CS PIPE CULVERTS, 0.064" THICK	1,114 LF		
0062	0588000000-E	310	18" CS PIPE CULVERTS, 0.064" THICK	212 LF		
0063	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (15", 0.064")	34 EA		
0064	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (18", 0.064")	8 EA		
0065	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (30", 0.079")	2 EA		
0066	0962000000-E	SP	**" X **" CAA STRUCTURAL PLATE PIPE ARCH, *****" THICK (49" X 33", 0.109")	512 LF		
0067	0995000000-E	340	PIPE REMOVAL	2,302 LF		
0068	0999000000-E	462	4" SLOPE PROTECTION	1,820 SY		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0069	1000000000-E	462	6" SLOPE PROTECTION	530 SY		
0070	1011000000-N	500	FINE GRADING	Lump Sum	L.S.	
0071	1077000000-E	SP	#57 STONE	260 TON		
0072	1099500000-E	505	SHALLOW UNDERCUT	1,000 CY		
0073	1099700000-E	505	CLASS IV SUBGRADE STABILIZATION	2,000 TON		
0074	1121000000-E	520	AGGREGATE BASE COURSE	159,455 TON		
0075	1220000000-E	545	INCIDENTAL STONE BASE	1,700 TON		
0076	1330000000-E	607	INCIDENTAL MILLING	4,300 SY		
0077	1491000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0C	92,975 TON		
0078	1503000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C	75,540 TON		
0079	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	32,055 TON		
0080	1523000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5C	51,940 TON		
0081	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	13,080 TON		
0082	1693000000-E	654	ASPHALT PLANT MIX, PAVEMENT REPAIR	324 TON		
0083	1840000000-E	665	MILLED RUMBLE STRIPS (ASPHALT CONCRETE)	102,990 LF		
0084	2000000000-N	806	RIGHT-OF-WAY MARKERS	484 EA		
0085	2022000000-E	815	SUBDRAIN EXCAVATION	8,820 CY		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0086	2026000000-E	815	GEOTEXTILE FOR SUBSURFACE DRAINS	26,250 SY		
0087	2036000000-E	815	SUBDRAIN COARSE AGGREGATE	4,410 CY		
0088	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	26,750 LF		
0089	2070000000-N	815	SUBDRAIN PIPE OUTLET	53 EA		
0090	2077000000-E	815	6" OUTLET PIPE	318 LF		
0091	2209000000-E	838	ENDWALLS	68.22 CY		
0092	2220000000-E	838	REINFORCED ENDWALLS	91.7 CY		
0093	2253000000-E	840	PIPE COLLARS	1 CY		
0094	2264000000-E	840	PIPE PLUGS	2.89 CY		
0095	2275000000-E	SP	FLOWABLE FILL	12 CY		
0096	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	303 EA		
0097	2297000000-E	840	MASONRY DRAINAGE STRUCTURES	33.89 CY		
0098	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	155.32 LF		
0099	2364000000-N	840	FRAME WITH TWO GRATES, STD 840.16	39 EA		
0100	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	36 EA		
0101	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	139 EA		
0102	2366000000-N	840	FRAME WITH TWO GRATES, STD 840.24	1 EA		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0103	2367000000-N	840	FRAME WITH TWO GRATES, STD 840.29	8 EA		
0104	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	12 EA		
0105	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	28 EA		
0106	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	30 EA		
0107	2396000000-N	840	FRAME WITH COVER, STD 840.54	10 EA		
0108	2440000000-N	852	CONCRETE TRANSITIONAL SECTION FOR CATCH BASIN	1 EA		
0109	2451000000-N	852	CONCRETE TRANSITIONAL SECTION FOR DROP INLET	13 EA		
0110	2538000000-E	846	**'-**" CONCRETE CURB & GUTTER (2'-9")	670 LF		
0111	2542000000-E	846	1'-6" CONCRETE CURB & GUTTER	4,465 LF		
0112	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	11,010 LF		
0113	2556000000-E	846	SHOULDER BERM GUTTER	6,470 LF		
0114	2591000000-E	848	4" CONCRETE SIDEWALK	210 SY		
0115	2605000000-N	848	CONCRETE CURB RAMPS	2 EA		
0116	2612000000-E	848	6" CONCRETE DRIVEWAY	1,615 SY		
0117	2619000000-E	850	4" CONCRETE PAVED DITCH	85 SY		
0118	2647000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)	770 SY		
0119	2655000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)	6,550 SY		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0120	2724000000-E	857	PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED	3,800 LF		
0121	2752000000-E	SP	GENERIC PAVING ITEM 5-1/2" MODIFIED SHOULDER BERM GUTTER	400 LF		
0122	2752000000-E	SP	GENERIC PAVING ITEM 6" MODIFIED SHOULDER BERM GUTTER	3,700 LF		
0123	2845000000-N	858	ADJUSTMENT OF METER BOXES OR VALVE BOXES	2 EA		
0124	3001000000-N	SP	IMPACT ATTENUATOR UNITS, TYPE TL-3	1 EA		
0125	3030000000-E	862	STEEL BEAM GUARDRAIL	17,212.5 LF		
0126	3045000000-E	862	STEEL BEAM GUARDRAIL, SHOP CURVED	225 LF		
0127	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	25 EA		
0128	3195000000-N	862	GUARDRAIL END UNITS, TYPE AT-1	16 EA		
0129	3210000000-N	862	GUARDRAIL END UNITS, TYPE CAT-1	24 EA		
0130	3215000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE III	8 EA		
0131	3287000000-N	SP	GUARDRAIL END UNITS, TYPE TL-3	33 EA		
0132	3317000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE B-77	23 EA		
0133	3389200000-E	865	CABLE GUIDERAIL	23,940 LF		
0134	3389500000-N	865	ADDITIONAL GUIDERAIL POSTS	25 EA		
0135	3389600000-N	865	CABLE GUIDERAIL ANCHOR UNITS	30 EA		
0136	3503000000-E	866	WOVEN WIRE FENCE, 47" FABRIC	62,650 LF		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0137	3506000000-E	866	4" TIMBER FENCE POSTS, ***** LONG (47")	3,995 EA		
0138	3512000000-E	866	5" TIMBER FENCE POSTS, ***** LONG (47")	910 EA		
0139	3557000000-E	866	ADDITIONAL BARBED WIRE	2,000 LF		
0140	3628000000-E	876	RIP RAP, CLASS I	5,006 TON		
0141	3635000000-E	876	RIP RAP, CLASS II	50 TON		
0142	3642000000-E	876	RIP RAP, CLASS A	480 TON		
0143	3649000000-E	876	RIP RAP, CLASS B	4,778 TON		
0144	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	31,665 SY		
0145	4048000000-E	902	REINFORCED CONCRETE SIGN FOUNDATIONS	7 CY		
0146	4054000000-E	902	PLAIN CONCRETE SIGN FOUNDATIONS	2 CY		
0147	4057000000-E	SP	OVERHEAD FOOTING	126 CY		
0148	4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	4,144 LB		
0149	4066000000-E	903	SUPPORTS, SIMPLE STEEL BEAM	2,764 LB		
0150	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	3,312 LF		
0151	4079000000-N	903	SUPPORTS, BARRIER (SMALL)	3 EA		
0152	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (26+00 -Y1RPC-)	Lump Sum	L.S.	
0153	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (530+95 -L-)	Lump Sum	L.S.	

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0154	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (537+00 -L-)	Lump Sum	L.S.	
0155	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (568+85 -L-)	Lump Sum	L.S.	
0156	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (598+00 -L-)	Lump Sum	L.S.	
0157	4096000000-N	904	SIGN ERECTION, TYPE D	15 EA		
0158	4102000000-N	904	SIGN ERECTION, TYPE E	164 EA		
0159	4108000000-N	904	SIGN ERECTION, TYPE F	44 EA		
0160	4109000000-N	904	SIGN ERECTION, TYPE *** (OVERHEAD) (A)	5 EA		
0161	4109000000-N	904	SIGN ERECTION, TYPE *** (OVERHEAD) (B)	2 EA		
0162	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	13 EA		
0163	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)	7 EA		
0164	4114000000-N	904	SIGN ERECTION, MILEMARKERS	24 EA		
0165	4115000000-N	904	SIGN ERECTION, OVERLAY (OVERHEAD)	8 EA		
0166	4116200000-N	904	SIGN ERECTION, REPOSITION OVERHEAD	3 EA		
0167	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	6 EA		
0168	4234000000-N	907	DISPOSAL OF SIGN, A OR B (OVERHEAD)	3 EA		
0169	4238000000-N	907	DISPOSAL OF SIGN, D, E OR F	62 EA		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0170	4241000000-N	907	DISPOSAL OF SIGN, OVERLAY (OVERHEAD)	8 EA		
0171	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	1,535 SF		
0172	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	576 SF		
0173	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	528 SF		
0174	4430000000-N	1130	DRUMS	530 EA		
0175	4435000000-N	1135	CONES	150 EA		
0176	4445000000-E	1145	BARRICADES (TYPE III)	512 LF		
0177	4455000000-N	1150	FLAGGER	562 DAY		
0178	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	2 EA		
0179	4470000000-N	1160	REMOVE & RESET TEMPORARY CRASH CUSHION	2 EA		
0180	4480000000-N	1165	TMA	1 EA		
0181	4485000000-E	1170	PORTABLE CONCRETE BARRIER	350 LF		
0182	4500000000-E	1170	REMOVE AND RESET PORTABLE CONCRETE BARRIER	350 LF		
0183	4510000000-N	1190	LAW ENFORCEMENT	16 HR		
0184	4516000000-N	1180	SKINNY DRUM	250 EA		
0185	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	1,150 EA		
0186	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	126,331 LF		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0187	4688000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 90 MILS)	166,708 LF		
0188	4695000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)	4,918 LF		
0189	4700000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)	9,755 LF		
0190	4720000000-E	1205	THERMOPLASTIC PAVEMENT MARKING CHARACTER (90 MILS)	16 EA		
0191	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	206 EA		
0192	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	282,859 LF		
0193	4815000000-E	1205	PAINT PAVEMENT MARKING LINES (6")	18,443 LF		
0194	4820000000-E	1205	PAINT PAVEMENT MARKING LINES (8")	1,624 LF		
0195	4825000000-E	1205	PAINT PAVEMENT MARKING LINES (12")	2,512 LF		
0196	4835000000-E	1205	PAINT PAVEMENT MARKING LINES (24")	922 LF		
0197	4840000000-N	1205	PAINT PAVEMENT MARKING CHARACTER	8 EA		
0198	4845000000-N	1205	PAINT PAVEMENT MARKING SYMBOL	96 EA		
0199	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	22,575 LF		
0200	4890000000-E	SP	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 12", 20 MILS (STANDARD GLASS BEADS)	2,810 LF		
0201	4890000000-E	SP	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 4", 20 MILS (STANDARD GLASS BEADS)	3,863 LF		
0202	4890000000-E	SP	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 6", 20 MILS (STANDARD GLASS BEADS)	17,921 LF		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0203	4890000000-E	SP	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 8", 20 MILS (STANDARD GLASS BEADS)	347 LF		
0204	4891000000-E	1205	GENERIC PAVEMENT MARKING ITEM THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MILS)	1,436 LF		
0205	4895000000-N	SP	GENERIC PAVEMENT MARKING ITEM NON-CAST IRON SNOWPLOWABLE PAVEMENT MARKER	1,757 EA		
0206	4900000000-N	1251	PERMANENT RAISED PAVEMENT MARKERS	1,173 EA		
0207	5325200000-E	1510	2" WATER LINE	100 LF		
0208	5325600000-E	1510	6" WATER LINE	38 LF		
0209	5325800000-E	1510	8" WATER LINE	1,284 LF		
0210	5326200000-E	1510	12" WATER LINE	5,901 LF		
0211	5326600000-E	1510	16" WATER LINE	11,486 LF		
0212	5329000000-E	1510	DUCTILE IRON WATER PIPE FITTINGS	41,810 LB		
0213	5540000000-E	1515	6" VALVE	13 EA		
0214	5546000000-E	1515	8" VALVE	4 EA		
0215	5558000000-E	1515	12" VALVE	9 EA		
0216	5558600000-E	1515	16" VALVE	12 EA		
0217	5571800000-E	1515	8" TAPPING SLEEVE & VALVE	1 EA		
0218	5572200000-E	1515	12" TAPPING SLEEVE & VALVE	2 EA		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0219	5572600000-E	1515	16" TAPPING SLEEVE & VALVE	7 EA		
0220	5606000000-E	1515	2" BLOW OFF	5 EA		
0221	5643000000-E	1515	**" WATER METER (1")	1 EA		
0222	5643100000-E	1515	3/4" WATER METER	6 EA		
0223	5666000000-N	1515	FIRE HYDRANT	12 EA		
0224	5672000000-N	1515	RELOCATE FIRE HYDRANT	3 EA		
0225	5673000000-E	1515	FIRE HYDRANT LEG	194 LF		
0226	5686500000-E	1515	WATER SERVICE LINE	239 LF		
0227	5691300000-E	1520	8" SANITARY GRAVITY SEWER	5,804 LF		
0228	5768000000-N	1520	SANITARY SEWER CLEAN-OUT	38 EA		
0229	5768500000-E	1520	SEWER SERVICE LINE	1,404 LF		
0230	5775000000-E	1525	4' DIA UTILITY MANHOLE	35 EA		
0231	5776000000-E	1525	5' DIA UTILITY MANHOLE	1 EA		
0232	5781000000-E	1525	UTILITY MANHOLE WALL 4' DIA	207 LF		
0233	5782000000-E	1525	UTILITY MANHOLE WALL 5' DIA	3 LF		
0234	5801000000-E	1530	ABANDON 8" UTILITY PIPE	45 LF		
0235	5804000000-E	1530	ABANDON 12" UTILITY PIPE	2,107 LF		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0236	5810000000-E	1530	ABANDON 16" UTILITY PIPE	7,423 LF		
0237	5814000000-E	1530	ABANDON 30" UTILITY PIPE	32 LF		
0238	5815000000-N	1530	REMOVE WATER METER	6 EA		
0239	5815500000-N	1530	REMOVE FIRE HYDRANT	4 EA		
0240	5816000000-N	1530	ABANDON UTILITY MANHOLE	2 EA		
0241	5835000000-E	1540	**" ENCASEMENT PIPE (4")	180 LF		
0242	5835700000-E	1540	16" ENCASEMENT PIPE	60 LF		
0243	5836000000-E	1540	24" ENCASEMENT PIPE	1,773 LF		
0244	5836200000-E	1540	30" ENCASEMENT PIPE	1,319 LF		
0245	5836400000-E	1540	36" ENCASEMENT PIPE	900 LF		
0246	5872500000-E	1550	BORE AND JACK OF **" (24")	436 LF		
0247	5872500000-E	1550	BORE AND JACK OF **" (30")	405 LF		
0248	5872500000-E	1550	BORE AND JACK OF **" (36")	337 LF		
0249	6000000000-E	1605	TEMPORARY SILT FENCE	162,810 LF		
0250	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	5,005 TON		
0251	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	37,945 TON		
0252	6012000000-E	1610	SEDIMENT CONTROL STONE	17,430 TON		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0253	6015000000-E	1615	TEMPORARY MULCHING	1,210.5 ACR		
0254	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	49,300 LB		
0255	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEEDING	250.5 TON		
0256	6024000000-E	1622	TEMPORARY SLOPE DRAINS	23,380 LF		
0257	6029000000-E	SP	SAFETY FENCE	17,820 LF		
0258	6030000000-E	1630	SILT EXCAVATION	173,020 CY		
0259	6036000000-E	1631	MATTING FOR EROSION CONTROL	580,445 SY		
0260	6037000000-E	SP	COIR FIBER MAT	2,085 SY		
0261	6038000000-E	SP	PERMANENT SOIL REINFORCEMENT MAT	5,770 SY		
0262	6042000000-E	1632	1/4" HARDWARE CLOTH	10,435 LF		
0263	6043000000-E	SP	LOW PERMEABILITY GEOTEXTILE	3,915 SY		
0264	6045000000-E	SP	**" TEMPORARY PIPE (24")	1,390 LF		
0265	6046000000-E	1636	TEMPORARY PIPE FOR STREAM CROSSING	250 LF		
0266	6048000000-E	SP	FLOATING TURBIDITY CURTAIN	115 SY		
0267	6069000000-E	1638	STILLING BASINS	2,704 CY		
0268	6070000000-N	1639	SPECIAL STILLING BASINS	12 EA		
0269	6071012000-E	SP	COIR FIBER WATTLE	24,790 LF		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0270	6071014000-E	SP	COIR FIBER WATTLE BARRIER	675 LF		
0271	6071020000-E	SP	POLYACRYLAMIDE (PAM)	23,775 LB		
0272	6071030000-E	1640	COIR FIBER BAFFLE	39,020 LF		
0273	6071050000-E	SP	**" SKIMMER (1-1/2")	94 EA		
0274	6071050000-E	SP	**" SKIMMER (2")	35 EA		
0275	6071050000-E	SP	**" SKIMMER (2-1/2")	18 EA		
0276	6071050000-E	SP	**" SKIMMER (3")	3 EA		
0277	6084000000-E	1660	SEEDING & MULCHING	759 ACR		
0278	6087000000-E	1660	MOWING	816 ACR		
0279	6090000000-E	1661	SEED FOR REPAIR SEEDING	12,250 LB		
0280	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	35 TON		
0281	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	18,375 LB		
0282	6108000000-E	1665	FERTILIZER TOPDRESSING	550.75 TON		
0283	6111000000-E	SP	IMPERVIOUS DIKE	823 LF		
0284	6114500000-N	1667	SPECIALIZED HAND MOWING	190 MHR		
0285	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	250 EA		
0286	6117500000-N	SP	CONCRETE WASHOUT STRUCTURE	17 EA		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0287	6120000000-E	SP	CULVERT DIVERSION CHANNEL	1,316 CY		
0288	6132000000-N	SP	GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE	2 EA		
0289	6132000000-N	SP	GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE CLEANOUT	6 EA		
0290	7060000000-E	1705	SIGNAL CABLE	6,450 LF		
0291	7120000000-E	1705	VEHICLE SIGNAL HEAD (12", 3 SECTION)	57 EA		
0292	7132000000-E	1705	VEHICLE SIGNAL HEAD (12", 4 SECTION)	2 EA		
0293	7252000000-E	1710	MESSENGER CABLE (1/4")	380 LF		
0294	7264000000-E	1710	MESSENGER CABLE (3/8")	3,080 LF		
0295	7279000000-E	1715	TRACER WIRE	14,175 LF		
0296	7300000000-E	1715	UNPAVED TRENCHING (**********) (1, 2")	6,250 LF		
0297	7300000000-E	1715	UNPAVED TRENCHING (**********) (2, 2")	11,185 LF		
0298	7301000000-E	1715	DIRECTIONAL DRILL (**********) (2, 2")	2,990 LF		
0299	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	71 EA		
0300	7348000000-N	1716	JUNCTION BOX (OVER-SIZED, HEAVY DUTY)	35 EA		
0301	7444000000-E	1725	INDUCTIVE LOOP SAWCUT	5,560 LF		
0302	7456000000-E	1726	LEAD-IN CABLE (**********) (14-2)	19,800 LF		
0303	7516000000-E	1730	COMMUNICATIONS CABLE (** FIBER) (24)	15,005 LF		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0304	7528000000-E	1730	DROP CABLE	1,505 LF		
0305	7540000000-N	1731	SPLICE ENCLOSURE	7 EA		
0306	7541000000-N	1731	MODIFY SPLICE ENCLOSURE	1 EA		
0307	7552000000-N	1731	INTERCONNECT CENTER	7 EA		
0308	7566000000-N	1733	DELINEATOR MARKER	30 EA		
0309	7576000000-N	SP	METAL STRAIN SIGNAL POLE	28 EA		
0310	7613000000-N	SP	SOIL TEST	28 EA		
0311	7614100000-E	SP	DRILLED PIER FOUNDATION	196 CY		
0312	7636000000-N	1745	SIGN FOR SIGNALS	9 EA		
0313	7684000000-N	1750	SIGNAL CABINET FOUNDATION	7 EA		
0314	7696000000-N	1751	CONTROLLERS WITH CABINET (**********) (2070LX BASE MOUNTED)	7 EA		
0315	7744000000-N	1751	DETECTOR CARD (TYPE 170)	56 EA		
0316	7901000000-N	1753	CABINET BASE EXTENDER	7 EA		
0317	7980000000-N	SP	GENERIC SIGNAL ITEM ETHERNET EDGE SWITCH	7 EA		
0318	7980000000-N	SP	GENERIC SIGNAL ITEM JUNCTION BOX MARKER	5 EA		
0361	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ********** (24+41.38 -Y16-)	Lump Sum	L.S.	
0362	0255000000-E	SP	GENERIC GRADING ITEM RIP RAP, CLASS B LIMESTONE	11,000 TON		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0363	5709300000-E	1520	6" FORCE MAIN SEWER	90 LF		
0364	5769000000-E	1520	DUCTILE IRON SEWER PIPE FITTINGS	224 LB		

WALL ITEMS

0319	8801000000-E	SP	MSE RETAINING WALL NO **** (1)	5,250 SF		
0320	8801000000-E	SP	MSE RETAINING WALL NO **** (2)	5,170 SF		
0321	8847000000-E	SP	GENERIC RETAINING WALL ITEM ARCHITECTURAL SURFACE TREATMENT (SOUND BARRIER WALL)	96,226 SF		
0322	8847000000-E	SP	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL -NW4B-	33,765 SF		
0323	8847000000-E	SP	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL -NW5-	25,710 SF		
0365	8801000000-E	SP	MSE RETAINING WALL NO **** (3)	1,200 SF		

STRUCTURE ITEMS

0324	8017000000-N	SP	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ********** (397+90.00 -L- LT)	Lump Sum	L.S.	
0325	8017000000-N	SP	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ********** (397+90.00 -L- RT)	Lump Sum	L.S.	
0326	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ********** (1, 23+16.56 -Y14-)	Lump Sum	L.S.	
0327	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ********** (1, 24+41.38 -Y16-)	Lump Sum	L.S.	
0328	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ********** (1, 46+43.11 -Y13-)	Lump Sum	L.S.	

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0329	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ********** (1, 80+65.32 -Y17-)	Lump Sum	L.S.	
0330	8112730000-N	450	PDA TESTING	9 EA		
0331	8147000000-E	420	REINFORCED CONCRETE DECK SLAB	104,159 SF		
0332	8161000000-E	420	GROOVING BRIDGE FLOORS	105,203 SF		
0333	8182000000-E	420	CLASS A CONCRETE (BRIDGE)	2,247.1 CY		
0334	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (23+16.56 -Y14-)	Lump Sum	L.S.	
0335	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (24+41.38 -Y16-)	Lump Sum	L.S.	
0336	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (397+90.00 -L- LT)	Lump Sum	L.S.	
0337	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (397+90.00 -L- RT)	Lump Sum	L.S.	
0338	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (46+43.11 -Y13-)	Lump Sum	L.S.	
0339	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (80+65.32 -Y17-)	Lump Sum	L.S.	
0340	8217000000-E	425	REINFORCING STEEL (BRIDGE)	307,058 LB		
0341	8238000000-E	425	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)	14,794 LB		
0342	8265000000-E	430	54" PRESTRESSED CONCRETE GIRDERS	5,078.63 LF		
0343	8277000000-E	430	MODIFIED 72" PRESTRESSED CONC GIRDERS	6,523.57 LF		

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0344	8328200000-E	450	PILE DRIVING EQUIPMENT SETUP FOR *** STEEL PILES (HP 12 X 53)	276 EA		
0345	8328200000-E	450	PILE DRIVING EQUIPMENT SETUP FOR *** STEEL PILES (HP 14 X 73)	48 EA		
0346	8328400000-E	450	PILE DRIVING EQUIPMENT SETUP FOR *** GALVANIZED STEEL PILES (HP 14 X 73)	99 EA		
0347	8364000000-E	450	HP 12 X 53 STEEL PILES	16,945 LF		
0348	8384000000-E	450	HP 14 X 73 STEEL PILES	2,880 LF		
0349	8384200000-E	450	HP 14 X 73 GALVANIZED STEEL PILES	6,330 LF		
0350	8393000000-N	450	PILE REDRIVES	207 EA		
0351	8475000000-E	460	TWO BAR METAL RAIL	1,093.34 LF		
0352	8503000000-E	460	CONCRETE BARRIER RAIL	1,967.9 LF		
0353	8517000000-E	460	1'-**" X *****" CONCRETE PARAPET (1'-2" X 2'-6")	428.92 LF		
0354	8517000000-E	460	1'-**" X *****" CONCRETE PARAPET (1'-2" X 3'-4")	718.53 LF		
0355	8531000000-E	462	4" SLOPE PROTECTION	3,067 SY		
0356	8608000000-E	876	RIP RAP CLASS II (2'-0" THICK)	3,255 TON		
0357	8622000000-E	876	GEOTEXTILE FOR DRAINAGE	3,615 SY		
0358	8657000000-N	430	ELASTOMERIC BEARINGS	Lump Sum	L.S.	
0359	8706000000-N	SP	EXPANSION JOINT SEALS	Lump Sum	L.S.	
0360	8860000000-N	SP	GENERIC STRUCTURE ITEM STRIP SEAL EXPANSION JOINTS	Lump Sum	L.S.	

County: CUMBERLAND

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount

0919/Jun14/Q6567109.26/D1560661306000/E364 **Total Amount Of Bid For Entire Project :**

Vendor 1 of 6: BRANCH CIVIL INC (3697)
Call Order 001 (Proposal: C204110)

Bid Information

Proposal County: CUMBERLAND
Vendor Address:
Signature Check: Michael Andrew Colbert
Time Bid Received: June 21, 2022 01:08 PM
Amendment Count: 1

Bid Checksum: 44A50BCCDF
Bid Total: $151,850,000.00
Items Total: $151,850,000.00
Time Total: $0.00

Bidding Errors:
None.

DBE Goal: 5.0% ($7.592,500.00)
Participation Submitted 5.09% ($7,735,927.83)

Vendor 1 of 6: BRANCH CIVIL INC (3697)
Call Order 001 (Proposal: C204110)

Bid Bond Information

Projects:		**Bond Maximum:**	
Counties:		**State of Incorporation:**	
Bond ID:	SNC05129142	**Agency Execution Date:**	05/18/2022 07
Paid by Check:	No	**Surety Name:**	Surety2000
Bond Percent:	5%	**Bond Agency Name:**	Federal Insurance Company

DBE Load Information

Letting ID: L220621
Letting Date: 06/21/2022
Call Order: 001
Contract ID: C204110
Project: NHF00100(024)NHF00100(024)NHF00100(024)NHF00100(024)
Bid Total: $151,850,000.00
DBE Goal: 5.00% ($7,592,500.00)

Vendor ID: 3697
Vendor Name: Branch Civil, Inc.
DBE Entered: 5.09% ($7,735,927.83)

Vendor ID	DBE Name	Is Supplier?	City/State	Goods/Service	Amount
2676	PAUL D WILLIAMS DBA PAUL D. WILLIAMS HAULING	False	P.O. Box 1385 DUNN, NC 28335	SubContractor	1,060,542.00
4880	TRICOR CONSTRUCTION INC	False	1983 CHESNEE HWY SPARTANBURG, SC 29303	SubContractor	3,444,268.10
11572	CRUZ BROTHERS CONCRETE, INC.	False	1572 PAYNE ROAD LOT 75 GRAHAM, NC 27253	SubContractor	1,833,316.50
15755	GOSALIA CONCRETE CONSTRUCTORS INC.	False	4607 N. 56TH STREET TAMPA, FL 33610	SubContractor	293,178.68
3230	HIATT & MASON ENTERPRISES INC	False	P.O. Box 1378 MOUNT AIRY, NC 27030	SubContractor	255,189.55
4247	SEAL BROTHERS CONTRACTING LLC	False	3618 WEST PINE ST MOUNT AIRY, NC 27030	SubContractor	849,433.00

BondID: SNC05129142
Surety Registry Agency: Surety2000
Verified?: 1
Surety Agency: Federal Insurance Company
Bond Execution Date: 05/18/2022 07:29:26 PM

Line Number	Item Number	Quantity	Unit	Unit Price	Extension Price
Section 0001 ROADWAY ITEMS					
0001	0000100000-N MOBILIZATION	1.000	LS	$7,400,000.0000	$7,400,000.00
0002	0000400000-N CONSTRUCTION SURVEYING	1.000	LS	$1,300,000.0000	$1,300,000.00
0003	0001000000-E CLEARING & GRUBBING .. ACRE(S)	1.000	LS	$21,000,000.0000	$21,000,000.00
0004	0008000000-E SUPPLEMENTARY CLEARING & GRUBBING	9.000	ACR	$12,600.0000	$113,400.00
0005	0015000000-N SEALING ABANDONED WELLS	30.000	EA	$2,800.0000	$84,000.00
0006	0022000000-E UNCLASSIFIED EXCAVATION	805620.000	CY	$7.0000	$5,639,340.00
0007	0028000000-N TYPE I STANDARD APPROACH FILL STATION ********** (23+16.56 -Y14-)	1.000	LS	$73,200.0000	$73,200.00
0008	0028000000-N TYPE I STANDARD APPROACH FILL STATION ********** (397+90.00 -L- LT)	1.000	LS	$72,900.0000	$72,900.00
0009	0028000000-N TYPE I STANDARD APPROACH FILL STATION ********** (397+90.00 -L- RT)	1.000	LS	$72,900.0000	$72,900.00
0010	0028000000-N TYPE I STANDARD APPROACH FILL STATION ********** (46+43.11 -Y13-)	1.000	LS	$130,000.0000	$130,000.00
0012	0029000000-N TYPE III REINFORCED APPROACH FILL, STATION ******* (80+65.32 -Y17-)	1.000	LS	$123,000.0000	$123,000.00
0013	0036000000-E UNDERCUT EXCAVATION	79510.000	CY	$5.0000	$397,550.00
0014	0106000000-E BORROW EXCAVATION	1528420.000	CY	$0.0100	$15,284.20
0015	0134000000-E DRAINAGE DITCH EXCAVATION	39260.000	CY	$3.5000	$137,410.00
0016	0141000000-E BERM DITCH CONSTRUCTION	2930.000	LF	$8.5000	$24,905.00
0017	0156000000-E REMOVAL OF EXISTING ASPHALT PAVEMENT	39690.000	SY	$8.0000	$317,520.00
0018	0177000000-E BREAKING OF EXISTING ASPHALT PAVEMENT	18540.000	SY	$2.7500	$50,985.00
0019	0192000000-N PROOF ROLLING	103.000	HR	$349.0000	$35,947.00
0020	0195000000-E SELECT GRANULAR MATERIAL	166223.000	CY	$0.0100	$1,662.23
0021	0196000000-E GEOTEXTILE FOR SOIL STABILIZATION	164200.000	SY	$2.5000	$410,500.00
0022	0199000000-E TEMPORARY SHORING	840.000	SF	$27.0000	$22,680.00
0023	0220000000-E ROCK EMBANKMENTS	670.000	TON	$84.0000	$56,280.00
0024	0222000000-E	480.000	SY	$2.7500	$1,320.00

		GEOTEXTILE FOR ROCK EMBANKMENTS			
0025	0225000000-E	960.000	SY	$34.0000	$32,640.00
		REINFORCED SOIL SLOPES			
0026	0318000000-E	5572.000	TON	$51.5000	$286,958.00
		FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES			
0027	0320000000-E	28922.000	SY	$3.0000	$86,766.00
		FOUNDATION CONDITIONING GEOTEXTILE			
0028	0342000000-E	196.000	LF	$173.0000	$33,908.00
		**" SIDE DRAIN PIPE (30")			
0029	0342000000-E	76.000	LF	$204.0000	$15,504.00
		**" SIDE DRAIN PIPE (36")			
0030	0342000000-E	44.000	LF	$447.0000	$19,668.00
		**" SIDE DRAIN PIPE (48")			
0031	0343000000-E	1676.000	LF	$130.0000	$217,880.00
		15" SIDE DRAIN PIPE			
0032	0344000000-E	196.000	LF	$121.0000	$23,716.00
		18" SIDE DRAIN PIPE			
0033	0345000000-E	416.000	LF	$176.0000	$73,216.00
		24" SIDE DRAIN PIPE			
0034	0354000000-E	892.000	LF	$75.0000	$66,900.00
		" RC PIPE CULVERTS, CLASS ** (15", V)			
0035	0354000000-E	20.000	LF	$103.0000	$2,060.00
		" RC PIPE CULVERTS, CLASS ** (18", V)			
0036	0354000000-E	448.000	LF	$121.0000	$54,208.00
		" RC PIPE CULVERTS, CLASS ** (24", V)			
0037	0354000000-E	188.000	LF	$160.0000	$30,080.00
		" RC PIPE CULVERTS, CLASS ** (30", V)			
0038	0354000000-E	196.000	LF	$392.0000	$76,832.00
		" RC PIPE CULVERTS, CLASS ** (48", V)			
0039	0366000000-E	8768.000	LF	$70.5000	$618,144.00
		15" RC PIPE CULVERTS, CLASS III			
0040	0372000000-E	1976.000	LF	$72.5000	$143,260.00
		18" RC PIPE CULVERTS, CLASS III			
0041	0378000000-E	2540.000	LF	$97.0000	$246,380.00
		24" RC PIPE CULVERTS, CLASS III			
0042	0384000000-E	2212.000	LF	$137.0000	$303,044.00
		30" RC PIPE CULVERTS, CLASS III			
0043	0390000000-E	760.000	LF	$176.0000	$133,760.00
		36" RC PIPE CULVERTS, CLASS III			
0044	0396000000-E	580.000	LF	$269.0000	$156,020.00
		42" RC PIPE CULVERTS, CLASS III			
0045	0402000000-E	1248.000	LF	$302.0000	$376,896.00
		48" RC PIPE CULVERTS, CLASS III			
0046	0408000000-E	1292.000	LF	$396.0000	$511,632.00
		54" RC PIPE CULVERTS, CLASS III			
0047	0420000000-E	292.000	LF	$659.0000	$192,428.00
		66" RC PIPE CULVERTS, CLASS III			
0048	0448000000-E	436.000	LF	$350.0000	$152,600.00
		****" RC PIPE CULVERTS, CLASS IV (48")			

0049	0448000000-E	882.000	LF	$479.0000	$422,478.00
	****" RC PIPE CULVERTS, CLASS IV (54")				
0050	0448000000-E	400.000	LF	$532.0000	$212,800.00
	****" RC PIPE CULVERTS, CLASS IV (60")				
0051	0448000000-E	732.000	LF	$759.0000	$555,588.00
	****" RC PIPE CULVERTS, CLASS IV (66")				
0052	0448000000-E	576.000	LF	$864.0000	$497,664.00
	****" RC PIPE CULVERTS, CLASS IV (72")				
0053	0448200000-E	4416.000	LF	$68.0000	$300,288.00
	15" RC PIPE CULVERTS, CLASS IV				
0054	0448300000-E	2784.000	LF	$91.5000	$254,736.00
	18" RC PIPE CULVERTS, CLASS IV				
0055	0448400000-E	4044.000	LF	$117.0000	$473,148.00
	24" RC PIPE CULVERTS, CLASS IV				
0056	0448500000-E	1592.000	LF	$150.0000	$238,800.00
	30" RC PIPE CULVERTS, CLASS IV				
0057	0448600000-E	1232.000	LF	$204.0000	$251,328.00
	36" RC PIPE CULVERTS, CLASS IV				
0058	0448700000-E	356.000	LF	$311.0000	$110,716.00
	42" RC PIPE CULVERTS, CLASS IV				
0059	0570000000-E	500.000	LF	$44.5000	$22,250.00
	6" CS PIPE CULVERTS, 0.064" THICK (SPRING BOX)				
0060	0576000000-E	44.000	LF	$195.0000	$8,580.00
	" CS PIPE CULVERTS, ***" THICK (30", 0.064")				
0061	0582000000-E	1114.000	LF	$105.0000	$116,970.00
	15" CS PIPE CULVERTS, 0.064" THICK				
0062	0588000000-E	212.000	LF	$124.0000	$26,288.00
	18" CS PIPE CULVERTS, 0.064" THICK				
0063	0636000000-E	34.000	EA	$631.0000	$21,454.00
	" CS PIPE ELBOWS, ***" THICK (15", 0.064")				
0064	0636000000-E	8.000	EA	$808.0000	$6,464.00
	" CS PIPE ELBOWS, ***" THICK (18", 0.064")				
0065	0636000000-E	2.000	EA	$1,300.0000	$2,600.00
	" CS PIPE ELBOWS, ***" THICK (30", 0.079")				
0066	0962000000-E	512.000	LF	$433.0000	$221,696.00
	" X **" CAA STRUCTURAL PLATE PIPE ARCH, ***" THICK (49" X 33", 0.109")				
0067	0995000000-E	2302.000	LF	$26.5000	$61,003.00
	PIPE REMOVAL				
0068	0999000000-E	1820.000	SY	$125.0000	$227,500.00
	4" SLOPE PROTECTION				
0069	1000000000-E	530.000	SY	$148.0000	$78,440.00
	6" SLOPE PROTECTION				
0070	1011000000-N	1.000	LS	$6,035,613.5400	$6,035,613.54
	FINE GRADING				
0071	1077000000-E	260.000	TON	$68.5000	$17,810.00
	#57 STONE				
0072	1099500000-E	1000.000	CY	$19.0000	$19,000.00
	SHALLOW UNDERCUT				
0073	1099700000-E	2000.000	TON	$49.0000	$98,000.00

		CLASS IV SUBGRADE STABILIZATION			
0074	1121000000-E	159455.000	TON	$46.0000	$7,334,930.00
		AGGREGATE BASE COURSE			
0075	1220000000-E	1700.000	TON	$60.0000	$102,000.00
		INCIDENTAL STONE BASE			
0076	1330000000-E	4300.000	SY	$1.5000	$6,450.00
		INCIDENTAL MILLING			
0077	1491000000-E	92975.000	TON	$70.0000	$6,508,250.00
		ASPHALT CONC BASE COURSE, TYPE B25.0C			
0078	1503000000-E	75540.000	TON	$75.0000	$5,665,500.00
		ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C			
0079	1519000000-E	32055.000	TON	$75.0000	$2,404,125.00
		ASPHALT CONC SURFACE COURSE, TYPE S9.5B			
0080	1523000000-E	51940.000	TON	$70.0000	$3,635,800.00
		ASPHALT CONC SURFACE COURSE, TYPE S9.5C			
0081	1575000000-E	13080.000	TON	$800.0000	$10,464,000.00
		ASPHALT BINDER FOR PLANT MIX			
0082	1693000000-E	324.000	TON	$280.0000	$90,720.00
		ASPHALT PLANT MIX, PAVEMENT REPAIR			
0083	1840000000-E	102990.000	LF	$0.3000	$30,897.00
		MILLED RUMBLE STRIPS (ASPHALT CONCRETE)			
0084	2000000000-N	484.000	EA	$443.0000	$214,412.00
		RIGHT-OF-WAY MARKERS			
0085	2022000000-E	8820.000	CY	$37.0000	$326,340.00
		SUBDRAIN EXCAVATION			
0086	2026000000-E	26250.000	SY	$14.5000	$380,625.00
		GEOTEXTILE FOR SUBSURFACE DRAINS			
0087	2036000000-E	4410.000	CY	$204.0000	$899,640.00
		SUBDRAIN COARSE AGGREGATE			
0088	2044000000-E	26750.000	LF	$19.0000	$508,250.00
		6" PERFORATED SUBDRAIN PIPE			
0089	2070000000-N	53.000	EA	$443.0000	$23,479.00
		SUBDRAIN PIPE OUTLET			
0090	2077000000-E	318.000	LF	$39.5000	$12,561.00
		6" OUTLET PIPE			
0091	2209000000-E	68.220	CY	$1,900.0000	$129,618.00
		ENDWALLS			
0092	2220000000-E	91.700	CY	$1,800.0000	$165,060.00
		REINFORCED ENDWALLS			
0093	2253000000-E	1.000	CY	$1,900.0000	$1,900.00
		PIPE COLLARS			
0094	2264000000-E	2.890	CY	$1,800.0000	$5,202.00
		PIPE PLUGS			
0095	2275000000-E	12.000	CY	$1,400.0000	$16,800.00
		FLOWABLE FILL			
0096	2286000000-N	303.000	EA	$4,100.0000	$1,242,300.00
		MASONRY DRAINAGE STRUCTURES			
0097	2297000000-E	33.890	CY	$2,800.0000	$94,892.00
		MASONRY DRAINAGE STRUCTURES			

0098	2308000000-E MASONRY DRAINAGE STRUCTURES	155.320 LF	$1,300.0000	$201,916.00
0099	2364000000-N FRAME WITH TWO GRATES, STD 840.16	39.000 EA	$1,200.0000	$46,800.00
0100	2364200000-N FRAME WITH TWO GRATES, STD 840.20	36.000 EA	$1,300.0000	$46,800.00
0101	2365000000-N FRAME WITH TWO GRATES, STD 840.22	139.000 EA	$2,500.0000	$347,500.00
0102	2366000000-N FRAME WITH TWO GRATES, STD 840.24	1.000 EA	$1,300.0000	$1,300.00
0103	2367000000-N FRAME WITH TWO GRATES, STD 840.29	8.000 EA	$1,300.0000	$10,400.00
0104	2374000000-N FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	12.000 EA	$1,300.0000	$15,600.00
0105	2374000000-N FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	28.000 EA	$1,300.0000	$36,400.00
0106	2374000000-N FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	30.000 EA	$1,300.0000	$39,000.00
0107	2396000000-N FRAME WITH COVER, STD 840.54	10.000 EA	$1,100.0000	$11,000.00
0108	2440000000-N CONCRETE TRANSITIONAL SECTION FOR CATCH BASIN	1.000 EA	$1,100.0000	$1,100.00
0109	2451000000-N CONCRETE TRANSITIONAL SECTION FOR DROP INLET	13.000 EA	$1,100.0000	$14,300.00
0110	2538000000-E **'-**" CONCRETE CURB & GUTTER (2'-9")	670.000 LF	$37.0000	$24,790.00
0111	2542000000-E 1'-6" CONCRETE CURB & GUTTER	4465.000 LF	$25.0000	$111,625.00
0112	2549000000-E 2'-6" CONCRETE CURB & GUTTER	11010.000 LF	$30.0000	$330,300.00
0113	2556000000-E SHOULDER BERM GUTTER	6470.000 LF	$38.5000	$249,095.00
0114	2591000000-E 4" CONCRETE SIDEWALK	210.000 SY	$53.5000	$11,235.00
0115	2605000000-N CONCRETE CURB RAMPS	2.000 EA	$2,500.0000	$5,000.00
0116	2612000000-E 6" CONCRETE DRIVEWAY	1615.000 SY	$90.0000	$145,350.00
0117	2619000000-E 4" CONCRETE PAVED DITCH	85.000 SY	$211.0000	$17,935.00
0118	2647000000-E 5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)	770.000 SY	$88.0000	$67,760.00
0119	2655000000-E 5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)	6550.000 SY	$91.5000	$599,325.00
0120	2724000000-E PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED	3800.000 LF	$111.0000	$421,800.00
0121	2752000000-E GENERIC PAVING ITEM 5-1/2" MODIFIED SHOULDER BERM GUTTER	400.000 LF	$37.0000	$14,800.00
0122	2752000000-E	3700.000 LF	$37.0000	$136,900.00

		GENERIC PAVING ITEM 6" MODIFIED SHOULDER BERM GUTTER			
0123	2845000000-N	2.000	EA	$776.0000	$1,552.00
	ADJUSTMENT OF METER BOXES OR VALVE BOXES				
0124	3001000000-N	1.000	EA	$31,500.0000	$31,500.00
	IMPACT ATTENUATOR UNITS, TYPE TL-3				
0125	3030000000-E	17212.500	LF	$31.0000	$533,587.50
	STEEL BEAM GUARDRAIL				
0126	3045000000-E	225.000	LF	$35.0000	$7,875.00
	STEEL BEAM GUARDRAIL, SHOP CURVED				
0127	3150000000-N	25.000	EA	$72.0000	$1,800.00
	ADDITIONAL GUARDRAIL POSTS				
0128	3195000000-N	16.000	EA	$1,000.0000	$16,000.00
	GUARDRAIL END UNITS, TYPE AT-1				
0129	3210000000-N	24.000	EA	$1,000.0000	$24,000.00
	GUARDRAIL END UNITS, TYPE CAT-1				
0130	3215000000-N	8.000	EA	$2,800.0000	$22,400.00
	GUARDRAIL ANCHOR UNITS, TYPE III				
0131	3287000000-N	33.000	EA	$3,800.0000	$125,400.00
	GUARDRAIL END UNITS, TYPE TL-3				
0132	3317000000-N	23.000	EA	$2,800.0000	$64,400.00
	GUARDRAIL ANCHOR UNITS, TYPE B-77				
0133	3389200000-E	23940.000	LF	$14.5000	$347,130.00
	CABLE GUIDERAIL				
0134	3389500000-N	25.000	EA	$95.5000	$2,387.50
	ADDITIONAL GUIDERAIL POSTS				
0135	3389600000-N	30.000	EA	$2,000.0000	$60,000.00
	CABLE GUIDERAIL ANCHOR UNITS				
0136	3503000000-E	62650.000	LF	$5.0000	$313,250.00
	WOVEN WIRE FENCE, 47" FABRIC				
0137	3506000000-E	3995.000	EA	$26.0000	$103,870.00
	4" TIMBER FENCE POSTS, ***** LONG (47")				
0138	3512000000-E	910.000	EA	$33.0000	$30,030.00
	5" TIMBER FENCE POSTS, ***** LONG (47")				
0139	3557000000-E	2000.000	LF	$1.2500	$2,500.00
	ADDITIONAL BARBED WIRE				
0140	3628000000-E	5006.000	TON	$75.0000	$375,450.00
	RIP RAP, CLASS I				
0141	3635000000-E	50.000	TON	$92.0000	$4,600.00
	RIP RAP, CLASS II				
0142	3642000000-E	480.000	TON	$80.0000	$38,400.00
	RIP RAP, CLASS A				
0143	3649000000-E	4778.000	TON	$75.0000	$358,350.00
	RIP RAP, CLASS B				
0144	3656000000-E	31665.000	SY	$4.0000	$126,660.00
	GEOTEXTILE FOR DRAINAGE				
0145	4048000000-E	7.000	CY	$1,200.0000	$8,400.00
	REINFORCED CONCRETE SIGN FOUNDATIONS				
0146	4054000000-E	2.000	CY	$1,200.0000	$2,400.00
	PLAIN CONCRETE SIGN FOUNDATIONS				

0147	4057000000-E	126.000	CY	$2,000.0000	$252,000.00
	OVERHEAD FOOTING				
0148	4060000000-E	4144.000	LB	$11.0000	$45,584.00
	SUPPORTS, BREAKAWAY STEEL BEAM				
0149	4066000000-E	2764.000	LB	$7.2500	$20,039.00
	SUPPORTS, SIMPLE STEEL BEAM				
0150	4072000000-E	3312.000	LF	$14.5000	$48,024.00
	SUPPORTS, 3-LB STEEL U-CHANNEL				
0151	4079000000-N	3.000	EA	$1,200.0000	$3,600.00
	SUPPORTS, BARRIER (SMALL)				
0152	4082100000-N	1.000	LS	$172,000.0000	$172,000.00
	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (26+00 -Y1RPC-)				
0153	4082100000-N	1.000	LS	$270,000.0000	$270,000.00
	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (530+95 -L-)				
0154	4082100000-N	1.000	LS	$113,000.0000	$113,000.00
	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (537+00 -L-)				
0155	4082100000-N	1.000	LS	$113,000.0000	$113,000.00
	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (568+85 -L-)				
0156	4082100000-N	1.000	LS	$113,000.0000	$113,000.00
	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (598+00 -L-)				
0157	4096000000-N	15.000	EA	$184.0000	$2,760.00
	SIGN ERECTION, TYPE D				
0158	4102000000-N	164.000	EA	$123.0000	$20,172.00
	SIGN ERECTION, TYPE E				
0159	4108000000-N	44.000	EA	$184.0000	$8,096.00
	SIGN ERECTION, TYPE F				
0160	4109000000-N	5.000	EA	$1,500.0000	$7,500.00
	SIGN ERECTION, TYPE *** (OVERHEAD) (A)				
0161	4109000000-N	2.000	EA	$860.0000	$1,720.00
	SIGN ERECTION, TYPE *** (OVERHEAD) (B)				
0162	4110000000-N	13.000	EA	$1,100.0000	$14,300.00
	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)				
0163	4110000000-N	7.000	EA	$553.0000	$3,871.00
	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)				
0164	4114000000-N	24.000	EA	$67.5000	$1,620.00
	SIGN ERECTION, MILEMARKERS				
0165	4115000000-N	8.000	EA	$922.0000	$7,376.00
	SIGN ERECTION, OVERLAY (OVERHEAD)				
0166	4116200000-N	3.000	EA	$1,800.0000	$5,400.00
	SIGN ERECTION, REPOSITION OVERHEAD				
0167	4155000000-N	6.000	EA	$30.5000	$183.00
	DISPOSAL OF SIGN SYSTEM, U-CHANNEL				
0168	4234000000-N	3.000	EA	$614.0000	$1,842.00
	DISPOSAL OF SIGN, A OR B (OVERHEAD)				
0169	4238000000-N	62.000	EA	$30.5000	$1,891.00
	DISPOSAL OF SIGN, D, E OR F				
0170	4241000000-N	8.000	EA	$123.0000	$984.00
	DISPOSAL OF SIGN, OVERLAY (OVERHEAD)				
0171	4400000000-E	1535.000	SF	$20.5000	$31,467.50

		WORK ZONE SIGNS (STATIONARY)			
0172	4405000000-E	576.000	SF	$11.5000	$6,624.00
	WORK ZONE SIGNS (PORTABLE)				
0173	4410000000-E	528.000	SF	$9.2500	$4,884.00
	WORK ZONE SIGNS (BARRICADE MOUNTED)				
0174	4430000000-N	530.000	EA	$52.5000	$27,825.00
	DRUMS				
0175	4435000000-N	150.000	EA	$27.5000	$4,125.00
	CONES				
0176	4445000000-E	512.000	LF	$32.0000	$16,384.00
	BARRICADES (TYPE III)				
0177	4455000000-N	562.000	DAY	$444.0000	$249,528.00
	FLAGGER				
0178	4465000000-N	2.000	EA	$25,200.0000	$50,400.00
	TEMPORARY CRASH CUSHIONS				
0179	4470000000-N	2.000	EA	$4,000.0000	$8,000.00
	REMOVE & RESET TEMPORARY CRASH CUSHION				
0180	4480000000-N	1.000	EA	$55,500.0000	$55,500.00
	TMA				
0181	4485000000-E	350.000	LF	$104.0000	$36,400.00
	PORTABLE CONCRETE BARRIER				
0182	4500000000-E	350.000	LF	$52.0000	$18,200.00
	REMOVE AND RESET PORTABLE CONCRETE BARRIER				
0183	4510000000-N	16.000	HR	$66.5000	$1,064.00
	LAW ENFORCEMENT				
0184	4516000000-N	250.000	EA	$40.0000	$10,000.00
	SKINNY DRUM				
0185	4650000000-N	1150.000	EA	$9.2500	$10,637.50
	TEMPORARY RAISED PAVEMENT MARKERS				
0186	4685000000-E	126331.000	LF	$1.2500	$157,913.75
	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)				
0187	4688000000-E	166708.000	LF	$1.2500	$208,385.00
	THERMOPLASTIC PAVEMENT MARKING LINES (6", 90 MILS)				
0188	4695000000-E	4918.000	LF	$3.2500	$15,983.50
	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)				
0189	4700000000-E	9755.000	LF	$3.5000	$34,142.50
	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)				
0190	4720000000-E	16.000	EA	$146.0000	$2,336.00
	THERMOPLASTIC PAVEMENT MARKING CHARACTER (90 MILS)				
0191	4725000000-E	206.000	EA	$233.0000	$47,998.00
	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)				
0192	4810000000-E	282859.000	LF	$0.4500	$127,286.55
	PAINT PAVEMENT MARKING LINES (4")				
0193	4815000000-E	18443.000	LF	$0.7500	$13,832.25
	PAINT PAVEMENT MARKING LINES (6")				
0194	4820000000-E	1624.000	LF	$1.2500	$2,030.00
	PAINT PAVEMENT MARKING LINES (8")				
0195	4825000000-E	2512.000	LF	$1.7500	$4,396.00
	PAINT PAVEMENT MARKING LINES (12")				

0196	4835000000-E	922.000	LF	$3.5000	$3,227.00
	PAINT PAVEMENT MARKING LINES (24")				
0197	4840000000-N	8.000	EA	$41.0000	$328.00
	PAINT PAVEMENT MARKING CHARACTER				
0198	4845000000-N	96.000	EA	$41.0000	$3,936.00
	PAINT PAVEMENT MARKING SYMBOL				
0199	4850000000-E	22575.000	LF	$0.6000	$13,545.00
	REMOVAL OF PAVEMENT MARKING LINES (4")				
0200	4890000000-E	2810.000	LF	$7.0000	$19,670.00
	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 12", 20 MILS (STANDARD GLASS BEADS)				
0201	4890000000-E	3863.000	LF	$3.5000	$13,520.50
	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 4", 20 MILS (STANDARD GLASS BEADS)				
0202	4890000000-E	17921.000	LF	$3.5000	$62,723.50
	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 6", 20 MILS (STANDARD GLASS BEADS)				
0203	4890000000-E	347.000	LF	$7.0000	$2,429.00
	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 8", 20 MILS (STANDARD GLASS BEADS)				
0204	4891000000-E	1436.000	LF	$14.0000	$20,104.00
	GENERIC PAVEMENT MARKING ITEM THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MILS)				
0205	4895000000-N	1757.000	EA	$56.0000	$98,392.00
	GENERIC PAVEMENT MARKING ITEM NON-CAST IRON SNOWPLOWABLE PAVEMENT MARKER				
0206	4900000000-N	1173.000	EA	$9.2500	$10,850.25
	PERMANENT RAISED PAVEMENT MARKERS				
0207	5325200000-E	100.000	LF	$52.5000	$5,250.00
	2" WATER LINE				
0208	5325600000-E	38.000	LF	$77.5000	$2,945.00
	6" WATER LINE				
0209	5325800000-E	1284.000	LF	$101.0000	$129,684.00
	8" WATER LINE				
0210	5326200000-E	5901.000	LF	$215.0000	$1,268,715.00
	12" WATER LINE				
0211	5326600000-E	11486.000	LF	$274.0000	$3,147,164.00
	16" WATER LINE				
0212	5329000000-E	41810.000	LB	$15.5000	$648,055.00
	DUCTILE IRON WATER PIPE FITTINGS				
0213	5540000000-E	13.000	EA	$2,200.0000	$28,600.00
	6" VALVE				
0214	5546000000-E	4.000	EA	$3,100.0000	$12,400.00
	8" VALVE				
0215	5558000000-E	9.000	EA	$9,300.0000	$83,700.00
	12" VALVE				
0216	5558600000-E	12.000	EA	$15,000.0000	$180,000.00
	16" VALVE				
0217	5571800000-E	1.000	EA	$7,900.0000	$7,900.00
	8" TAPPING SLEEVE & VALVE				
0218	5572200000-E	2.000	EA	$9,900.0000	$19,800.00

		12" TAPPING SLEEVE & VALVE			
0219	5572600000-E	7.000	EA	$22,700.0000	$158,900.00
	16" TAPPING SLEEVE & VALVE				
0220	5606000000-E	5.000	EA	$11,000.0000	$55,000.00
	2" BLOW OFF				
0221	5643000000-E	1.000	EA	$3,400.0000	$3,400.00
	**" WATER METER (1")				
0222	5643100000-E	6.000	EA	$3,000.0000	$18,000.00
	3/4" WATER METER				
0223	5666000000-N	12.000	EA	$6,900.0000	$82,800.00
	FIRE HYDRANT				
0224	5672000000-N	3.000	EA	$3,900.0000	$11,700.00
	RELOCATE FIRE HYDRANT				
0225	5673000000-E	194.000	LF	$98.0000	$19,012.00
	FIRE HYDRANT LEG				
0226	5686500000-E	239.000	LF	$30.0000	$7,170.00
	WATER SERVICE LINE				
0227	5691300000-E	5804.000	LF	$250.0000	$1,451,000.00
	8" SANITARY GRAVITY SEWER				
0228	5768000000-N	38.000	EA	$1,000.0000	$38,000.00
	SANITARY SEWER CLEAN-OUT				
0229	5768500000-E	1404.000	LF	$53.5000	$75,114.00
	SEWER SERVICE LINE				
0230	5775000000-E	35.000	EA	$6,900.0000	$241,500.00
	4' DIA UTILITY MANHOLE				
0231	5776000000-E	1.000	EA	$9,100.0000	$9,100.00
	5' DIA UTILITY MANHOLE				
0232	5781000000-E	207.000	LF	$489.0000	$101,223.00
	UTILITY MANHOLE WALL 4' DIA				
0233	5782000000-E	3.000	LF	$721.0000	$2,163.00
	UTILITY MANHOLE WALL 5' DIA				
0234	5801000000-E	45.000	LF	$18.0000	$810.00
	ABANDON 8" UTILITY PIPE				
0235	5804000000-E	2107.000	LF	$19.0000	$40,033.00
	ABANDON 12" UTILITY PIPE				
0236	5810000000-E	7423.000	LF	$30.0000	$222,690.00
	ABANDON 16" UTILITY PIPE				
0237	5814000000-E	32.000	LF	$36.0000	$1,152.00
	ABANDON 30" UTILITY PIPE				
0238	5815000000-N	6.000	EA	$274.0000	$1,644.00
	REMOVE WATER METER				
0239	5815500000-N	4.000	EA	$1,300.0000	$5,200.00
	REMOVE FIRE HYDRANT				
0240	5816000000-N	2.000	EA	$1,200.0000	$2,400.00
	ABANDON UTILITY MANHOLE				
0241	5835000000-E	180.000	LF	$143.0000	$25,740.00
	**" ENCASEMENT PIPE (4")				
0242	5835700000-E	60.000	LF	$238.0000	$14,280.00
	16" ENCASEMENT PIPE				

0243	5836000000-E 24" ENCASEMENT PIPE	1773.000	LF	$250.0000	$443,250.00
0244	5836200000-E 30" ENCASEMENT PIPE	1319.000	LF	$253.0000	$333,707.00
0245	5836400000-E 36" ENCASEMENT PIPE	900.000	LF	$260.0000	$234,000.00
0246	5872500000-E BORE AND JACK OF **" (24")	436.000	LF	$2,100.0000	$915,600.00
0247	5872500000-E BORE AND JACK OF **" (30")	405.000	LF	$2,300.0000	$931,500.00
0248	5872500000-E BORE AND JACK OF **" (36")	337.000	LF	$2,600.0000	$876,200.00
0249	6000000000-E TEMPORARY SILT FENCE	162810.000	LF	$3.7500	$610,537.50
0250	6006000000-E STONE FOR EROSION CONTROL, CLASS A	5005.000	TON	$45.0000	$225,225.00
0251	6009000000-E STONE FOR EROSION CONTROL, CLASS B	37945.000	TON	$45.0000	$1,707,525.00
0252	6012000000-E SEDIMENT CONTROL STONE	17430.000	TON	$45.0000	$784,350.00
0253	6015000000-E TEMPORARY MULCHING	1210.500	ACR	$1,600.0000	$1,936,800.00
0254	6018000000-E SEED FOR TEMPORARY SEEDING	49300.000	LB	$2.2500	$110,925.00
0255	6021000000-E FERTILIZER FOR TEMPORARY SEEDING	250.500	TON	$1,100.0000	$275,550.00
0256	6024000000-E TEMPORARY SLOPE DRAINS	23380.000	LF	$12.0000	$280,560.00
0257	6029000000-E SAFETY FENCE	17820.000	LF	$2.7500	$49,005.00
0258	6030000000-E SILT EXCAVATION	173020.000	CY	$2.7500	$475,805.00
0259	6036000000-E MATTING FOR EROSION CONTROL	580445.000	SY	$1.3500	$783,600.75
0260	6037000000-E COIR FIBER MAT	2085.000	SY	$11.0000	$22,935.00
0261	6038000000-E PERMANENT SOIL REINFORCEMENT MAT	5770.000	SY	$4.5000	$25,965.00
0262	6042000000-E 1/4" HARDWARE CLOTH	10435.000	LF	$9.0000	$93,915.00
0263	6043000000-E LOW PERMEABILITY GEOTEXTILE	3915.000	SY	$8.5000	$33,277.50
0264	6045000000-E **" TEMPORARY PIPE (24")	1390.000	LF	$121.0000	$168,190.00
0265	6046000000-E TEMPORARY PIPE FOR STREAM CROSSING	250.000	LF	$140.0000	$35,000.00
0266	6048000000-E FLOATING TURBIDITY CURTAIN	115.000	SY	$51.0000	$5,865.00
0267	6069000000-E	2704.000	CY	$4.7500	$12,844.00

	STILLING BASINS				
0268	6070000000-N	12.000	EA	$2,300.0000	$27,600.00
	SPECIAL STILLING BASINS				
0269	6071012000-E	24790.000	LF	$10.0000	$247,900.00
	COIR FIBER WATTLE				
0270	6071014000-E	675.000	LF	$17.0000	$11,475.00
	COIR FIBER WATTLE BARRIER				
0271	6071020000-E	23775.000	LB	$5.7500	$136,706.25
	POLYACRYLAMIDE (PAM)				
0272	6071030000-E	39020.000	LF	$9.0000	$351,180.00
	COIR FIBER BAFFLE				
0273	6071050000-E	94.000	EA	$1,900.0000	$178,600.00
	**" SKIMMER (1-1/2")				
0274	6071050000-E	35.000	EA	$2,200.0000	$77,000.00
	**" SKIMMER (2")				
0275	6071050000-E	18.000	EA	$2,300.0000	$41,400.00
	**" SKIMMER (2-1/2")				
0276	6071050000-E	3.000	EA	$2,600.0000	$7,800.00
	**" SKIMMER (3")				
0277	6084000000-E	759.000	ACR	$3,000.0000	$2,277,000.00
	SEEDING & MULCHING				
0278	6087000000-E	816.000	ACR	$255.0000	$208,080.00
	MOWING				
0279	6090000000-E	12250.000	LB	$10.0000	$122,500.00
	SEED FOR REPAIR SEEDING				
0280	6093000000-E	35.000	TON	$1,500.0000	$52,500.00
	FERTILIZER FOR REPAIR SEEDING				
0281	6096000000-E	18375.000	LB	$5.7500	$105,656.25
	SEED FOR SUPPLEMENTAL SEEDING				
0282	6108000000-E	550.750	TON	$1,200.0000	$660,900.00
	FERTILIZER TOPDRESSING				
0283	6111000000-E	823.000	LF	$21.0000	$17,283.00
	IMPERVIOUS DIKE				
0284	6114500000-N	190.000	MHR	$204.0000	$38,760.00
	SPECIALIZED HAND MOWING				
0285	6117000000-N	250.000	EA	$566.0000	$141,500.00
	RESPONSE FOR EROSION CONTROL				
0286	6117500000-N	17.000	EA	$1,100.0000	$18,700.00
	CONCRETE WASHOUT STRUCTURE				
0287	6120000000-E	1316.000	CY	$25.5000	$33,558.00
	CULVERT DIVERSION CHANNEL				
0288	6132000000-N	2.000	EA	$333.0000	$666.00
	GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE				
0289	6132000000-N	6.000	EA	$222.0000	$1,332.00
	GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE CLEANOUT				
0290	7060000000-E	6450.000	LF	$3.0000	$19,350.00
	SIGNAL CABLE				
0291	7120000000-E	57.000	EA	$953.0000	$54,321.00
	VEHICLE SIGNAL HEAD (12", 3 SECTION)				

0292	7132000000-E	2.000	EA	$1,400.0000	$2,800.00
	VEHICLE SIGNAL HEAD (12", 4 SECTION)				
0293	7252000000-E	380.000	LF	$3.5000	$1,330.00
	MESSENGER CABLE (1/4")				
0294	7264000000-E	3080.000	LF	$3.5000	$10,780.00
	MESSENGER CABLE (3/8")				
0295	7279000000-E	14175.000	LF	$1.0000	$14,175.00
	TRACER WIRE				
0296	7300000000-E	6250.000	LF	$12.5000	$78,125.00
	UNPAVED TRENCHING (**********) (1, 2")				
0297	7300000000-E	11185.000	LF	$16.0000	$178,960.00
	UNPAVED TRENCHING (**********) (2, 2")				
0298	7301000000-E	2990.000	LF	$37.0000	$110,630.00
	DIRECTIONAL DRILL (**********) (2, 2")				
0299	7324000000-N	71.000	EA	$492.0000	$34,932.00
	JUNCTION BOX (STANDARD SIZE)				
0300	7348000000-N	35.000	EA	$861.0000	$30,135.00
	JUNCTION BOX (OVER-SIZED, HEAVY DUTY)				
0301	7444000000-E	5560.000	LF	$8.5000	$47,260.00
	INDUCTIVE LOOP SAWCUT				
0302	7456000000-E	19800.000	LF	$2.5000	$49,500.00
	LEAD-IN CABLE (**********) (14-2)				
0303	7516000000-E	15005.000	LF	$3.2500	$48,766.25
	COMMUNICATIONS CABLE (** FIBER) (24)				
0304	7528000000-E	1505.000	LF	$3.2500	$4,891.25
	DROP CABLE				
0305	7540000000-N	7.000	EA	$2,200.0000	$15,400.00
	SPLICE ENCLOSURE				
0306	7541000000-N	1.000	EA	$1,200.0000	$1,200.00
	MODIFY SPLICE ENCLOSURE				
0307	7552000000-N	7.000	EA	$2,300.0000	$16,100.00
	INTERCONNECT CENTER				
0308	7566000000-N	30.000	EA	$185.0000	$5,550.00
	DELINEATOR MARKER				
0309	7576000000-N	28.000	EA	$16,700.0000	$467,600.00
	METAL STRAIN SIGNAL POLE				
0310	7613000000-N	28.000	EA	$1,700.0000	$47,600.00
	SOIL TEST				
0311	7614100000-E	196.000	CY	$1,700.0000	$333,200.00
	DRILLED PIER FOUNDATION				
0312	7636000000-N	9.000	EA	$431.0000	$3,879.00
	SIGN FOR SIGNALS				
0313	7684000000-N	7.000	EA	$1,100.0000	$7,700.00
	SIGNAL CABINET FOUNDATION				
0314	7696000000-N	7.000	EA	$22,600.0000	$158,200.00
	CONTROLLERS WITH CABINET (**********) (2070LX BASE MOUNTED)				
0315	7744000000-N	56.000	EA	$228.0000	$12,768.00
	DETECTOR CARD (TYPE 170)				
0316	7901000000-N	7.000	EA	$369.0000	$2,583.00

		CABINET BASE EXTENDER			
0317	7980000000-N	7.000	EA	$3,500.0000	$24,500.00
	GENERIC SIGNAL ITEM ETHERNET EDGE SWITCH				
0318	7980000000-N	5.000	EA	$92.5000	$462.50
	GENERIC SIGNAL ITEM JUNCTION BOX MARKER				
0361	0028000000-N	1.000	LS	$186,000.0000	$186,000.00
	TYPE I STANDARD APPROACH FILL STATION ********** (24+41.38 -Y16-)				
0362	0255000000-E	11000.000	TON	$130.0000	$1,430,000.00
	GENERIC GRADING ITEM RIP RAP, CLASS B LIMESTONE				
0363	5709300000-E	90.000	LF	$218.0000	$19,620.00
	6" FORCE MAIN SEWER				
0364	5769000000-E	224.000	LB	$11.5000	$2,576.00
	DUCTILE IRON SEWER PIPE FITTINGS				
Section 0001 Total					$127,685,618.02

Section 0003
WALL ITEMS

0319	8801000000-E	5250.000	SF	$98.5000	$517,125.00
	MSE RETAINING WALL NO **** (1)				
0320	8801000000-E	5170.000	SF	$98.5000	$509,245.00
	MSE RETAINING WALL NO **** (2)				
0321	8847000000-E	96226.000	SF	$1.0000	$96,226.00
	GENERIC RETAINING WALL ITEM ARCHITECTURAL SURFACE TREATMENT (SOUND BARRIER WALL)				
0322	8847000000-E	33765.000	SF	$45.0000	$1,519,425.00
	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL -NW4B-				
0323	8847000000-E	25710.000	SF	$45.0000	$1,156,950.00
	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL -NW5-				
0365	8801000000-E	1200.000	SF	$98.5000	$118,200.00
	MSE RETAINING WALL NO **** (3)				
Section 0003 Total					$3,917,171.00

Section 0004
STRUCTURE ITEMS

0324	8017000000-N	1.000	LS	$609,000.0000	$609,000.00
	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ********** (397 +90.00 -L- LT)				
0325	8017000000-N	1.000	LS	$602,000.0000	$602,000.00
	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ********** (397 +90.00 -L- RT)				
0326	8091000000-N	1.000	LS	$7,200.0000	$7,200.00
	FOUNDATION EXCAVATION FOR BENT ** AT STATION ********** (1, 23+16.56 -Y14-)				
0327	8091000000-N	1.000	LS	$10,800.0000	$10,800.00
	FOUNDATION EXCAVATION FOR BENT ** AT STATION ********** (1, 24+41.38 -Y16-)				
0328	8091000000-N	1.000	LS	$16,200.0000	$16,200.00
	FOUNDATION EXCAVATION FOR BENT ** AT STATION ********** (1, 46+43.11 -Y13-)				
0329	8091000000-N	1.000	LS	$16,200.0000	$16,200.00

		FOUNDATION EXCAVATION FOR BENT ** AT STATION ********** (1, 80+65.32 -Y17-)			
0330	8112730000-N	9.000	EA	$3,100.0000	$27,900.00
	PDA TESTING				
0331	8147000000-E	104159.000	SF	$50.0000	$5,207,950.00
	REINFORCED CONCRETE DECK SLAB				
0332	8161000000-E	105203.000	SF	$0.6500	$68,381.95
	GROOVING BRIDGE FLOORS				
0333	8182000000-E	2247.100	CY	$1,100.0000	$2,471,810.00
	CLASS A CONCRETE (BRIDGE)				
0334	8210000000-N	1.000	LS	$84,500.0000	$84,500.00
	BRIDGE APPROACH SLABS, STATION ********** (23+16.56 -Y14-)				
0335	8210000000-N	1.000	LS	$132,000.0000	$132,000.00
	BRIDGE APPROACH SLABS, STATION ********** (24+41.38 -Y16-)				
0336	8210000000-N	1.000	LS	$104,000.0000	$104,000.00
	BRIDGE APPROACH SLABS, STATION ********** (397+90.00 -L- LT)				
0337	8210000000-N	1.000	LS	$93,300.0000	$93,300.00
	BRIDGE APPROACH SLABS, STATION ********** (397+90.00 -L- RT)				
0338	8210000000-N	1.000	LS	$153,000.0000	$153,000.00
	BRIDGE APPROACH SLABS, STATION ********** (46+43.11 -Y13-)				
0339	8210000000-N	1.000	LS	$180,000.0000	$180,000.00
	BRIDGE APPROACH SLABS, STATION ********** (80+65.32 -Y17-)				
0340	8217000000-E	307058.000	LB	$1.7500	$537,351.50
	REINFORCING STEEL (BRIDGE)				
0341	8238000000-E	14794.000	LB	$4.5000	$66,573.00
	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)				
0342	8265000000-E	5078.630	LF	$410.0000	$2,082,238.30
	54" PRESTRESSED CONCRETE GIRDERS				
0343	8277000000-E	6523.570	LF	$450.0000	$2,935,606.50
	MODIFIED 72" PRESTRESSED CONC GIRDERS				
0344	8328200000-E	276.000	EA	$2,200.0000	$607,200.00
	PILE DRIVING EQUIPMENT SETUP FOR *** STEEL PILES (HP 12 X 53)				
0345	8328200000-E	48.000	EA	$2,300.0000	$110,400.00
	PILE DRIVING EQUIPMENT SETUP FOR *** STEEL PILES (HP 14 X 73)				
0346	8328400000-E	99.000	EA	$1,900.0000	$188,100.00
	PILE DRIVING EQUIPMENT SETUP FOR *** GALVANIZED STEEL PILES (HP 14 X 73)				
0347	8364000000-E	16945.000	LF	$52.0000	$881,140.00
	HP 12 X 53 STEEL PILES				
0348	8384000000-E	2880.000	LF	$71.5000	$205,920.00
	HP 14 X 73 STEEL PILES				
0349	8384200000-E	6330.000	LF	$84.5000	$534,885.00
	HP 14 X 73 GALVANIZED STEEL PILES				
0350	8393000000-N	207.000	EA	$0.0100	$2.07
	PILE REDRIVES				
0351	8475000000-E	1093.340	LF	$261.0000	$285,361.74
	TWO BAR METAL RAIL				
0352	8503000000-E	1967.900	LF	$182.0000	$358,157.80
	CONCRETE BARRIER RAIL				
0353	8517000000-E	428.920	LF	$177.0000	$75,918.84
	1'-**" X *****" CONCRETE PARAPET (1'-2" X 2'-6")				

0354	8517000000-E 1'-**" X *****" CONCRETE PARAPET (1'-2" X 3'-4")	718.530	LF	$226.0000	$162,387.78
0355	8531000000-E 4" SLOPE PROTECTION	3067.000	SY	$167.0000	$512,189.00
0356	8608000000-E RIP RAP CLASS II (2'-0" THICK)	3255.000	TON	$70.5000	$229,477.50
0357	8622000000-E GEOTEXTILE FOR DRAINAGE	3615.000	SY	$4.0000	$14,460.00
0358	8657000000-N ELASTOMERIC BEARINGS	1.000	LS	$78,600.0000	$78,600.00
0359	8706000000-N EXPANSION JOINT SEALS	1.000	LS	$227,000.0000	$227,000.00
0360	8860000000-N GENERIC STRUCTURE ITEM STRIP SEAL EXPANSION JOINTS	1.000	LS	$370,000.0000	$370,000.00
Section 0004 Total					$20,247,210.98
Item Total					$151,850,000.00

ELECTRONIC BID SUBMISSION

By submitting this bid electronically, I hereby acknowledge that all requirements included in the hard copy proposal, addendum, amendments, plans, standard specifications, supplemental specifications and special provisions are part of the bid and contract. Further, I acknowledge that I have read, understand, accept, acknowledge and agree to comply with all statements in this electronic bid.

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NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION

The prequalified bidder declares (or certifies, verifies, or states) under penalty of perjury under the laws of the United States that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating N.C.G.S. §133-24 within the last three years, and that the prequalified bidder intends to do the work with his own bonafide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the Contractor is attesting his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. §133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

DEBARMENT CERTIFICATION OF PREQUALIFIED BIDDER

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation that is file with the Department, or has become erroneous because of changed circumstances.

2. The terms covered transaction, debarred, suspended, ineligible, lower tier

covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded, as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.

3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.

4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal- Aid Provision titled Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR 1273) provided by the Department, without subsequent modification, in all lower tier covered transactions.

5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.

6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

DEBARMENT CERTIFICATION

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or

commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and

d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion and debarment certification will result in the prequalified bidder’s bid being considered non-responsive.

EXPLANATION:

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Award Limits on Multiple Projects

By answering YES to this statement, the bidder acknowleges that they are using the award limits on multiple projects? **Yes** ○**No** ◉

A bidder who desires to bid on more than one project on which bids are to be opened on the same date, and who also desires to avoid receiving an award of more projects than he is equipped to handle, may bid on any number of projects but may limit the total amount of work awarded to him on selected projects by completing the AWARD LIMITS ON MULTIPLE PROJECTS.

The Award Limits on Multiple Projects must be filled in on each project bid for which the Bidder desires protection.

It is the desire of the Bidder to be awarded contracts, the value of which

will not exceed a total of for those

projects indicated herein, for which bids will be opened on (MM/DD/YY)

The Award Limits shall apply to the following projects:

Contract Number
County

Contract Number
County

Contract Number
County

Contract Number
County

Contract Number
County

Contract Number
County

It is agreed that if I am (we are) the low Bidder(s) on indicated projects, the total value of which is more than the above stipulated award limits, the Board of Transportation will award me (us) projects from among those indicated

that have a total value not to exceed the award limit and will result in the lowest total bids to the Department of Transportation.

DBE List Summary

Project: NHF00100(024)
Bid Total: 151,850,000.00
Goal: 5.00% (7,592,500.00)
Total Entered: 5.09% (7,735,927.83)

Bidder ID: 3697
Business Name: Branch Civil, Inc.

ID	Name	Is Supplier?	Item Count	Amount	Is Complete?
2676	PAUL D WILLIAMS DBA PAUL D. WILLIAMS HAULING	False	4	1,060,542.00	True
4880	TRICOR CONSTRUCTION INC	False	5	3,444,268.10	True
11572	CRUZ BROTHERS CONCRETE, INC.	False	16	1,833,316.50	True
15755	GOSALIA CONCRETE CONSTRUCTORS INC.	False	3	293,178.68	True
3230	HIATT & MASON ENTERPRISES INC	False	1	255,189.55	True
4247	SEAL BROTHERS CONTRACTING LLC	False	2	849,433.00	True

Name: PAUL D WILLIAMS DBA PAUL D. WILLIAMS HAULING ID: 2676

Address: P.O. Box 1385 DUNN, NC 28335

Used As: SubContractor DBE Items Total:$1,060,542.00

Items for PAUL D WILLIAMS DBA PAUL D. WILLIAMS HAULING

0001 ROADWAY ITEMS				
0077	1491000000-E ASPHALT CONC BASE COURSE, TYPE B25.0C	92975.000 TON	$4.2000	$390,495.00
0078	1503000000-E ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C	75540.000 TON	$4.2000	$317,268.00
0079	1519000000-E ASPHALT CONC SURFACE COURSE, TYPE S9.5B	32055.000 TON	$4.2000	$134,631.00
0080	1523000000-E ASPHALT CONC SURFACE COURSE, TYPE S9.5C	51940.000 TON	$4.2000	$218,148.00
Section 0001 Total				$1,060,542.00
Item Total				$1,060,542.00

Name: TRICOR CONSTRUCTION INC ID: 4880

Address: 1983 CHESNEE HWY SPARTANBURG, SC 29303

Used As: SubContractor DBE Items Total:$3,444,268.10

Items for TRICOR CONSTRUCTION INC

0003 WALL ITEMS					
0319	8801000000-E MSE RETAINING WALL NO **** (1)	5250.000	SF	$89.0000	$467,250.00
0320	8801000000-E MSE RETAINING WALL NO **** (2)	5170.000	SF	$89.0000	$460,130.00
0322	8847000000-E GENERIC RETAINING WALL ITEM SOUND BARRIER WALL -NW4B-	33765.000	SF	$40.5400	$1,368,833.10
0323	8847000000-E GENERIC RETAINING WALL ITEM SOUND BARRIER WALL -NW5-	25710.000	SF	$40.5000	$1,041,255.00
0365	8801000000-E MSE RETAINING WALL NO **** (3)	1200.000	SF	$89.0000	$106,800.00
Section 0003 Total					$3,444,268.10
Item Total					$3,444,268.10

Name: CRUZ BROTHERS CONCRETE, INC. ID: 11572

Address: 1572 PAYNE ROAD LOT 75 GRAHAM, NC 27253

Used As: SubContractor DBE Items Total:$1,833,316.50

Items for CRUZ BROTHERS CONCRETE, INC.

0001 ROADWAY ITEMS					
0068	0999000000-E 4" SLOPE PROTECTION	1820.000	SY	$113.0000	$205,660.00
0069	1000000000-E 6" SLOPE PROTECTION	530.000	SY	$132.0000	$69,960.00
0108	2440000000-N CONCRETE TRANSITIONAL SECTION FOR CATCH BASIN	1.000	EA	$950.0000	$950.00
0109	2451000000-N CONCRETE TRANSITIONAL SECTION FOR DROP INLET	13.000	EA	$950.0000	$12,350.00
0110	2538000000-E **'-**" CONCRETE CURB & GUTTER (2'-9")	670.000	LF	$33.0000	$22,110.00
0111	2542000000-E 1'-6" CONCRETE CURB & GUTTER	4465.000	LF	$24.0000	$107,160.00
0112	2549000000-E 2'-6" CONCRETE CURB & GUTTER	11010.000	LF	$27.1500	$298,921.50
0113	2556000000-E SHOULDER BERM GUTTER	6470.000	LF	$35.0000	$226,450.00
0114	2591000000-E 4" CONCRETE SIDEWALK	210.000	SY	$48.0000	$10,080.00
0115	2605000000-N CONCRETE CURB RAMPS	2.000	EA	$2,250.0000	$4,500.00
0116	2612000000-E 6" CONCRETE DRIVEWAY	1615.000	SY	$82.0000	$132,430.00
0117	2619000000-E 4" CONCRETE PAVED DITCH	85.000	SY	$189.0000	$16,065.00
0118	2647000000-E 5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)	770.000	SY	$79.0000	$60,830.00
0119	2655000000-E 5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)	6550.000	SY	$81.0000	$530,550.00
0121	2752000000-E GENERIC PAVING ITEM 5-1/2" MODIFIED SHOULDER BERM GUTTER	400.000	LF	$33.0000	$13,200.00
0122	2752000000-E GENERIC PAVING ITEM 6" MODIFIED SHOULDER BERM GUTTER	3700.000	LF	$33.0000	$122,100.00
Section 0001 Total					$1,833,316.50

Item Total	$1,833,316.50

Name: GOSALIA CONCRETE CONSTRUCTORS INC. ID: 15755

Address: 4607 N. 56TH STREET TAMPA, FL 33610

Used As: SubContractor DBE Items Total:$293,178.68

Items for GOSALIA CONCRETE CONSTRUCTORS INC.

0004 STRUCTURE ITEMS				
0352	8503000000-E	1967.900 LF	$93.5000	$183,998.65
	CONCRETE BARRIER RAIL			
0353	8517000000-E	428.920 LF	$82.0000	$35,171.44
	1'-**" X *****" CONCRETE PARAPET (1'-2" X 2'-6")			
0354	8517000000-E	718.530 LF	$103.0000	$74,008.59
	1'-**" X *****" CONCRETE PARAPET (1'-2" X 3'-4")			
Section 0004 Total				$293,178.68
Item Total				$293,178.68

Name: HIATT & MASON ENTERPRISES INC ID: 3230

Address: P.O. Box 1378 MOUNT AIRY, NC 27030

Used As: SubContractor DBE Items Total:$255,189.55

Items for HIATT & MASON ENTERPRISES INC

0004 STRUCTURE ITEMS				
0331	8147000000-E REINFORCED CONCRETE DECK SLAB	104159.000 SF	$2.4500	$255,189.55
Section 0004 Total				$255,189.55
Item Total				$255,189.55

Name: SEAL BROTHERS CONTRACTING LLC ID: 4247

Address: 3618 WEST PINE ST MOUNT AIRY, NC 27030

Used As: SubContractor DBE Items Total:$849,433.00

Items for SEAL BROTHERS CONTRACTING LLC

0001 ROADWAY ITEMS					
0249	6000000000-E TEMPORARY SILT FENCE	162810.000	LF	$3.3000	$537,273.00
0272	6071030000-E COIR FIBER BAFFLE	39020.000	LF	$8.0000	$312,160.00
Section 0001 Total					$849,433.00
Item Total					$849,433.00

THIS PROPOSAL CONTAINS THE FOLLOWING ERRORS/WARNINGS (IF ANY)

This Bid contains 1 amendment files

1 06/13/2022 ADD & MODIFY ITEMS

Electronic Bid Submission

By submitting this bid electronically, I hereby acknowledge that all requirements included in the hard copy proposal, addendum, amendments, plans, standard specifications, supplemental specifications and special provisions are part of the bid and contract. Further, I acknowledge that I have read, understand, accept, acknowledge and agree to comply with all statements in this electronic bid.

I hereby certify that I have the authority to submit this bid.

Signature _____

Agency _____

Date _____

Signature _____

Agency _____

Date _____

Signature _____

Agency _____

Date _____

Attachments

Failure to complete and attach the Fuel Usage Factor Adjustment Form will result in using 2.90 gallons per ton as the Fuel Usage Factor for Diesel for the asphalt items included on the form. The contractor will not be permitted to change the option after the bids are submitted.

NOTE: The maximum upload limit is 5 MB. ☐ Verify

Contract Item Sheets For C204110

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
			ROADWAY ITEMS			
0001	0000100000-N	800	MOBILIZATION	LUMP SUM	7,400,000.00	7,400,000.00
0002	0000400000-N	801	CONSTRUCTION SURVEYING	LUMP SUM	1,300,000.00	1,300,000.00
0003	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	LUMP SUM LS	21,000,000.00	21,000,000.00
0004	0008000000-E	200	SUPPLEMENTARY CLEARING & GRUBBING	9 ACR	12,600.00	113,400.00
0005	0015000000-N	205	SEALING ABANDONED WELLS	30 EA	2,800.00	84,000.00
0006	0022000000-E	225	UNCLASSIFIED EXCAVATION	805,620 CY	7.00	5,639,340.00
0007	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ********** (23+16.56 -Y14-)	LUMP SUM	73,200.00	73,200.00
0008	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ********** (397+90.00 -L- LT)	LUMP SUM	72,900.00	72,900.00
0009	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ********** (397+90.00 -L- RT)	LUMP SUM	72,900.00	72,900.00
0010	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ********** (46+43.11 -Y13-)	LUMP SUM	130,000.00	130,000.00
0012	0029000000-N	SP	TYPE III REINFORCED APPROACH FILL, STATION ******* (80+65.32 -Y17-)	LUMP SUM	123,000.00	123,000.00
0013	0036000000-E	225	UNDERCUT EXCAVATION	79,510 CY	5.00	397,550.00
0014	0106000000-E	230	BORROW EXCAVATION	1,528,420 CY	0.01	15,284.20
0015	0134000000-E	240	DRAINAGE DITCH EXCAVATION	39,260 CY	3.50	137,410.00
0016	0141000000-E	240	BERM DITCH CONSTRUCTION	2,930 LF	8.50	24,905.00
0017	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	39,690 SY	8.00	317,520.00
0018	0177000000-E	250	BREAKING OF EXISTING ASPHALT PAVEMENT	18,540 SY	2.75	50,985.00
0019	0192000000-N	260	PROOF ROLLING	103 HR	349.00	35,947.00
0020	0195000000-E	265	SELECT GRANULAR MATERIAL	166,223 CY	0.01	1,662.23
0021	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZATION	164,200 SY	2.50	410,500.00

Contract Item Sheets For C204110

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0022	0199000000-E	SP	TEMPORARY SHORING	840 SF	27.00	22,680.00
0023	0220000000-E	SP	ROCK EMBANKMENTS	670 TON	84.00	56,280.00
0024	0222000000-E	SP	GEOTEXTILE FOR ROCK EMBANKMENTS	480 SY	2.75	1,320.00
0025	0225000000-E	SP	REINFORCED SOIL SLOPES	960 SY	34.00	32,640.00
0026	0318000000-E	300	FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES	5,572 TON	51.50	286,958.00
0027	0320000000-E	300	FOUNDATION CONDITIONING GEOTEXTILE	28,922 SY	3.00	86,766.00
0028	0342000000-E	310	**" SIDE DRAIN PIPE (30")	196 LF	173.00	33,908.00
0029	0342000000-E	310	**" SIDE DRAIN PIPE (36")	76 LF	204.00	15,504.00
0030	0342000000-E	310	**" SIDE DRAIN PIPE (48")	44 LF	447.00	19,668.00
0031	0343000000-E	310	15" SIDE DRAIN PIPE	1,676 LF	130.00	217,880.00
0032	0344000000-E	310	18" SIDE DRAIN PIPE	196 LF	121.00	23,716.00
0033	0345000000-E	310	24" SIDE DRAIN PIPE	416 LF	176.00	73,216.00
0034	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (15", V)	892 LF	75.00	66,900.00
0035	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (18", V)	20 LF	103.00	2,060.00
0036	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (24", V)	448 LF	121.00	54,208.00
0037	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (30", V)	188 LF	160.00	30,080.00
0038	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (48", V)	196 LF	392.00	76,832.00
0039	0366000000-E	310	15" RC PIPE CULVERTS, CLASS III	8,768 LF	70.50	618,144.00
0040	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	1,976 LF	72.50	143,260.00
0041	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	2,540 LF	97.00	246,380.00
0042	0384000000-E	310	30" RC PIPE CULVERTS, CLASS III	2,212 LF	137.00	303,044.00
0043	0390000000-E	310	36" RC PIPE CULVERTS, CLASS III	760 LF	176.00	133,760.00
0044	0396000000-E	310	42" RC PIPE CULVERTS, CLASS III	580 LF	269.00	156,020.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0045	0402000000-E	310	48" RC PIPE CULVERTS, CLASS III	1,248 LF	302.00	376,896.00
0046	0408000000-E	310	54" RC PIPE CULVERTS, CLASS III	1,292 LF	396.00	511,632.00
0047	0420000000-E	310	66" RC PIPE CULVERTS, CLASS III	292 LF	659.00	192,428.00
0048	0448000000-E	310	****" RC PIPE CULVERTS, CLASS IV (48")	436 LF	350.00	152,600.00
0049	0448000000-E	310	****" RC PIPE CULVERTS, CLASS IV (54")	882 LF	479.00	422,478.00
0050	0448000000-E	310	****" RC PIPE CULVERTS, CLASS IV (60")	400 LF	532.00	212,800.00
0051	0448000000-E	310	****" RC PIPE CULVERTS, CLASS IV (66")	732 LF	759.00	555,588.00
0052	0448000000-E	310	****" RC PIPE CULVERTS, CLASS IV (72")	576 LF	864.00	497,664.00
0053	0448200000-E	310	15" RC PIPE CULVERTS, CLASS IV	4,416 LF	68.00	300,288.00
0054	0448300000-E	310	18" RC PIPE CULVERTS, CLASS IV	2,784 LF	91.50	254,736.00
0055	0448400000-E	310	24" RC PIPE CULVERTS, CLASS IV	4,044 LF	117.00	473,148.00
0056	0448500000-E	310	30" RC PIPE CULVERTS, CLASS IV	1,592 LF	150.00	238,800.00
0057	0448600000-E	310	36" RC PIPE CULVERTS, CLASS IV	1,232 LF	204.00	251,328.00
0058	0448700000-E	310	42" RC PIPE CULVERTS, CLASS IV	356 LF	311.00	110,716.00
0059	0570000000-E	310	6" CS PIPE CULVERTS, 0.064" THICK (SPRING BOX)	500 LF	44.50	22,250.00
0060	0576000000-E	310	**" CS PIPE CULVERTS, *****" THICK (30", 0.064")	44 LF	195.00	8,580.00
0061	0582000000-E	310	15" CS PIPE CULVERTS, 0.064" THICK	1,114 LF	105.00	116,970.00
0062	0588000000-E	310	18" CS PIPE CULVERTS, 0.064" THICK	212 LF	124.00	26,288.00
0063	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (15", 0.064")	34 EA	631.00	21,454.00
0064	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (18", 0.064")	8 EA	808.00	6,464.00
0065	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (30", 0.079")	2 EA	1,300.00	2,600.00
0066	0962000000-E	SP	**" X **" CAA STRUCTURAL PLATE PIPE ARCH, *****" THICK (49" X 33", 0.109")	512 LF	433.00	221,696.00

Contract Item Sheets For C204110

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0067	0995000000-E	340	PIPE REMOVAL	2,302 LF	26.50	61,003.00
0068	0999000000-E	462	4" SLOPE PROTECTION	1,820 SY	125.00	227,500.00
0069	1000000000-E	462	6" SLOPE PROTECTION	530 SY	148.00	78,440.00
0070	1011000000-N	500	FINE GRADING	LUMP SUM	6,035,613.54	6,035,613.54
0071	1077000000-E	SP	#57 STONE	260 TON	68.50	17,810.00
0072	1099500000-E	505	SHALLOW UNDERCUT	1,000 CY	19.00	19,000.00
0073	1099700000-E	505	CLASS IV SUBGRADE STABILIZATION	2,000 TON	49.00	98,000.00
0074	1121000000-E	520	AGGREGATE BASE COURSE	159,455 TON	46.00	7,334,930.00
0075	1220000000-E	545	INCIDENTAL STONE BASE	1,700 TON	60.00	102,000.00
0076	1330000000-E	607	INCIDENTAL MILLING	4,300 SY	1.50	6,450.00
0077	1491000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0C	92,975 TON	70.00	6,508,250.00
0078	1503000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C	75,540 TON	75.00	5,665,500.00
0079	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	32,055 TON	75.00	2,404,125.00
0080	1523000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5C	51,940 TON	70.00	3,635,800.00
0081	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	13,080 TON	800.00	10,464,000.00
0082	1693000000-E	654	ASPHALT PLANT MIX, PAVEMENT REPAIR	324 TON	280.00	90,720.00
0083	1840000000-E	665	MILLED RUMBLE STRIPS (ASPHALT CONCRETE)	102,990 LF	0.30	30,897.00
0084	2000000000-N	806	RIGHT-OF-WAY MARKERS	484 EA	443.00	214,412.00
0085	2022000000-E	815	SUBDRAIN EXCAVATION	8,820 CY	37.00	326,340.00
0086	2026000000-E	815	GEOTEXTILE FOR SUBSURFACE DRAINS	26,250 SY	14.50	380,625.00
0087	2036000000-E	815	SUBDRAIN COARSE AGGREGATE	4,410 CY	204.00	899,640.00
0088	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	26,750 LF	19.00	508,250.00
0089	2070000000-N	815	SUBDRAIN PIPE OUTLET	53 EA	443.00	23,479.00

Contract Item Sheets For C204110

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0090	2077000000-E	815	6" OUTLET PIPE	318 LF	39.50	12,561.00
0091	2209000000-E	838	ENDWALLS	68.22 CY	1,900.00	129,618.00
0092	2220000000-E	838	REINFORCED ENDWALLS	91.7 CY	1,800.00	165,060.00
0093	2253000000-E	840	PIPE COLLARS	1 CY	1,900.00	1,900.00
0094	2264000000-E	840	PIPE PLUGS	2.89 CY	1,800.00	5,202.00
0095	2275000000-E	SP	FLOWABLE FILL	12 CY	1,400.00	16,800.00
0096	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	303 EA	4,100.00	1,242,300.00
0097	2297000000-E	840	MASONRY DRAINAGE STRUCTURES	33.89 CY	2,800.00	94,892.00
0098	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	155.32 LF	1,300.00	201,916.00
0099	2364000000-N	840	FRAME WITH TWO GRATES, STD 840.16	39 EA	1,200.00	46,800.00
0100	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	36 EA	1,300.00	46,800.00
0101	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	139 EA	2,500.00	347,500.00
0102	2366000000-N	840	FRAME WITH TWO GRATES, STD 840.24	1 EA	1,300.00	1,300.00
0103	2367000000-N	840	FRAME WITH TWO GRATES, STD 840.29	8 EA	1,300.00	10,400.00
0104	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	12 EA	1,300.00	15,600.00
0105	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	28 EA	1,300.00	36,400.00
0106	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	30 EA	1,300.00	39,000.00
0107	2396000000-N	840	FRAME WITH COVER, STD 840.54	10 EA	1,100.00	11,000.00
0108	2440000000-N	852	CONCRETE TRANSITIONAL SECTION FOR CATCH BASIN	1 EA	1,100.00	1,100.00
0109	2451000000-N	852	CONCRETE TRANSITIONAL SECTION FOR DROP INLET	13 EA	1,100.00	14,300.00
0110	2538000000-E	846	**'-**" CONCRETE CURB & GUTTER (2'-9")	670 LF	37.00	24,790.00

Contract Item Sheets For C204110

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0111	2542000000-E	846	1'-6" CONCRETE CURB & GUTTER	4,465 LF	25.00	111,625.00
0112	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	11,010 LF	30.00	330,300.00
0113	2556000000-E	846	SHOULDER BERM GUTTER	6,470 LF	38.50	249,095.00
0114	2591000000-E	848	4" CONCRETE SIDEWALK	210 SY	53.50	11,235.00
0115	2605000000-N	848	CONCRETE CURB RAMPS	2 EA	2,500.00	5,000.00
0116	2612000000-E	848	6" CONCRETE DRIVEWAY	1,615 SY	90.00	145,350.00
0117	2619000000-E	850	4" CONCRETE PAVED DITCH	85 SY	211.00	17,935.00
0118	2647000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)	770 SY	88.00	67,760.00
0119	2655000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)	6,550 SY	91.50	599,325.00
0120	2724000000-E	857	PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED	3,800 LF	111.00	421,800.00
0121	2752000000-E	SP	GENERIC PAVING ITEM 5-1/2" MODIFIED SHOULDER BERM GUTTER	400 LF	37.00	14,800.00
0122	2752000000-E	SP	GENERIC PAVING ITEM 6" MODIFIED SHOULDER BERM GUTTER	3,700 LF	37.00	136,900.00
0123	2845000000-N	858	ADJUSTMENT OF METER BOXES OR VALVE BOXES	2 EA	776.00	1,552.00
0124	3001000000-N	SP	IMPACT ATTENUATOR UNITS, TYPE TL-3	1 EA	31,500.00	31,500.00
0125	3030000000-E	862	STEEL BEAM GUARDRAIL	17,212.5 LF	31.00	533,587.50
0126	3045000000-E	862	STEEL BEAM GUARDRAIL, SHOP CURVED	225 LF	35.00	7,875.00
0127	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	25 EA	72.00	1,800.00
0128	3195000000-N	862	GUARDRAIL END UNITS, TYPE AT-1	16 EA	1,000.00	16,000.00
0129	3210000000-N	862	GUARDRAIL END UNITS, TYPE CAT-1	24 EA	1,000.00	24,000.00
0130	3215000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE III	8 EA	2,800.00	22,400.00
0131	3287000000-N	SP	GUARDRAIL END UNITS, TYPE TL-3	33 EA	3,800.00	125,400.00
0132	3317000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE B-77	23 EA	2,800.00	64,400.00

Contract Item Sheets For C204110

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0133	3389200000-E	865	CABLE GUIDERAIL	23,940 LF	14.50	347,130.00
0134	3389500000-N	865	ADDITIONAL GUIDERAIL POSTS	25 EA	95.50	2,387.50
0135	3389600000-N	865	CABLE GUIDERAIL ANCHOR UNITS	30 EA	2,000.00	60,000.00
0136	3503000000-E	866	WOVEN WIRE FENCE, 47" FABRIC	62,650 LF	5.00	313,250.00
0137	3506000000-E	866	4" TIMBER FENCE POSTS, ***** LONG (47")	3,995 EA	26.00	103,870.00
0138	3512000000-E	866	5" TIMBER FENCE POSTS, ***** LONG (47")	910 EA	33.00	30,030.00
0139	3557000000-E	866	ADDITIONAL BARBED WIRE	2,000 LF	1.25	2,500.00
0140	3628000000-E	876	RIP RAP, CLASS I	5,006 TON	75.00	375,450.00
0141	3635000000-E	876	RIP RAP, CLASS II	50 TON	92.00	4,600.00
0142	3642000000-E	876	RIP RAP, CLASS A	480 TON	80.00	38,400.00
0143	3649000000-E	876	RIP RAP, CLASS B	4,778 TON	75.00	358,350.00
0144	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	31,665 SY	4.00	126,660.00
0145	4048000000-E	902	REINFORCED CONCRETE SIGN FOUNDATIONS	7 CY	1,200.00	8,400.00
0146	4054000000-E	902	PLAIN CONCRETE SIGN FOUNDATIONS	2 CY	1,200.00	2,400.00
0147	4057000000-E	SP	OVERHEAD FOOTING	126 CY	2,000.00	252,000.00
0148	4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	4,144 LB	11.00	45,584.00
0149	4066000000-E	903	SUPPORTS, SIMPLE STEEL BEAM	2,764 LB	7.25	20,039.00
0150	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	3,312 LF	14.50	48,024.00
0151	4079000000-N	903	SUPPORTS, BARRIER (SMALL)	3 EA	1,200.00	3,600.00
0152	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (26+00 -Y1RPC-)	LUMP SUM	172,000.00	172,000.00
0153	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (530+95 -L-)	LUMP SUM	270,000.00	270,000.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0154	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (537+00 -L-)	LUMP SUM	113,000.00	113,000.00
0155	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (568+85 -L-)	LUMP SUM	113,000.00	113,000.00
0156	4082100000-N	906	SUPPORTS, OVERHEAD SIGN STRUCTURE AT STA ****** (598+00 -L-)	LUMP SUM	113,000.00	113,000.00
0157	4096000000-N	904	SIGN ERECTION, TYPE D	15 EA	184.00	2,760.00
0158	4102000000-N	904	SIGN ERECTION, TYPE E	164 EA	123.00	20,172.00
0159	4108000000-N	904	SIGN ERECTION, TYPE F	44 EA	184.00	8,096.00
0160	4109000000-N	904	SIGN ERECTION, TYPE *** (OVERHEAD) (A)	5 EA	1,500.00	7,500.00
0161	4109000000-N	904	SIGN ERECTION, TYPE *** (OVERHEAD) (B)	2 EA	860.00	1,720.00
0162	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	13 EA	1,100.00	14,300.00
0163	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)	7 EA	553.00	3,871.00
0164	4114000000-N	904	SIGN ERECTION, MILEMARKERS	24 EA	67.50	1,620.00
0165	4115000000-N	904	SIGN ERECTION, OVERLAY (OVERHEAD)	8 EA	922.00	7,376.00
0166	4116200000-N	904	SIGN ERECTION, REPOSITION OVERHEAD	3 EA	1,800.00	5,400.00
0167	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	6 EA	30.50	183.00
0168	4234000000-N	907	DISPOSAL OF SIGN, A OR B (OVERHEAD)	3 EA	614.00	1,842.00
0169	4238000000-N	907	DISPOSAL OF SIGN, D, E OR F	62 EA	30.50	1,891.00
0170	4241000000-N	907	DISPOSAL OF SIGN, OVERLAY (OVERHEAD)	8 EA	123.00	984.00
0171	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	1,535 SF	20.50	31,467.50
0172	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	576 SF	11.50	6,624.00

Contract Item Sheets For C204110

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0173	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	528 SF	9.25	4,884.00
0174	4430000000-N	1130	DRUMS	530 EA	52.50	27,825.00
0175	4435000000-N	1135	CONES	150 EA	27.50	4,125.00
0176	4445000000-E	1145	BARRICADES (TYPE III)	512 LF	32.00	16,384.00
0177	4455000000-N	1150	FLAGGER	562 DAY	444.00	249,528.00
0178	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	2 EA	25,200.00	50,400.00
0179	4470000000-N	1160	REMOVE & RESET TEMPORARY CRASH CUSHION	2 EA	4,000.00	8,000.00
0180	4480000000-N	1165	TMA	1 EA	55,500.00	55,500.00
0181	4485000000-E	1170	PORTABLE CONCRETE BARRIER	350 LF	104.00	36,400.00
0182	4500000000-E	1170	REMOVE AND RESET PORTABLE CONCRETE BARRIER	350 LF	52.00	18,200.00
0183	4510000000-N	1190	LAW ENFORCEMENT	16 HR	66.50	1,064.00
0184	4516000000-N	1180	SKINNY DRUM	250 EA	40.00	10,000.00
0185	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	1,150 EA	9.25	10,637.50
0186	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	126,331 LF	1.25	157,913.75
0187	4688000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 90 MILS)	166,708 LF	1.25	208,385.00
0188	4695000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)	4,918 LF	3.25	15,983.50
0189	4700000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)	9,755 LF	3.50	34,142.50
0190	4720000000-E	1205	THERMOPLASTIC PAVEMENT MARKING CHARACTER (90 MILS)	16 EA	146.00	2,336.00
0191	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	206 EA	233.00	47,998.00
0192	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	282,859 LF	0.45	127,286.55
0193	4815000000-E	1205	PAINT PAVEMENT MARKING LINES (6")	18,443 LF	0.75	13,832.25
0194	4820000000-E	1205	PAINT PAVEMENT MARKING LINES (8")	1,624 LF	1.25	2,030.00
0195	4825000000-E	1205	PAINT PAVEMENT MARKING LINES (12")	2,512 LF	1.75	4,396.00

Contract Item Sheets For C204110

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0196	4835000000-E	1205	PAINT PAVEMENT MARKING LINES (24")	922 LF	3.50	3,227.00
0197	4840000000-N	1205	PAINT PAVEMENT MARKING CHARACTER	8 EA	41.00	328.00
0198	4845000000-N	1205	PAINT PAVEMENT MARKING SYMBOL	96 EA	41.00	3,936.00
0199	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	22,575 LF	0.60	13,545.00
0200	4890000000-E	SP	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 12", 20 MILS (STANDARD GLASS BEADS)	2,810 LF	7.00	19,670.00
0201	4890000000-E	SP	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 4", 20 MILS (STANDARD GLASS BEADS)	3,863 LF	3.50	13,520.50
0202	4890000000-E	SP	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 6", 20 MILS (STANDARD GLASS BEADS)	17,921 LF	3.50	62,723.50
0203	4890000000-E	SP	GENERIC PAVEMENT MARKING ITEM POLYUREA PAVEMENT MARKING LINES, 8", 20 MILS (STANDARD GLASS BEADS)	347 LF	7.00	2,429.00
0204	4891000000-E	1205	GENERIC PAVEMENT MARKING ITEM THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MILS)	1,436 LF	14.00	20,104.00
0205	4895000000-N	SP	GENERIC PAVEMENT MARKING ITEM NON-CAST IRON SNOWPLOWABLE PAVEMENT MARKER	1,757 EA	56.00	98,392.00
0206	4900000000-N	1251	PERMANENT RAISED PAVEMENT MARKERS	1,173 EA	9.25	10,850.25
0207	5325200000-E	1510	2" WATER LINE	100 LF	52.50	5,250.00
0208	5325600000-E	1510	6" WATER LINE	38 LF	77.50	2,945.00
0209	5325800000-E	1510	8" WATER LINE	1,284 LF	101.00	129,684.00
0210	5326200000-E	1510	12" WATER LINE	5,901 LF	215.00	1,268,715.00
0211	5326600000-E	1510	16" WATER LINE	11,486 LF	274.00	3,147,164.00
0212	5329000000-E	1510	DUCTILE IRON WATER PIPE FITTINGS	41,810 LB	15.50	648,055.00
0213	5540000000-E	1515	6" VALVE	13 EA	2,200.00	28,600.00
0214	5546000000-E	1515	8" VALVE	4 EA	3,100.00	12,400.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0215	5558000000-E	1515	12" VALVE	9 EA	9,300.00	83,700.00
0216	5558600000-E	1515	16" VALVE	12 EA	15,000.00	180,000.00
0217	5571800000-E	1515	8" TAPPING SLEEVE & VALVE	1 EA	7,900.00	7,900.00
0218	5572200000-E	1515	12" TAPPING SLEEVE & VALVE	2 EA	9,900.00	19,800.00
0219	5572600000-E	1515	16" TAPPING SLEEVE & VALVE	7 EA	22,700.00	158,900.00
0220	5606000000-E	1515	2" BLOW OFF	5 EA	11,000.00	55,000.00
0221	5643000000-E	1515	**" WATER METER (1")	1 EA	3,400.00	3,400.00
0222	5643100000-E	1515	3/4" WATER METER	6 EA	3,000.00	18,000.00
0223	5666000000-N	1515	FIRE HYDRANT	12 EA	6,900.00	82,800.00
0224	5672000000-N	1515	RELOCATE FIRE HYDRANT	3 EA	3,900.00	11,700.00
0225	5673000000-E	1515	FIRE HYDRANT LEG	194 LF	98.00	19,012.00
0226	5686500000-E	1515	WATER SERVICE LINE	239 LF	30.00	7,170.00
0227	5691300000-E	1520	8" SANITARY GRAVITY SEWER	5,804 LF	250.00	1,451,000.00
0228	5768000000-N	1520	SANITARY SEWER CLEAN-OUT	38 EA	1,000.00	38,000.00
0229	5768500000-E	1520	SEWER SERVICE LINE	1,404 LF	53.50	75,114.00
0230	5775000000-E	1525	4' DIA UTILITY MANHOLE	35 EA	6,900.00	241,500.00
0231	5776000000-E	1525	5' DIA UTILITY MANHOLE	1 EA	9,100.00	9,100.00
0232	5781000000-E	1525	UTILITY MANHOLE WALL 4' DIA	207 LF	489.00	101,223.00
0233	5782000000-E	1525	UTILITY MANHOLE WALL 5' DIA	3 LF	721.00	2,163.00
0234	5801000000-E	1530	ABANDON 8" UTILITY PIPE	45 LF	18.00	810.00
0235	5804000000-E	1530	ABANDON 12" UTILITY PIPE	2,107 LF	19.00	40,033.00
0236	5810000000-E	1530	ABANDON 16" UTILITY PIPE	7,423 LF	30.00	222,690.00
0237	5814000000-E	1530	ABANDON 30" UTILITY PIPE	32 LF	36.00	1,152.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0238	5815000000-N	1530	REMOVE WATER METER	6 EA	274.00	1,644.00
0239	5815500000-N	1530	REMOVE FIRE HYDRANT	4 EA	1,300.00	5,200.00
0240	5816000000-N	1530	ABANDON UTILITY MANHOLE	2 EA	1,200.00	2,400.00
0241	5835000000-E	1540	**" ENCASEMENT PIPE (4")	180 LF	143.00	25,740.00
0242	5835700000-E	1540	16" ENCASEMENT PIPE	60 LF	238.00	14,280.00
0243	5836000000-E	1540	24" ENCASEMENT PIPE	1,773 LF	250.00	443,250.00
0244	5836200000-E	1540	30" ENCASEMENT PIPE	1,319 LF	253.00	333,707.00
0245	5836400000-E	1540	36" ENCASEMENT PIPE	900 LF	260.00	234,000.00
0246	5872500000-E	1550	BORE AND JACK OF **" (24")	436 LF	2,100.00	915,600.00
0247	5872500000-E	1550	BORE AND JACK OF **" (30")	405 LF	2,300.00	931,500.00
0248	5872500000-E	1550	BORE AND JACK OF **" (36")	337 LF	2,600.00	876,200.00
0249	6000000000-E	1605	TEMPORARY SILT FENCE	162,810 LF	3.75	610,537.50
0250	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	5,005 TON	45.00	225,225.00
0251	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	37,945 TON	45.00	1,707,525.00
0252	6012000000-E	1610	SEDIMENT CONTROL STONE	17,430 TON	45.00	784,350.00
0253	6015000000-E	1615	TEMPORARY MULCHING	1,210.5 ACR	1,600.00	1,936,800.00
0254	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	49,300 LB	2.25	110,925.00
0255	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEEDING	250.5 TON	1,100.00	275,550.00
0256	6024000000-E	1622	TEMPORARY SLOPE DRAINS	23,380 LF	12.00	280,560.00
0257	6029000000-E	SP	SAFETY FENCE	17,820 LF	2.75	49,005.00
0258	6030000000-E	1630	SILT EXCAVATION	173,020 CY	2.75	475,805.00
0259	6036000000-E	1631	MATTING FOR EROSION CONTROL	580,445 SY	1.35	783,600.75
0260	6037000000-E	SP	COIR FIBER MAT	2,085 SY	11.00	22,935.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0261	6038000000-E	SP	PERMANENT SOIL REINFORCEMENT MAT	5,770 SY	4.50	25,965.00
0262	6042000000-E	1632	1/4" HARDWARE CLOTH	10,435 LF	9.00	93,915.00
0263	6043000000-E	SP	LOW PERMEABILITY GEOTEXTILE	3,915 SY	8.50	33,277.50
0264	6045000000-E	SP	**" TEMPORARY PIPE (24")	1,390 LF	121.00	168,190.00
0265	6046000000-E	1636	TEMPORARY PIPE FOR STREAM CROSSING	250 LF	140.00	35,000.00
0266	6048000000-E	SP	FLOATING TURBIDITY CURTAIN	115 SY	51.00	5,865.00
0267	6069000000-E	1638	STILLING BASINS	2,704 CY	4.75	12,844.00
0268	6070000000-N	1639	SPECIAL STILLING BASINS	12 EA	2,300.00	27,600.00
0269	6071012000-E	SP	COIR FIBER WATTLE	24,790 LF	10.00	247,900.00
0270	6071014000-E	SP	COIR FIBER WATTLE BARRIER	675 LF	17.00	11,475.00
0271	6071020000-E	SP	POLYACRYLAMIDE (PAM)	23,775 LB	5.75	136,706.25
0272	6071030000-E	1640	COIR FIBER BAFFLE	39,020 LF	9.00	351,180.00
0273	6071050000-E	SP	**" SKIMMER (1-1/2")	94 EA	1,900.00	178,600.00
0274	6071050000-E	SP	**" SKIMMER (2")	35 EA	2,200.00	77,000.00
0275	6071050000-E	SP	**" SKIMMER (2-1/2")	18 EA	2,300.00	41,400.00
0276	6071050000-E	SP	**" SKIMMER (3")	3 EA	2,600.00	7,800.00
0277	6084000000-E	1660	SEEDING & MULCHING	759 ACR	3,000.00	2,277,000.00
0278	6087000000-E	1660	MOWING	816 ACR	255.00	208,080.00
0279	6090000000-E	1661	SEED FOR REPAIR SEEDING	12,250 LB	10.00	122,500.00
0280	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	35 TON	1,500.00	52,500.00
0281	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	18,375 LB	5.75	105,656.25
0282	6108000000-E	1665	FERTILIZER TOPDRESSING	550.75 TON	1,200.00	660,900.00
0283	6111000000-E	SP	IMPERVIOUS DIKE	823 LF	21.00	17,283.00

Contract Item Sheets For C204110

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0284	6114500000-N	1667	SPECIALIZED HAND MOWING	190 MHR	204.00	38,760.00
0285	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	250 EA	566.00	141,500.00
0286	6117500000-N	SP	CONCRETE WASHOUT STRUCTURE	17 EA	1,100.00	18,700.00
0287	6120000000-E	SP	CULVERT DIVERSION CHANNEL	1,316 CY	25.50	33,558.00
0288	6132000000-N	SP	GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE	2 EA	333.00	666.00
0289	6132000000-N	SP	GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE CLEANOUT	6 EA	222.00	1,332.00
0290	7060000000-E	1705	SIGNAL CABLE	6,450 LF	3.00	19,350.00
0291	7120000000-E	1705	VEHICLE SIGNAL HEAD (12", 3 SECTION)	57 EA	953.00	54,321.00
0292	7132000000-E	1705	VEHICLE SIGNAL HEAD (12", 4 SECTION)	2 EA	1,400.00	2,800.00
0293	7252000000-E	1710	MESSENGER CABLE (1/4")	380 LF	3.50	1,330.00
0294	7264000000-E	1710	MESSENGER CABLE (3/8")	3,080 LF	3.50	10,780.00
0295	7279000000-E	1715	TRACER WIRE	14,175 LF	1.00	14,175.00
0296	7300000000-E	1715	UNPAVED TRENCHING (**********) (1, 2")	6,250 LF	12.50	78,125.00
0297	7300000000-E	1715	UNPAVED TRENCHING (**********) (2, 2")	11,185 LF	16.00	178,960.00
0298	7301000000-E	1715	DIRECTIONAL DRILL (**********) (2, 2")	2,990 LF	37.00	110,630.00
0299	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	71 EA	492.00	34,932.00
0300	7348000000-N	1716	JUNCTION BOX (OVER-SIZED, HEAVY DUTY)	35 EA	861.00	30,135.00
0301	7444000000-E	1725	INDUCTIVE LOOP SAWCUT	5,560 LF	8.50	47,260.00
0302	7456000000-E	1726	LEAD-IN CABLE (**********) (14-2)	19,800 LF	2.50	49,500.00
0303	7516000000-E	1730	COMMUNICATIONS CABLE (** FIBER) (24)	15,005 LF	3.25	48,766.25
0304	7528000000-E	1730	DROP CABLE	1,505 LF	3.25	4,891.25
0305	7540000000-N	1731	SPLICE ENCLOSURE	7 EA	2,200.00	15,400.00

Contract Item Sheets For C204110

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0306	7541000000-N	1731	MODIFY SPLICE ENCLOSURE	1 EA	1,200.00	1,200.00
0307	7552000000-N	1731	INTERCONNECT CENTER	7 EA	2,300.00	16,100.00
0308	7566000000-N	1733	DELINEATOR MARKER	30 EA	185.00	5,550.00
0309	7576000000-N	SP	METAL STRAIN SIGNAL POLE	28 EA	16,700.00	467,600.00
0310	7613000000-N	SP	SOIL TEST	28 EA	1,700.00	47,600.00
0311	7614100000-E	SP	DRILLED PIER FOUNDATION	196 CY	1,700.00	333,200.00
0312	7636000000-N	1745	SIGN FOR SIGNALS	9 EA	431.00	3,879.00
0313	7684000000-N	1750	SIGNAL CABINET FOUNDATION	7 EA	1,100.00	7,700.00
0314	7696000000-N	1751	CONTROLLERS WITH CABINET (**********) (2070LX BASE MOUNTED)	7 EA	22,600.00	158,200.00
0315	7744000000-N	1751	DETECTOR CARD (TYPE 170)	56 EA	228.00	12,768.00
0316	7901000000-N	1753	CABINET BASE EXTENDER	7 EA	369.00	2,583.00
0317	7980000000-N	SP	GENERIC SIGNAL ITEM ETHERNET EDGE SWITCH	7 EA	3,500.00	24,500.00
0318	7980000000-N	SP	GENERIC SIGNAL ITEM JUNCTION BOX MARKER	5 EA	92.50	462.50

Contract Item Sheets For C204110

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
			WALL ITEMS			
0319	8801000000-E	SP	MSE RETAINING WALL NO **** (1)	5,250 SF	98.50	517,125.00
0320	8801000000-E	SP	MSE RETAINING WALL NO **** (2)	5,170 SF	98.50	509,245.00
0321	8847000000-E	SP	GENERIC RETAINING WALL ITEM ARCHITECTURAL SURFACE TREATMENT (SOUND BARRIER WALL)	96,226 SF	1.00	96,226.00
0322	8847000000-E	SP	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL -NW4B-	33,765 SF	45.00	1,519,425.00
0323	8847000000-E	SP	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL -NW5-	25,710 SF	45.00	1,156,950.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
			STRUCTURE ITEMS			
0324	8017000000-N	SP	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ********** (397+90.00 -L- LT)	LUMP SUM	609,000.00	609,000.00
0325	8017000000-N	SP	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ********** (397+90.00 -L- RT)	LUMP SUM	602,000.00	602,000.00
0326	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ********** (1, 23+16.56 -Y14-)	LUMP SUM	7,200.00	7,200.00
0327	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ********** (1, 24+41.38 -Y16-)	LUMP SUM	10,800.00	10,800.00
0328	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ********** (1, 46+43.11 -Y13-)	LUMP SUM	16,200.00	16,200.00
0329	8091000000-N	410	FOUNDATION EXCAVATION FOR BENT ** AT STATION ********** (1, 80+65.32 -Y17-)	LUMP SUM	16,200.00	16,200.00
0330	8112730000-N	450	PDA TESTING	9 EA	3,100.00	27,900.00
0331	8147000000-E	420	REINFORCED CONCRETE DECK SLAB	104,159 SF	50.00	5,207,950.00
0332	8161000000-E	420	GROOVING BRIDGE FLOORS	105,203 SF	0.65	68,381.95
0333	8182000000-E	420	CLASS A CONCRETE (BRIDGE)	2,247.1 CY	1,100.00	2,471,810.00
0334	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (23+16.56 -Y14-)	LUMP SUM	84,500.00	84,500.00
0335	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (24+41.38 -Y16-)	LUMP SUM	132,000.00	132,000.00
0336	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (397+90.00 -L- LT)	LUMP SUM	104,000.00	104,000.00
0337	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (397+90.00 -L- RT)	LUMP SUM	93,300.00	93,300.00
0338	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (46+43.11 -Y13-)	LUMP SUM	153,000.00	153,000.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0339	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ********** (80+65.32 -Y17-)	LUMP SUM	180,000.00	180,000.00
0340	8217000000-E	425	REINFORCING STEEL (BRIDGE)	307,058 LB	1.75	537,351.50
0341	8238000000-E	425	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)	14,794 LB	4.50	66,573.00
0342	8265000000-E	430	54" PRESTRESSED CONCRETE GIRDERS	5,078.63 LF	410.00	2,082,238.30
0343	8277000000-E	430	MODIFIED 72" PRESTRESSED CONC GIRDERS	6,523.57 LF	450.00	2,935,606.50
0344	8328200000-E	450	PILE DRIVING EQUIPMENT SETUP FOR *** STEEL PILES (HP 12 X 53)	276 EA	2,200.00	607,200.00
0345	8328200000-E	450	PILE DRIVING EQUIPMENT SETUP FOR *** STEEL PILES (HP 14 X 73)	48 EA	2,300.00	110,400.00
0346	8328400000-E	450	PILE DRIVING EQUIPMENT SETUP FOR *** GALVANIZED STEEL PILES (HP 14 X 73)	99 EA	1,900.00	188,100.00
0347	8364000000-E	450	HP 12 X 53 STEEL PILES	16,945 LF	52.00	881,140.00
0348	8384000000-E	450	HP 14 X 73 STEEL PILES	2,880 LF	71.50	205,920.00
0349	8384200000-E	450	HP 14 X 73 GALVANIZED STEEL PILES	6,330 LF	84.50	534,885.00
0350	8393000000-N	450	PILE REDRIVES	207 EA	0.01	2.07
0351	8475000000-E	460	TWO BAR METAL RAIL	1,093.34 LF	261.00	285,361.74
0352	8503000000-E	460	CONCRETE BARRIER RAIL	1,967.9 LF	182.00	358,157.80
0353	8517000000-E	460	1'-**" X *****" CONCRETE PARAPET (1'-2" X 2'-6")	428.92 LF	177.00	75,918.84
0354	8517000000-E	460	1'-**" X *****" CONCRETE PARAPET (1'-2" X 3'-4")	718.53 LF	226.00	162,387.78
0355	8531000000-E	462	4" SLOPE PROTECTION	3,067 SY	167.00	512,189.00
0356	8608000000-E	876	RIP RAP CLASS II (2'-0" THICK)	3,255 TON	70.50	229,477.50
0357	8622000000-E	876	GEOTEXTILE FOR DRAINAGE	3,615 SY	4.00	14,460.00
0358	8657000000-N	430	ELASTOMERIC BEARINGS	LUMP SUM	78,600.00	78,600.00
0359	8706000000-N	SP	EXPANSION JOINT SEALS	LUMP SUM	227,000.00	227,000.00

Contract Item Sheets For C204110

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0360	8860000000-N	SP	GENERIC STRUCTURE ITEM STRIP SEAL EXPANSION JOINTS	LUMP SUM	370,000.00	370,000.00

Contract Item Sheets For C204110

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
			ROADWAY ITEMS			
0361	0028000000-N	SP	TYPE I STANDARD APPROACH FILL STATION ********** (24+41.38 -Y16-)	LUMP SUM	186,000.00	186,000.00
0362	0255000000-E	SP	GENERIC GRADING ITEM RIP RAP, CLASS B LIMESTONE	11,000 TON	130.00	1,430,000.00
0363	5709300000-E	1520	6" FORCE MAIN SEWER	90 LF	218.00	19,620.00
0364	5769000000-E	1520	DUCTILE IRON SEWER PIPE FITTINGS	224 LB	11.50	2,576.00

Contract Item Sheets For C204110

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
			WALL ITEMS			
0365	8801000000-E	SP	MSE RETAINING WALL NO **** (3)	1,200 SF	98.50	118,200.00
				TOTAL AMOUNT OF BID FOR ENTIRE PROJECT		$151,850,000.00

1524/Jul05/Q6567109.26/D1560661306000/E364

Form SPA-1
Revised 3-11-2022

Contract Number	C204110
TIP Number	U-2519BA, U-2519BB
County and Route	Cumberland; Fayetteville Outerloop

Bid Items Eligible for Steel Price Adjustment

Instructions: This form shall be completed in accordance the Special Provision. If you choose to have Steel Price Adjustments applied to any of the items listed below, write the word "Yes" in the "Option" column corresponding to the item. The form must be signed, dated, and submitted to the Contract Engineer within timeframe required by the Special Provision.

Contract Line Number	Item Number	Description	Category	Option (Yes or No)
136	3503000000-E	Woven Wire Fence 47" Fabric	5	Yes
133	3389200000-E	Cable Guiderail	Guardrail (GR)	Yes
125	3030000000-E	Steel Beam Guardrail	Guardrail (GR)	Yes
147	4057000000-E	Overhead Footing	1	No
148	4060000000-E	Supports, Breakaway Steel Beam	5	No
149	4066000000-E	Supports, Simple Steel Beam	5	No
150	4072000000-E	Supports, 3-LB U-Channel	5	No
151	4079000000-N	Supports, Barrier (Small)	5	No
152	4082100000-N	Supports, Overhead Sign Structure at STA. 26+00-Y1RPC-	6	No
153	4082100000-N	Supports, Overhead Sign Structure at STA. 530+95-L-	6	No
154	4082100000-N	Supports, Overhead Sign Structure at STA.537+00-L-	6	No
155	4082100000-N	Supports, Overhead Sign Structure at STA. 568+85-L-	6	No
156	4082100000-N	Supports, Overhead Sign Structure at STA. 598+00-L-	6	No

Signature	Firm or Corporation
	Branch Civil, Inc.
Date:	Vendor Number
7/13/2022	3697

Contract No. C204110

County Cumberland

Rev. 1-16-18

EXECUTION OF CONTRACT
NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION

CORPORATION

The Contractor declares (or certifies, verifies, or states) under penalty of perjury under the laws of the United States that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with this Contract, that the Contractor has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Contractor intends to do the work with its own bona fide employees or subcontractors and did not bid for the benefit of another contractor.

By submitting this Execution of Contract, Non-Collusion and Debarment Certification, the Contractor is certifying his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

Branch Civil Inc

Full name of Corporation

P.O. Box 40004, Roanoke, VA 24022

Address as Prequalified

Attest _____ By _____

~~Secretary~~/~~Assistant Secretary~~
Select appropriate title

~~President~~/Vice ~~President~~/~~Assistant Vice President~~
Select appropriate title

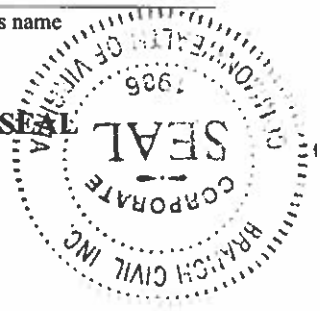
Jeffrey M. Bourne

Print or type Signer's name

Michael Colbert

Print or type Signer's name

CORPORATE SEAL



Contract No. C 204110
County Cumberland

Rev. 1-16-18

DEBARMENT CERTIFICATION

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation filed with the Department, or has become erroneous because of changed circumstances.

2. The terms *covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal,* and *voluntarily excluded,* as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.

3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.

4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal-Aid Provision titled *Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR* 1273) provided by the Department, without subsequent modification, in all lower tier covered transactions.

5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.

6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

Contract No. C204110
County Cumberland

Rev. 1-16-18

DEBARMENT CERTIFICATION

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and

d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion and debarment certification will result in the prequalified bidder's bid being considered non-responsive.

☐ Check here if an explanation is attached to this certification.

Contract No. **C204110**

County (ies): **Cumberland**

ACCEPTED BY THE
DEPARTMENT OF TRANSPORTATION

DocuSigned by:
Ronald E. Davenport, Jr.
F81B6038A47A442...
Contract Officer

07/15/2022
Date

Execution of Contract and Bonds
Approved as to Form:

DocuSigned by:
Jessica Price
B584472DA33F432...
Attorney General

07/15/2022
Date

Contract No. C204110
County CUMBERLAND

Rev 5-17-11

Bond No. K41583617 Federal Insurance Company
Bond No. 47-SUR-300171-01-0049 Berkshire Hathaway Specialty Insurance Company

CONTRACT PAYMENT BOND

Date of Payment Bond Execution	July 6, 2022
Name of Principal Contractor	Branch Civil, Inc.
Name of Surety:	Federal Insurance Company, 202B Hall's Mill Road, Whitehouse Station, NJ 08889 Berkshire Hathaway Specialty Insurance Company, 1314 Douglas Street, Suite 1400, Omaha, NE 68102 - 1944
Name of Contracting Body:	**North Carolina Department of Transportation** **Raleigh, North Carolina**
Amount of Bond:	$151,850,000.00
Contract ID No.:	C204110
County Name:	CUMBERLAND

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL CONTRACTOR (hereafter, PRINCIPAL) and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the Contracting Body, numbered as shown above and hereto attached:

NOW THEREFORE, if the principal shall promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Contract No. C204110

County CUMBERLAND

Rev 5-17-11

CONTRACT PAYMENT BOND

Affix Seal of Surety Company

Federal Insurance Company
Berkshire Hathaway Specialty Insurance Company
Print or type Surety Company Name

By Jaclyn Thomas, Attorney-In-Fact
Print, stamp or type name of Attorney-in-Fact

Signature of Attorney-in-Fact

Signature of Witness

Krystal L. Stravato, Witness
Print or type Signer's name

100 South Jefferson Road, Suite 101, Whippany, NJ 07981
Address of Attorney-in-Fact

Contract No. C204110
County CUMBERLAND

Rev 5-17-11

CONTRACT PAYMENT BOND

CORPORATION

SIGNATURE OF CONTRACTOR (Principal)

Branch Civil, Inc.

Full name of Corporation

P.O. Box 40004, Roanoke, VA 24022

Address as prequalified

By _____

Signature of **President, ~~Vice President, Assistant Vice President~~**

Select appropriate title

Brian Quinlan

Print or type Signer's name

Affix Corporate Seal

Attest _____

Signature of **Secretary, ~~Assistant Secretary~~**

Select appropriate title

Jeffrey M Bourne

Print or type Signer's name

Contract No. C204110
County CUMBERLAND

Rev 5-17-11

Bond No. K41583617 Federal Insurance Company
Bond No. 47-SUR-300171-01-0049 Berkshire Hathaway Specialty Insurance Company

CONTRACT PERFORMANCE BOND

Date of Performance Bond Execution:	July 6, 2022
Name of Principal Contractor:	Branch Civil, Inc.
Name of Surety:	Federal Insurance Company, 202B Hall's Mill Road, Whitehouse Station, NJ 08889 Berkshire Hathaway Specialty Insurance Company, 1314 Douglas Street, Suite 1400, Omaha, NE 68102 - 1944
Name of Contracting Body:	**North Carolina Department of Transportation** **Raleigh, North Carolina**
Amount of Bond:	$151,850,000.00
Contract ID No.:	C204110
County Name:	CUMBERLAND

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL CONTRACTOR (hereafter, PRINCIPAL) and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the Contracting Body, numbered as shown above and hereto attached:

NOW THEREFORE, if the principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Contract No. C204110

County CUMBERLAND

Rev 5-17-11

CONTRACT PERFORMANCE BOND

Affix Seal of Surety Company

Federal Insurance Company
Berkshire Hathaway Specialty Insurance Company
Print or type Surety Company Name

By Jaclyn Thomas, Attorney-In-Fact
Print, stamp or type name of Attorney-in-Fact

Signature of Attorney-in-Fact

Signature of Witness

Krystal L. Stravato, Witness
Print or type Signer's name

100 South Jefferson Road, Suite 101, Whippany, NJ 07981
Address of Attorney-in-Fact

Contract No. C204110
County CUMBERLAND

Rev 5-17-11

CONTRACT PERFORMANCE BOND

CORPORATION

SIGNATURE OF CONTRACTOR (Principal)

Branch Civil, Inc.

Full name of Corporation

P.O. Box 40004, Roanoke, VA 24022

Address as prequalified

By _____

Signature of **President, ~~Vice President, Assistant Vice President~~**

Select appropriate title

Brian Quinlan

Print or type Signer's name

Affix Corporate Seal

Attest _____

Signature of **Secretary, ~~Assistant Secretary~~**

Select appropriate title

Jeffrey M. Bourne

Print or type Signer's name

CHUBB

Power of Attorney

Federal Insurance Company | Vigilant Insurance Company | Pacific Indemnity Company
Westchester Fire Insurance Company | ACE American Insurance Company

Know All by These Presents, that **FEDERAL INSURANCE COMPANY**, an Indiana corporation, **VIGILANT INSURANCE COMPANY**, a New York corporation, **PACIFIC INDEMNITY COMPANY**, a Wisconsin corporation, **WESTCHESTER FIRE INSURANCE COMPANY** and **ACE AMERICAN INSURANCE COMPANY** corporations of the Commonwealth of Pennsylvania, do each hereby constitute and appoint Thomas MacDonald, Marisol Mojica, Edward Reilly, Krystal L. Stravato, Jaclyn Thomas and Kevin T. Walsh Jr. of Whippany, New Jersey; Andrea E. Gorbert of Jericho, New York; Neil C. Donovan, and Gerard Leib of Berwyn, Pennsylvania ----------

each as their true and lawful Attorney-in-Fact to execute under such designation in their names and to affix their corporate seals to and deliver for and on their behalf as surety thereon or otherwise, bonds and undertakings and other writings obligatory in the nature thereof (other than bail bonds) given or executed in the course of business, and any instruments amending or altering the same, and consents to the modification or alteration of any instrument referred to in said bonds or obligations.

In Witness Whereof, said **FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, PACIFIC INDEMNITY COMPANY, WESTCHESTER FIRE INSURANCE COMPANY** and **ACE AMERICAN INSURANCE COMPANY** have each executed and attested these presents and affixed their corporate seals on this 6th day of **April, 2022.**

Dawn M. Chloros, Assistant Secretary

Stephen M. Haney, Vice President

STATE OF NEW JERSEY
County of Hunterdon ss.

On this 6th day of **April, 2022** before me, a Notary Public of New Jersey, personally came Dawn M. Chloros and Stephen M. Haney, to me known to be Assistant Secretary and Vice President, respectively, of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, PACIFIC INDEMNITY COMPANY, WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY, the companies which executed the foregoing Power of Attorney, and the said Dawn M. Chloros and Stephen M. Haney, being by me duly sworn, severally and each for herself and himself did depose and say that they are Assistant Secretary and Vice President, respectively, of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, PACIFIC INDEMNITY COMPANY, WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY and know the corporate seals thereof, that the seals affixed to the foregoing Power of Attorney are such corporate seals and were thereto affixed by authority of said Companies; and that their signatures as such officers were duly affixed and subscribed by like authority.

Notarial Seal

KATHERINE J. ADELAAR
NOTARY PUBLIC OF NEW JERSEY
No. 2316685
Commission Expires July 16, 2024

Notary Public

CERTIFICATION

Resolutions adopted by the Boards of Directors of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY on August 30, 2016; WESTCHESTER FIRE INSURANCE COMPANY on December 11, 2006; and ACE AMERICAN INSURANCE COMPANY on March 20, 2009:

"RESOLVED, that the following authorizations relate to the execution, for and on behalf of the Company, of bonds, undertakings, recognizances, contracts and other written commitments of the Company entered into in the ordinary course of business (each a "Written Commitment"):

(1) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise.

(2) Each duly appointed attorney-in-fact of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise, to the extent that such action is authorized by the grant of powers provided for in such person's written appointment as such attorney-in-fact.

(3) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to appoint in writing any person the attorney-in-fact of the Company with full power and authority to execute, for and on behalf of the Company, under the seal of the Company or otherwise, such Written Commitments of the Company as may be specified in such written appointment, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.

(4) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to delegate in writing to any other officer of the Company the authority to execute, for and on behalf of the Company, under the Company's seal or otherwise, such Written Commitments of the Company as are specified in such written delegation, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.

(5) The signature of any officer or other person executing any Written Commitment or appointment or delegation pursuant to this Resolution, and the seal of the Company, may be affixed by facsimile on such Written Commitment or written appointment or delegation.

FURTHER RESOLVED, that the foregoing Resolution shall not be deemed to be an exclusive statement of the powers and authority of officers, employees and other persons to act for and on behalf of the Company, and such Resolution shall not limit or otherwise affect the exercise of any such power or authority otherwise validly granted or vested."

I, Dawn M. Chloros, Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, PACIFIC INDEMNITY COMPANY, WESTCHESTER FIRE INSURANCE COMPANY and ACE AMERICAN INSURANCE COMPANY (the "Companies") do hereby certify that

(i) the foregoing Resolutions adopted by the Board of Directors of the Companies are true, correct and in full force and effect,
(ii) the foregoing Power of Attorney is true, correct and in full force and effect.

Given under my hand and seals of said Companies at Whitehouse Station, NJ, this July 6, 2022

Dawn M. Chloros, Assistant Secretary

IN THE EVENT YOU WISH TO VERIFY THE AUTHENTICITY OF THIS BOND OR NOTIFY US OF ANY OTHER MATTER, PLEASE CONTACT US AT:
Telephone (908) 903-3493 Fax (908) 903-3656 e-mail: surety@chubb.com

Berkshire Hathaway Specialty Insurance

Power Of Attorney

BERKSHIRE HATHAWAY SPECIALTY INSURANCE COMPANY
NATIONAL INDEMNITY COMPANY / NATIONAL LIABILITY & FIRE INSURANCE COMPANY

Know all men by these presents, that **BERKSHIRE HATHAWAY SPECIALTY INSURANCE COMPANY**, a corporation existing under and by virtue of the laws of the State of Nebraska and having an office at One Lincoln Street, 23rd Floor, Boston, Massachusetts 02111, **NATIONAL INDEMNITY COMPANY**, a corporation existing under and by virtue of the laws of the State of Nebraska and having an office at 3024 Harney Street, Omaha, Nebraska 68131 and **NATIONAL LIABILITY & FIRE INSURANCE COMPANY**, a corporation existing under and by virtue of the laws of the State of Connecticut and having an office at 100 First Stamford Place, Stamford, Connecticut 06902 (hereinafter collectively the "Companies"), pursuant to and by the authority granted as set forth herein, do hereby name, constitute and appoint: **Jaclyn Thomas, Kevin T. Walsh, Jr., Thomas MacDonald, Krystal L. Stravato, 100 South Jefferson Road, Suite 101, of the city of Whippany, State of New Jersey,** their true and lawful attorney(s)-in-fact to make, execute, seal, acknowledge, and deliver, for and on their behalf as surety and as their act and deed, any and all undertakings, bonds, or other such writings obligatory in the nature thereof, in pursuance of these presents, the execution of which shall be as binding upon the Companies as if it has been duly signed and executed by their regularly elected officers in their own proper persons. **This authority for the Attorney-In-Fact shall be limited to the execution of the attached bond(s) or other such writings obligatory in the nature thereof.**

In witness whereof, this Power of Attorney has been subscribed by an authorized officer of the Companies, and the corporate seals of the Companies have been affixed hereto this date of December 20, 2018. This Power of Attorney is made and executed pursuant to and by authority of the Bylaws, Resolutions of the Board of Directors, and other Authorizations of **BERKSHIRE HATHAWAY SPECIALTY INSURANCE COMPANY, NATIONAL INDEMNITY COMPANY** and **NATIONAL LIABILITY & FIRE INSURANCE COMPANY**, which are in full force and effect, each reading as appears on the back page of this Power of Attorney, respectively. **The following signature by an authorized officer of the Company may be a facsimile, which shall be deemed the equivalent of and constitute the written signature of such officer of the Company for all purposes regarding this Power of Attorney, including satisfaction of any signature requirements on any and all undertakings, bonds, or other such writings obligatory in the nature thereof, to which this Power of Attorney applies.**

BERKSHIRE HATHAWAY SPECIALTY INSURANCE COMPANY,

By: _____
David Fields, Executive Vice President

NATIONAL INDEMNITY COMPANY, NATIONAL LIABILITY & FIRE INSURANCE COMPANY,

By: _____
David Fields, Vice President

NOTARY
State of Massachusetts, County of Suffolk, ss:
On this 20th day of December, 2018, before me appeared David Fields, Executive Vice President of BERKSHIRE HATHAWAY SPECIALTY INSURANCE COMPANY and Vice President of NATIONAL INDEMNITY COMPANY and NATIONAL LIABILITY & FIRE INSURANCE COMPANY, who being duly sworn, says that his capacity is as designated above for such Companies; that he knows the corporate seals of the Companies; that the seals affixed to the foregoing instrument are such corporate seals; that they were affixed by order of the board of directors or other governing body of said Companies pursuant to its Bylaws, Resolutions and other Authorizations, and that he signed said instrument in that capacity of said Companies.

[Notary Seal]

GEOFFERY A. DELISIO
Notary Public
Commonwealth of Massachusetts
My Comm. Expires November 29, 2024

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Notary Public

I, Ralph Tornetta, the undersigned, Officer of **BERKSHIRE HATHAWAY SPECIALTY INSURANCE COMPANY, NATIONAL INDEMNITY COMPANY AND NATIONAL LIABILITY & FIRE INSURANCE COMPANY,** do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies which is in full force and effect and has not been revoked. IN TESTIMONY WHEREOF, I have hereunto affixed the seals of said Companies this July 6, 2022.

_____
Officer

To verify the authenticity of this Power of Attorney please contact us at: BHSI Surety Department, Berkshire Hathaway Specialty Insurance Company, One Lincoln Street, 23rd Floor Boston, MA 02111 | (770) 625-1516 or by email at Jennifer.Porter@bhspecialty.com *THIS POWER OF ATTORNEY IS VOID IF ALTERED*

To notify us of a claim please contact us on our 24-hour toll free number at (855) 453-9675, via email at claimsnotice@bhspecialty.com, via fax to (617) 507-8259, or via mail.