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

C204356

CONTRACT AND
CONTRACT BONDS

FOR CONTRACT NO. C204356

WBS 34518.3.8 STATE FUNDED

T.I.P NO. R-2915E

COUNTY OF ASHE
THIS IS THE ROADWAY & CULVERT CONTRACT
ROUTE NUMBER US 221 LENGTH 3.537 MILES
LOCATION US-221 FROM US-221 BYPASS TO US-221 BUSINESS/NC-88 IN JEFFERSON.

CONTRACTOR JAMES R VANNOY & SONS CONSTRUCTION COMPANY INC
ADDRESS P.O. BOX 635
JEFFERSON, NC 286400635

BIDS OPENED MARCH 17, 2020
CONTRACT EXECUTION 4/9/2020

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

PROPOSAL

INCLUDES ADDENDUM No. 1 DATED 03-03-2020

DATE AND TIME OF BID OPENING: **MARCH 17, 2020 AT 2:00 PM**

CONTRACT ID	C204356
WBS	34518.3.8

FEDERAL-AID NO.	STATE FUNDED
COUNTY	ASHE
T.I.P. NO.	R-2915E
MILES	3.537
ROUTE NO.	US 221
LOCATION	US-221 FROM US-221 BYPASS TO US-221 BUSINESS/NC-88 IN JEFFERSON.
TYPE OF WORK	WIDENING, GRADING, DRAINAGE, PAVING, SIGNALS, AND CULVERTS.

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 & CULVERT PROPOSAL

5% BID BOND OR BID DEPOSIT REQUIRED

_____

PROPOSAL FOR THE CONSTRUCTION OF

CONTRACT No. C204356 IN ASHE 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. **C204356** 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. **C204356** in **Ashe 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.

NORTH CAROLINA PROFESSIONAL SEAL 022071 ENGINEER RONALD ELTON DAVENPORT, JR.

State Contract Officer

DocuSigned by:
Ronald E. Davenport, Jr. 3/2/2020
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TABLE OF CONTENTS

COVER SHEET
PROPOSAL SHEET

PROJECT SPECIAL PROVISIONS

CONTRACT TIME AND LIQUIDATED DAMAGES: G-1
INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES: G-1
INTERMEDIATE CONTRACT TIME NUMBER 2 AND LIQUIDATED DAMAGES: G-2
INTERMEDIATE CONTRACT TIME NUMBER 3 AND LIQUIDATED DAMAGES: G-3
PERMANENT VEGETATION ESTABLISHMENT: G-3
CONSTRUCTION MORATORIUM: G-4
MAJOR CONTRACT ITEMS: G-4
SPECIALTY ITEMS: G-4
FUEL PRICE ADJUSTMENT: G-5
SCHEDULE OF ESTIMATED COMPLETION PROGRESS: G-5
MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE: G-6
CONTRACTOR'S LICENSE REQUIREMENTS: G-21
USE OF UNMANNED AIRCRAFT SYSTEM (UAS): G-21
SUBSURFACE INFORMATION: G-21
PORTABLE CONCRETE BARRIER - (Partial Payments for Materials): G-21
MAINTENANCE OF THE PROJECT: G-22
AWARD OF CONTRACT: G-22
ELECTRONIC BIDDING: G-23
TWELVE MONTH GUARANTEE: G-23
OUTSOURCING OUTSIDE THE USA: G-24
EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION: G-24
PROCEDURE FOR MONITORING BORROW PIT DISCHARGE: G-29
TROUT BUFFER VARIANCE: G-31

ROADWAY R-1

STANDARD SPECIAL PROVISIONS

AVAILABILITY FUNDS – TERMINATION OF CONTRACTS SSP-1
NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY SSP-2
ERRATA SSP-5
PLANT AND PEST QUARANTINES SSP-6
MINIMUM WAGES SSP-7
TITLE VI AND NONDISCRIMINATION SSP-8
ON-THE-JOB TRAINING SSP-16

UNIT PROJECT SPECIAL PROVISIONS

GEOTECHNICAL GT-0.1
UTILITY CONSTRUCTION UC-1
UTILITY BY OTHERS UBO-1
EROSION CONTROL EC-1

PIPE LINER..... PL-I
STORM WATER..... SW-1
TRAFFIC SIGNALS ..... TS-I
STRUCTURE / CULVERTS..... ST-I

PERMITS .....P-I

PROPOSAL ITEM SHEET

ITEM SHEET(S) (TAN SHEETS)

PROJECT SPECIAL PROVISIONS

GENERAL

CONTRACT TIME AND LIQUIDATED DAMAGES:

(8-15-00) (Rev. 12-18-07) 108 SP1 G07 A

The date of availability for this contract is **July 1, 2020**, 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 **November 11, 2024**.

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 **July 1, 2020**.

The completion date for this intermediate contract time is **May 15, 2024**.

The liquidated damages for this intermediate contract time are **Two Thousand Dollars ($ 2,000.00)** 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 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 **US 221, US 221 Business and NC 163** during the following time restrictions:

DAY AND TIME RESTRICTIONS
Monday thru Friday
7:00 AM to 8:30 AM

In addition, the Contractor shall not close or narrow a lane of traffic on **US 221, US 221 Business and NC 163**, 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 **7:00 AM** December 31st and **6:00 PM** January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until **6:00 PM** the following Tuesday.

3. For Easter, between the hours of **7:00 AM** Thursday and **6:00 PM** Monday.

4. For Memorial Day, between the hours of **7:00 AM** Friday and **6:00 PM** Tuesday.

5. For Independence Day, between the hours of **7:00 AM** the day before Independence Day and **6:00 PM** the day after Independence Day.

   If Independence Day is on a Friday, Saturday, Sunday or Monday, then between the hours of **7:00 AM** the Thursday before Independence Day and **6:00 PM** the Tuesday after Independence Day.

6. For Labor Day, between the hours of **7:00 AM** Friday and **6:00 PM** Tuesday.

7. For Thanksgiving, between the hours of **7:00 AM** Tuesday and **6:00 PM** Monday.

8. For Christmas, between the hours of **7:00 AM** the Friday before the week of Christmas Day and **6:00 PM** the following Tuesday after the week of Christmas Day.

9. For the **"Christmas in July" Festival**, typically occurring during the first weekend of July, between the hours of **7:00 AM** the **Friday** before the **"Christmas in July" Festival** and **6:00 PM** the following **Monday** after the **"Christmas in July" Festival**.

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 **One Thousand Dollars ($ 1,000.00)** per hour.

INTERMEDIATE CONTRACT TIME NUMBER 3 AND LIQUIDATED DAMAGES:

(2-20-07) (Rev. 6-18-13) 108 SP1 G14 H

The Contractor shall complete the work required of **Phase I, Step #2**, pertaining to construction of -Y35- (SR 1149 - Mount Jefferson Road), as shown on Sheet **TMP-3** and shall place and maintain traffic on same.

The date of availability for this intermediate contract time is the date the Contractor elects to begin the work.

The completion date for this intermediate contract time is the date which is **twenty-one (21)** consecutive calendar days after and including the date the Contractor begins this work.

The liquidated damages are **Five Hundred Dollars ($ 500.00)** 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.

CONSTRUCTION MORATORIUM:
(7-15-14) SP1 G18A

No in-water work or land disturbance within the 25 foot wide buffer zone will be allowed from **October 15** through **April 15** of any year.

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
5	Unclassified Excavation
15	Temporary Shoring
71	Asphalt Conc Base Course, Type B25.0C
72	Asphalt Conc Intermediate Course, Type I19.0C
73	Asphalt Conc Surface Course, Type S9.5C
279	Sound Barrier Wall NW7B

SPECIALTY ITEMS:
(7-1-95)(Rev. 1-17-12) 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
120-132	Guardrail
133-136	Fencing
141-152	Signing
171-174, 181-182, 188	Long-Life Pavement Markings
189	Permanent Pavement Markers
190-205	Utility Construction
206-243,245	Erosion Control
244	Reforestation
246-273	Signals/ITS System

FUEL PRICE ADJUSTMENT:

(11-15-05) (Rev. 2-18-14) 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 **$ 1.8495** 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	2.90
Asphalt Concrete Intermediate Course, Type ____	Gal/Ton	2.90
Asphalt Concrete Surface Course, Type ____	Gal/Ton	2.90
Open-Graded Asphalt Friction Course	Gal/Ton	2.90
Permeable Asphalt Drainage Course, Type ____	Gal/Ton	2.90
Sand Asphalt Surface Course, Type ____	Gal/Ton	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

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)
2021	(7/01/20 - 6/30/21)	**33**% of Total Amount Bid
2022	(7/01/21 - 6/30/22)	**29**% of Total Amount Bid
2023	(7/01/22 - 6/30/23)	**25**% of Total Amount Bid
2024	(7/01/23 - 6/30/24)	**13**% 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.

MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE:

(10-16-07)(Rev. 12-17-19) 102-15(J) SP1 G66

Description

The purpose of this Special Provision is to carry out the North Carolina Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts financed in whole or in part with State funds.

Definitions

Additional MBE/WBE Subcontractors - Any MBE/WBE submitted at the time of bid that will not be used to meet the Combined MBE /WBE Goal. No submittal of a Letter of Intent is required.

Combined MBE/WBE Goal: A portion of the total contract, expressed as a percentage that is to be performed by committed MBE/WBE subcontractors.

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

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

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

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

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

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) MBE/WBE firm.

North Carolina Unified Certification Program (NCUCP) - A program that provides comprehensive services and information to applicants for MBE/WBE certification. The MBE/WBE program follows the same regulations as the federal Disadvantaged Business Enterprise (DBE) program 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.

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

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

Forms and Websites Referenced in this Provision

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

DBE-1S *Subcontractor Payment Information* - Form for reporting the payments made to all MBE/WBE firms working on the project. This form is for paper bid projects only. https://connect.ncdot.gov/business/Turnpike/Documents/Form%20DBE-1S%20Subcontractor%20Payment%20Information.pdf

RF-1 *MBE/WBE Replacement Request Form* - Form for replacing a committed MBE or WBE. 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 MBE/WBE subcontractor, manufacturer or regular dealer that affirms that a portion of said contract is going to be performed by the signed MBE/WBE 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 MBE and WBE Subcontractors Form - Form for entering MBE/WBE subcontractors on a project that will meet the Combined MBE/WBE goal. This form is for paper bids only.

http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/09%20MBE-WBE%20Subcontractors%20(State).docx

Subcontractor Quote Comparison Sheet - Spreadsheet for showing all subcontractor quotes in the work areas where MBEs and WBEs 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

Combined MBE/WBE Goal

The Combined MBE/WBE Goal for this project is **8.0%**

The Combined Goal was established utilizing the following anticipated participation for Minority Business Enterprises and Women Business Enterprises:

(A) Minority Business Enterprises **4.0 %**

(1) *If the anticipated MBE participation is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that MBEs participate in at least the percent of the contract as set forth above.

(2) *If the anticipated MBE participation is zero*, the Contractor shall make an effort to recruit and use MBEs during the performance of the contract. Any MBE participation obtained shall be reported to the Department.

(B) Women Business Enterprises **4.0 %**

(1) *If the anticipated WBE participation is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that WBEs participate in at least the percent of the contract as set forth above.

(2) *If the anticipated WBE participation is zero*, the Contractor shall make an effort to recruit and use WBEs during the performance of the contract. Any WBE participation obtained shall be reported to the Department.

The Bidder is required to submit only participation to meet the Combined MBE/WBE Goal. The Combined Goal may be met by submitting all MBE participation, all WBE participation, or a combination of MBE and WBE participation.

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 MBE and WBE certified shall be used to meet the Combined MBE/WBE 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 MBE/WBE Subcontractors

At the time of bid, bidders shall submit all MBE and WBE participation that they anticipate to use during the life of the contract. Only those identified to meet the Combined MBE/WBE Goal will be considered committed, even though the listing shall include both committed MBE/WBE subcontractors and additional MBE/WBE subcontractors. Any additional MBE/WBE subcontractor participation above the goal will follow the banking guidelines found elsewhere in this provision. All other additional MBE/WBE subcontractor participation submitted at the time of bid will be used toward the Department's overall race-neutral goals. Only those firms with current MBE and WBE certification at the time of bid opening will be acceptable for listing in the bidder's submittal of MBE and WBE participation. The Contractor shall indicate the following required information:

(A) Electronic Bids

Bidders shall submit a listing of MBE and WBE participation in the appropriate section of the electronic submittal file.

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

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

(3) The bidder shall be responsible for ensuring that the MBE and WBE are 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 MBE's or WBE's participation will not count towards achieving the Combined MBE/WBE goal.

(B) Paper Bids

(1) *If the Combined MBE/WBE Goal is more than zero,*

(a) Bidders, at the time the bid proposal is submitted, shall submit a listing of MBE/WBE participation, including the names and addresses on *Listing of MBE and WBE 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 MBE and WBE participation for the contract.

(b) If bidders have no MBE or WBE participation, they shall indicate this on the *Listing of MBE and WBE 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 MBE and WBE 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 MBE/WBE 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 MBE's or WBE's participation will not count towards achieving the Combined MBE/WBE Goal.

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

MBE or WBE Prime Contractor

When a certified MBE or WBE firm bids on a contract that contains a Combined MBE/WBE goal, the 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 MBE or WBE bidder on a contract will meet the Combined MBE/WBE Goal by virtue of the work it performs on the contract with its own forces. However, all the work that is performed by the MBE or WBE bidder and any other similarly certified subcontractors will count toward the goal. The MBE or WBE bidder shall list itself along with any MBE or WBE subcontractors, if any, in order to receive credit toward the goal.

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

Written Documentation – Letter of Intent

The bidder shall submit written documentation for each MBE/WBE that will be used to meet the Combined MBE/WBE Goal of the contract, indicating the bidder's commitment to use the MBE/WBE 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 MBE and WBE to be used toward the Combined MBE/WBE Goal, or if the form is incomplete (i.e. both signatures are not present), the MBE/WBE participation will not count toward meeting the Combined MBE/WBE Goal. If the lack of this participation drops the commitment below the Combined MBE/WBE

Goal, the Contractor shall submit evidence of good faith efforts for the goal, 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.

Banking MBE/WBE Credit

If the bid of the lowest responsive bidder exceeds $500,000 and if the committed MBE/WBE participation submitted exceeds the algebraic sum of the Combined MBE /WBE Goal by $1,000 or more, the excess will be placed on deposit by the Department for future use by the bidder. Separate accounts will be maintained for MBE and WBE participation and these may accumulate for a period not to exceed 24 months.

When the apparent lowest responsive bidder fails to submit sufficient participation by MBE and WBE firms to meet the advertised goal, as part of the good faith effort, the Department will consider allowing the bidder to withdraw funds to meet the Combined MBE/WBE Goal as long as there are adequate funds available from the bidder's MBE and WBE bank accounts.

Submission of Good Faith Effort

If the bidder fails to meet or exceed the Combined MBE/WBE Goal, the apparent lowest responsive bidder shall submit to the Department documentation of adequate good faith efforts made to reach that specific 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 would be 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 MBE/WBE 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 a Combined MBE/WBE Goal 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 MBE/WBE participation. Adequate good faith efforts also mean that the bidder actively and aggressively sought MBE/WBE 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 goals 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 MBEs/WBEs that are also prequalified subcontractors. The bidder must solicit this interest within at least 10 days prior to bid opening to allow the MBEs/WBEs to respond to the solicitation. Solicitation shall provide the opportunity to MBEs/WBEs within the Division and surrounding Divisions where the project is located. The bidder must determine with certainty if the MBEs/WBEs are interested by taking appropriate steps to follow up initial solicitations.

(B) Selecting portions of the work to be performed by MBEs/WBEs in order to increase the likelihood that the Combined MBE/WBE Goal will be achieved.

(1) Where appropriate, break out contract work items into economically feasible units to facilitate MBE/WBE 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 advertised goal when the work to be sublet includes potential for MBE/WBE participation (2nd and 3rd tier subcontractors).

(C) Providing interested certified MBEs/WBEs that are also prequalified subcontractors 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 MBEs/WBEs. It is the bidder's responsibility to make a portion of the work available to MBE/WBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available MBE/WBE subcontractors and suppliers, so as to facilitate MBE/WBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of MBEs/WBEs 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 MBEs/WBEs to perform the work.

(2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including MBE/WBE subcontractors, and would take a firm's price and capabilities as well as the advertised goal into consideration. However, the fact that there may be some additional costs involved in finding and using MBEs/WBEs is not in itself sufficient reason for a bidder's failure to meet the contract 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 MBEs/WBEs if the price difference is excessive or unreasonable.

(E) Not rejecting MBEs/WBEs 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 MBEs/WBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or bidder.

(G) Making efforts to assist interested MBEs/WBEs 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 MBEs/WBEs. 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 MBE or WBE quotes.

(I) Any other evidence that the bidder submits which shows that the bidder has made reasonable good faith efforts to meet the advertised 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 Combined MBE/WBE Goal.

(2) The bidders' past performance in meeting the contract goal.

(3) The performance of other bidders in meeting the advertised goal. For example, when the apparent successful bidder fails to meet the 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 advertised goal, but meets or exceeds the average MBE and WBE 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 Combined MBE/WBE Goal can be met or that an adequate good faith effort has been made to meet the advertised 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 MBE/WBE Participation Toward Meeting the Combined MBE/WBE Goal

(A) Participation

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

(B) Joint Checks

Prior notification of joint check use shall be required when counting MBE/WBE 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 MBE/WBE may enter into subcontracts. Work that a MBE subcontracts to another MBE firm may be counted toward the anticipated MBE participation. The same holds true for work that a WBE subcontracts to another WBE firm. Work that a MBE/WBE subcontracts to a non-MBE/WBE firm does <u>not</u> count toward the contract goal requirement. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the MBE or WBE participation breakdown. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified firms and there is no interest or availability, and they can get assistance from other certified firms, the Engineer will not hold the prime responsible for meeting the individual MBE or WBE breakdown. If a MBE or WBE 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 MBE or WBE is not performing a commercially useful function.

(D) Joint Venture

When a MBE or WBE 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 MBE or WBE in the joint venture, that portion of the total dollar value being a distinct clearly defined portion of work that the MBE or WBE performs with its forces.

(E) Suppliers

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

(F) Manufacturers and Regular Dealers

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

(1) The fees or commissions charged by a MBE/WBE 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 MBE/WBE, 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) MBE/WBE Utilization

The Contractor may count toward its contract goal requirement only expenditures to MBEs and WBEs that perform a commercially useful function in the work of a contract. A MBE/WBE 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 MBE/WBE 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 MBE/WBE 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 MBE/WBE credit claimed for its performance of the work, and any other relevant factors. If it is determined that a MBE or WBE is not performing a Commercially Useful Function, the contractor may present evidence to rebut this presumption to the Department.

(B) MBE/WBE Utilization in Trucking

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

(1) The MBE/WBE 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 the Combined MBE/WBE Goal.

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

(3) The MBE/WBE 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 MBE may subcontract the work to another MBE firm, including an owner-operator who is certified as a MBE. The same holds true that a WBE may subcontract the work to another WBE firm, including an owner-operator who is certified as a WBE. When this occurs, the MBE or WBE who subcontracts work receives credit for the total value of the transportation services the subcontracted MBE or WBE provides on the contract. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the participation breakdown. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified transportation service providers and there is no interest or availability, and they can get assistance from other certified providers, the Engineer will not hold the prime responsible for meeting the individual MBE or WBE participation breakdown.

(5) The MBE/WBE may also subcontract the work to a non-MBE/WBE firm, including from an owner-operator. The MBE/WBE who subcontracts the work to a non-MBE/WBE is entitled to credit for the total value of transportation services provided by the non-MBE/WBE subcontractor not to exceed the value of transportation services provided by MBE/WBE-owned trucks on the contract. Additional participation by non-MBE/WBE 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 MBE/WBE and the Contractor will not count towards the MBE/WBE contract requirement.

(6) A MBE/WBE may lease truck(s) from an established equipment leasing business open to the general public. The lease must indicate that the MBE/WBE 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 MBE/WBE, so long as the lease gives the MBE/WBE absolute priority for

use of the leased truck. This type of lease may count toward the MBE/WBE's credit as long as the driver is under the MBE/WBE's payroll.

(7) Subcontracted/leased trucks shall display clearly on the dashboard the name of the MBE/WBE 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.

MBE/WBE Replacement

When a Contractor has relied on a commitment to a MBE or WBE subcontractor (or an approved substitute MBE or WBE subcontractor) to meet all or part of a contract goal requirement, the contractor shall not terminate the MBE/WBE 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 MBE/WBE subcontractor, a non-MBE/WBE 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 MBE/WBE 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 MBE/WBE subcontractor five (5) business days to respond to the Contractor's Notice of Intent to Request Termination and/or Substitution. If the MBE/WBE subcontractor objects to the intended termination/substitution, the MBE/WBE, 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 MBE/WBE subcontractor.

A committed MBE/WBE 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 MBE/WBE subcontractor fails or refuses to execute a written contract;
(b) The listed MBE/WBE 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 MBE/WBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the prime contractor;
(c) The listed MBE/WBE subcontractor fails or refuses to meet the prime contractor's reasonable, nondiscriminatory bond requirements;
(d) The listed MBE/WBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
(e) The listed MBE/WBE 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 MBE/WBE subcontractor is not a responsible contractor;
(g) The listed MBE/WBE voluntarily withdraws from the project and provides written notice of withdrawal;
(h) The listed MBE/WBE is ineligible to receive MBE/WBE credit for the type of work required;

(i) A MBE/WBE owner dies or becomes disabled with the result that the listed MBE/WBE contractor is unable to complete its work on the contract;
(j) Other documented good cause that compels the termination of the MBE/WBE subcontractor. Provided, that good cause does not exist if the prime contractor seeks to terminate a MBE/WBE it relied upon to obtain the contract so that the prime contractor can self-perform the work for which the MBE/WBE contractor was engaged or so that the prime contractor can substitute another MBE/WBE or non-MBE/WBE contractor after contract award.

The Contractor shall comply with the following for replacement of a committed MBE/WBE:

(A) Performance Related Replacement

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

If a replacement MBE/WBE is not found that can perform at least the same amount of work as the terminated MBE/WBE, 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 MBE/WBEs that their interest is solicited in contracting the work defaulted by the previous MBE/WBE or in subcontracting other items of work in the contract.

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

(a) The names, addresses, and telephone numbers of MBE/WBEs who were contacted.
(b) A description of the information provided to MBE/WBEs regarding the plans and specifications for portions of the work to be performed.

(3) A list of reasons why MBE/WBE quotes were not accepted.

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

(B) Decertification Replacement

(1) When a committed MBE/WBE 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 MBE/WBE 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 MBE/WBE is decertified prior to the Department receiving the SAF (*Subcontract Approval Form*) for the named MBE/WBE firm, the Contractor shall take all necessary and reasonable steps to replace the MBE/WBE subcontractor with another MBE/WBE subcontractor to perform at least the same amount of work to meet the Combined MBE/WBE goal requirement. If a MBE/WBE 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).

All requests for replacement of a committed MBE/WBE 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 MBE/WBE, 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 MBE/WBE based upon the Contractor's commitment, the MBE/WBE shall participate in additional work to the same extent as the MBE/WBE 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 MBEs/WBEs 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 MBE/WBE, the Contractor shall seek participation by MBEs/WBEs 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 MBE/WBE, the Contractor shall seek additional participation by MBEs/WBEs equal to the reduced MBE/WBE 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 MBE/WBE subcontractor. The Department reserves the right to require copies of actual subcontract agreements involving MBE/WBE 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 MBE/WBE 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 MBE/WBE credit.

Reporting Minority and Women Business Enterprise Participation

The Contractor shall provide the Engineer with an accounting of payments made to all MBE/ WBE 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 MBEs/WBEs, 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-MBE/WBE 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 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.

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).

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.

SUBSURFACE INFORMATION:

(7-1-95) 450 SP1 G112 D

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

PORTABLE CONCRETE BARRIER - (Partial Payments for Materials):

(7-1-95) (Rev. 8-16-11) 1170-4 SP1 G121

When so authorized by the Engineer, partial materials payments will be made up to 95 percent of the delivered cost of portable concrete barrier, provided that these materials have been delivered on the project and stored in an acceptable manner, and further provided the documents listed in Subarticle 109-5(C) of the *2018 Standard Specifications* have been furnished to the Engineer.

The provisions of Subarticle 109-5(B) of the *2018 Standard Specifications* will apply to the portable concrete barrier.

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.

AWARD OF CONTRACT:

Revise the 2018 *Standard Specifications* as follows:

Page 1-23, Subarticle 103-4 (A) General, first paragraph, replace the 3rd and 4th sentences with the following:

Where award is to be made, the notice of award will be issued within 60 days after the opening of bids or upon issuance of any necessary debt instrument, whichever is later, but not to exceed 120 days; except with the consent of the lowest responsible bidder the decision to award the contract to such bidder may be delayed for as long a time as may be agreed upon by the Department and such bidder. In the absence of such agreement, the lowest responsible bidder may withdraw his bid at the expiration of 120 days without penalty if no notice of award has been issued.

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"

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.

OUTSOURCING OUTSIDE THE USA:

(9-21-04) (Rev. 5-16-06) SP1 G150

All work on consultant contracts, services contracts, and construction contracts shall be performed in the United States of America. No work shall be outsourced outside of the United States of America.

Outsourcing for the purpose of this provision is defined as the practice of subcontracting labor, work, services, staffing, or personnel to entities located outside of the United States.

The North Carolina Secretary of Transportation shall approve exceptions to this provision in writing.

EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:

(1-16-07) (Rev 04-01-19) 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:

(I) 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 of 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-B Certified Designer on the erosion and sediment control/stormwater component of all reclamation plans and if applicable, the certification number of the Level III-A 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 40I 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 I5 milliequivalents per I00 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.

TROUT BUFFER VARIANCE:

No in-water work or land disturbance may occur within any trout stream buffer zone until the trout variance is acquired by the Department and permission is granted by the Engineer.

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.

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* or *Milling Asphalt Pavement, __" Depth*. 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. 5-19-15) 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 Value Management 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-V1 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 State Value Management Engineer at valuemanagementunit@ncdot.gov for review. The Engineer and the State Value Management 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*.

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

POLYPROPYLENE CULVERT PIPE:

(8-20-19) 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, 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

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

Item	**Section**
Polypropylene Pipe	1032-9

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 11 reinforced concrete pipe, aluminized 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.

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.

CLASS IV SUBGRADE STABILIZATION IN LIEU OF CHEMICAL STABILIZATION:

(6-16-15) (Rev. 5-15-18) 501, 542 SP5 R17

Description

In lieu of chemical stabilization, provide Class IV subgrade stabilization by replacing 8 inches of subgrade soils with geotextile and Class IV select material. This substitution is allowed in full typical section width and cannot result in chemically stabilized sections less than 1,000 feet in length, unless otherwise approved by the Engineer. This substitution is not allowed for chemically stabilized sections with geotextile for pavement stabilization. Notify the Engineer at least 30 days in advance of starting Class IV subgrade stabilization in lieu of chemical stabilization. Define "subbase" as the portion of the roadbed below the Class IV subgrade stabilization.

Materials

Refer to the *2018 Standard Specifications*.

Item	Section
Geotextile for Soil Stabilization, Type 4	1056
Select Material, Class IV	1016

Use Class IV select material for Class IV subgrade stabilization.

Construction Methods

Before placing geotextile for soil stabilization below Class IV subgrade stabilization, proof roll subbases in accordance with Section 260 of the Standard Specifications. Install geotextile for soil stabilization in accordance with Article 270-3 in the *2018 Standard Specifications*. Place, compact and maintain Class IV subgrade stabilization in accordance with Article 505-3 of the *2018 Standard Specifications* for a Type 2 aggregate subgrade.

Measurement and Payment

Class IV Subgrade Stabilization in Lieu of Chemical Stabilization will be paid at the prices established in the contract that relate to the chemical stabilization type that is being replaced (lime or cement). No direct payment will be made for additional excavation required to accommodate this alternate.

The total amount paid for this subgrade stabilization alternative will be limited to the contract amounts per square yard for replacement for Portland cement or lime, theoretical tons of Portland cement or lime replaced, mixing of cement or lime, and theoretical gallons of asphalt curing seal replaced at the rate of 0.15 gallons per square yard.

A supplement agreement will be executed prior to starting the work to create a square yard price for the *Class IV Subgrade Stabilization in Lieu of Chemical Stabilization* and deleting the quantities associated with the work being replaced.

SHOULDER WEDGE:

(9-20-11) (Rev. 8-21-12) 610 SP6 R03R

Revise the *2018 Standard Specifications* as follows:

Page 6-21, Article 610-8, SPREADING AND FINISHING, add the following after line 39:

Attach a device, mounted on screed of paving equipment, capable of constructing a shoulder wedge with an angle of 30 degrees plus or minus 4 degrees along the outside edge of the roadway, measured from the horizontal plane in place after final compaction on the final surface course. Use an approved mechanical device which will form the asphalt mixture to produce a wedge with uniform texture, shape and density while automatically adjusting to varying heights.

Payment for use of this device will be incidental to the other pay items in the contract.

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 **$ 494.58** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **February 1, 2020**.

MILLING ASPHALT PAVEMENT:

(1-15-19) 607 SP6 R59

Revise the *2018 Standard Specifications* as follows:

Page 6-5, Article 607-2, EQUIPMENT, lines 14-16, delete the seventh sentence of this Article and replace with the following:

Use either a non-contacting laser or sonar type ski system with a minimum of three referencing stations mounted on the milling machine at a length of at least 24 feet.

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 (1ntermediate & 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**	**Max. Rut**	**Volumetric Properties [B]**			
			G_{mm} @		**VMA**	**VTM**	**VFA**	

			N_{ini}	N_{des}	Depth (mm)	% Min.	%	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, DENS1TY REQU1REMENTS, replace with the following:

TABLE 610-7 DENS1TY REQU1REMENTS	
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, F1NAL SURFACE TEST1NG, 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 1tem	**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 PROPERT1ES, replace with the following:

TABLE 1012-1
AGGREGATE CONSENSUS PROPERT1ES[A]

Mix Type	Coarse Aggregate Angularity[B]	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 MACH1NE GU1DANCE

(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 one GPS rover unit for use during the duration of the contract. The rover 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 rover 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.

GUARDRAIL END UNITS, TYPE - TL-2:

(10-21-08) (Rev. 7-1-17) 862 SP8 R64

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 2 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-2	Each

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

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

Item	Section
Grout, Type 2	1003
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.

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.

SNOWPLOWABLE PAVEMENT MARKERS:

3-19-19 1086, 1250, 1253 SP10 R07

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 snowplowable pavement markers evaluated by NTPEP. The 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. Shape the housing to deflect a snowplow

blade upward in both directions without being damaged. Plastic lens faces shall use an abrasion resistant coating.

Use recycled snowplowable pavement markers that meet all the requirements of new snowplowable pavement markers except Subarticle 1086-3(B)(1). Recycled snowplowable pavement markers with minimal variation in dimensions are acceptable only when the reflector fits in the housing of the recycled snowplowable pavement marker as originally designed.

(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 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 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.

Install snowplowable pavement marker housings into slots sawcut into the pavement. Make slots in the pavement to exactly duplicate the shape of the housing of the snowplowable pavement markers.

Promptly remove all debris resulting from the saw cutting operation from the pavement surface. Install the marker housings within 7 calendar days after saw cutting slots in 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. Fill the cleaned slots totally with epoxy adhesive flush with the surface of the existing pavement. Install snowplowable pavement markers according to the manufacturer's recommendations.

Protect the 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 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 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. Removal of broken housings and preparation of slots will be considered incidental to the work of replacing housings.

(C) Recycled Snowplowable Pavement Marker Housings

Use properly refurbished snowplowable pavement marker housings as approved by the Engineer such that approved new reflectors can be installed inside the housings.

TEMPORARY SHORING:

(2-20-07) (Rev. 1-16-18) 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, welded wire grid or metallic strip reinforcement.

Temporary geosynthetic walls consist of geotextile or geogrid reinforcement wrapped behind welded wire facing. Define "temporary geotextile wall" as a temporary geosynthetic wall with geotextile reinforcement and "temporary geogrid wall" as a temporary geosynthetic wall with geogrid 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 height below the grade in front of walls.

(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
Neat Cement Grout	1003
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
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 1V select material for temporary guardrail. Use neat cement grout for Type 2 grout for ground anchors. Use 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 11, Type 1, Class 111, Class V or Class V1 select material or material that meets AASHTO M 145 for soil classification A-2-4 with a maximum P1 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*.

(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 Reinforcement

Use geogrids with a roll width of at least 4 feet and an "approved" or "approved for provisional use" status code. The list of approved geogrids is available from: connect.ncdot.gov/resources/Materials/Pages/Materials-Manual-by-Material.aspx

Provide geogrids for geogrid reinforcement with design strengths in accordance with the accepted submittals. Geogrids are typically approved for ultimate tensile strengths in the machine direction (MD) and cross-machine direction (CD) or short-term design strengths for a 3-year design life in the MD 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 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. For LRFD shoring designs, apply traffic (live load) surcharge in accordance with Figure C11.5.5-3 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 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. For anchored shoring designs, apply traffic impact load as horizontal load (P_{HI}) in accordance with Figure 3.11.6.3-2(a) of the AASHTO LRFD specifications.

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 reinforcement, use approved geogrid properties available from the website shown elsewhere in this provision. If the website does not list a short-term design strength for an approved geogrid, use a short-term design strength equal to the ultimate tensile strength divided by 3.5 for the geogrid reinforcement. 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 geotextile or geogrid 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.

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 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:

(I) 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.

(I) 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 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) 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.

Wrap geotextile reinforcement and retention geotextiles behind welded wire facing as shown in the plans and accepted submittals and 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 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 geotextile or geogrid reinforcement 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

EXTRUDED THERMOPLASTIC PAVEMENT MARKING THICKNESS:

3-19-19 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 a minimum pavement marking thickness of 0.090 inch above the surface of the pavement.

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. 1f 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, 1tchgrass, 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. 1n 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.1-15-19) 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 10-162, 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

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

MINIMUM WAGES

(7-21-09) Z-5

FEDERAL: The Fair Labor Standards Act provides that with certain exceptions every employer shall pay wages at the rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

STATE: The North Carolina Minimum Wage Act provides that every employer shall pay to each of his employees, wages at a rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

The minimum wage paid to all skilled labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

The minimum wage paid to all intermediate labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

The minimum wage paid to all unskilled labor on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

This determination of the intent of the application of this act to the contract on this project is the responsibility of the Contractor.

The Contractor shall have no claim against the Department of Transportation for any changes in the minimum wage laws, Federal or State. It is the responsibility of the Contractor to keep fully informed of all Federal and State Laws affecting his contract.

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 Fthnicity	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

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.

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PROJECT SPECIAL PROVISIONS

GEOTECHNICAL

STANDARD SHORING (SPECIAL)	GT-1.1 - GT-1.4
TEMPORARY SOIL NAIL WALLS (SPECIAL)	GT-2.1 - GT-2.9
GEOTEXTILE FOR PAVEMENT STABILIZATION - (5/15/2018)	GT-3.1 - GT-3.2

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Geotechnical Engineering Unit
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STANDARD SHORING: **(1-16-18)**

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
Neat Cement 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 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,

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(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 with a roll width of at least 4 ft and an "approved" or "approved for provisional use" status code. The list of approved geogrids is available from: connect.ncdot.gov/resources/Materials/Pages/Materials-Manual-by-Material.aspx

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 geogrid wall location, provide geogrids for geogrid reinforcement with short-term design strengths as shown in Geotechnical Standard Detail No. 1801.02. Geogrids are typically approved for ultimate tensile strengths in the machine direction (MD) and cross-machine direction (CD) or short-term design strengths for a 3-year design life in the MD 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 I or Class III Select Material
Coarse Aggregate	Class V or VI Select Material

If the website does not list a short-term design strength for an approved geogrid, use a short-term design strength equal to the ultimate tensile strength divided by 3.5 for the geogrid reinforcement.

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

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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 V1 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.

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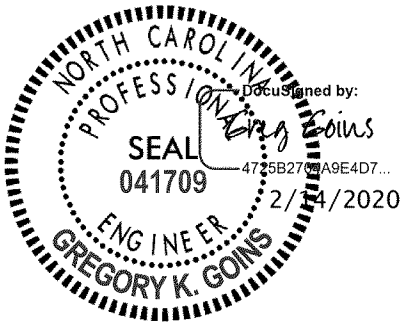
Measurement and Payment

Standard shoring will be measured and paid in accordance with the *Temporary Shoring* provision.



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TEMPORARY SOIL NAIL WALLS: (1-16-18)

Description

Construct temporary soil nail walls consisting of soil nails spaced at a regular pattern and connected to a reinforced shotcrete face. A soil nail consists of a steel bar grouted in a drilled hole inclined at an angle below horizontal. At the Contractor's option, use temporary soil nail walls instead of temporary shoring for full cut sections. Design and construct temporary soil nail walls based on actual elevations and wall dimensions in accordance with the contract and accepted submittals. Use a prequalified Anchored Wall Contractor to construct temporary soil nail walls. Define "soil nail wall" as a temporary soil nail wall and "Soil Nail Wall Contractor" as the Anchored Wall Contractor installing soil nails and applying shotcrete. Define "nail" as a soil nail.

Provide positive protection for soil nail walls at locations shown in the plans and as directed. See *Temporary Shoring* provision for positive protection types and definitions.

Materials

Refer to Division 10 of the *Standard Specifications*.

Item	Section
Geocomposites	1056
Neat Cement Grout, Type 2	1003
Reinforcing Steel	1070
Shotcrete	1002
Select Material, Class IV	1016
Steel Plates	1072-2

Use Class IV select material for temporary guardrail. Provide soil nails consisting of grouted steel bars and nail head assemblies. Use deformed steel bars that meet AASHTO M 275 or M 31, Grade 60 or 75. Splice bars in accordance with Article 1070-9 of the *Standard Specifications*.

Fabricate centralizers from schedule 40 PVC plastic pipe or tube, steel or other material not detrimental to steel bars (no wood). Size centralizers to position bars within 1" of drill hole centers and allow tremies to be inserted to ends of holes. Use centralizers that do not interfere with grout placement or flow around bars.

Provide nail head assemblies consisting of nuts, washers and bearing plates. Use steel plates for bearing plates and steel washers and hex nuts recommended by the Soil Nail Manufacturer.

Provide Type 6 material certifications for soil nail materials in accordance with Article 106-3 of the *Standard Specifications*. 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 soil nail wall materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

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

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is not available, set concrete barrier next to and up against traffic side of soil nail walls except for barrier above walls. Concrete barrier with the minimum required clear distance is required above soil nail walls.

(B) Temporary Guardrail

Define "clear distance" behind temporary guardrail as the horizontal distance between guardrail posts and soil nail walls. At the Contractor's option or if clear distance for soil nail walls is less than 4 ft, use temporary guardrail with 8 ft posts and a clear distance of at least 2.5 ft. Place ABC in clear distance and around guardrail posts instead of pavement.

(C) Soil Nail Wall Designs

Before beginning soil nail wall design, survey existing ground elevations in the vicinity of wall locations to determine actual design heights (H). Use a prequalified Anchored Wall Design Consultant to design soil nail walls. Provide designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for the Anchored Wall Design Consultant.

Submit PDF files of working drawings and design calculations for soil nail wall designs in accordance with Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, wall profiles, typical sections and details of soil nail wall design and construction sequence. Include details in working drawings of soil nail locations, unit grout/ground bond strengths, shotcrete reinforcement and if necessary, obstructions extending through walls or interfering with nails. Include details in construction sequence of excavation, grouting, installing reinforcement, nail testing and shotcreting with mix designs and shotcrete nozzleman certifications. Do not begin soil nail wall construction until a design submittal is accepted.

Design soil nail walls in accordance with the plans and allowable stress design method in the *FHWA Geotechnical Engineering Circular No. 7 "Soil Nail Walls"* (Publication No. FHWA-IF-03-017) unless otherwise required.

Design soil nails that meet the following unless otherwise approved:

(1) Horizontal and vertical spacing of at least 3 ft,

(2) Inclination of at least 12° below horizontal and

(3) Diameter of 4" to 10".

Do not extend nails beyond right-of-way or easement limits. If existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with nails, maintain a clearance of at least 6" between obstructions and nails.

Design soil nail walls for a traffic surcharge of 250 psf if traffic will be above and within H of walls. This traffic surcharge does not apply to construction traffic. Design soil nail walls for any construction surcharge if construction traffic will be above and within H of walls. For temporary guardrail with 8 ft posts above soil nail walls, analyze walls for a horizontal load of 300 lb/ft of wall.

Place geocomposite drain strips with a horizontal spacing of no more than 10 ft and center strips between adjacent nails. Attach drain strips to excavation faces. Use shotcrete at least 4" thick and reinforce shotcrete with #4 waler bars around nail heads. Two waler bars

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(one on each side of nail head) in the horizontal and vertical directions are required for a total of 4 bars per nail.

(D) Preconstruction Meeting

Before starting soil nail wall construction, hold a preconstruction meeting to discuss the construction, inspection and testing of the soil nail walls. If this meeting occurs before all soil nail wall submittals have been accepted, additional preconstruction meetings may be required before beginning construction of soil nail walls without accepted submittals. The Resident, District or Bridge Maintenance Engineer, Area Construction Engineer, Geotechnical Operations Engineer, Contractor and Soil Nail Wall Contractor Superintendent will attend preconstruction meetings.

(E) Preconstruction Meeting

Before beginning wall construction, provide preconstruction test panels in accordance with Subarticle 1002-3(D) of the *Standard Specifications*.

Construction Methods

Control drainage during construction in the vicinity of soil nail walls. Direct run off away from soil nail walls and areas above and behind walls.

Install foundations located behind soil nail walls before beginning wall construction. Do not excavate behind soil nail walls. If overexcavation occurs, repair walls with an approved method and a revised soil nail wall design may be required.

Install positive protection in accordance with the contract and accepted submittals. Use PCB in accordance with Section 1170 of the *Standard Specifications* and Roadway Standard Drawing No. 1170.01. Use temporary guardrail in accordance with Section 862 of the *Standard Specifications* and Roadway Standard Drawing No. 862.01, 862.02 and 862.03.

(A) Excavation

Excavate for soil nail walls from the top down in accordance with the accepted submittals. Excavate in staged horizontal lifts with no negative batter (excavation face leaning forward). Excavate lifts in accordance with the following:

(1) Heights not to exceed vertical nail spacing,

(2) Bottom of lifts no more than 3 ft below nail locations for current lift and

(3) Horizontal and vertical alignment within 6" of location shown in the accepted submittals.

Remove any cobbles, boulders, rubble or debris that will protrude more than 2" into the required shotcrete thickness. Rocky ground such as colluvium, boulder fills and weathered rock may be difficult to excavate without leaving voids.

Apply shotcrete to excavation faces within 24 hours of excavating each lift unless otherwise approved. Shotcreting may be delayed if it can be demonstrated that delays will not adversely affect excavation stability. If excavation faces will be exposed for more than 24 hours, use polyethylene sheets anchored at top and bottom of lifts to protect excavation faces from changes in moisture content.

If an excavation becomes unstable at any time, suspend soil nail wall construction and

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temporarily stabilize the excavation by immediately placing an earth berm up against the unstable excavation face. When this occurs, repair walls with an approved method and a revised soil nail wall design may be required.

Do not excavate the next lift until nail installations and testing and shotcrete application for the current lift are accepted and grout and shotcrete for the current lift have cured at least 3 days and 1 day, respectively.

(B) Soil Nails

Drill and grout nails the same day and do not leave drill holes open overnight. Control drilling and grouting to prevent excessive ground movements, damaging structures and pavements or fracturing rock and soil formations. If ground heave or subsidence occurs, suspend soil nail wall construction and take corrective action to minimize movement. If property damage occurs, make repairs with an approved method and a revised soil nail wall design may be required.

(1) Drilling

Use drill rigs of the sizes necessary to install soil nails and with sufficient capacity to drill through whatever materials are encountered. Drill straight and clean holes with the dimensions and inclination shown in the accepted submittals. Drill holes within 6" of locations and 2° of inclination shown in the accepted submittals unless otherwise approved.

Stabilize drill holes with temporary casings if unstable, caving or sloughing material is anticipated or encountered. Do not use drilling fluids to stabilize drill holes or remove cuttings.

(2) Steel Bars

Center steel bars in drill holes with centralizers. Securely attach centralizers along bars at no more than 8 ft centers. Attach uppermost and lowermost centralizers 18" from excavation faces and ends of holes.

Do not insert steel bars into drill holes until hole locations, dimensions, inclination and cleanliness are approved. Do not vibrate, drive or otherwise force bars into holes. If a steel bar cannot be completely and easily inserted into a drill hole, remove the bar and clean or redrill the hole.

(3) Grouting

Remove oil, rust inhibitors, residual drilling fluids and similar foreign materials from holding tanks/hoppers, stirring devices, pumps, lines, tremie pipes and any other equipment in contact with grout before use. 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.

Inject grout at the lowest point of drill holes through tremies, e.g., grout tubes, casings, hollow-stem augers or drill rods, in one continuous operation. Fill drill

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holes progressively from ends of holes to excavation faces and withdraw tremies at a slow even rate as holes are filled to prevent voids in grout. Extend tremies into grout at least 5 ft at all times except when grout is initially placed in holes.

Provide grout free of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing). Cold joints in grout are not allowed except for test nails. Remove any temporary casings as grout is placed and record grout volume for each drill hole.

(4) Nail Heads

Install nail head assemblies after shotcreting. Before shotcrete reaches initial set, seat bearing plates and tighten nuts so plates contact shotcrete uniformly. If uniform contact is not possible, install nail head assemblies on mortar pads so nail heads are evenly loaded.

(C) Drain Strips

Install geocomposite drain strips as shown in the accepted submittals. Before installing shotcrete reinforcement, place drain strips with the geotextile side against excavation faces. For highly irregular faces and at the discretion of the Engineer, drain strips may be placed after shotcreting over weep holes through the shotcrete. Hold drain strips in place with anchor pins so strips are in continuous contact with surfaces to which they are attached and allow for full flow the entire height of soil nail walls. Discontinuous drain strips are not allowed. If splices are needed, overlap drain strips at least 12" so flow is not impeded. Cut off excess drain strip length and expose strip ends below shotcrete when soil nail wall construction is complete.

(D) Shotcrete

Clean ungrouted zones of drill holes and excavation faces of loose materials, mud, rebound and other foreign material. Moisten surfaces to receive shotcrete. Install shotcrete reinforcement in accordance with the contract and accepted submittals. Secure reinforcing steel so shooting does not displace or vibrate reinforcement. Install approved thickness gauges on 5 ft centers in the horizontal and vertical directions to measure shotcrete thickness.

Apply shotcrete in accordance with the contract, accepted submittals and Subarticle 1002-3(F) of the *Standard Specifications*. Use approved shotcrete nozzlemen who made satisfactory preconstruction test panels to apply shotcrete. Direct shotcrete at right angles to excavation faces except when shooting around reinforcing steel. Rotate nozzle steadily in small circular patterns and apply shotcrete from bottom of lifts up.

Make shotcrete surfaces uniform and free of sloughing or sagging. Completely fill ungrouted zones of drill holes and any other voids with shotcrete. Taper construction joints to a thin edge over a horizontal distance of at least the shotcrete thickness. Wet joint surfaces before shooting adjacent sections.

Repair surface defects as soon as possible after shooting. Remove any shotcrete which lacks uniformity, exhibits segregation, honeycombing or lamination or contains any voids or sand pockets and replace with fresh shotcrete to the satisfaction of the Engineer. Protect shotcrete from freezing and rain until shotcrete reaches initial set.

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(E) Construction Records

Provide 2 copies of soil nail wall construction records within 24 hours of completing each lift. Include the following in construction records:

(1) Names of Soil Nail Wall Contractor, Superintendent, Nozzleman, Drill Rig Operator, Project Manager and Design Engineer;

(2) Wall description, county, Department's contract, TIP and WBS element number;

(3) Wall station and number and lift location, dimensions, elevations and description;

(4) Nail locations, dimensions and inclinations, bar types, sizes and grades and temporary casing information;

(5) Date and time drilling begins and ends, steel bars are inserted into drill holes, grout and shotcrete are mixed and arrives on-site and grout placement and shotcrete application begins and ends;

(6) Grout volume, temperature, flow and density records;

(7) Ground and surface water conditions and elevations if applicable;

(8) Weather conditions including air temperature at time of grout placement and shotcrete application; and

(9) All other pertinent details related to soil nail wall construction.

After completing each soil nail wall or stage of a wall, provide a PDF file of all corresponding construction records.

Nail Testing

"Proof tests" are performed on nails incorporated into walls, i.e., production nails. Define "test nail" as a nail tested with a proof test. Proof tests are typically required for at least one nail per nail row per soil nail wall or at least 5% of production nails, whichever is greater. More or less test nails may be required depending on subsurface conditions encountered. The Engineer will determine the number and locations of proof tests required. Do not test nails until grout and shotcrete attain the required 3 day compressive strength.

(A) Test Equipment

Use the following equipment to test nails:

(1) Two dial gauges with rigid supports,

(2) Hydraulic jack and pressure gauge and

(3) Jacking block or reaction frame.

Provide dial gauges with enough range and precision to measure the maximum test nail movement to 0.001". Use pressure gauges graduated in 100 psi increments or less. Submit identification numbers and calibration records for load cells, jacks and pressure gauges with the soil nail wall design. Calibrate each jack and pressure gauge as a unit.

Align test equipment to uniformly and evenly load test nails. Use a jacking block or reaction frame that does not damage or contact shotcrete within 3 ft of nail heads. Place dial gauges opposite each other on either side of test nails and align gauges within 5° of

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bar inclinations. Set up test equipment so resetting or repositioning equipment during nail testing is not needed.

(B) Test Nails

Test nails include both unbonded and bond lengths. Grout only bond lengths before nail testing. Provide unbonded and bond lengths of at least 3 ft and 10 ft, respectively.

Steel bars for production nails may be overstressed under higher test nail loads. If necessary, use larger size or higher grade bars with more capacity for test nails instead of shortening bond lengths to less than the minimum required.

(C) Proof Tests

Determine maximum bond length (L_B) using the following:

$$L_B \leq (C_{RT} \times A_t \times f_y) / (Q_{ALL} \times 1.5)$$

Where,
L_B = bond length (ft),
C_{RT} = reduction coefficient, 0.9 for Grade 60 and 75 bars or 0.8 for Grade 150 bars,
A_t = bar area (in^2),
f_y = bar yield stress (ksi) and
Q_{ALL} = allowable unit grout/ground bond strength (kips/ft).

Determine design test load (DTL) based on as-built bond length and allowable unit grout/ground bond strength using the following:

$$DTL = L_B \times Q_{ALL}$$

Where,
DTL = design test load (kips).

Perform proof tests by incrementally loading nails to failure or a load of 150% of DTL based on the following schedule:

Load	Hold Time
AL*	Until movement stabilizes
0.25 DTL	Until movement stabilizes
0.50 DTL	Until movement stabilizes
0.75 DTL	Until movement stabilizes
1.00 DTL	Until movement stabilizes
1.25 DTL	Until movement stabilizes
1.50 DTL	10 or 60 minutes (creep test)
AL*	1 minute

* Alignment load (AL) is the minimum load needed to align test equipment and should not exceed 0.05 DTL.

Reset dial gauges to zero after applying alignment load. Record test nail movement at each load increment and monitor test nails for creep at the 1.5 DTL load increment. Measure and record movement during creep test at 1, 2, 3, 5, 6 and 10 minutes. If test nail movement between 1 and 10 minutes is greater than 0.04", maintain the 1.5 DTL load increment for

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an additional 50 minutes and record movement at 20, 30, 50 and 60 minutes. Repump jack as needed to maintain load during hold times.

(D) Test Nail Acceptance

Submit 2 copies of test nail records including load versus movement and time versus creep movement plots within 24 hours of completing each proof test. The Engineer will review the test nail records to determine if test nails are acceptable. Test nail acceptance is based in part on the following criteria.

(1) Total movement during creep test is less than 0.04" between the 1 and 10 minute readings or less than 0.08" between the 6 and 60 minute readings and creep rate is linear or decreasing throughout hold time.

(2) Total movement at maximum load exceeds 80% of the theoretical elastic elongation of the unbonded length.

(3) Pullout failure does not occur at or before the 1.5 DTL load increment. Define "pullout failure" as the inability to increase load while movement continues. Record pullout failure load as part of test nail data.

Maintain stability of unbonded lengths for subsequent grouting. If a test nail is accepted but the unbonded length cannot be satisfactorily grouted, do not incorporate the test nail into the soil nail wall and add another production nail to replace the test nail.

If the Engineer determines a test nail is unacceptable, either perform additional proof tests on adjacent production nails or revise the soil nail design or installation methods for the production nails represented by the unacceptable test nail as determined by the Engineer. Submit a revised soil nail wall design for acceptance, provide an acceptable test nail with the revised design or installation methods and install additional production nails for the nails represented by the unacceptable test nail.

After completing nail testing for each soil nail wall or stage of a wall, provide a PDF file of all corresponding test nail records.

Measurement and Payment

Temporary soil nail walls will be measured and paid in square feet. Temporary soil nail walls will be paid for at the contract unit price for *Temporary Shoring*. Temporary soil nail walls will be measured as the square feet of exposed wall face area. No measurement will be made for any embedment or pavement thickness above soil nail walls.

The contract unit price for *Temporary Shoring* will be full compensation for providing soil nail wall designs, submittals, labor, tools, equipment and soil nail wall materials, excavating, hauling and removing excavated materials, installing and testing soil nails, grouting, shotcreting and supplying drain strips and any incidentals necessary to construct soil nail walls. No additional payment will be made and no extension of completion date or time will be allowed for repairing property damage, overexcavations or unstable excavations, unacceptable test nails or thicker shotcrete.

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

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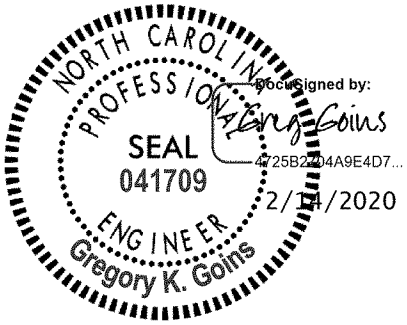
plans or estimated quantities shown in the bid item sheets as a result of actual field measurements or site conditions.

PCB will be measured and paid in accordance with Section 1170 of the *Standard Specifications*. No additional payment will be made for anchoring PCB for soil nail walls. Costs for anchoring PCB will be incidental to soil nail walls.

Temporary guardrail will be measured and paid for in accordance with Section 862 of the *Standard Specifications*.



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GEOTEXTILE FOR PAVEMENT STABILIZATION: (5-15-18)

Description

Supply and install geotextile for pavement stabilization in accordance with the contract. Geotextile for pavement stabilization may be required above chemically stabilized subgrades or below Class IV subgrade stabilization to prevent pavement cracking at locations shown in the plans and as directed. Define "subbase" as the portion of the roadbed below the Class IV subgrade stabilization.

Materials

Refer to Division 10 of the *Standard Specifications*.

Item	Section
Geotextiles	1056
Select Material, Class IV	1016

Use Class IV select material for Class IV subgrade stabilization. Provide Type 5 geotextile for geotextile for pavement stabilization that meets the following tensile strength requirements in the machine direction (MD) and cross-machine direction (CD):

GEOTEXTILE FOR PAVEMENT STABILIZATION REQUIREMENTS		
Tensile Strength	**Requirement (MARV[A])**	**Test Method**
Tensile Strength @ 5% Strain (MD & CD[A])	1,900 lb/ft	ASTM D4595
Ultimate Tensile Strength (MD & CD[A])	4,800 lb/ft	ASTM D4595

A. MD, CD and MARV per Article 1056-3 of the *Standard Specifications*.

Construction Methods

Geotextile for pavement stabilization may be required at locations shown in the plans and other locations as directed. For locations with ABC on chemically stabilized subgrades, use of geotextile for pavement stabilization will be based on sampling and testing for chemical stabilization. For all other locations, notify the Engineer when the embankment is completed to within 2 ft of subgrade elevation and allow 3 days for the Engineer to determine if geotextile for pavement stabilization is required.

Before placing geotextile for pavement stabilization below Class IV subgrade stabilization, proof roll subbases in accordance with Section 260 of the *Standard Specifications*. Place geotextile for pavement stabilization above chemically stabilized subgrades or below Class IV subgrade stabilization as shown in the plans. Pull geotextiles taut so they are in tension and free of kinks, folds, wrinkles or creases. Install geotextile for pavement stabilization perpendicular to the survey or lane line in the MD and adjacent to each other in the CD as shown in the plans. Continuous geotextiles are required in the MD, i.e., do not splice or overlap geotextiles so seams are parallel to the survey or lane line. Completely cover stabilized subgrades or subbases with geotextile for pavement stabilization. Overlapping geotextiles in the CD is permitted but not required. Overlap geotextiles in the direction that aggregate will be placed to prevent lifting the edge of the top geotextile. Hold geotextiles in place with wire staples or anchor pins as needed.

Do not damage geotextile for pavement stabilization when placing ABC or Class IV subgrade stabilization. Place and compact ABC in accordance with the contract and *Standard*

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Specifications. Place, compact and maintain Class IV subgrade stabilization in accordance with Article 505-3 of the *Standard Specifications* for a Type 2 aggregate subgrade. Do not operate heavy equipment on geotextiles any more than necessary to construct base courses or subgrades. Replace any damaged geotextiles to the satisfaction of the Engineer.

Measurement and Payment

Geotextile for Pavement Stabilization will be measured and paid in square yards. Geotextiles will be measured along subgrades or subbases as the square yards of exposed geotextiles installed before placing ABC or Class IV subgrade stabilization. No measurement will be made for overlapping geotextiles. The contract unit price for *Geotextile for Pavement Stabilization* will be full compensation for providing, transporting and installing geotextiles, wire staples and anchor pins.

Class IV Subgrade Stabilization will be measured and paid in accordance with Article 505-4 of the *Standard Specifications*. No measurement will be made for any undercut excavation of fill materials from subbases.

Payment will be made under:

Pay Item	**Pay Unit**
Geotextile for Pavement Stabilization	Square Yard

DocuSigned by:
Scott A. Hidden
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1/28/2020

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Project: R-2915E **UC-1** County: Ashe

PROJECT SPECIAL PROVISIONS
Utility Construction
2/5/2020

RK&K
8601 Six Forks Rd., Forum 1, Suite 700
Raleigh, NC 27615

NORTH CAROLINA PROFESSIONAL SEAL 32654 ENGINEER BRYAN M. BADEY
DocuSigned by:
Bryan Badey
9BA4BFC74F37415...
2/6/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

The proposed utility construction shall meet the NCDOT 2018 "Standard Specifications for Roads and Structures" with amendments noted below.

Contractor shall coordinate closely with NCDOT and Utility owners during installation of water and sanitary sewer lines for any necessary shut downs and/or by-pass pumping.

Revise the 2018 Standard Specifications as follows:

Page 15-1, Sub-article 1500-2 Cooperation with the Utility Owner, paragraph 2:
add the following sentences:

The Water and Sanitary Sewer line owners are the Town of Jefferson and Town of West Jefferson. The contact person for the Town of Jefferson is Roger Miller, he can be reached at 336-846-9368. The contact person for the Town of West Jefferson is Brantley Price, he can be reached at 336-246-3551.

PROJECT SPECIAL PROVISIONS
Utilities by Others

Weston & Sampson
WSE of North Carolina, PC
598 East Chatham Street Suite 137
Phone: 919.297.0220
NC License: C-4647
Cary, NC 27511
Fax: 919.297.0221

General:

The following utility companies have facilities that will conflict with the construction of this project.

A) Blue Ridge Energy EMC – Distribution Power
B) CenturyLink
C) Frontier Natural Gas
D) Skyline Telephone

The utility conflicts will be adjusted by the date noted and are therefore listed in these special provisions for the benefit of the Contractor. All utility work listed herein will be performed 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 2018 Standard Specifications for Roads and Structures.

*Each/Any phases includes any relocation being performed along associated L Line and Y Lines

Utilities Requiring Adjustments:

A) Blue Ridge Energy EMC – Distribution Power
Mr. Steve Taylor
828.264.8894
staylor@blueridgeenergy.com

1. See "Utilities By Others Plans" for utility conflicts
2. Blue Ridge Energy EMC will require the contractor to perform the proposed slope cuts from L Line Sta# 745+00 to 757+00 and SR1 Line Sta# 13+00 to 26+00
3. Blue Ridge Energy EMC will require the contractor cut to within no more that 1' of the proposed final elevation from 745+00 to 757+00 and SR1 Line Sta# 13+00 to 26+00
4. Blue Ridge Energy EMC will require the NCDOT Contractor to clear and grub the ROW for L Line Sta# 745+00 to 757+00 and SR1 Line Sta# 13+00 to 26+00
5. Blue Ridge Energy EMC will require 2 calendar weeks notification to begin relocation.
6. Blue Ridge Energy EMC will complete their relocation of approx. 4 weeks after given access to the site.
7. Contractor should contact and Coordinate with Blue Ridge Energy EMC before excavating begins.

B) CenturyLink Communications
Chris Spicer
336-526-2070
chris.spicer@byers.com

1. See "Utilities By Others Plans" for utility conflict.
2. CenturyLink will require the contractor to perform the proposed slope cuts from L Line Sta# 745+00 to 757+00 and SR1 Sta# 13+00 to 26+00
3. CenturyLink will require the NCDOT Contractor to clear and grub the ROW from L Line Sta# 745+00 to 757+00 and SR1 Line Sta# 13+00 to 26+00
4. CenturyLink will require the NCDOT contractor to place conduit under and alongside proposed drainage at:
    a. SR1 approximate Sta# 15+20 left
    b. SR1 approximate Sta# 20+90 left
    c. SR1 approximate Sta# 23+40 left
    d. SR1 approximate Sta# 23+75 through 25+15
5. CenturyLink will provide the conduit to the NCDOT Contractor
6. CenturyLink requires 2 calendar weeks notification to begin relocation.
7. CenturyLink will complete relocations approx. 4 weeks after given access to site
8. CenturyLink to run temporary facilities from SR1 Sta# 13+00 to SR1 Sta# 26+00
9. Contractor should contact and Coordinate with CenturyLink before excavating begins.

C) Skyline Telephone
Eric Holt
336-876-6591
Eric.holt@skyline.org

1. See "Utilities By Others Plans" for utility conflict
2. Skyline Telephone will require the contractor to perform the proposed slope cuts from L Line Sta# 745+00 to 757+00 and SR1 Sta# 13+00 to 26+00
3. Skyline Telephone will require the NCDOT Contractor to clear and grub the ROW from L Line Sta# 745+00 to 757+00 and SR1 Line Sta# 13+00 to 26+00
4. Skyline Telephone will require 3 calendar weeks notification to begin relocations
5. Skyline Telephone will relocate in 2 phases
    a. Phase 1 will be completed before the NCDOT contractor is given access to the site
    b. Phase 2 will be completed after the project has been LET
        i. Phase 2 runs from SR1 Sta# 13+00 to 26+00
6. Skyline Telephone will complete relocations approx. 3 weeks after given access to site.
7. Skyline Telephone requires 2 calendar weeks notification to begin relocation
8. Contractor should contact and Coordinate with Skyline Telephone before excavating begins.

D) Frontier Natural Gas
Ted Gambill
336-526-2690
tgambill@egas.net

1. See "Utilities By Others Plans" for utility conflict
2. Frontier Natural Gas will require approx. 6 weeks to complete relocations

3. Frontier Natural Gas should have relocations complete before contractor is given access to site
4. Frontier Natural Gas will require a minimum of 2 calendar weeks notification to mobilize
5. Contractor should contact and Coordinate with Frontier Natural Gas before excavating begins.

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: **(West)**

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.

Shoulder and Median Areas

August 1 - June 1		**May 1 - September 1**	
20#	Kentucky Bluegrass	20#	Kentucky Bluegrass
75#	Hard Fescue	75#	Hard Fescue
25#	Rye Grain	10#	German or Browntop Millet
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Areas Beyond the Mowing Pattern, Waste and Borrow Areas:

August 1 - June 1		**May 1 - September 1**	
100#	Tall Fescue	100#	Tall Fescue
15#	Kentucky Bluegrass	15#	Kentucky Bluegrass
30#	Hard Fescue	30#	Hard Fescue
25#	Rye Grain	10#	German or Browntop Millet
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

EC-2

Approved Tall Fescue Cultivars

06 Dust
2nd Millennium
3rd Millennium
Apache III
Avenger
Barlexas
Barlexas II
Bar Fa
Barrera
Barrington
Barrobusto
Barvado
Biltmore
Bingo
Bizem
Blackwatch
Blade Runner II
Bonsai
Braveheart
Bravo
Bullseye
Cannavaro
Catalyst
Cayenne
Cessane Rz
Chipper
Cochise IV
Constitution
Corgi
Corona
Coyote
Darlington
Davinci
Desire
Dominion
Dynamic
Dynasty
Endeavor
Escalade
Essential
Evergreen 2
Falcon IV
Falcon NG
Falcon V
Faith
Fat Cat
Festnova
Fidelity
Finelawn Elite
Finelawn Xpress
Finesse II
Firebird
Firecracker LS
Firenza
Five Point
Focus
Forte
Garrison
Gazelle II
Gold Medallion
Grande 3
Greenbrooks
Greenkeeper
Gremlin
Greystone
Guardian 21
Guardian 41
Hemi
Honky Tonk
Hot Rod
Hunter
Inferno
Innovator
Integrity
Jaguar 3
Jamboree
Justice
Kalahari
Kitty Hawk 2000
Legitimate
Lexington
LSD
Magellan
Matador
Millennium SRP
Monet
Mustang 4
Ninja 2
Ol' Glory
Olympic Gold
Padre
Patagonia
Pedigree
Picasso
Piedmont
Plantation
Proseeds 530I
Prospect
Pure Gold
Quest
Raptor II
Rebel Exeda
Rebel Sentry
Rebel IV
Regiment II
Regenerate
Rendition
Rhambler 2 SRP
Rembrandt
Reunion
Riverside
RNP
Rocket
Scorpion
Serengeti
Shelby
Sheridan
Signia
Silver Hawk
Sliverstar
Shenandoah Elite
Sidewinder
Skyline
Solara
Southern Choice II
Speedway
Spyder LS
Sunset Gold
Taccoa
Tanzania
Trio
Tahoe II
Talladega
Tarheel
Terrano
Titan ltd
Titanium LS
Tracer
Traverse SRP
Tulsa Time
Turbo
Turbo RZ
Tuxedo RZ
Ultimate
Venture
Umbrella
Van Gogh
Watchdog
Wolfpack II
Xtremegreen

Approved Kentucky Bluegrass Cultivars:

4-Season	Blue Velvet	Gladstone	Quantum Leap
Alexa II	Blueberry	Granite	Rambo
America	Boomerang	Hampton	Rhapsody
Apollo	Brilliant	Harmonie	Rhythm
Arcadia	Cabernet	Impact	Rita
Aries	Champagne	Jefferson	Royce
Armada	Champlain	Juliet	Rubicon
Arrow	Chicago II	Jump Start	Rugby II
Arrowhead	Corsair	Keeneland	Shiraz
Aura	Courtyard	Langara	Showcase
Avid	Delight	Liberator	Skye
Award	Diva	Madison	Solar Eclipse
Awesome	Dynamo	Mercury	Sonoma
Bandera	Eagleton	Midnight	Sorbonne
Barduke	Emblem	Midnight II	Starburst
Barnique	Empire	Moon Shadow	Sudden Impact
Baroness	Envicta	Moonlight SLT	Total Eclipse
Barrister	Everest	Mystere	Touche
Barvette HGT	Everglade	Nu Destiny	Tsunami
Bedazzled	Excursion	NuChicago	Unique
Belissimo	Freedom II	NuGlade	Valor
Bewitched	Freedom III	Odyssey	Voyager II
Beyond	Front Page	Perfection	Washington
Blacksburg II	Futurity	Pinot	Zinfandel
Blackstone	Gaelic	Princeton 105	
Blue Note	Ginney II	Prosperity	

Approved Hard Fescue Cultivars:

Aurora II	Eureka II	Oxford	Scaldis II
Aurora Gold	Firefly	Reliant II	Spartan II
Berkshire	Granite	Reliant IV	Stonehenge
Bighorn GT	Heron	Rescue 911	
Chariot	Nordic	Rhino	

On cut and fill slopes 2:1 or steeper add 20# Sericea Lespedeza 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 **(West)**

Native Grass Seeding and Mulching shall be performed on the disturbed areas of wetlands and riparian areas, and adjacent to Stream Relocation and/or trout stream 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.

August 1 - June 1		**May 1 – September 1**	
18#	Creeping Red Fescue	18#	Creeping Red Fescue
8#	Big Bluestem	8#	Big Bluestem
6#	Indiangrass	6#	Indiangrass
4#	Switchgrass	4#	Switchgrass
35#	Rye Grain	25#	German or Browntop Millet
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*.

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. 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 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*, and the rate of application 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 six 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.

REFORESTATION:

Description

Reforestation will be planted within interchanges and along the outside borders of the road, and in other areas as directed. *Reforestation* is not shown on the plan sheets. See the Reforestation Detail Sheet.

All non-maintained riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated with native woody species.

The entire *Reforestation* operation shall comply with the requirements of Section 1670 of the *Standard Specifications*.

Materials

Reforestation shall be bare root seedlings 12"-18" tall.

Construction Methods

Reforestation shall be planted as soon as practical following permanent S*eeding and Mulching*. The seedlings shall be planted in a 16-foot wide swath adjacent to mowing pattern line, or as directed.

Root dip: The roots of reforestation seedlings shall be coated with a slurry of water, and either a fine clay (kaolin) or a superabsorbent that is designated as a bare root dip. The type, mixture ratio, method of application, and the time of application shall be submitted to the Engineer for approval.

With the approval of the Engineer, seedlings may be coated before delivery to the job or at the time of planting, but at no time shall the roots of the seedlings be allowed to dry out. The roots shall be moistened immediately prior to planting.

Seasonal Limitations: *Reforestation* shall be planted from November 15 through March 15.

Measurement and Payment

Reforestation will be measured and paid for in accordance with Article 1670-17 of the *Standard Specifications*.

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

ENVIRONMENTALLY SENSITIVE AREAS:

Description

This project is located in an *Environmentally Sensitive Area*. This designation requires special procedures to be used for clearing and grubbing, temporary stream crossings, and grading operations within the Environmentally Sensitive Areas identified on the plans and as designated by the Engineer. This also requires special procedures to be used for seeding and mulching and staged seeding within the project.

The Environmentally Sensitive Area shall be defined as a 50-foot buffer zone on both sides of the stream or depression measured from top of streambank or center of depression.

Construction Methods

(A) Clearing and Grubbing

In areas identified as Environmentally Sensitive Areas, the Contractor may perform clearing operations, but not grubbing operations until immediately prior to beginning grading operations as described in Article 200-1 of the *Standard Specifications*. Only

clearing operations (not grubbing) shall be allowed in this buffer zone until immediately prior to beginning grading operations. Erosion control devices shall be installed immediately following the clearing operation.

(B) Grading

Once grading operations begin in identified Environmentally Sensitive Areas, work shall progress in a continuous manner until complete. All construction within these areas shall progress in a continuous manner such that each phase is complete and areas are permanently stabilized prior to beginning of next phase. Failure on the part of the Contractor to complete any phase of construction in a continuous manner in Environmentally Sensitive Areas will be just cause for the Engineer to direct the suspension of work in accordance with Article 108-7 of the *Standard Specifications*.

(C) Temporary Stream Crossings

Any crossing of streams within the limits of this project shall be accomplished in accordance with the requirements of Subarticle 107-12 of the *Standard Specifications*.

(D) Seeding and Mulching

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.

Seeding and mulching shall be performed on the areas disturbed by construction immediately following final grade establishment. No appreciable time shall lapse into the contract time without stabilization of slopes, ditches and other areas within the Environmentally Sensitive Areas.

(E) Stage Seeding

The work covered by this section shall consist of the establishment of a vegetative cover on cut and fill slopes as grading progresses. Seeding and mulching shall be done in stages on cut and fill slopes that are greater than 20 feet in height measured along the slope, or greater than 2 acres in area. Each stage shall not exceed the limits stated above.

Additional payments will not be made for the requirements of this section, as the cost for this work shall be included in the contract unit prices for the work involved.

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	≥80	%
Porosity (Permanent Net)	ECTC Guidelines	≥85	%
Maximum Permissible Shear Stress (Vegetated)	Performance Bench Test	≥8.0	lb/ft^2
Maximum Allowable Velocity (Vegetated)	Performance Bench Test	≥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:

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.

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 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 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*.

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

TIERED SKIMMER BASIN WITH BAFFLES:

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
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.

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 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.

Geotextile for Soil Stabilization will be measured and paid for in accordance with Article 270-4 of the *Standard Specifications*.

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

<u>STORMWATER BASIN EROSION CONTROL:</u>

Description

Provide a skimmer to remove sediment from construction site runoff in permanent stormwater basins at locations shown in the erosion control plans. Work includes constructing basin, installation of coir fiber baffles, furnishing, installation and cleanout of skimmer, providing and placing stone pad on bottom of basin underneath skimmer device, stabilizing side slopes of basin with matting and seed, disposing of excess materials, removing coir fiber baffles, and skimmer device.

Materials

Item	Section
Seeding and Mulching	1060-4
Matting for Erosion Control	1060-8
Staples	1060-8
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.

Construction Methods

Construct permanent stormwater basin according to the plans with basin surface free of obstructions, debris, and pockets of low-density material. 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 the coupling connection provided with the skimmer 1 ft. from the bottom of the basin and attach to permanent stormwater drainage structure. Attach the 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 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.

All bare side slope sections of the stormwater basin shall be seeded with a permanent seed mix as directed and in accordance with Articles 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.

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.

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*.

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

<u>WATTLE:</u>

Description

Wattles are tubular products consisting of excelsior fibers encased in synthetic netting. Wattles are used on slopes or channels to intercept runoff and act as a velocity break. 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 wattles, matting installation, and removing wattles.

Materials

Wattle shall meet the following specifications:

100% Curled Wood (Excelsior) Fibers
Minimum Diameter 12 in.
Minimum Density 2.5 lb/ft^3 +/- 10%

Net Material	Synthetic
Net Openings	1 in. x 1 in.
Net Configuration	Totally Encased
Minimum Weight	20 lb. +/- 10% per 10 ft. length

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.

Construction Methods

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 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.

The Contractor shall maintain the 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

Wattle 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 *Wattle*.

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.

Payment will be made under:

Pay Item	**Pay Unit**
Wattle	Linear Foot

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

WATTLE BARRIER:
(5-20-13) 1630

Description

Wattle barriers are tubular products consisting of excelsior fibers encased in natural or synthetic netting and used at the toe of fills or on slopes to intercept runoff. 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 wattle barriers.

Materials

Wattle shall meet the following specifications:

Inner Material	100% Curled Wood (Excelsior) Fibers
Minimum Diameter	18"
Minimum Length	10 ft.
Minimum Density	2.9 lb./c.f.± 10%
Net Material	Synthetic
Net Openings	1" x 1"
Net Configuration	Totally Encased
Minimum Weight	5 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 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 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 wattle barrier 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 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 wattle barriers until the project is accepted or until the wattle barriers are removed, and remove and dispose of silt accumulations at the wattle barriers when so directed in accordance with Section 1630 of the *Standard Specifications*.

Measurement and Payment

Wattle Barrier 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 wattle barrier.

Payment will be made under:

Pay Item	Pay Unit
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

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:
(01-03-19)

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 are approved then those details 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*.

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

PUMP AROUND OPERATION:

Description

The work covered by this section consists of furnishing, installing, maintaining and removing any and all pump around systems used on this project. The Contractor shall install a pump around system in locations as shown in the plans and in other locations approved by the Engineer. The pump around system shall provide a passageway for the stream flow around the work site.

The quantity of pump around systems may be increased, decreased, or eliminated entirely as directed. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work. See NCDOT *Best Management Practices for Construction and Maintenance Activities* manual for example pump around operation.

Materials

Item	**Section**
Special Stilling Basin	1639

Impervious Dike shall meet the specifications as provided elsewhere in this contract.

Pumps shall be of sufficient size to divert the stream flow around the work area, as approved by the Engineer.

Construction Methods

Install *impervious dike(s)* as shown on the plans or as directed. Pump water around the work site. If the water is turbid or exposed to bare soil, pump through a *special stilling basin*. Once the work is complete in an area remove the *impervious dike(s)* and pump system, and stabilize the area.

Measurement and Payment

Impervious Dike will be measured and paid for as provided elsewhere in this contract.

Special Stilling Basin will be measured and paid for in accordance with Article 1639-4 of the *Standard Specifications*.

Payment for pumping operations shall be considered incidental to the work of installing pipes and culverts. The pumping operations shall include but not be limited to, diverting the stream flow around the work area and pumping runoff from the work area into a stilling basin, special stilling basin or other sediment control device. No additional payment will be made for furnishing materials or maintenance of the pumping operations for the installation of pipes and culverts.

The above prices and payments will be full compensation for all work covered by this section including, but not limited to furnishing all of the necessary materials, construction, maintenance and removal of the impervious dike and pump around system.

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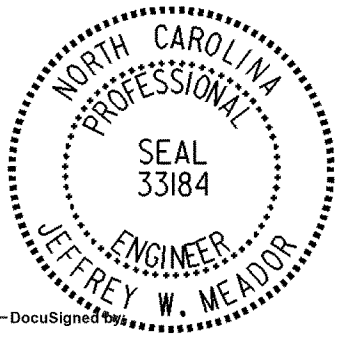
PROJECT SPECIAL PROVISIONS
PIPE LINER

TABLE OF CONTENTS

PAGE #

TABLE OF CONTENTS..... 1

PIPE REHABILITATION 2



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Jeffrey W. Meador
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SPECIAL PROVISION FOR PIPE REHABILITATION:

I. DESCRIPTION

This work shall consist of the rehabilitation of existing storm water pipes, or culverts by the method or methods specified at the designated locations described in the Contract.

Pipe liner systems used for rehabilitation shall be from the NCDOT Approved Products List and may be subject to limitations for use as specified herein, by site-specific limitations for those locations listed in the Contract, or limitations as shown on the NCDOT Approved Products List for the specific liner system. The Contractor shall consult the Contract to determine the method or methods that are permitted at each rehabilitation location.

Liners provided per this special provisions shall be designed per the *NCDOT Manual for Pipe Rehabilitation*.

The Contractor shall provide contract submittals as called for herein to the Engineer a minimum of 10 days prior to start of installation.

Designated Locations and Allowable Methods

Site	Latitude (decimal degrees)	Longitude (decimal degrees)	County	Route	Allowable Liner Categories	Notes
616	36.3899511	-81.4838601	Ashe	US 221	CIPP	702+77 -L-, 24" CMP
613	36.3905746	-81.4838737	Ashe	US 221	CIPP	705+05 -L-, 24" CMP
1041	36.4033713	-81.4808294	Ashe	US 221	Cementitious / Geopolymer Spray Liner	752+78 -L-, 66" CMP
1042	36.4041895	-81.4804652	Ashe	US 221	CIPP	755+95 -L-, 24" CMP
1043	36.4056601	-81.4812766	Ashe	SR 1149	Cementitious / Geopolymer Spray Liner	10+62 -Y35- 66" CMP
1123	36.4077067	-81.4789206	Ashe	US 221	Cementitious / Geopolymer Spray Liner	769+54 -L-, 36" CMP
1311	36.416455	-81.4742993	Ashe	US 221	CIPP	804+70 -L-, 30" CMP
1319	36.4160495	-81.4744562	Ashe	US 221	Cementitious / Geopolymer Spray Liner	803+56 -L-, 48" CMP
1415	36.4188533	-81.4702042	Ashe	SR 1254	CIPP	16+56 -Y36-, 24" CMP

II. MATERIALS

Category A - Cured-In-Place Pipe (CIPP) liners are lining an existing culvert by either pulling or inverting a resin-impregnated fabric tube and curing the tube in place. When CIPP liners are specified, the liner system supplied by the Contractor shall conform to the following requirements as supported by contract submittals:

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- Must list host pipe diameter ranges for which the product is applicable.
- Must indicate corrosion potential/acid reaction potential.
- Must list cure method (e.g., UV, steam, hot water, etc.).
- Must list typical, minimum, maximum application thicknesses.
- Calculated minimum thickness of liner
- Designation of air or water inversion or pull-in-place method
- Maximum allowable pulling force
- Site specific cure time
- Minimum pressure to hold liner tight against the host pipe
- Maximum pressure to ensure liner does not sustain damage
- Maximum and minimum cure temperatures
- Ambient temperature range allowable during installation
- Post cure temperature
- Temperature cure profile.
- Sample of temperature and pressure log to be used for monitoring the curing process
- Certification on manufacturer's letterhead indicating that the contractor is approved by the fabric tube and resin manufacturer to perform CIPP installation work.
- Manufacturer moisture limitations (e.g. installation in the dry, humidity restrictions, etc.).

- Material safety data sheets for all hazardous chemicals that will be used on the job site including resin, catalyst, cleaners, and repair agents. Identify the proposed use for each hazardous chemical and where it will be used in the work.
- Must provide and comply with specification for installation, and provide NCDOT Type 1 or Type 4 Certificates of compliance with material specifications as applicable to the below, or equivalent as approved by the Engineer:
    - ASTM D5813
    - ASTM F1216 for inverted CIPP
    - ASTM F1743 for pulled-in-place CIPP
    - ASTM F2019 for pulled-in-place GRP CIPP
    - ASTM F2599 for sectional inverted CIPP (applies to pipe sections, not full length)

- Long Term Modulus of Elasticity for calculations = 150,000 psi. NCDOT Type 2 or Type 5 certifications may be submitted by vendors or contractors for proof of alternate Long Term Modulus of Elasticity extrapolated from ASTM D2990, 10000-hour test. Design value of Long Term Modulus of Elasticity may be no greater than 50% of Initial Modulus of Elasticity. Tested value must be greater than or equal to value used in design equations.

- Initial Modulus of Elasticity for calculations = 300,000 psi. NCDOT Type 2 or Type 5 certifications may be submitted by vendors or contractors for proof of alternate Initial Modulus of Elasticity based on ASTM D790. Tested value must be greater than or equal to value used in design equations.

- Long Term Flexural Strength = 2250 psi. NCDOT Type 2 or Type 5 certifications may be submitted by vendors or contractors for proof of alternate Long Term Flexural Strength extrapolated from ASTM D2990, 10000-hour test. Tested value must be greater than or equal to value used in design equations.

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When **Category B Fold and Form flexible liners** are specified, the liner system supplied by the Contractor shall conform to the following requirements as supported by contract submittals:

- Must list host pipe diameter ranges for which the product is applicable.
- Must indicate corrosion potential/acid reaction potential.
- Must list type of reforming method (steam, hot water, etc.).
- Certification on manufacturer's letterhead indicating that the contractor is approved by the manufacturer to perform installation work.
- Material safety data sheets for all hazardous chemicals that will be used on the job site. Identify the proposed use for each hazardous chemical and where it will be used in the work.
- Calculated minimum thickness of liner.
- Maximum allowable pulling force
- Site specific reforming & cooling time
- Minimum pressure to hold liner tight against the host pipe
- Maximum pressure to ensure liner does not sustain damage
- Maximum and minimum forming temperatures
- Ambient temperature range for installation.
- Sample of temperature and pressure log to be used for monitoring the curing process.
- Must provide and comply with specification for installation, and provide NCDOT Type 1 or Type 4 Certificates of compliance with material specifications as applicable to the below, or equivalent as approved by the Engineer:
    - ASTM D1784 defines PVC cell class referenced below
    - ASTM F1504 for PVC cell classification 12334 or 13223
    - ASTM F1533 for polyethylene
    - ASTM F714 for polyethylene min. cell classification 335420 and 2-4% carbon black
    - ASTM F1606 for deformed polyethylene
    - ASTM F1947 for folded PVC
- Methods & pipe classification not permitted for use due to low pipe strength:
    - ASTM F1867 for folded / formed PVC Type A
    - ASTM F1871 for PVC Type A cell classification 12111

- NCDOT Type 2 or Type 5 certifications must be submitted by vendors or contractors for proof of Long Term Modulus of Elasticity, 50-year sustained loading value, if the following values are not used in design calculations: 22,000 psi shall be used for HDPE, PE, PP; and 140,000 psi shall be used for PVC; per AASHTO LRFD Bridge Design Specifications 8th ed., Table 12.12.3.3-1.

When **Category C HDPE, PE, PVC, PP, solid wall slip liners** are specified, the liner system supplied by the Contractor shall conform to the following requirements as supported by contract submittals:

- Must list host pipe diameter ranges for which the product is applicable.
- Must indicate corrosion potential/acid reaction potential.
- Must be closed profile; i.e. no definable bell and spigot that protrudes from the outer wall of the pipe.

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- Certification on manufacturer's letterhead indicating that the contractor is approved by the manufacturer to perform installation work.
- Material safety data sheets for all hazardous chemicals that will be used on the job site. Identify the proposed use for each hazardous chemical and where it will be used in the work.
- Calculated minimum thickness of liner.
- Maximum allowable pulling and/or pushing force
- Grouting mix design and manufacturer recommendations
- Installation procedures and recommendations.
- Must provide inside diameter and outside diameter of pipe.

- Must provide and comply with specification for installation, and provide NCDOT Type 1 or Type 4 Certificates of compliance with material specifications as applicable to the below, or equivalent as approved by the Engineer:
    - ASTM D1784 defines PVC cell class referenced below
    - ASTM D3350 defines PE cell class referenced below
    - ASTM F714 for solid wall polyethylene min cell classification 345464 and 2–4% carbon black
    - AASHTO M326 for solid wall polyethylene
    - ASTM D3034 for solid wall PVC, min. cell classification 12454
    - ASTM F679 for solid wall PVC, large diameter, min. cell classification 12454
    - ASTM D2241 for solid wall PVC, min. cell classification 12454
    - ASTM F585 for polyethylene slip-line
    - ASTM F2620 for polyethylene heat fusion joining

- NCDOT Type 2 or Type 5 certifications must be submitted by vendors or contractors for proof of Long Term Modulus of Elasticity, 50-year sustained loading value, if the following values are not used in design calculations: 22,000 psi shall be used for HDPE, PE, PP; and 140,000 psi shall be used for PVC; per AASHTO LRFD Bridge Design Specifications 8th ed., Table 12.12.3.3-1.

When **Category D HDPE, PVC, PP corrugated, profile wall, steel reinforced, or spiral wound slip liners** are specified, the liner system supplied by the Contractor shall conform to the following requirements as supported by contract submittals:

- Must list host pipe diameter ranges for which the product is applicable.
- Must indicate corrosion potential/acid reaction potential.
- Certification on manufacturer's letterhead indicating that the contractor is approved by the manufacturer to perform installation work.
- Material safety data sheets for all hazardous chemicals that will be used on the job site. Identify the proposed use for each hazardous chemical and where it will be used in the work.
- Calculated minimum thickness of liner.
- Maximum allowable pulling and/or pushing force
- Grouting mix design and manufacturer recommendations
- Installation procedures and recommendations.

DocuSign Envelope ID: BB3AFA5B-DB1A-4D5A-9ADD-30C9061E4CB9

- Must provide and comply with specification for installation, and provide NCDOT Type 1 or Type 4 Certificates of compliance with material specifications as applicable to the below, or equivalent as determined by the Engineer:
    - ASTM D1784 defines PVC cell class referenced below
    - AASHTO M294 for polyethylene profile wall (See NCDOT Standard Specifications 1032-7)
    - ASTM F894 for profile polyethylene
    - ASTM F2562 or F2435 for steel reinforced polyethylene min. cell classification 334452 and 2-4% carbon black
    - AASHTO M304 for profile PVC (see NCDOT Standard Specifications 1032-8)
    - ASTM F1803 for closed profile PVC
    - ASTM F949 and F794 for corrugated PVC min cell classification 12454
    - AASHTO M330 for corrugated polypropylene
    - AASHTO MP20-13 for steel reinforced polyethylene ribbed
    - ASTM F1735 PVC for profile strip / spiral wound, min. cell classification 12454
        - Steel Reinforced – Resin conforms to ASTM D3350, min. cell classification 335420 and 2-4% carbon black. Steel fully encapsulated.
    - ASTM F1697 PVC for profile strip / machine spiral wound, min. cell classification 12454
        - Steel Reinforced – Resin conforms to ASTM D3350, min. cell classification 335420 and 2-4% carbon black. Steel fully encapsulated.
    - ASTM F585 for polyethylene slip-line
    - ASTM F1698 for PVC spiral wound
    - ASTM F1741 for PVC machine spiral wound

- NCDOT Type 2 or Type 5 certifications must be submitted by vendors or contractors for proof of Long Term Modulus of Elasticity, 50-year sustained loading value, if the following values are not used in design calculations: 22,000 psi shall be used for HDPE, PE, PP; and 140,000 psi shall be used for PVC; per AASHTO LRFD Bridge Design Specifications 8th ed., Table 12.12.3.3-1.

Category E - Spray-on liners consist of conduit lining with spray applied, factory blended cementitious, geopolymer, or other material. The liner system supplied by the Contractor shall conform to the following requirements as supported by contract submittals:

- Must list host pipe diameter ranges for which the product is applicable.
- Must indicate corrosion potential/acid reaction potential.
- Must list liner material type.
- Must list typical, minimum, maximum application thicknesses.
- Must include documentation of specification or standard practice for installation.
- Minimum thickness of liner from design calculations.
- Manufacturer moisture limitations (e.g. installation in the dry, humidity restrictions, etc.).

- Certification on manufacturer's letterhead indicating that the contractor is approved by manufacturer to perform installation work.
- Material safety data sheets for all hazardous chemicals that will be used on the job site. Identify the proposed use for each hazardous chemical and where it will be used in the work.
- Site specific cure time

DocuSign Envelope ID: BB3AFA5B-DB1A-4D5A-9ADD-30C9061E4CB9

- Must provide volume (cubic yards or cubic feet) of liner material planned for use in each host pipe. For example, cubic yards of dry, unmixed cementitious liner material. This must match the value provided by design calculations.
- Ambient temperature range during installation.
- Other submittals as appropriate for the type of spray-on liner, as determined by the Engineer.
- Minimum thickness for cementitious or geopolymer liner material is 1 inch (clear of corrugations and / or bolt heads).
- For cementitious or geopolymer liners, submit to the Engineer NCDOT Type 2 or Type 5 certifications for the categories below, and a letter of certification from the manufacturer that states the material to be used conforms to manufacturer specifications. Actual properties must meet or exceed the values used in structural calculations when field tested.

Property	Test Method	Duration	Provide Value
Compressive Strength	AASHTO T106	3 Day 28 Days	psi psi
Flexural Strength	ASTM C 293	7 Days 28 Days	psi psi
Modulus of Elasticity	ASTM C 469	28 Days	psi
Tensile Strength	ASTM C 496	---	psi
Bond Strength	ASTM C 882	28 Days	psi

- For onsite or offsite Ready Mix or Project Produced cementitious or geopolymer liners (i.e. not "bag mixes" produced by a manufacturer), submit a mix design to the Engineer for approval.

- One of the following two submittal sets shall be required depending on whether the liner exhibits Rigid Pipe or Flexible Pipe behavior:

    - Liners which exhibit Rigid Pipe behavior, such as <u>Cementitious or geopolymer liners, shall be treated as non-reinforced concrete pipe</u>. Rigid Pipe behavior is characterized by cracking when subjected to 2% or greater deflection.

        - Provide NCDOT Type 2 or Type 5 certifications of allowable D-Load of proposed liner assuming fully deteriorated host pipe condition in accordance with ASTM C497 three edge bearing test for non-reinforced pipe.

            - The D-Load documentation submitted must be for test specimens that are less than or equal to the proposed liner thickness, equal to host pipe inside diameter and shape, and greater than or equal to host pipe ovality in the case of a deformed host pipe.

            - If manufacturer's ASTM C497 test is conducted on a smooth wall host form (such as a cardboard or plastic sonotube), and the proposed liner is to be installed in a host pipe with internal

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corrugations or bolt heads, only the liner thickness clear of the corrugations or bolt heads may be considered as structural.

- Liners which exhibit Flexible Pipe behavior (can withstand greater than 2% deflection without structural damage) shall be treated as Thermoplastic Pipe. Cementitious and geopolymer liners are not eligible for this method:

  - Long Term Modulus of Elasticity, 50-year sustained loading value shall be used. Vendor or contractor must provide value used in calculations. It shall be estimated by using 50% of the Initial Modulus of Elasticity value provided by ASTM D790. Provide NCDOT Type 2 or Type 5 certifications for value used in calculations.

  - Tensile Strength 50-year sustained loading value (Fu) shall be used. Vendor or contractor must provide value used in calculations. It shall be estimated by using 50% of the Initial Tensile Strength value provided by ASTM D638. Provide NCDOT Type 2 or Type 5 certifications for value used in calculations.

Category F - Smooth-wall steel pipe liner rehabilitation materials shall conform to 1032-5 of the Standard Specifications, except as altered herein.

Grade B pipe shall be used with minimum wall thicknesses as listed in the *NCDOT Manual for Pipe Rehabilitation.*

The Contractor shall submit the folllowing items to the Engineer:

- Material safety data sheets for all hazardous chemicals that will be used on the job site. Identify the proposed use for each hazardous chemical and where it will be used in the work.
- Grouting mix design and manufacturer recommendations.

III. CONSTRUCTION

Pre-Installation Inspection – The Contractor shall perform a pre-installation video inspection of pipe using NASSCO certified personnel. The camera shall be situated at the centerline of the pipe, and shall be mounted on a rubber tired or tracked pipe rover that allows for a 360-degree inspection. Inspection equipment shall be capable of measuring protrusions and obstructions of ½ inch or greater. Provide a pipe profile, on which deflections that may affect the installation of the liner are located and noted. The inspection shall be performed in the presence of the Engineer, unless waived by the Engineer. Dewater the host pipe to the satisfaction of the Engineer, and in accordance with NCDOT Best Management Practices for Construction and Maintenance Activities. A thorough culvert inspection is required to determine the number of existing "pipe to pipe" connections and the extent, if any, of obstruction removal and voids. The inspection shall be performed by experienced personnel trained in locating breaks, obstacles, voids and service connections. Video inspections shall be clearly labeled on the media with the

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time, date, and location of the pipe inspected. A copy of the video inspection shall be furnished to the Engineer at least 10 days prior to the start of rehabilitative construction. In the event the Contractor's inspection shows the method of rehabilitation the Contractor has selected is no longer viable at that location as verified by the Engineer, the Contractor shall select another allowable method, if specified, from those designated in the Contract.

Pipe Clean-out - The Contractor shall clear the existing pipe(s) designated for rehabilitation of any debris, sediment, protrusions greater than ½ inch in height, and any other potential obstructions prior to the start of rehabilitation efforts. The Contractor shall then thoroughly clean and prepare the host pipe prior to the liner installation. Cleaning shall conform to the recommendations of the liner manufacturer, and any additional requirements of this special provision. In the absence of manufacturer recommendations, the Contractor shall submit his/her proposed method for cleaning and preparing the host pipe for the Engineer's review and acceptance at least 10 working days prior to beginning the work at that location.

Grouting Host Pipe - The Contractor shall perform grouting work described in the contract, prior to pipe liner installation to correct existing deficiencies, such as voids.

Inlet & Outlet Sealing – All pipe liner installations shall be sealed to the host pipe at the terminal ends of the liner to prevent flow between the liner and host pipe.

De-Watering – All pipe liners and grout shall be installed in dry conditions. The Contractor shall de-water by diverting, pumping, or bypassing any water flow through an existing pipe or drainage system prior to and during the lining process. The method of de-watering is to be determined by the contractor but must be approved by the Engineer prior to implementing.

Disposal Plan – The Contractor shall submit a Disposal Plan to the Engineer a minimum of 10 days prior to installation. The Disposal Plan shall indicate how by-products and waste are to be contained, captured, transported offsite, and disposed of in accordance with project permits and local, state and federal regulations. It shall be the Contractor's responsibility to report and take appropriate corrective actions to remediate any water quality alteration resulting from lining operations in accordance with project permits and applicable local, state or federal regulations. The cost for such remediation shall be at the Contractor's expense.

Category A – Cured-In-Place Pipe liner method. The Cured-In-Place Pipe liner system shall be fabricated and installed in such a manner as to result in a maintained full contact tight fit to the internal circumference of the host pipe for its entire length. The installation shall adhere to the cure times and temperatures stipulated in the manufacturer's recommended installation and cure specifications and the finished product shall be free of de-lamination, bubbling, rippling or other signs of installation failure.

Install per specification or standard practice for installation (ASTM F1216 inverted CIPP, or F1743 pulled-in-place CIPP, or F2019 pulled-in-place GRP CIPP, or F2599 sectional inverted CIPP for example).

Pulled-in-place liner installation must be accomplished without significant liner twisting, or stretching the liner greater than 1% of its original length during installation. At no time shall the pulling force, as measured by a contractor-provided dynamometer or load cell, exceed that

DocuSign Envelope ID: BB3AFA5B-DB1A-4D5A-9ADD-30C9061E4CB9

established by the liner manufacturer. For liner lengths greater than 100 feet, protect the pipe liner end using a device that uniformly distributes the applied load around the perimeter of the liner.

Curing for styrene-based, epoxy-based, and vinyl ester-based CIPP may be accomplished by water, steam or ultraviolet light and shall be in accordance with the liner manufacturer's recommendations.

Installation and curing requirements of pipe sections shall be in accordance with the manufacturer's recommendations for the specific product, as applicable. The Contractor shall furnish installation and curing requirements for the various flexible liners including individual components of the system, tube type (reinforced or non-reinforced), manufacturer name and type of resin including catalyst, volume of resin required to achieve proper impregnation and curing. All components of the systems shall be as recommended by the manufacturer for the specific system used, and all components shall include lot numbers and expiration dates.

The Contractor shall place an impermeable barrier immediately upstream and downstream of the host pipe, prior to liner insertion, to capture any possible raw resin spillage during installation and shall dispose of any materials in accordance with the submitted disposal plan.

Where the pulled-in-place method of installation is used, the Contractor shall install a semi-rigid plastic slip sheet over any interior portions of the host pipe that could tear the outer film or over any significant voids in the host pipe.

Reconnect the existing storm drain lateral connections immediately after the liner has been cured in place. Use robotic cutting devices to re-establish tie-ins in non-man accessible pipes.

The Contractor shall monitor temperature via a minimum of three thermocouples on the outer surface (interface between the host pipe and liner) of the liner (one each at the upstream and downstream ends and one approximately mid-length of the host pipe). The Contractor shall monitor pressure during inversion and curing, and maintain pressure between minimum and maximum allowable pressures as provided by the manufacturer. The Contractor shall automatically log cure time-temperature and time-pressure data at 30 second intervals with a data logger and provide such information in a format acceptable to the Engineer.

Submit the tape and log of recorded temperatures and pressure to the Engineer within 48 hours after completing the resin-curing process.

The Contractor shall thoroughly rinse the cured lined pipe with clean water prior to re-introducing flow.
The Contractor shall capture all cure water and/or steam condensate and rinse water and dispose of, in accordance with the submitted disposal plan.
Within 21 days of completing the resin curing at a given culvert location, submit the test results from a ISO 17025 lab suitable to the Engineer. The report must be signed by a representative of the independent testing lab. The report must include:

- Flexural strength and flexural modulus test results for field samples.
- Thickness measurements for the liner using prepared core samples.
- Description of the defects in the tested samples in terms of the effect on CIPP performance.

DocuSign Envelope ID: BB3AFA5B-DB1A-4D5A-9ADD-30C9061E4CB9

Make cured samples from the identical materials (tube, resin and catalyst) to be used for the CIPP. Identify each sample by date, contract number, drainage system number of the corresponding culvert, thickness, name of resin, and name of catalyst.
The samples must be 6 by 16 inches in size: Comply with the following sampling procedures unless UV cured:

- Place 3 aluminum-plate clamped molds, each containing a flat plate sample, inside the downtube when heated circulated water is used, and in the silencer when steam is used during the resin curing period
- Seal each flat plate sample in a heavy-duty plastic envelope inside the mold
- Remove the 3 cured flat plate samples after draining all of the moisture from the cured CIPP

If UV cured, comply with field sampling procedures under ASTM F2019, Section 7: Recommended Inspection Practices.

Test the samples for flexural properties under ASTM D790, ASTM D5813, ASTM F1216, ASTM F1743, or ASTM F2019. Verify that physical properties of the field samples comply with the minimum values under:

- ASTM F1216, Table 1 (modified values), for heat cured polyester, vinyl ester, and epoxy resins. The flexural strength must be at least 5,000 psi. The flexural modulus must be at least 300,000 psi.
- ASTM F2019, Table 1, for UV cured CIPP. The flexural strength must be at least 6,500 psi. The flexural modulus must be at least 725,000 psi. Comply with sampling and testing procedures under ASTM F2019, Section 7: Recommended Inspection Practices.

Take core samples in the presence of the Engineer. Comply with the following core sample requirements:

- Take 2 samples. Take the samples at least 1 foot from each end of the culvert at a location near the top of the culvert. Samples must be at least 2 inches in diameter.
- If culvert material is corrugated metal, obtain samples at the corrugation crests.

Prepare the core samples by separating the CIPP material from the culvert material. If heat cured, remove the film from the inner lining or preliner. If UV cured, remove the film from the inner and outer foil.
Measure the thickness of the liner at 3 spots on each sample. If the culvert material is corrugated metal, measure the thickness at 3 spots that are along a line corresponding to the corrugation crests. Calculate the thickness as an average of at least 6 measurements.

If UV cured, comply with sampling and testing procedures under ASTM F2019, Section 7: Recommended Inspection Practices. If the culvert material is corrugated metal, measure the thickness at 3 spots that are along a line corresponding to the corrugation crests. Calculate the thickness as an average of at least 6 measurements.

CIPP may be rejected if any of:

- Actual temperature and curing time and schedule do not comply with those shown in the authorized work plan
- Pressure deviates more than 1 psi from the required pressure

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- At any time during installation the manufacturer's required minimum cool-down time or maximum cool-down rate is violated
- There are defects including:
  - Concentrated ridges, including folds and wrinkles exceeding 8 percent of the CIPP diameter
  - Dry spots
  - Lifts
  - Holes
  - Tears
  - Soft spots
  - Blisters or bubbles
  - Delaminations
  - Gaps in the length of the CIPP
  - Gaps or a loose fit between the exterior of the CIPP and the culvert
- Test results indicate one of the following:
  - If heat cured, 2 of the 3 flat plate samples do not have any of the following:
    - the specified modulus of elasticity
    - the specified flexural strength
    - either the specified modulus of elasticity or the specified flexural strength
  - If UV cured, 2 of the 3 cured samples do not have any of the following:
    - the specified modulus of elasticity
    - the specified flexural strength
    - either the specified modulus of elasticity or the specified flexural strength
- The liner thickness is less than the greater of either one of the following:
  - Specified thickness
  - Calculated minimum thickness shown in your authorized work plan
- Materials and installation methods are not those shown in your authorized installation plan
- Defects are excessive or unrepairable
- CIPP is not continuous or does not fit tightly for the full length of the culvert

If UV cured, and post installation inspections reveal signs of incomplete curing (dripping resin, etc), contractor will trim liner obscuring uncured liner, re-wet, and re-cure with UV.

Category B - Fold and form flexible liners shall be installed per specification or standard practice for installation (ASTM F1606 deformed polyethylene, ASTM F1867 folded/formed PVC Type A, or ASTM F1947 folded PVC, for example).

The liner system shall be fabricated and installed in such a manner as to result in a maintained full contact tight fit to the internal circumference of the host pipe for its entire length. The installation shall adhere to the reforming pressures and temperatures stipulated in the manufacturer's recommended installation specifications and the finished product shall be free of bubbling, rippling or other signs of installation failure.

Installation and reforming requirements of pipe sections shall be in accordance with the manufacturer recommendations for the specific product as applicable. All components of the systems shall be as recommended by the manufacturer for the specific system used, and all components shall include lot numbers. The Contractor shall submit documentation from the

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manufacturer to verify compliance with the requirements of this paragraph as well as installation recommendations to the Engineer.

Reconnect the existing storm drain lateral connections immediately after the liner has been installed in place. Use robotic cutting devices to re-establish tie-ins in non-man accessible pipes.

The Contractor shall monitor temperature via a minimum of three thermocouples on the outer surface (interface between host pipe and liner) of the liner (one each at the upstream and downstream ends and one approximately mid-length of the host pipe). The Contractor shall automatically log cure time-temperature and time-pressure data at 30 second intervals with a data logger and provide such information in a format acceptable to the Engineer.

Submit the tape and log of recorded temperatures to the Engineer within 48 hours after completing the lining process. Submit the recorded pressure to the Engineer within 48 hours after completing the lining process.

Liner may be rejected if any of:

- Actual temperature and curing time and schedule do not comply with those shown in the authorized work plan
- Pressure deviates more than 1 psi from the required pressure
- There are defects including:
    - Concentrated ridges, including folds and wrinkles exceeding 8 percent of the liner diameter
    - Lifts
    - Holes
    - Tears
    - Soft spots
    - Blisters or bubbles
    - Gaps in the length of the liner
    - Gaps or a loose fit between the exterior of the liner and the culvert
- The liner thickness is less than the greater of either one of the following:
    - Specified thickness
    - Calculated minimum thickness shown in your authorized work plan
- Materials and installation methods are not those shown in installation plan
- Defects are excessive or unrepairable
- Liner is not continuous or does not fit tightly for the full length of the culvert

Category C – HDPE, PE, PVC, or PP solid wall slip liner shall be installed per specification or standard practice for installation (ASTM F585 polyethylene slip-line, ASTM F2620 polyethylene heat fusion joining, for example).

Installation requirements of pipe sections shall be according the manufacturer recommendations for the specific product as applicable. All components of the systems shall be as recommended by the manufacturer for the specific system used, and all components shall include lot numbers.

Before lining, pull or push a mandrel through the existing pipe or perform laser survey to verify liner clearance. The liner must be positioned and secured to facilitate its complete encapsulation by grout. Follow the Manufacturer's recommendations for handling and assembling the pipe, and all provisions included in the design calculations. Reconnect the existing storm drain lateral

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connections immediately after the liner has been installed in place. Use robotic cutting devices to re-establish tie-ins in non-man accessible pipes. Prior to filling the annular space, connect and seal all laterals between the new liner pipe and the existing lateral.

Grout the entire annular space with non-shrink grout or an expansive admixture approved by the Manufacturer for use with the liner system. In the absence of Manufacturer recommendations for grout, refer to Section 1003 of Standard Specifications. Provide a minimum annular space of 1 inch for grouting between the new and existing pipes. Provide details on how to hold the liner pipe to line and grade until the grout has set. Ensure the maximum pressure developed by the grout does not exceed the manufacturer's recommendation for the maximum allowable external pressure for the liner pipe. If the volume of the grout used is less than the anticipated (calculated) volume, or an inspection of the relined culvert indicates that there are voids in the annular space, the Contractor must provide the Engineer with a plan to rehabilitate all identified voids. Depending on the location and size of the voids, additional grouting may be required in these areas. This may be accomplished by re-grouting in those areas from within the culvert. The voids must be filled to the satisfaction of the Engineer at no additional cost. Grouting is included with the cost of pipe liner installation.

Lining with HDPE or PP: Field cuts will be permitted only at the terminal ends. No pipe sections less than 3 feet long will be allowed in any lining projects. Perform all butt fusion, welding and extrusion welding of pipe in accordance with the Manufacturer's recommendation. Based on existence of alignment breaks or pinch points in the host pipe, all joints shall be butt fusion welded, or extrusion welded unless alternate joining methods are approved by the Engineer, in which case limit joint separations to less than ½ inch between adjoining sections.

Lining with Polyvinyl Chloride Pipe: Reline with a PVC Pipe with integral bell and spigot joints. Field cuts will be permitted only at the terminal ends. No pipe sections less than 3 feet long will be allowed in any lining projects. The submittals must address the following PVC specific issues: Will the PVC liner will be pulled or pushed through the culvert, along with the type of pushing or pulling ring/plate to be used? Will a nose cone or different device be used in the process? How will the jacking, pulling or pushing loads on the liner be monitored in order to conform to Manufacturer's specifications and guidelines?

Category D - HDPE, PVC, or PP corrugated, profile, or spiral wound slip liner shall be installed per specification or standard practice for installation (ASTM F585 polyethylene slip-line, ASTM F1698 PVC spiral wound, ASTM F1741 PVC machine spiral wound, for example).

Installation requirements of pipe sections shall be according the manufacturer recommendations for the specific product as applicable. All components of the systems shall be as recommended by the manufacturer for the specific system used, and all components shall include lot numbers.

Before lining, pull or push a mandrel through the existing pipe to verify liner clearance. The liner must be positioned and secured to facilitate its complete encapsulation by grout. Follow the Manufacturer's recommendations for handling and assembling the pipe, and all provisions included in the design calculations. Immediately reconnect the existing storm drain lateral connections after the liner has been installed in place. Use robotic cutting devices to re-establish tie-ins in non-man accessible pipes. Prior to filling the annular space, connect and seal all laterals between the new liner pipe and the existing lateral.

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Grout the entire annular space with non-shrink grout approved by the Manufacturer for use with the liner system. In the absence of Manufacturer recommendations for grout, refer to Section 1003 of Standard Specifications. Provide a minimum annular space of 1 inch around the circumference for grouting between the new and existing pipes. (Spiral Wound liner that is designed to fit tightly to the interior wall of the host pipe is not subject to the 1 inch annular space and grouting.) Provide details on how to hold the liner pipe to line and grade until the grout has set. Ensure the maximum pressure developed by the grout does not exceed the manufacturer's recommendation for the maximum allowable external pressure for the liner pipe. If the volume of the grout used is less than the anticipated (calculated) volume, or an inspection of the relined culvert indicates that there are voids in the annular space, the Contractor must provide the Engineer with a plan to rehabilitate all identified voids. Depending on the location and size of the voids, additional grouting may be required in these areas. This may be accomplished by re-grouting in those areas from within the culvert. The voids must be filled to the satisfaction of the Engineer at no additional cost. Grouting is included with the cost of pipe liner installation.

Lining with HDPE or PP (does not apply to spiral-wound): Field cuts will be permitted only at the terminal ends. No pipe sections less than 3 feet long will be allowed in any lining projects. Perform all butt fusion, welding and extrusion welding of pipe in accordance with the Manufacturer's recommendation. Based on existence of alignment breaks or pinch points in the host pipe, all joints shall be butt fusion welded, or extrusion welded unless alternate joining methods are approved by the Engineer, in which case limit joint separations to less than ½ inch between adjoining sections.

Lining with Polyvinyl Chloride Pipe (does not apply to spiral-wound): Reline with a PVC Pipe with integral bell and spigot joints. Field cuts will be permitted only at the terminal ends. No pipe sections less than 3 feet long will be allowed in any lining projects. The submittals for this item provided for Department approval shall also address the following PVC specific issues prior to any work approval is granted: Will the PVC liner will be pulled or pushed through the culvert, along with the type of pushing or pulling ring/plate to be used? Will a nose cone or different device be used in the process? How will the jacking, pulling or pushing loads on the liner be monitored in order to conform to Manufacturer's specifications and guidelines?

Category E - Spray-On cementitious, geopolymer, or other materials shall be installed in accordance with the liner material manufacturer's recommendations. For spray-on cementitious, geopolymer, or other liner systems, the following requirements shall apply:

Control the temperature and humidity in the host pipe according to the manufacturer's recommendation, including stopping air drafts through the pipe. Measure and record the temperature and humidity. The Contractor shall automatically log cure time-humidity and time-temperature data at 30 minute intervals with a data logger and provide such information in a format acceptable to the Engineer.

Patch and fill voids, holes, and gaps in the host pipe with an approved hydraulic cement or the same cementitious or geopolymer based material to be used for the liner to provide a solid continuous surface on which to spray. Stop water infiltration into the host pipe by applying dry hydraulic cement, or other methods approved by the Engineer. Prepare lateral connections to the host pipe according to the manufacturer's recommendations. Record the batch or lot number from the containers used each day.

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To achieve bonding to the host pipe: Before placing liner, remove all coatings, corrosion, and other surface material until only base steel (or other host pipe material) is exposed by sandblasting the portion of the culvert to be coated. Where human access is limited, you must substitute sandblasting with mechanical scraping tools, water-jetting and a swab. Ensure cleaning methods will not affect chemical properties of liner, or adhesion of liner.

Application of liner material must be uninterrupted and continuous. Use a machine approved by the manufacturer, and capable of projecting liner material against the culvert wall without rebound and at a velocity sufficient to cause liner material to pack densely and adhere in place. Obtain authorization from the Engineer for placing liner material by hand to fill gaps left by dewatering pipe during the time period after application before fully cured, while material may be added.

The machine operator must continuously monitor the application of cementitious material.

The travel of the projecting machine and the discharge rate of liner material must be entirely mechanically controlled and must produce a uniform thickness of liner material without segregation around the perimeter and along the culvert length. The pipeliner must be free of sand pockets or visible lack of homogeneity.

Contractor must submit an installation plan to the Engineer which details the number of passes, sled travel speed, and installation parameters relevant to the work.

Remove splatter and the accumulation of other undesirable substances along the culvert invert.

Obtain authorization from the Engineer for placing liner material by hand methods at sharp bends and special locations where machine placement is impracticable.

Provide a smooth finished surface texture.

After placement, the lining must be the greater of 1 inch thick (cementitious or geopolymer), or calculated thickness. For corrugated pipe, the thickness must be measured over the top of the corrugation crests. For host pipe with protruding bolt heads, the thickness must be measured over the top of the bolt heads. The tolerance for the pipe liner's thickness is plus 0.12 inch with no minus tolerance.

Depth gauges shall be installed in the soffit (12 o'clock position) of the host pipe every 10 feet along the length to allow determination of liner thickness. Depth gauges shall protrude from the host pipe wall a distance equivalent to the final surface of the liner, and shall remain in place permanently. Depth gauges shall be metal screws or rods with the shaft not greater than 3/16" diameter.

During the time period after application before fully cured, while material may be added, verify the applied thickness at least once every 10 feet to the satisfaction of the Engineer. Apply additional material to any areas found to be less than the design thickness.

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Ensure the liner is continuous over the entire length of the host pipe and free from defects such as foreign inclusions, holes and cracks no larger than 0.01 inches wide. Ensure the renewed conduit is impervious to infiltration and exfiltration.

Protect walls, surfaces, streambed and plants at the entrance and exit of the host pipe from overspray. The Contractor shall install a temporary curtain at the outlet and inlet to prevent overspray during installation.

The Contractor shall thoroughly rinse the cured pipe with clean water and dispose of it in accordance with the disposal plan.

The Contractor shall reinstate water flow no sooner than recommended by manufacturer or 24 hours following installation, whichever is greater.

For cementitious or geopolymer spray-on liners, the Contractor shall prevent the escape of any rinse water from the lined pipe or otherwise capture it until he/she can either (1) dispose of it in accordance with the submitted disposal plan; or (2) continuously monitor the pH of the rinse water until the pH is less than 9 whereupon it may be released.

For other liner types, the Contractor shall capture and dispose of the rinse water in accordance with the submitted disposal plan, prior to reinstating flow.

Quality Control for Geopolymer or Cementitious Liner:

The Contractor shall submit NCDOT Type 1 or Type 4 certifications for each lined pipe in accordance with required cementitious liner properties table in the Materials section. Engineer, at his option, may collect concrete mix samples for testing. If the material does not achieve the specified properties listed in the Materials section, the pipe liner may be rejected. Submit a new work plan for the placement of material before replacing the rejected pipeliner.

The Contractor shall take core samples of the liner under direction and in the presence of the Engineer. Core sample diameter shall be at least twice the liner thickness. Repair cored area with liner material. The Department transports core samples to a Materials and Tests Regional Laboratory for testing.

- If there are visible defects in the pipeliner, submit a work plan for repairing the defects. Measure the length of the defect along the centerline of the culvert.
- If the length of the defect is 60 inches long or less, patch defects using the same cementitious material used in the work. Hand methods may be used.
- If the length of the defect is greater than 60 inches long, replace the defective length of the pipeliner for the full diameter of the pipeliner. Replace the defective length using machine methods.

Quality Control for other liner material will be determined per manufacturer recommendations and the Engineer.

Category F – Smooth wall steel pipe liner rehabilitation methods shall conform to Section 330 of the Standard Specifications, except as altered herein. The work shall be rehabilitation by the

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insertion of a smooth wall steel pipe into a host pipe. Where field welding is required, pipe shall be joined by butt welds in accordance with AWWA C-206. Field welded butt joints shall be complete joint penetration (CJP) and the adjoining members shall be assembled so that the seams in the adjacent pipe sections are offset from each other by at least five (5) times the thickness of the thinner member.

Welding procedures employed for welding shall be qualified by testing or prequalified in accordance with AWS D1.1

Personnel performing field welding operations shall have been tested and qualified by the Department.

The contractor shall provide a Certified Welding Inspector (CWI) on site during all welding and inspection operations to perform the necessary quality control examinations. Non-destructive testing/examination for testing to include visual outlined in the AWWA C-206 shall be provided at the contractor's expense.

Personnel performing these functions shall be qualified in accordance with AWS QC1 and/or the recommendations of the current edition of ASNT SNT-TC-1A. Radiographic and Hydrostatic testing is not required.

Before lining, pull or push a mandrel through the existing pipe to verify liner clearance. The liner must be positioned and secured to facilitate its complete encapsulation by grout. Follow the Manufacturer's recommendations for handling and assembling the pipe, and all provisions included in the design calculations. Reconnect the existing storm drain lateral connections after the liner has been installed in place. Use robotic cutting devices to re-establish tie-ins in non-man accessible pipes. Prior to filling the annular space, connect and seal all laterals between the new liner pipe and the existing lateral.

Grout the entire annular space with non-shrink grout approved by the Manufacturer for use with the liner system. In the absence of Manufacturer recommendations for grout, refer to Section 1003 of Standard Specifications. Provide a minimum annular space of I inch for grouting between the new and existing pipes. Provide details on how to hold the liner pipe to line and grade until the grout has set. Ensure the maximum pressure developed by the grout does not exceed the manufacturer's recommendation for the maximum allowable external pressure for the liner pipe. If the volume of the grout used is less than the anticipated (calculated) volume, or an inspection of the relined culvert indicates that there are voids in the annular space, the Contractor must provide the Engineer with a plan to rehabilitate all identified voids. Depending on the location and size of the voids, additional grouting may be required in these areas. This may be accomplished by re-grouting in those areas from within the culvert. The voids must be filled to the satisfaction of the Engineer at no additional cost. Grouting is included with the cost of pipe liner installation.

Post Installation Inspection – In addition to the inspection performed by the Department, the Contractor shall perform two post-installation video inspections using NASSCO certified personnel. The first inspection shall take place between 90 and 100 calendar days after completion of installation for each culvert or system to a single outfall. The second inspection shall take place 30 calendar days prior to the end of the liner warranty period (5 years, secured by construction bond). The camera shall be situated at the centerline of the pipe, and shall be

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mounted on a rubber tired or tracked pipe rover that allows for a 360-degree inspection. Inspection equipment shall be capable of measuring protrusions and obstructions of ½ inch or greater. The inspection shall be performed in the presence of the Engineer. Dewater the host pipe to the satisfaction of the Engineer. Video inspections shall be clearly labeled on the media with the time, date, and location of the pipe inspected. A copy of the video inspection shall be furnished to the Engineer prior to acceptance of the work.

The finished liner may be rejected if not continuous over its entire length and free from visual defects such as foreign inclusions, joint separation, cracks, insufficient liner thickness, material loss, roughness, deformation, dry spots, pinholes, insufficient bonding to host pipe, delamination, or other material or installation deficiencies as described herein.

Remedies for rejection of liner - In the event the first post inspection of the installation reveals defects in localized areas of the liner pipe (comprising less than 20 percent of the pipe length) the localized defects shall be repaired as specified by the manufacturer. Where defects occur on 20 percent or more of the pipe length the defects shall be repaired, however, the Contractor will not be allowed to continue with his methodology of installation and/or the liner system used until he/she can demonstrate to the Engineer that he/she has remedied his/her operations to a sufficient level of quality as determined by the engineer. All such remedial efforts shall be at the Contractor's expense. Further failure(s) to perform a proper installation may result in the disallowance of the use of that liner system and an adjustment in the cost or non-payment of the failed installations depending on the severity of the failure.

In the event the first post installation inspection is not conducted until all or most of the locations in the Contract permitting this methodology have been performed, and the inspection reveals defects on 20 percent or more of the host pipe's length, then an adjustment in the cost or non-payment of the failed installations may be made by the Engineer depending on the severity of the failure.

In the event the second post inspection of the installation reveals defects, the Department may execute the option to call the construction bond to reimburse the Department for repairs or corrections, or to act as an adjustment in the cost, or both.

IV. MEASUREMENT AND PAYMENT

Pre Installation Inspection will be measured and paid for as the actual number of linear feet of pipe inspected, including mobilization of equipment, and production of records. Linear footage is not increased for multiple passes of inspection equipment through a length of pipe.

Pipe Rehabilitation will be measured and paid for as the actual number of linear feet of pipe for the Size, and Method that has been incorporated into the completed and accepted work. Note: At locations shown in the Contract where multiple methods are permitted, the Contractor may select any of the methods specified, however, if only one method is specified, this will be the only method permitted at that location. This price shall include post installation inspection, cleaning and preparation of the host pipe, furnishing and installing the liner, lateral reconnection, coupling and expansion devices, annular cement grout, design (if necessary) and shop drawing preparation, furnishing and installing liner and all components of the liner system, capturing any discharges or releases during installation or curing operations, furnishing any documentation or fees required for effluent or condensate disposal, all testing and sampling including furnishing

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reports and pre and post installation video inspections, waste disposal costs, excavation, sheeting, shoring, disposing of surplus and unsuitable material; backfilling and backfill material; compaction, restoring existing surfaces, and clearing debris and obstructions.

De-Watering will be measured and paid as the actual number of water diversions or bypasses required to complete Pipe Rehabilitation work. Each instance of De-Watering paid includes De-Watering for pre-inspection, installation, post inspections, and remediation (if necessary). All materials, equipment, labor, or other resources required to de-watering a site shall be incidental to the unit cost for De-watering.

Payment will be made under:

Pay Item	**Pay Unit**
Pre Installation Inspection	Linear Foot
(Size) Pipe Rehabilitation CIPP Liner	Linear Foot
(Size) Pipe Rehabilitation Cementitious / Geopolymer Spray Liner	Linear Foot
De-Watering	Each

DocuSign Envelope ID: BB3AFA5B-DB1A-4D5A-9ADD-30C9061E4CB9

PROJECT SPECIAL PROVISIONS
STORM WATER

TABLE OF CONTENTS

PAGE #

TABLE OF CONTENTS..... 1

6" PERFORATED PIPE 2

ANTI-FLOTATION CONCRETE.....3

ENGINEERED SOIL MEDIA.....4

REBAR TRASH RACK AND REMOVABLE ORIFICE TRASH RACK.....6

WASHED NO. 57 STONE.....7

NORTH CAROLINA PROFESSIONAL SEAL 33184 ENGINEER JEFFREY W. MEADOR

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Jeffrey W. Meador
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6" PERFORATED PIPE

Description
Furnish and install 6" perforated pipe with filter sock and 6" PVC cleanouts as shown in the plans and as directed. Ensure that perforated pipe and filter sock are kept clean and are not expose to mud, sediment or other fine materials during handling and installation.

Materials
Refer to Division 10

Item	Section
Corrugated Plastic Pipe and Fittings	1044-7
PVC Pipe	1044-6

Filter sock material shall meet the minimum requirements of ASTM D6707 for Type A fabrics.

Measurement and Payment
6" Pipe – Perforated with Filter Sock will be measured and paid per linear foot of pipe that has been incorporated into the completed and accepted work. *6" PVC Cleanouts* will be measured and paid per each cleanout that has been incorporated into the completed and accepted work. Work includes but is not limited to furnishing and placing all pipe, filter sock, and pipe fittings and all other incidentals necessary to satisfactorily complete the work.

Payment will be made under:

Pay Item	Pay Unit
6" Pipe – Perforated with Filter Sock	Linear Feet
6" PVC Cleanouts	Each

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ANTI-FLOTATION CONCRETE

Description
Furnish and install concrete ballast in drainage structures as indicated on the plans or by the Engineer. Place concrete in accordance with section 840 of the Standard Specifications for Roads and Structures.

Materials
Refer to Division 10

Item	Section
Portland Cement Concrete, Class B	1000

Measurement and Payment
Anti-Flotation Concrete will be measured and paid per cubic yard of concrete that has been incorporated into the completed and accepted work. Work includes but is not limited to furnishing and placing concrete and all other incidentals necessary to satisfactorily complete the work.

Payment will be made under:

Pay Item	Pay Unit
Anti–Flotation Concrete	Cubic Yard

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ENGINEERED SOIL MEDIA

Description
This work shall consist of furnishing and installing the Engineered Soil Media (ESM) in the filtration facility as shown on the plans and as directed by the Engineer.

Materials
The Contractor shall provide an ESM with the following physical properties:

(1) Homogenous soil mix of 85-88 percent by weight sand (USDA Soil Textural Classification), 8 to 12 percent fines (silt and clay), and 2 to 5 percent organic matter (organic matter shall be leaf or bark compost, or similar, and shall not be animal manure).
(2) P-Index between 10 and 30
(3) pH value between 5.5 – 7.5
(4) Permeability between 1 and 2 inches/hour
(5) Be uniform and free of stones, stumps, roots or other similar material greater than 2 inches

All the individual components as well as the media shall be reasonably free of weed seed or toxic substances or any other material which would be harmful to plant growth, and shall be maintained free from such during stockpiling, transport, and installation

Mixing
The ESM components shall be thoroughly mixed by a mechanical device designed specifically for producing uniform ESM. The process for mixing shall be submitted in writing to the Engineer prior to mixing. An on site inspection of the mixing procedure may be required prior to approval of the mixing process. No samples shall be prepared prior to receiving approval of the mixing process.

Testing
The Contractor will be responsible for ensuring that the media meets the material requirements presented herein. Prior to placement of the media, the Contractor will submit a soils test report demonstrating that the media meets the material requirements. Random samples may be taken by the Engineer in order to test for mix uniformity and to verify that it remains within the specified ranges for the physical properties. The media shall not be placed until approved by the Engineer.

Stockpiling
If the media is to be stockpiled, the location chosen for stockpiling shall be reasonably free of weed seed, vegetation, toxic substances, or any other material which would be harmful to plant growth. Prior to stockpiling, the Engineer shall approve the stockpile location.

DocuSign Envelope ID: BB3AFA5B-DB1A-4D5A-9ADD-30C9061E4CB9

Construction Methods

The filtration facility shall not be constructed until all contributing drainage areas are stabilized as shown on the plans and to the satisfaction of the Engineer. No heavy equipment shall operate within the perimeter of a filtration facility during excavation, underdrain placement, backfilling, planting, or mulching of the facility.

Excavation

The filtration facility shall be excavated to the dimensions, side slopes, and elevations shown on the plans. The method of excavation shall minimize the compaction of the bottom of the filtration facility (the 'rake' method of working the bucket should be used). Prior to placing the underdrain and the ESM, the bottom of the excavation shall be tilled to a minimum depth of 12" to alleviate any compaction of the facility bottom.

Placement and Compaction of the Media

The media shall be placed and graded using low ground-contact pressure equipment or by excavators and/or backhoes operating on the ground adjacent to the filtration facility. The media shall be placed in horizontal layers not to exceed 12" for the entire area of the filtration facility. The ESM shall be compacted by saturating the entire area of the filtration facility after each lift of ESM is placed until water flows from the underdrain. Water for saturation shall be applied by spraying or sprinkling. Saturation of each lift shall be performed in the presence of the Engineer. An appropriate sediment control device shall be used to treat any sediment-laden water discharged from the underdrain. If the media becomes contaminated during the construction of the facility, the contaminated material shall be removed and replaced with uncontaminated material. Final grading of the media shall be performed after a 24-hour settling period. Final elevation shall be within 1 inch of the elevation shown on the plans.

Measurement and Payment

Engineered Soil Media will be measured and paid for as the actual number of cubic yards of ESM that has been installed and accepted. Such prices and payments will be full compensation for furnishing, placing, amending, all labor, equipment, herbicide treatments and all incidentals necessary to complete the work satisfactorily.

Payment will be made under:

Pay Item	Pay Unit
Engineered Soil Media	Cubic Yard

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REBAR TRASH RACK AND REMOVABLE ORIFICE TRASH RACK

Description
The work consists of the fabrication and installation of a trash rack in accordance with the details in the plans. The trash rack should be installed in accordance with the manufacturer's recommendations and as directed by the Engineer.

Materials
Materials and fabrication methods for the trash rack shall conform to requirements of Sections 1070, 1072, 1074 and 1081 of the *2018 Standard Specifications for Roads and Structures.*

Measurement and Payment
Rebar Trash Rack and Removable Orifice Trash Rack will be measured and paid for as each for the actual number of trash racks that have been incorporated into the completed and accepted work. Such prices and payment will be full compensation for all materials, labor, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Rebar Trash Rack	Each
Removable Orifice Trash Rack	Each

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WASHED NO. 57 STONE

Description

Furnish and place washed No. 57 stone as shown in the plans and as directed. Stone shall be thoroughly washed with clear water and permitted to dry prior to placement. The washed stone shall be free of clay, loam, dust, similar adherent materials and organic materials unless otherwise permitted by the Engineer in writing.

Materials

Refer to Division 10

Item	Section
Washed course aggregate (Size No. 57) as indicated on the plans	1005 & 1014-2

Measurement and Payment

Washed No. 57 Stone will be measured and paid in tons of stone that has been incorporated into the completed and accepted work. Work includes but is not limited to furnishing, hauling, placing and all incidentals necessary to satisfactorily complete the work.

Payment will be made under:

Pay Item	Pay Unit
Washed No. 57 Stone	Tons

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NORTH CAROLINA PROFESSIONAL SEAL 044558 ENGINEER DAVID T. SEARS

DocuSigned by: 2/7/2020
David T. Sears
3655EB0D84BA458

Document not considered final unless all signatures completed.

Signals and Intelligent Transportation Systems
Project Special Provisions
(Version 18.2)

Prepared By: DTS
7-Feb-20

Contents

1. 2018 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES 3
1.1. GENERAL REQUIREMENTS – CONSTRUCTION METHODS (1700-3(K)) 3
1.2. WOOD POLES – CONSTRUCTION METHODS (1720-3) 3

2. SIGNAL HEADS 3
2.1. MATERIALS 3
A. General: 3
B. Vehicle Signal Heads: 5
C. Pedestrian Signal Heads: 8
D. Signal Cable: 9

3. CONTROLLERS WITH CABINETS 10
3.1. MATERIALS – GENERAL CABINETS 10
3.2. MATERIALS – TYPE 170E CABINETS 11
A. Type 170 E Cabinets General: 11
B. Type 170 E Cabinet Electrical Requirements: 11
C. Type 170 E Cabinet Physical Requirements: 19
D. Model 2018 Enhanced Conflict Monitor: 21
3.3. MATERIALS – TYPE 170 DETECTOR SENSOR UNITS 31
3.4. MATERIALS – TYPE 2070E CONTROLLERS 31

4. VIDEO IMAGING LOOP EMULATOR DETECTOR SYSTEMS 32
4.1. DESCRIPTION 32
4.2. MATERIALS 32
A. General: 32
B. Loop Emulator System: 34
C. Video Imaging Loop Emulator System Support: 35
4.3. CONSTRUCTION METHODS 35
4.4. MEASUREMENT AND PAYMENT 36

5. TRAFFIC SIGNAL SUPPORTS 36
5.1. METAL TRAFFIC SIGNAL SUPPORTS – ALL POLES 36
A. General: 36
B. Materials: 39
C. Construction Methods: 40
5.2. METAL POLE UPRIGHTS (VERTICAL MEMBERS) 40
A. Materials: 40
B. Construction Methods: 42
5.3. DRILLED PIER FOUNDATIONS FOR METAL TRAFFIC SIGNAL POLES 42
A. Description: 43
B. Soil Test and Foundation Determination: 43
C. Drilled Pier Construction: 45

DocuSign Envelope ID: B0CA3C75-4123-4996-8030-F83E9D68A530

5.4. POLE NUMBERING SYSTEM 45
A. New Poles *45*
5.5. MEASUREMENT AND PAYMENT 46

DocuSign Envelope ID: B0CA3C75-4123-4996-8030-F83E9D68A530

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. 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

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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
lzod 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 I ¼-inch vertical conduit entrance hubs with the hubs capped on the lower plate and I 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.

I. 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

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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.

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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.

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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.

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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.

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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

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- 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:

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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

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operate properly over a temperature range of -40° F to +185° 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

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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.

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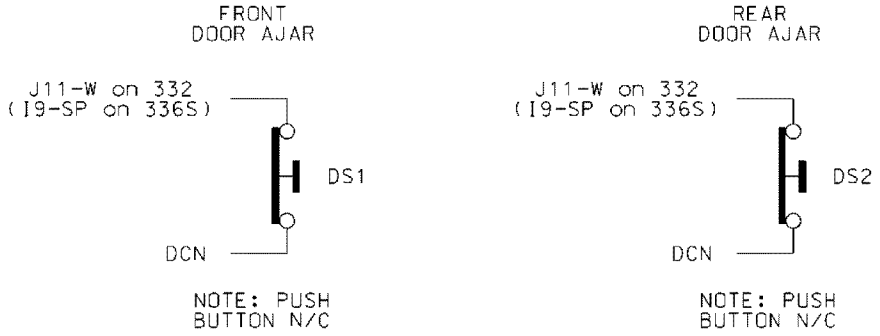
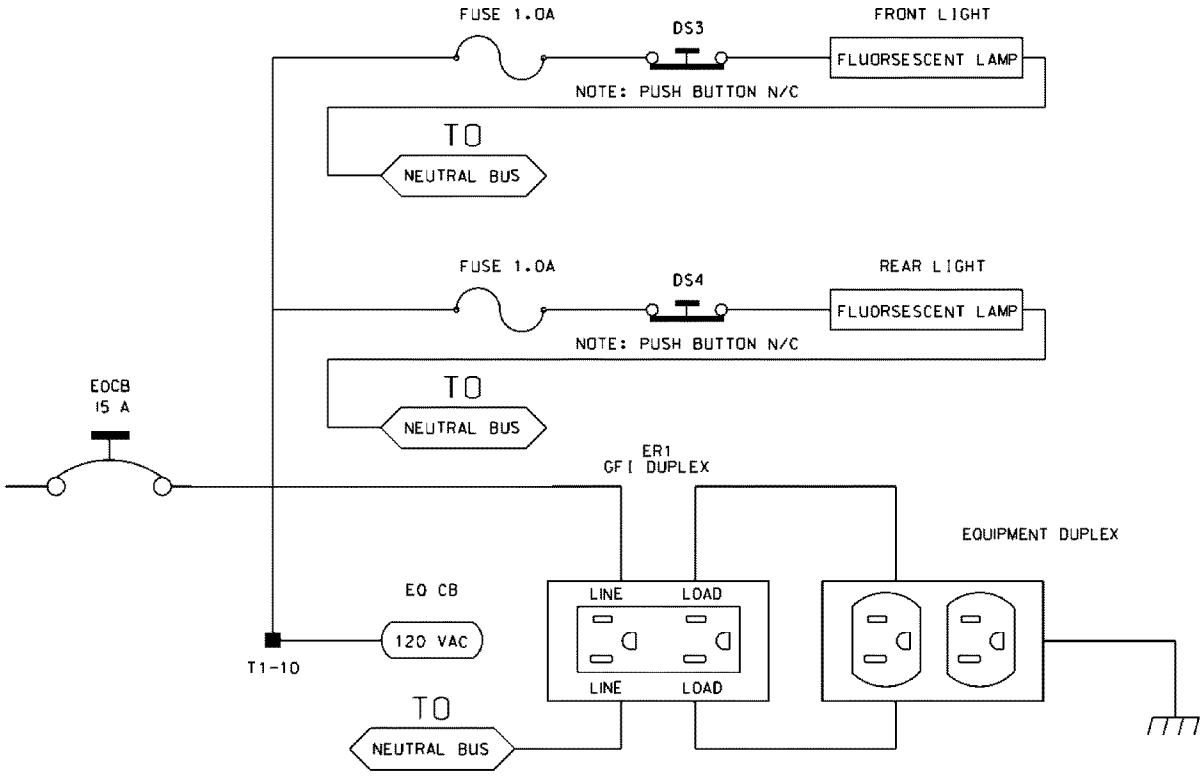


Furnish a fluorescent fixture in the rear across the top of the cabinet and another fluorescent fixture in the front across the top of the cabinet at a minimum. Ensure that the fixtures provide sufficient light to illuminate all terminals, labels, switches, and devices in the cabinet. Conveniently locate 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

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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:

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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

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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.

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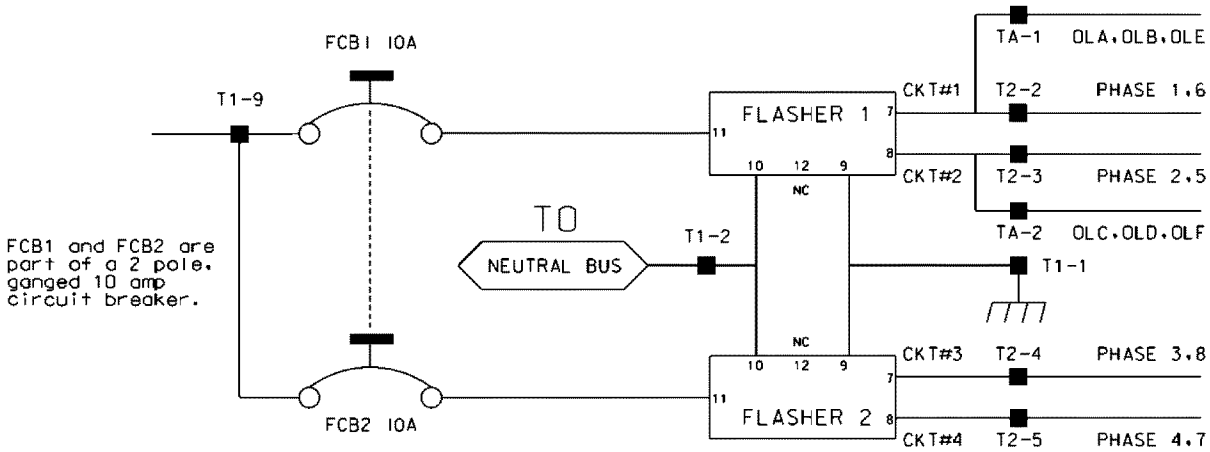

Ensure auxiliary output files are wired as follows:

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.

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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

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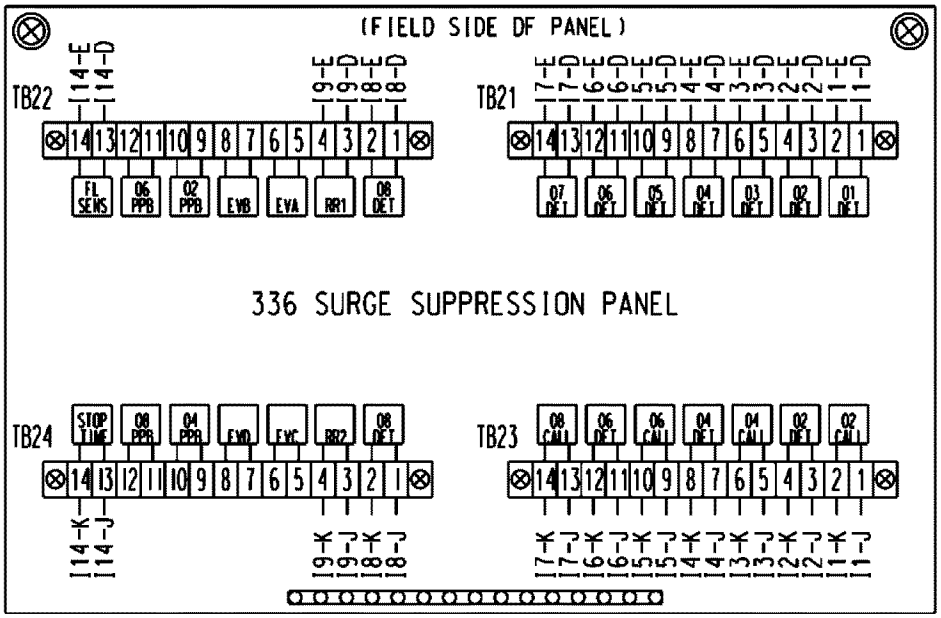
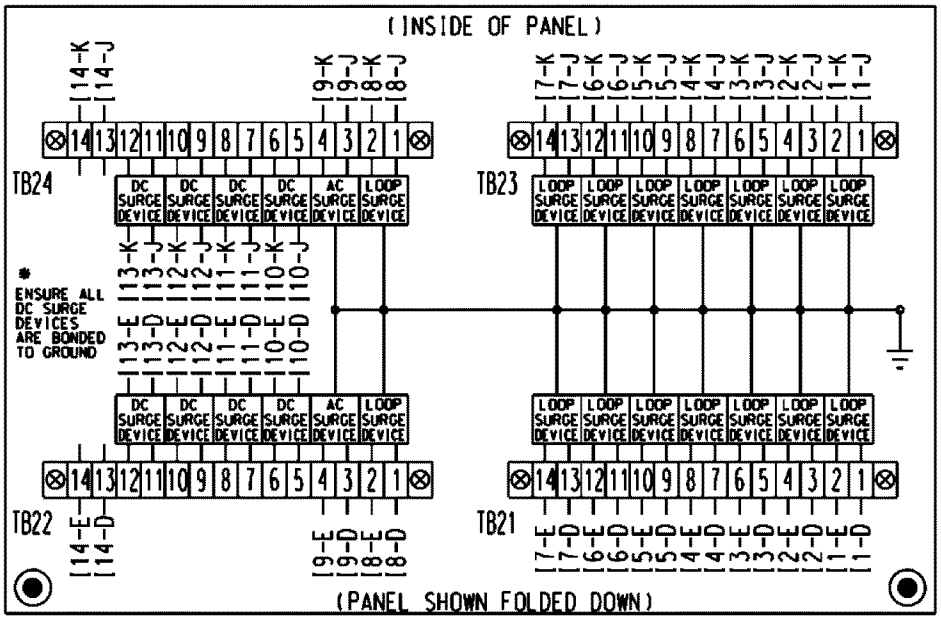
the swing down panel for termination of loop lead-in shield grounds. Ensure that a Number 4 AWG green wire connects the surge protection panel assembly ground bus to the main cabinet equipment ground.





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

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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)

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- 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.

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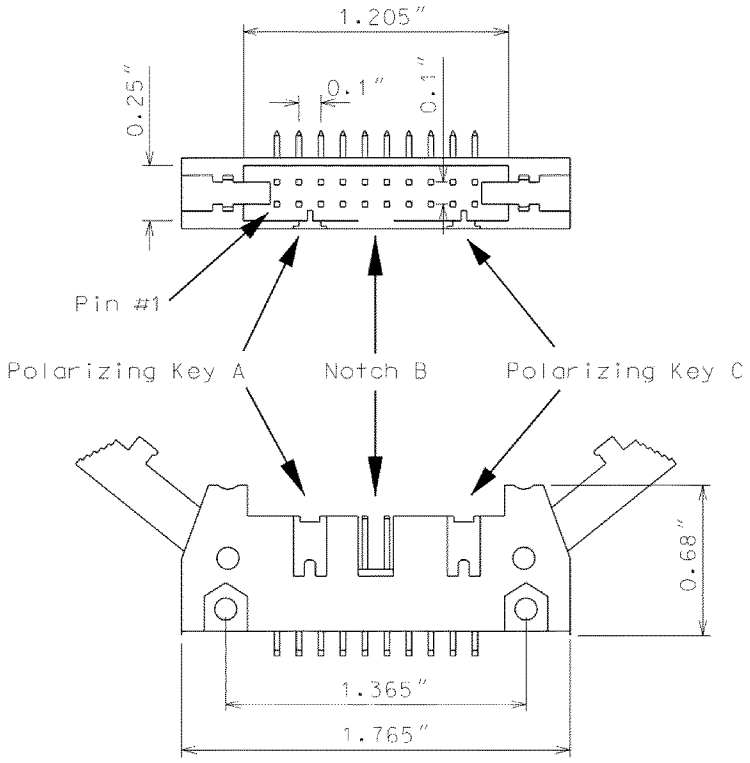

Ensure the red interface connector pins on the monitor have the following functions:

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.

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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.

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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

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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

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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.

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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	-

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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

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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

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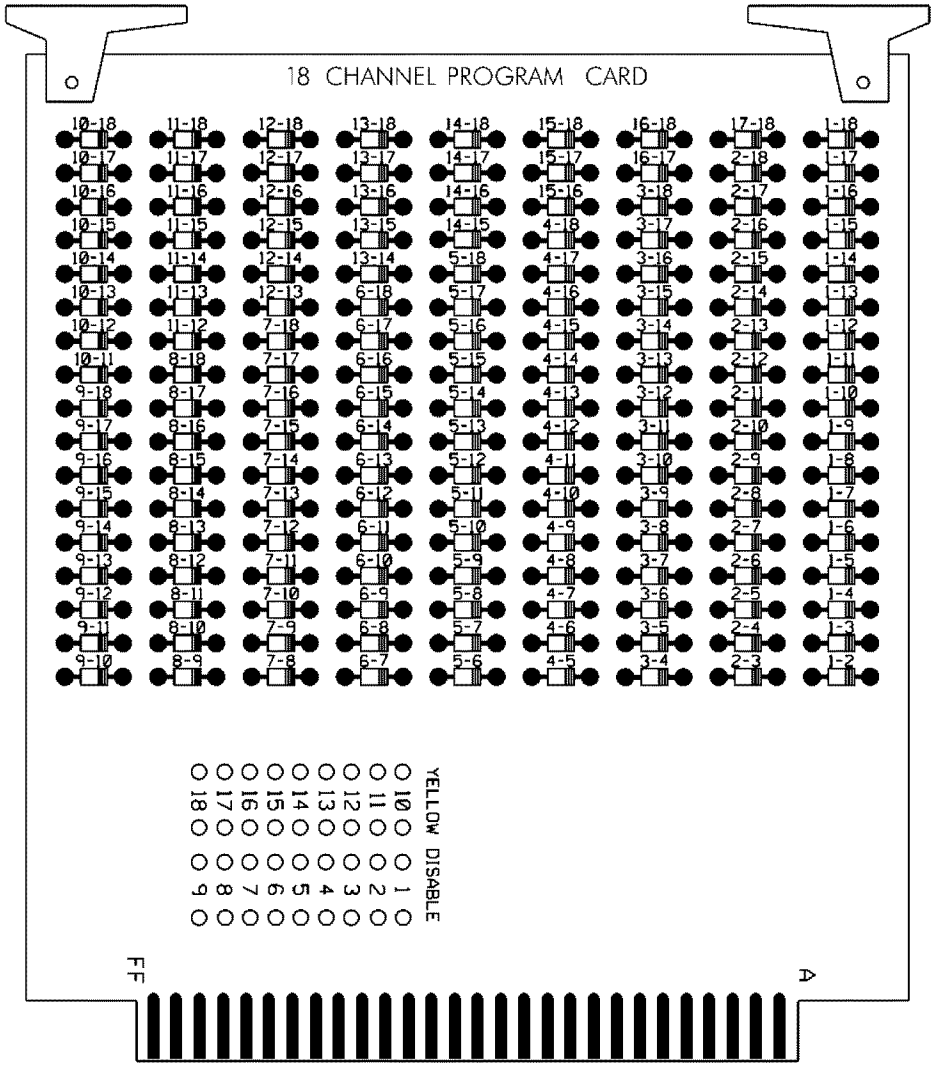

3.3. MATERIALS – TYPE 170 DETECTOR SENSOR UNITS

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 2070E CONTROLLERS

Furnish model 2070E 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 2070E controllers with OS-9 release 1.3.1 or later with kernel edition #380 or later operating software and device drivers, composed of the unit chassis and at a minimum the following modules and assemblies:

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- MODEL 2070-1E, 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
- MODEL 2070-7A, Async Serial Com Module (9-pin RS-232)

4. VIDEO IMAGING LOOP EMULATOR DETECTOR SYSTEMS

4.1. DESCRIPTION

Design, furnish, provide training, and install video imaging loop emulator detection systems with all necessary hardware in accordance with the plans and specifications.

Unless otherwise specified in the contract, all loop emulator detection equipment will remain the property of the contractor.

4.2. MATERIALS

A. General:

Material and equipment furnished under this section must be pre-approved on the Department's QPL by the date of installation except miscellaneous hardware such as cables and mounting hardware do not need to be pre-approved.

Used equipment will be acceptable provided the following conditions have been met:

- Equipment is listed on the current QPL.
- Equipment is in good working condition.
- Equipment is to remain the property of the contractor.

Ensure that software is licensed for use by the Department and by any other agency responsible for maintaining or operating the loop emulation system. Provide the Department with a license to duplicate and distribute the software as necessary for design and maintenance support.

Design and furnish video imaging loop emulator detection systems that detect vehicles at signalized intersections by processing video images and providing detection outputs to the signal controller in real time (within 112 milliseconds of vehicle arrival).

Furnish all required camera sensor units, loop emulator processor units, hardware and software packages, cabling, poles, mast arms, harnesses, camera mounting assemblies, surge protection panels, grounding systems, messenger cable and all necessary hardware. Furnish systems that allow the display of detection zones superimposed on an image of the roadway on a Department-furnished monitor or laptop computer screen. Ensure detection zones can be defined and data entered using a simple keyboard or mouse and monitor, or using a laptop PC with software.

Provide design drawings showing design details and camera sensor unit locations for review and acceptance before installation. Provide mounting height and location requirements for camera sensor units on the design based on site survey. Design video imaging loop emulator detection systems with all necessary hardware. Indicate all necessary poles, spans, mast arms, luminaire arms, cables,

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camera mounting assemblies and hardware to achieve the required detection zones where Department owned poles are not adequate to locate the camera sensor units. Do not design for the installation of poles in medians.

Obtain the Engineer's approval before furnishing video imaging loop emulator detection systems. The contractor is responsible for the final design of video imaging loop emulator detection systems. Review and acceptance of the designs by the Department does not relieve the contractor from the responsibility to provide fully functional systems and to ensure that the required detection zones can be provided.

Provide the ability to program each detection call (input to the controller) with the following functions:

- Full Time Delay – Delay timer is active continuously,
- Normal Delay – Delay timer is inhibited when assigned phase is green (except when used with TS 2 and 170/2070L controllers),
- Extend – Call is extended for this amount of time after vehicle leaves detection area,
- Delay Call/Extend Call – This feature uses a combination of full time delay and extend time on the same detection call. Ensure operation is as follows: Vehicle calls are received after the delay timer times out. When a call is detected, it is held until the detection area is empty and the programmed extend time expires. If another vehicle enters the detection area before the extend timer times out, the call is held and the extend time is reset. When the extend timer times out, the delay timer has to expire before another vehicle call can be received.

Provide the ability to program each detection zone as one of the following functions:

- Presence detector,
- Directional presence detector,
- Pulse detector,
- Directional pulse detector.

Ensure previously defined detector zones and configurations can be edited.

Provide each individual system with all the necessary equipment to focus and zoom the camera lenses without the need to enter the camera enclosure.

Provide systems that allow for the placement of at least 8 detection zones within the combined field of view of a single camera sensor unit. Provide a minimum of 8 detection outputs per camera.

Provide detection zones that can be overlapped. Ensure systems reliably detect vehicles when the horizontal distance from the camera sensor unit to the detection zone area is less than ten times the mounting height of the sensor. Ensure systems detect vehicles in multiple travel lanes.

Ensure systems can detect vehicle presence within a 98 to 102 percent accuracy (up to 2 percent of the vehicles missed and up to 2 percent of false detection) for clear, dry, daylight conditions, a 96 to 105 percent accuracy (up to 4 percent of the vehicles missed and up to 5 percent false detection) for dawn and dusk conditions, and a 96 percent accuracy (up to 4 percent of the vehicles missed) for night and adverse conditions (fog, snow, rain, etc.) using standard sensor optics and in the absence of occlusion.

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Repair and replace all failed components within 72 hours.

The Department may conduct field-testing to ensure the accuracy of completed video imaging loop emulator detection systems.

B. Loop Emulator System:

Furnish loop emulator systems that receive and simultaneously process information from camera sensor units, and provides detector outputs to signal controllers.

Ensure systems provide the following:

- Operate in a typical roadside environment and meet the environmental specifications and are fully compatible with NEMA TS 1, NEMA TS 2, or Type 170/2070L controllers and cabinets,
- provide a "fail-safe" mode whereby failure of one or more of the camera sensor units or power failure of the loop emulator system will cause constant calls to be placed on the affected vehicle detection outputs to the signal controller,
- provide compensation for minor camera movement of up to 2 percent of the field of view at 400 feet without falsely detecting vehicles,
- process the video at a minimum rate of 30 times per second,
- provide separate wired connectors inside the controller cabinet for video recording each camera,
- provide remote video monitoring with a minimum refresh rate at 1 frame per second over a standard dial-up telephone line,
- provide remote video detection monitoring.

Furnish camera sensor units that comply with the following:

- have an output signal conforming to EIA RS-170 standard,
- have a nominal output impedance of 75 ohms,
- be immune to bright light sources, or have built in circuitry or protective devices to prevent damage to the sensor when pointed directly at strong light sources,
- be housed in a light colored environmental enclosure that is water proof and dust tight, and that conforms to NEMA-4 specifications or better,
- simultaneously monitor at least five travel lanes when placed at the proper mounting location with a zoom lens,
- have a sunshield attached to the environmental enclosure to minimize solar heating,
- meet FCC class B requirements for electromagnetic interference emissions,
- have a heater attached to the viewing window of the environmental enclosure to prevent ice and condensation in cold weather.

Where coaxial video cables and other cables are required between the camera sensor and other components located in the controller cabinet, furnish surge protection in the controller cabinet.

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If furnishing coaxial communications cable comply with the following, as recommended by the approved loop emulator manufacturer:

- Number 20 AWG, solid bare copper conductor terminated with crimped-on BNC connectors (do not use BNC adapters) from the camera sensor to the signal controller cabinet.
- Number 22 AWG, stranded bare copper conductor terminated with crimped-on BNC connectors (do not use BNC adapters) from the camera sensor unit to the junction box, and within the signal controller cabinet.

Furnish power cable appropriately sized to meet the power requirements of the sensors. At a minimum, provide three conductor 120 VAC field power cable.

As determined during the site survey, furnish sensor junction boxes with nominal 6 x 10 x 6 inches dimensions at each sensor location. Provide terminal blocks and tie points for coaxial cable.

C. Video Imaging Loop Emulator System Support:

Furnish video imaging loop emulator systems with either a simple keyboard or a mouse with monitor and appropriate software, or with system software for use on department-owned laptop PCs. Ensure the system is Windows 2000 and Windows XP compatible.

Provide Windows 2000 and Windows XP compatible personal computer software, if needed, to provide remote video and video detection monitoring.

Ensure systems allow the user to edit previously defined detector configurations. When a vehicle is within a detection zone, provide for a change in color or intensity of the detection zone perimeter or other appropriate display changes on the Department-furnished monitor or laptop computer screen.

Provide cabling and interconnection hardware with 6-foot minimum length interconnection cable to interface with the system.

Provide all associated equipment manuals and documentation.

4.3. CONSTRUCTION METHODS

Arrange and conduct site surveys with the system manufacturer's representative and Department personnel to determine proper camera sensor unit selection and placement. Provide the Department at least 3 working days notice before conducting site surveys. Upon completion of the site surveys the Department will provide revised plans reflecting the findings of the site survey.

Before beginning work at locations requiring video imaging loop emulator detection systems, furnish system software. Upon activation of detection zones, provide detector configuration files. Ensure that up-to-date detection configuration files are furnished for various detection zone configurations that may be required for construction phasing.

Place into operation loop emulator detection systems. Configure loop emulator detection systems to achieve required detection in designated zones. Have a certified manufacturer's representative on site to supervise and assist with installation, set up, and testing of the system.

Install the necessary processing and communications equipment in the signal controller cabinet. Make all necessary modifications to install equipment, cabling harnesses, and camera sensor interface panels with surge suppression.

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Perform modifications to camera sensor unit gain, sensitivity, and iris limits necessary to complete the installation.

Do not install camera sensor units on signal poles unless approved by the Engineer.

Install the necessary cables from each sensor to the signal controller cabinet along signal cabling routes. Install surge protection and terminate all cable conductors.

Relocate camera sensor units and reconfigure detection zones as necessary according to the plans for construction phases.

Provide at least 8 hours of training on the set up, operation, troubleshooting, and maintenance of the loop emulator detection system to a maximum of ten Department personnel. Arrange for training to be conducted by the manufacturer's representative at an approved site within the Division responsible for administration of the project. Thirty days before conducting training submit a detailed course curriculum, draft manuals and materials, and resumes. Obtain approval of the submittal before conducting the training. At least one week before beginning training, provide three sets of complete documentation necessary to maintain and operate the system. Do not perform training until installation of loop emulator detection systems is complete.

4.4. MEASUREMENT AND PAYMENT

Actual number of site surveys, arranged, conducted, and accepted.

Actual number of luminaire arms for video systems furnished, installed, and accepted.

Actual number of cameras without internal loop emulator processing units furnished, installed, and accepted.

Actual number of external loop emulator processing units furnished, installed, and accepted.

Actual number of camera sensor units relocated with detection zones reconfigured installed, and accepted.

No measurement will be made of video imaging loop emulator system support or training, power and video cables, and trenching as these items will be considered incidental to furnishing and installing video imaging loop emulator detection systems.

Payment will be made under:

Site Survey ..... Each
Luminaire Arm for Video System ..... Each
Camera without Internal Loop Emulator Processing Unit ..... Each
External Loop Emulator Processing Unit ..... Each
Relocate Camera Sensor Unit ..... Each

5. TRAFFIC SIGNAL SUPPORTS

5.1. METAL TRAFFIC SIGNAL SUPPORTS – ALL POLES

A. General:

Furnish and install metal strain poles and metal poles with mast arms, grounding systems, and all necessary hardware. The work covered by this special provision includes requirements for the design, fabrication, and installation of both standard and custom/site specifically designed metal traffic signal supports and associated foundations.

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Provide metal traffic signal support systems that contain no guy assemblies, struts, or stay braces. Provide designs of completed assemblies with hardware that equals or exceeds AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals* 6th Edition, 2013 (hereafter 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.

Pole heights shown on signal plans are estimated from available data for bid purposes. Prior to furnishing metal signal poles, use field measurements and adjusted cross-sections to determine whether pole heights are sufficient to obtain required clearances. If pole heights are not sufficient, the Contractor should immediately notify the Engineer of the required revised pole heights.

Ensure that metal signal poles permit cables to be installed inside poles and any required mast arms. For holes in the poles and arms used to accommodate cables, provide full-circumference grommets. Arm flange plate wire access holes should be deburred, non grommeted, and oversized to fit around the 2" diameter grommeted shaft flange plate wire access hole.

After fabrication, have steel poles, required mast arms, and all parts used in the assembly hot-dip galvanized per section 1076. Design structural assemblies with weep holes large enough and properly located to drain molten zinc during the galvanization process. Provide hot-dip galvanizing on structures that meets or exceeds ASTM Standard A-123. Provide galvanizing on hardware that meets or exceeds ASTM Standard A-153. Ensure that threaded material is brushed and retapped as necessary after galvanizing. Perform repair of damaged galvanizing that complies with the following:

Repair of Galvanizing.....Article 1076-7

Standard Drawings for Metal Poles are available that supplement these project special provisions. These 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 *2018 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES*, hereinafter referred to as the *Standard Specifications* for submittal requirements. Furnish shop drawings for approval. Provide the copies of detailed shop drawings for each type of structure as summarized below. Ensure that shop drawings include material specifications for each component and 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**. Provide an itemized bill of materials for all structural components and associated connecting hardware on the drawings.

Comply with article 1098-1A of the *Standard Specifications* for Qualified Products List (QPL) submittals. All shop drawings must include project location description, signal inventory number(s) and a project number or work order number on the drawings.

Summary of information required for metal pole review submittal:

Item	Hardcopy Submittal	Electronic Submittal	Comments / Special Instructions
Sealed, Approved Signal Plan/Loading Diagram	1	1	All structure design information needs to reflect the latest approved signal plans

DocuSign Envelope ID: B0CA3C75-4123-4996-8030-F83E9D68A530

Custom Pole Shop Drawings	4 sets	1 set	Show NCDOT 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 and identified for multiple pages.
Standard Pole Shop Drawings (from the QPL)	4 sets	1 set	Submit drawings on 11" x 17" format media. Show NCDOT 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 and identified for multiple pages.
Structure Calculations	1 set	1 set	Not required for Standard QPL Poles
Standard Pole Foundation Drawings	1 set	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 M-8.
Custom Foundation Drawings	4 sets	1 set	Submit drawings on 11" x 17" format media. Show NCDOT 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 and identified for multiple pages. If QPL Poles are used, include the corresponding QPL pole shop drawings with this submittal.
Foundation Calculations	1	1	**Submit copies of LPILE input, output and pile tip deflection graph per Section 11.4 of this specification for each foundation.** Not required for Standard QPL Poles
Soil Boring Logs and Report	1	1	Report should 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 inventory number.

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 should 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

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has the right to request additional analysis and copies of the calculations to expedite the approval process.

B. Materials:

Fabricate metal pole and arm shaft from coil or plate steel to meet the requirements of ASTM A 595 Grade A tubes. For structural steel shapes, plates and bars use A572 Gr 50 min or ASTM A709 Gr 50 min. Provide pole and arm shafts that are round in cross section or multisided tubular shapes and have a uniform linear taper of 0.14 in/ft. Construct shafts from one piece of single ply plate or coil so there are no circumferential weld splices. Galvanize in accordance with AASHTO M 111 or an approved equivalent.

Use the submerged arc process or other NCDOT previously approved process suitable for pole shaft and arms to continuously weld pole shafts and arm shafts along their entire length. The longitudinal seam weld will be finished flush to the outside contour of the base metal. Ensure shafts have no circumferential welds except at the lower end joining the shaft to the pole base and arm 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*, except that no field welding on any part of the pole will be permitted unless approved by a qualified engineer.

Refer to Metal Pole Standard Drawing Sheets M2 through M5 for fabrication details. Fabricate anchor bases and mast arm connecting plates from plate steel meeting, as a minimum, the requirements of ASTM A572 Gr 50, AASHTO M270 Gr 50, ASTM A709 Gr50, or an approved equivalent. Conform to the applicable bolt pattern and orientation as shown on Metal Pole Standard Drawing Sheet M2.

Ensure all hardware is galvanized steel or stainless steel. The Contractor is responsible for ensuring that the designer/fabricator specifies connecting hardware and/or materials that do not create a dissimilar metal corrosive reaction.

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 six (6) 1-1/2" diameter high strength bolts when arm lengths are greater than 50'-0" long.

Unless otherwise required by the design, ensure each anchor rod is 2" diameter and 60" length. Provide 10" minimum thread projection at the top of the rod, and 8" minimum at the bottom of the rod. Use anchor rod assembly and drilled pier foundation materials that meet the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

For each structural bolt and other steel hardware, hot dip galvanizing shall conform to the requirements of AASHTO M 232 (ASTM A 153). Ensure end caps for poles or mast arms are constructed of cast aluminum conforming to Aluminum Alloy 356.0F.

Provide a circular anchor bolt lock plate that will be secured to the anchor bolts at the embedded end with 2 washers and 2 nuts. Provide a base plate template that matches the bolt circle diameter of the anchor bolt lock plate. Construct plates and templates from ¼" minimum thick steel with a minimum width of 4". Galvanizing is not required for both plates.

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Provide 4 heavy hex nuts and 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.

C. Construction Methods:

Erect signal support poles only after concrete has attained a minimum allowable compressive strength of 3000 psi. Install anchor rod assemblies in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

For further construction methods, see construction methods for Metal Strain Pole, or Metal Pole with Mast Arm.

Connect poles to grounding electrodes and bond them to the electrical service grounding electrodes.

For holes in the poles used to accommodate cables, install grommets before wiring pole or arm. Do not cut or split grommets.

Attach the terminal compartment cover to the pole by a sturdy chain or cable. Ensure the chain or cable is long enough to permit the cover to hang clear of the compartment opening when the cover is removed, and is strong enough to prevent vandalism. Ensure the chain or cable will not interfere with service to the cables in the pole base.

Attach cap to pole with a sturdy chain or cable. Ensure the chain or cable is long enough to permit the cap to hang clear of the opening when the cap is removed.

Perform repair of damaged galvanizing that complies with the *Standard Specifications*, Article 1076-7 "Repair of Galvanizing."

Install galvanized wire mesh around the perimeter of the base plate to cover the gap between the base plate and top of foundation for debris and pest control.

Install a ¼" thick plate for concrete foundation tag to include: concrete grade, depth, diameter, and reinforcement sizes of the installed foundation.

5.2. METAL POLE UPRIGHTS (VERTICAL MEMBERS)

A. Materials:

- Provide tapered tubular shafts and fabricated of steel conforming to ASTM A-595 Grade A or an approved equivalent.
- Hot-dip galvanize poles in accordance with AASHTO M 111 or an approved equivalent.
- Have shafts that are continuously welded for the entire length by the submerged arc process, and with exposed welds ground or rolled smooth and flush with the base metal. Provide welding that conforms to Article 1072-18 of the *Standard Specification* except that no field welding on any part of the pole will be permitted.
- Have Shafts with no circumferential welds except at the lower end joining the shaft to the base.
- Have anchor bases for steel poles fabricated from plate steel meeting as a minimum the requirements of ASTM A572 Gr 50, AASHTO M270 Gr 50, ASTM A709 Gr 50, or an approved equivalent.

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Provide a grounding lug(s) in the approximate vicinity of the messenger cable clamp for bonding and grounding messenger cable. Lugs must accept #4 or #6 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.

Have poles permanently stamped above the hand holes with the identification tag details as shown on Metal Pole Standard Drawing Sheet M2.

Provide liquid tight flexible metal conduit (Type LFMC), liquid tight flexible nonmetallic conduit (Type LFNC), high density polyethylene conduit (Type HDPE), or approved equivalent to isolate conductors feeding luminaires.

Fabricate poles from a single piece of steel or aluminum with single line seam weld with no transverse butt welds. Fabrication of two ply pole shafts is unacceptable with the exception of fluted shafts. Provide tapers for all shafts that begin at base and that have diameters which decrease uniformly at the rate of not more than 0.14 inch per foot (11.7 millimeters per meter) of length.

Provide four anchor nuts and four washers for each anchor bolt. Ensure that anchor bolts have required diameters, lengths, and positions, and will develop strengths comparable to their respective poles.

Provide a terminal compartment with cover and screws in each pole that encompasses the hand hole and contains a 12-terminal barrier type terminal block. Provide two 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 that the chain or cable is long enough to permit the cover to hang clear of the compartment opening when the cover is removed, and is strong enough to prevent vandals from being able to disconnect the cover from the pole. Ensure that the chain or cable will not interfere with service to the cables in the pole base.

Install grounding lugs that will accept #4 or #6 AWG wire to electrically bond messenger cables to the pole. Refer to Metal Pole Standard Drawing Sheet M6 for construction details.

For each pole, provide a 1/2 inch minimum thread diameter, coarse thread stud and nut for grounding which will accommodate #6 AWG ground wire. Ensure that 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 that the cap is cast aluminum conforming to Aluminum Association Alloy 356.0F. Furnish cap attached to the pole with a sturdy chain or cable approved by the Engineer. Ensure that the chain or cable is long enough to permit the cap to hang clear of the pole-top opening when the cap is removed.

When required by the plans, furnish couplings 42 inches above the bottom of the base for mounting of pedestrian pushbuttons. Provide mounting points consisting of 1-1/2 inch internally threaded half-couplings that comply with the NEC and that are mounted within the poles. Ensure that couplings are essentially flush with the outside surfaces of the poles and are installed before any required galvanizing. Provide a threaded plug in each mounting point. Ensure that the surface of the plug is essentially flush with the outer end of the mounting point when installed and has a recessed hole to accommodate a standard wrench.

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1. STRAIN POLE SHAFTS

Provide 2 messenger cable (span wire) clamps and associated hardware for attachment of messenger cable. Ensure that diameter of the clamp is appropriate to its location on the pole and is appropriately designed to be adjustable from 1'-6" below the top, down to 6'-6" below the top of the pole. Do not attach more than one support cable to a messenger cable clamp.

Provide a minimum of three (3) 2 inch (50 mm) 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.

Ensure that allowable pole deflection does not exceed that allowed per 6th Edition AASHTO. Ensure maximum deflection at the top of the pole does not exceed 2.5 percent of the pole height.

2. MAST ARM POLE SHAFTS

Ensure that allowable pole deflection does not exceed that allowed per 6th Edition AASHTO. Ensure that maximum angular rotation of the top of the mast arm pole does not exceed 1 degree 40 minutes (1°40').

B. Construction Methods:

Install metal poles, hardware, and fittings as shown on the manufacturer's installation drawings. Install metal poles so that when the pole is fully loaded it is within 1 degree 40 minutes (1°40') of vertical. Install poles with the manufacturer's recommended "rake." Use threaded leveling nuts to establish rake if required.

5.3. DRILLED PIER FOUNDATIONS FOR METAL TRAFFIC SIGNAL POLES

Analysis procedures and formulas shall be based on AASHTO 6th Edition, latest ACI code and the *Drilled Shafts: Construction Procedures and Design Methods* FHWA-NHI-10-016 manual. Design methods based on engineering publications or research papers needs to have prior approval from NCDOT. The Department reserves the right to accept or disapprove any method used for the analysis.

Use a Factor of Safety of 1.33 for torsion and 2.0 for bending for the foundation design.

Foundation design for lateral load shall not exceed 1" lateral deflection at top of foundation.

For lateral analysis, use LPILE Plus V6.0 or later. Inputs, results and corresponding graphs are to be submitted with the design calculations.

Skin Friction is to be calculated 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 2.5ft for cohesive soils when calculating skin friction.

When hammer efficiency is not provided, assume a value of 0.70.

Design all custom foundations to carry the maximum capacity of each metal pole. For standard case strain poles only, if a custom foundation is designed, use the actual shear, axial and moment reactions from the Standard 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 allowing an exemption to the maximum capacity design. The

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contractor must gain approval from the engineer before reducing a foundation's capacity. On projects where poor soil is known to be present, it is advisable that the contractor consider getting foundations 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 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 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 B7 (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 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 (drilled pier and wing wall, if applicable). Any additional costs 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 also 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.

Some standard drilled piers for supporting poles with mast arms may require wing walls to resist torsional rotation. Based upon this provision and the results of the required soil test, a drilled pier length and wing wall requirement may be determined and constructed in accordance with the plans.

For non-standard site-specific poles, the contractor-selected pole fabricator will determine if the addition of wing walls is necessary for the supporting foundations.

2. Soil Test:

Perform a soil test at each proposed metal pole location. Complete all required fill placement and excavation at each signal 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 2 consecutive 6-in. intervals.

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- A total of 50 blows have been applied with < 3-in. penetration.

Describe each intersection as the "Intersection of *(Route or SR #)*, *(Street Name)* and *(Route or SR #)*, *(Street Name)*, _____ County, Signal Inventory No. _____". Label borings with "B- *N, S, E, W, NE, NW, SE or SW*" corresponding to the quadrant location within the intersection. 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.

3. Standard Foundation Determination:

Use the following method for determining the Design N-value:

$$N_{AVG} = \frac{(N@1' + N@2.5' + \ldots\ldots\ldots N@\text{Deepest Boring Depth})}{\text{Total Number of N-values}}$$

$$Y = (N@1')^2 + (N@2.5')^2 + \ldots\ldots\ldots (N@\text{Deepest Boring Depth})^2$$

$$Z = (N@1' + N@2.5' + \ldots\ldots\ldots N@\text{Deepest Boring Depth})$$

$$N_{STD\ DEV} = \left(\frac{(\text{Total Number of N-values} \times Y) - Z^2}{(\text{Total Number of N-values}) \times (\text{Total Number of N-values} - 1)} \right)^{0.5}$$

Design N-value equals lesser of the following two conditions:

$N_{AVG} - (N_{STD\ DEV} \times 0.45)$

Or

$$\text{Average of First Four N-Values} = \frac{(N@1' + N@2.5' + N@5' + N@7.5')}{4}$$

Note: If less than 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 for weight of hammer or weight of rod. If N-value is greater than 50, reduce N-value to 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 Foundations Chart (sheet M 8) 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"

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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) above 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 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:

http://www.ncdot.gov/doh/preconstruct/highway/geotech/formdet/misc/MetalPole.pdf

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) above. Design drilled piers for side resistance only in accordance with Section 4.6 of the *AASHTO Standard Specifications for Highway Bridges*. Use the computer software LPILE version-6.0 or later manufactured by Ensoft, Inc. to analyze drilled piers. Use the 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 that result in a horizontal lateral movement of less than 1 inch at the top of the pier and a horizontal rotational movement of less than 1 inch at the edge of the pier. Contact the Engineer for pole loading diagrams for standard poles to be used for non-standard foundation designs. Submit any 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 foundations in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

5.4. POLE NUMBERING SYSTEM

A. New Poles

Attach an identification tag to each pole shaft and mast arm section as shown on Metal Pole Standard Drawing Sheet M2 "Typical Fabrication Details Common To All Metal Poles".

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5.5. 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 signal support structures.

Payment will be made under:

Metal Strain Signal Pole .....Each
Soil Test .....Each
Drilled Pier Foundation..... Cubic Yard

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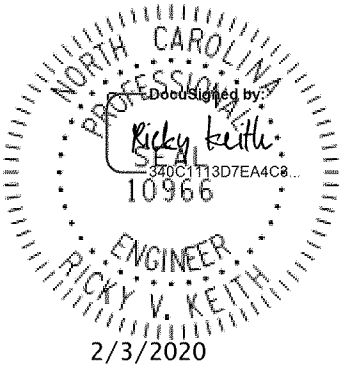
PROJECT SPECIAL PROVISIONS
CULVERT

TABLE OF CONTENTS

	PAGE #
TABLE OF CONTENTS	1
OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT (12-12-13)	2
FALSEWORK AND FORMWORK (4-5-12)	10
SUBMITTAL OF WORKING DRAWINGS (6-28-17)	17
CRANE SAFETY (6-20-19)	23
GROUT FOR STRUCTURES (12-1-17)	24
SOUND BARRIER WALL (8-29-19)	25



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PROJECT SPECIAL PROVISIONS
R-2915E
CULVERT

OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT AT STATION 34+20.00 -L- **(12-12-13)**

1.0 GENERAL

This Special Provision covers the design, fabrication and construction of precast reinforced concrete box culverts intended for the conveyance of storm water.

If the option is indicated on the plans, the submittal for a precast reinforced box culvert in lieu of a cast-in-place culvert is permitted. Design the precast culvert sections in accordance with ASTM C1577 or the current edition of the AASHTO LRFD Bridge Design Specifications. Rate all sizes of precast reinforced concrete box culverts in accordance with the current edition of the AASHTO Manual for Bridge Evaluation. Ensure the culvert rates for the AASHTO design loads and North Carolina's legal loads (see Section 2.0 for North Carolina's legal loads). Provide the size and number of barrels as indicated on the plans. Detail the culvert with cast-in-place wings walls and footings. Precast wing walls and footings will not be allowed. Provide a precast box culvert that meets the requirements of Section 1077 and any other applicable parts of the Standard Specifications.

The design and rating of the precast and cast-in-place members is the responsibility of the Contractor and is subject to review, comments and approval. Submit two sets of detailed plans and rating sheets for review. Include all details in the plans, including the size and spacing of the required reinforcement necessary to build the precast box and cast-in-place members. Have a North Carolina Registered Professional Engineer check and seal the plans, rating sheets and design calculations. After the plans, rating sheets and design calculations are reviewed and, if necessary, the corrections made, submit one set of plans and rating sheets on 22" x 34" sheets to become part of the contract plans.

If the span, rise and design earth cover for the precast reinforced concrete box culvert are identical to a previously approved submittal, the Contractor may request the previously approved design calculations and plans be considered as the submittal for review and approval. However, a set of plans and rating sheets will need to be submitted to become part of the contract plans.

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2.0 NORTH CAROLINA'S LEGAL LOADS

Apply the following legal loads to all structures carrying interstate traffic:

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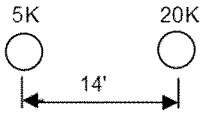
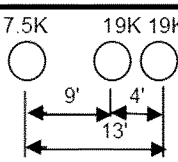
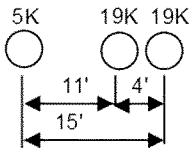
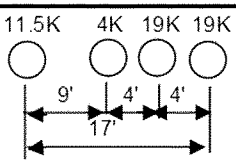
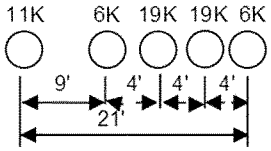
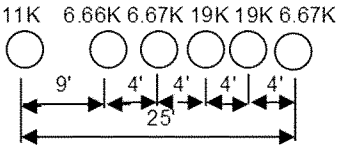
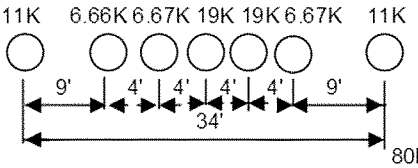
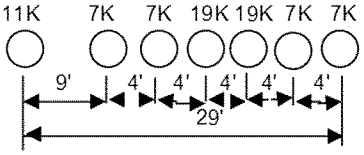
SH	 25K 12.5 TON
S3A	 45.5K 22.75 TON
S3C	 43K 21.5 TON
S4A	 53.5K 26.75 TON
S5A	 61K 30.5 TON
S6A	 69K 34.5 TON
S7A	 80K 40 TON
S7B	 77K 38.5 TON

TRUCK TRACTOR SEMI-TRAILER(TTST)	
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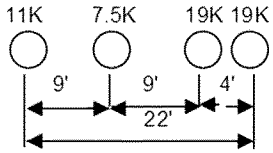
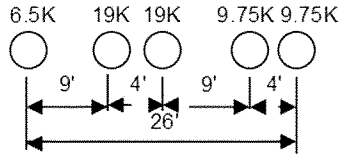
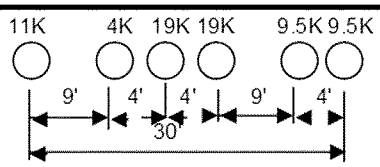
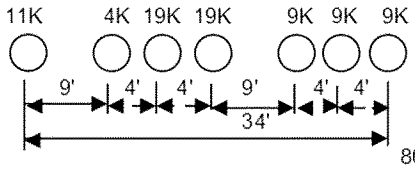
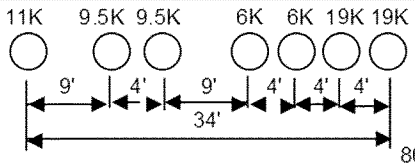
T4A	 56.5K 28.25 TON
T5B	 64K 32 TON
T6A	 72K 36 TON
T7A	 80K 40 TON
T7B	 80K 40 TON

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Apply the following legal loads to all structures carrying non-interstate traffic:

SINGLE VEHICLE (SV)		TRUCK TRACTOR SEMI-TRAILER (TTST)	
REF. #	SCHEMATIC	REF. #	SCHEMATIC
SNSH	5K 22K 14' 27K 13.5 TON	TNAGRIT3	22K 22K 22K 9' 9' 18' 66K 33 Ton
SNGARBS2	23.5K 16.5K 14' 40K 20 TON	TNT4A	12.1K 12.05K 21K 21K 9' 9' 4' 22' 66.15K 33.075 TON
SNAGRIS2	22K 22K 14' 44K 22 Ton	TNAGRIT4	22K 22K 21K 21K 9' 9' 4' 22' 86K 43 TON
SNCOTTS3	4.5K 25K 25K 11' 4' 15' 54.5K 27.25 TON	TNAGT5A	22K 21K 21K 13K 13K 9' 4' 9' 4' 26' 90K 45 TON
SNAGGRS4	16K 15.85K 19K 19K 9' 4' 4' 17' 69.85K 34.925 TON	TNAGT5B	6K 21K 21K 21K 21K 9' 4' 9' 4' 26' 90K 45 TON
SNS5A	12.1K 8.5K 21K 21K 8.5K 9' 4' 4' 4' 21' 71.1K 35.55 TON	TNT6A	12.1K 8.2K 21K 21K 10.45K 10.45K 9' 4' 4' 9' 4' 30' 83.2K 41.6 TON
SNS6A	12.1K 8.6K 8.6K 21K 21K 8.6K 9' 4' 4' 4' 4' 25' 79.9K 39.95 TON	TNT7A	4.1K 4K 21K 21K 11.3K 11.3K 11.3K 9' 4' 4' 9' 4' 4' 34' 84K 42 TON
SNS7B	7.6K 8.6K 8.6K 21K 21K 8.6K 8.6K 9' 4' 4' 4' 4' 4' 29' 84K 42 TON	TNT7B	4.1K 10.5K 10.5K 8.45K 8.45K 21K 21K 9' 4' 9' 4' 4' 4' 34' 84K 42 TON

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3.0 PRECAST REINFORCED CONCRETE BOX SECTIONS

The precast reinforced concrete box culvert sections shall match the size and hydraulic opening indicated in the contract plans.

A. Design

1. Design Fill – The design earth cover is reported on the plans as the elevation difference between the point of maximum fill and the bottom of the top slab.

2. Placement of Reinforcement – Provide a 1 inch concrete cover over the reinforcement subject to the provisions of Section F. Extend the inside reinforcement into the tongue portion of the joint and the outside reinforcement into the groove portion of the joint. Detail the clear distance of the end wires so it is not less than 1/2 inch or more than 2 inches from the ends of the box section. Assemble reinforcement per the requirements of ASTM C1577 or the approved design. The exposure of the ends of the wires used to position the reinforcement is not a cause for rejection.

3. Laps and Spacing – Use lap splices for the transverse reinforcement. Detail the transverse wires so that the center to center spacing is not less than 2 inches or more than 4 inches. Do not detail the longitudinal wires with a center to center spacing of more than 8 inches.

B. Joints

1. Produce the precast reinforced concrete box section with tongue and groove ends. Design and form these ends of the box section so, when the sections are laid together, they make a continuous line of box sections with a smooth interior free of appreciable irregularities in the flowline, all compatible with the permissible variations given in Section F. The internal joint formed at the tongue and groove ends of the precast units shall be sealed with either bitumen/butyl sealant or closed-cell neoprene material. The internal joint material shall be installed in accordance with the manufacturer's recommendations. The material shall be shown on the shop drawings when they are submitted for review.

2. Seal the external joint with an outside sealer wrap conforming to ASTM C877 that is at least 12 inches wide and covers the joint on both the sides and the top of the box section. Use ConWrap CS-212 from Concrete Sealants, Inc., EZ-Wrap from Press-Seal Gasket Corporation, Seal Wrap from Mar-Mac Manufacturing Co., Inc., Cadilloc External Pipe Joint from Cadilloc, or an approved equal for the outside sealer wrap. If the outside sealer wrap is not applied in a continuous strip along the entire joint, a 12 inch minimum lap of the outside sealer wrap is permitted. Before placing the outside sealer wrap, clean and prime the area receiving the outside sealer wrap in accordance with the sealer wrap manufacturer recommendations. The joint wrap manufacturer installation recommendations shall be included with shop drawings submitted for review. The external joint wrap shall be installed in pieces, as indicated on Figure 1 below:

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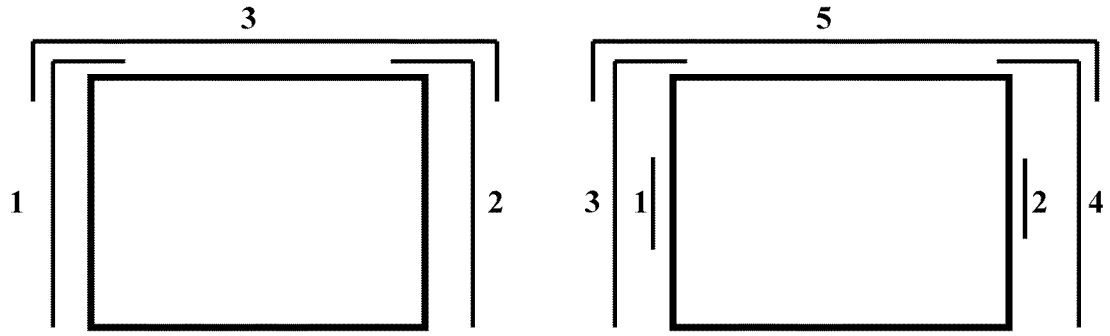

Figure 1

Cover the external joint sealer with a 3 foot strip of filter fabric conforming to Type 4 requirements in Section 1056 of the Standard Specifications.

Place multiple lines of a precast reinforced concrete box culvert such that the longitudinal joint between the sections has a minimum width of 3 inches. Fill the joint between multiple lines of precast box sections with Class A concrete. Use Class A concrete that meets the requirements listed in the Standard Specifications except that Field Compressive Strength Specimens are not required.

C. Manufacture

Manufacture precast reinforced concrete box culvert sections by either the wet cast method or dry cast method.

1. Mixture – In addition to the requirements of Section 1077 of the Standard Specifications, do not proportion the mix with less than 564 lb/yd^3 of portland cement.

2. Strength – Concrete shall develop a minimum 28-day compressive strength of 5000 psi. Movement of the precast sections should be minimized during the initial curing period. Any damage caused by moving or handling during the initial curing phase will be grounds for rejection of that precast section.

3. Air Entrainment – Air entrain the concrete in accordance with Section 1077 - 5(A) of the Standard Specifications. For dry cast manufacturing, air entrainment is not required.

4. Testing – Test the concrete in accordance with the requirements of Section 1077 - 5(B).

5. Handling – Handling devices or holes are permitted in each box section for the purpose of handling and placing. Submit details of handling devices or holes for approval and do not cast any concrete until approval is granted. Remove all handling

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devices flush with concrete surfaces as directed. Fill holes in a neat and workmanlike manner with an approved non-metallic non-shrink grout, concrete, or hole plug.

D. Physical Requirements

Acceptability of precast culvert sections is based on concrete cylinders made and tested in accordance with ASTM C31 and ASTM C39.

E. Permissible Variations

1. Flatness – All external surfaces shall be flat, true, and plumb. Irregularities, depressions, or high spots on all external surfaces shall not exceed 1/2 inch in 8 feet.

2. Internal Dimensions – Produce sections so that the internal and haunch dimensions do not vary more than 1/4 inch from the plan dimensions.

3. Adjacent Sections - Internal, external, and haunch dimensions for connecting sections shall not vary more than 1/2 inch.

4. Length of Tongue and Groove – The minimum length of the tongue shall be 4 inches. The minimum length of the groove shall be 4 inches. The dimensions of the tongue and groove shall not vary more than 1/4 inch from the plan dimensions.

5. Slab and Wall Thickness – Produce sections so that the slab and wall thickness are not less than that shown on the plans by more than 5% or 3/16 inch, whichever is greater. A thickness more than that required on the plans is not a cause for rejection.

6. Length of Opposite Surfaces – Produce sections so that variations in laying lengths of two opposite surfaces of the box section meet the requirements of ASTM C1577, Section 11.3.

7. Length of Section – Produce sections so that the underrun in length of a section is not more than 1/2 inch in any box section.

8. Position of Reinforcement – Produce sections so that the maximum variation in the position of the reinforcement is ±3/8 inch for slab and wall thicknesses of 5 inches or less and ±1/2 inch for slab and wall thicknesses greater than 5 inches. Produce sections so that the concrete cover is never less than 5/8 inch as measured to the internal surface or the external surface. The preceding minimum cover limitations do not apply at the mating surfaces of the joint.

9. Area of Reinforcement – Use the design steel shown on the plans for the steel reinforcement. Steel areas greater than those required are not cause for rejection. The permissible variation in diameter of any wire in finished fabric is prescribed for the wire before fabrication by either AASHTO M32 or M225.

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F. Marking

1. Each section shall be match-marked in order of intended installation as indicated on the approved shop drawings. Ensure that pieces fit together neatly and in a workmanlike manner. In order to ensure a good, neat field fit, the Department will verify assembly of the first five adjacent sections or 20% of the total culvert length, whichever is greater, at the producer's facility and match-mark the pieces. This will require that a minimum of three adjacent sections of the culvert be fitted at the production yard at a time and then match-marked. Once three sections have been match-marked, the first section may be removed for shipment and a fourth section set for marking. Continue in a progressive manner until all sections have been properly match-marked. The producer shall document the GO-NO-GO dimensional measurements of each box culvert section produced through the post-pour inspection process.

2. Clearly mark each section of the box culvert in accordance with ASTM C1577, Section 15. The information requirements of Section 15.1 shall be clearly marked on the inner surface of each section.

G. Construction

1. Pre-installation Meeting – A pre-installation meeting is required prior to installation. Representatives from the Contractor, the precast box manufacturer, and the Department should attend this meeting. The precast box manufacturer representative shall be on site during installation.

2. Foundation – Foundation for precast box culvert shall meet the requirements of Section 414 of the Standard Specifications. In addition, Type VI foundation material shall be encapsulated in filter fabric conforming to Type 4 requirements in Section 1056 of the Standard Specifications. The filter fabric shall be placed perpendicular to the culvert barrel. Provide sufficient overhang beyond the excavation to allow a minimum lap of 3 feet when the foundation material is placed and fabric wrapped on top. Perpendicular sections of fabric shall be continuous. A minimum lap of 2 feet shall be provided between sections of fabric.

3. Installation – Sections shall be placed at the beginning of the outlet end of the culvert with the groove end being laid upgrade. Tongue sections shall be laid into the groove sections. Positive means shall be provided to pull each section firmly into the previously placed section so that the joints are tightly homed. Use a "come-along", box pullers or other approved methods to create a positive means of joining box sections. Construction equipment shall not have direct contact with the box section. The load of the box shall be suspended by lifting device during joining procedure.

4. Backfill – Complete backfill in accordance with Section 414 of the Standard Specifications.

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4.0 BASIS OF PAYMENT

Any additional cost of redesigning will be paid for by the Contractor if Precast Reinforced Concrete Culvert is used in lieu of the cast-in-place culvert shown on the plans. Except for Foundation Conditioning Material and Culvert Excavation, payment for the Precast Box Culvert will be a lump sum amount equal to the payment that would be allowed for construction of a Cast-in-Place Box Culvert. Plan quantities and unit bid prices will be used to compute the lump sum amount. Such price and payment will be full compensation for all work covered by this Special Provision, the plans and applicable parts of the Standard Specifications and will include, but not be limited to, furnishing all labor, materials (including all filter fabric), equipment and other incidentals necessary to complete this work. Such price and payment will also be full compensation for concrete, reinforcing steel, labor, equipment and all other related materials necessary for the completion of the barrel section, and the construction of the headwalls, leveling pad, end curtain walls, wings and wing footings.

DocuSign Envelope ID: CC3E15C2-C14D-4194-A36A-182805C845FE

FALSEWORK AND FORMWORK (4-5-12)

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. Submit the number of copies as called for by the contract.

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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.

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.

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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.

DocuSign Envelope ID: CC3E15C2-C14D-4194-A36A-182805C845FE

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.

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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		

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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.

DocuSign Envelope ID: CC3E15C2-C14D-4194-A36A-182805C845FE

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.

DocuSign Envelope ID: CC3E15C2-C14D-4194-A36A-182805C845FE

SUBMITTAL OF WORKING DRAWINGS (6-28-17)

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.

In order 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 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.

Submittals may also be made via email.

Send submittals to:

jlbolden@ncdot.gov (James Bolden)

Send an additional e-copy of the submittal to the following address:

eomile@ncdot.gov (Emmanuel Omile)

DocuSign Envelope ID: CC3E15C2-C14D-4194-A36A-182805C845FE

mrorie@ncdot.gov (Madonna Rorie)

For submittals to the Geotechnical Engineering Unit, use the following addresses:

For projects in Divisions 1-7, use the following Eastern Regional Office address:

Via US mail:

Mr. Chris Kreider, P. E.
Eastern Regional Geotechnical Manager
North Carolina Department of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
1570 Mail Service Center
Raleigh, NC 27699-1570

Via other delivery service:

Mr. Chris Kreider, P. E.
Eastern Regional Geotechnical Manager
North Carolina Department of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
3301 Jones Sausage Road, Suite 100
Garner, NC 27529

Via Email: EastGeotechnicalSubmittal@ncdot.gov

For projects in Divisions 8-14, use the following Western Regional Office address:

Via US mail or other delivery service:

Mr. Eric Williams, P. E.
Western Regional Geotechnical Manager
North Carolina Department of Transportation
Geotechnical Engineering Unit
Western Regional Office
5253 Z Max Boulevard
Harrisburg, NC 28075

Via Email: WestGeotechnicalSubmittal@ncdot.gov

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

(919) 250 – 4082 facsimile

DocuSign Envelope ID: CC3E15C2-C14D-4194-A36A-182805C845FE

jlbolden@ncdot.gov

Secondary Structures Contacts: Emmanuel Omile (919) 707 – 6451

Madonna Rorie (919) 707 – 6508

Eastern Regional Geotechnical Contact (Divisions 1-7):

Chris Kreider (919) 662 – 4710

ckreider@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 the number of hard copies shown below of the same complete submittal directly to the Structures Management Unit and/or the Geotechnical Engineering Unit.

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	Copies Required by Structures Management Unit	Copies Required by Geotechnical Engineering Unit	Contract Reference Requiring Submittal [1]
Arch Culvert Falsework	5	0	Plan Note, SN Sheet & "Falsework and Formwork"
Box Culvert Falsework [7]	5	0	Plan Note, SN Sheet & "Falsework and Formwork"

DocuSign Envelope ID: CC3E15C2-C14D-4194-A36A-182805C845FE

Cofferdams	6	2	Article 410-4
Foam Joint Seals [6]	9	0	"Foam Joint Seals"
Expansion Joint Seals (hold down plate type with base angle)	9	0	"Expansion Joint Seals"
Expansion Joint Seals (modular)	2, then 9	0	"Modular Expansion Joint Seals"
Expansion Joint Seals (strip seals)	9	0	"Strip Seals"
Falsework & Forms [2] (substructure)	8	0	Article 420-3 & "Falsework and Formwork"
Falsework & Forms (superstructure)	8	0	Article 420-3 & "Falsework and Formwork"
Girder Erection over Railroad	5	0	Railroad Provisions
Maintenance and Protection of Traffic Beneath Proposed Structure	8	0	"Maintenance and Protection of Traffic Beneath Proposed Structure at Station ___"
Metal Bridge Railing	8	0	Plan Note
Metal Stay-in-Place Forms	8	0	Article 420-3
Metalwork for Elastomeric Bearings [4,5]	7	0	Article 1072-8
Miscellaneous Metalwork [4,5]	7	0	Article 1072-8
Disc Bearings [4]	8	0	"Disc Bearings"
Overhead and Digital Message Signs (DMS) (metalwork and foundations)	13	0	Applicable Provisions
Placement of Equipment on Structures (cranes, etc.)	7	0	Article 420-20
Precast Concrete Box Culverts	2, then 1 reproducible	0	"Optional Precast Reinforced Concrete Box Culvert at Station ___"

DocuSign Envelope ID: CC3E15C2-C14D-4194-A36A-182805C845FE

Prestressed Concrete Cored Slab (detensioning sequences) [3]	6	0	Article 1078-11
Prestressed Concrete Deck Panels	6 and 1 reproducible	0	Article 420-3
Prestressed Concrete Girder (strand elongation and detensioning sequences)	6	0	Articles 1078-8 and 1078-11
Removal of Existing Structure over Railroad	5	0	Railroad Provisions
Revised Bridge Deck Plans (adaptation to prestressed deck panels)	2, then 1 reproducible	0	Article 420-3
Revised Bridge Deck Plans (adaptation to modular expansion joint seals)	2, then 1 reproducible	0	"Modular Expansion Joint Seals"
Sound Barrier Wall (precast items)	10	0	Article 1077-2 & "Sound Barrier Wall"
Sound Barrier Wall Steel Fabrication Plans [5]	7	0	Article 1072-8 & "Sound Barrier Wall"
Structural Steel [4]	2, then 7	0	Article 1072-8
Temporary Detour Structures	10	2	Article 400-3 & "Construction, Maintenance and Removal of Temporary Structure at Station ____"
TFE Expansion Bearings [4]	8	0	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.

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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	Copies Required by Geotechnical Engineering Unit	Copies Required by Structures Management Unit	Contract Reference Requiring Submittal [1]
Drilled Pier Construction Plans [2]	1	0	Subarticle 411-3(A)
Crosshole Sonic Logging (CSL) Reports [2]	1	0	Subarticle 411-5(A)(2)
Pile Driving Equipment Data Forms [2,3]	1	0	Subarticle 450-3(D)(2)
Pile Driving Analyzer (PDA) Reports [2]	1	0	Subarticle 450-3(F)(3)
Retaining Walls [4]	1 drawings, 1 calculations	2 drawings	Applicable Provisions
Temporary Shoring [4]	1 drawings, 1 calculations	2 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.

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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.

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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.

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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

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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.

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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.

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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

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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

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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

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
Trout Buffer Zone Waiver	Department of Energy, Mineral, and Land Resources, 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.

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
151 PATTON AVENUE
ROOM 208
ASHEVILLE, NORTH CAROLINA 28801-5006

December 27, 2019

Regulatory Division

Action ID: SAW-2012-00882

North Carolina Department of Transportation
Division of Highways
Mr. Philip S. Harris III, P.E., C.P.M.
Natural Environment Section Head
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Harris:

I refer to your Department of the Army (DA) Individual Permit dated January 7, 2015, in which we authorized the placement of fill material into 3.04 acre of wetlands and 7,886 linear feet (lf) of stream, and temporary placement of fill material into 0.31 acres of Waters of the US, associated with the widening of US Highway 221 from US 421 to US 221 Business/NC 88 in Jefferson, in Watauga and Ashe Counties, North Carolina (TIP Numbers R-2519 A-E). This was a phased permit and only authorized work on Sections A, B and D. Sections C and E were not authorized to commence until final design was 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 (the Corps). Also refer to the modifications issued August 31, 2016 authorizing the final design of Section C and the modification December 7, 2017 authorizing impact modifications under the old bridge crossing the South Fork New River in Section B.

By letter dated April 7, 2017, you requested a modification for final impacts associated with changes to two permit sites in Section B as a result of a driveway modification and new temporary wetland fill. The requested changes involve an additional 0.15 acre of temporary wetland impact at Section B Site 4. It also includes the relocation of the stream impact at Site 3 for a total of 71 linear feet of permanent stream impact, a reduction of 40 linear feet compared to the previously authorized impact. This modification request would bring the overall projected impacts (Sections A-E) associated with this modification request for the project to 3.11 acres of permanent wetland impacts, 0.15 acre of temporary wetland impacts, 8,156 linear feet of permanent stream impacts (6,983 linear feet of fill and 1,173 linear feet of bank stabilization), and 0.34 acre of temporary stream impacts.

By letter dated June 15, 2018, we received another modification request for changes to Site 1B on Section B. This request would result in an additional 20 linear feet of bank stabilization along Gap Creek. This modification request would bring the overall projected impacts (Sections A-E) associated with this modification request for the project to 3.11 acres of permanent wetland impacts, 0.15 acre of temporary wetland impacts, 8,176 linear feet of permanent stream impacts (6,983 linear feet of fill and 1,193 linear feet of bank stabilization), and 0.34 acre of temporary stream impacts.

By letter dated April 5, 2019, we received a request to modify and extend this permit to include the final impacts for R-2915E. This final design of Section E proposes impacts to 0.46 acre of permanent wetland impacts, 0.01 acre of temporary impact, 1,366 linear feet of permanent stream impacts (907 linear feet of channel fill and 459 linear feet of bank stabilization) and 576 linear feet (0.07 acre) of temporary stream impacts. The total stream impacts for R-2915E have increased since the preliminary impacts presented in 2014 as a few streams have been delineated since then, the slopes have changed in a few locations, bank stabilization impacts have been added, and drainage design at the time was very preliminary. The overall projected impacts (Sections A-E) associated with this modification request for the project changed to 3.05 acres of permanent wetland impacts, 0.15 acre of temporary wetland impacts, 0.05 acre of hand clearing in wetlands, 9,137 linear feet of permanent stream impacts (7,485 linear feet of fill and 1,652 linear feet of bank stabilization), and 0.41 acre of temporary stream impacts

After review of the information you submitted and the inclusion of the following special conditions, we have determined that your existing DA authorization is modified to include the work detailed in your submittals dated April 7, 2017, June 15, 2018 and April 5, 2019.

1. All work authorized by this permit must be performed in strict compliance with the originally approved application and plans for R-2915, which were received on July 22, 2014 and the updated modification request and plans dated July 28, 2016, April 7, 2017, November 20, 2017, June 15, 2018 except where superseded by this authorization.

* 2. In order to compensate for impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the enclosed 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 authorization. Mitigation for R-2915 Sections A, B, C and D were already required by permit issued January 7, 2015 and subsequent modifications detailed above. A Mitigation Responsibility Transfer Form is enclosed requiring the offset of final design impacts to Section E of R-2915.

In addition to special conditions stated above, all conditions of the original permit and its modifications apply except those superseded by this authorization. The expiration date has been extended to December 31, 2024.

If you have questions, please contact Steve Kichefski at (828) 271-7980, extension 4234.

FOR THE COMMANDER

Monte Matthews
Lead Project Manager
Regulatory Division

Enclosure

cc (without enclosure):

Michael Turchy – NCDOT
Dave Wanucha - NCDWR
Marla Chambers – NCWRC
Amanetta Somerville – USEPA
Claire Ellwanger – USFWS
Felix Davila - FHWA
Monte Matthews – USACE

Environmental Quality

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

S. JAY ZIMMERMAN
Director

April 28, 2017

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 US 221 Widening from US 421 to US 221 Business/NC88 in Jefferson located in Watauga and Ashe Counties. Federal Aid Project No. STP-0221(13); TIP No. R-2915. WBS 34518.1.1. NCDWR Project No. 20140762v.3

Dear Mr. Harris:

Attached hereto is a modification of Certification No. 004001 issued to The North Carolina Department of Transportation (NCDOT) originally dated September 8, 2014 and subsequently modified on August 23, 2016.

If we can be of further assistance, do not hesitate to contact us.

Sincerely,

S. Jay Zimmerman, Director
Division of Water Resources

Attachments

Electronic copy only distribution:
- Steve Kichefski, US Army Corps of Engineers, Asheville Field Office
- Heath Slaughter, Division 11 Environmental Officer
- Colin Mellor, NC Department of Transportation
- Carla Dagnino, NC Department of Transportation
- Dr. Cynthia Van Der Wiele, US Environmental Protection Agency
- Marella Buncick, US Fish and Wildlife Service
- Marla Chambers, NC Wildlife Resources Commission
- Beth Harmon, Division of Mitigation Services
- Dave Wanucha, NC Division of Water Resources Winston Salem Regional Office
- File Copy

P-6

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. This certification authorizes the NCDOT to temporarily impact an additional 0.15 acres of jurisdictional wetlands, 71 linear feet (40 linear feet less than originally approved) of jurisdictional streams in Ashe County. The project shall be constructed pursuant to the modification dated received April 7, 2017. The authorized impacts are as described below:

Stream Impacts in the New 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 Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
Original approved impacts at Site 3	-	-	111	-	111	
New impacts with this approval at Site 3	-	-	(40)	-	(40)	(40)
Totals	-	-	71		71	(40)

Total Stream Impact for (Site/Modification): 71 linear feet (40 linear feet less)

Wetland Impacts in the New River Basin (riverine)

Site	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Total Wetland Impact (ac)
Original approved impacts at Site 3	<0.01	-	-	<0.01	-	<0.02
New additional impacts with this approval at Site 3	-	0.15	-	-	-	0.15
Totals	<0.01	0.15	-	<0.01	-	0.17

Total Wetland Impact for Site: 0.17 acres.

The application provides adequate assurance that the discharge of fill material into the waters of the New 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 April 7, 2017. All the authorized activities and conditions of certification associated with the original Water Quality Certification dated September 8, 2017 and subsequently modified on August 23, 2016 still apply except where superseded 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. Following completion of the project, the temporary sediment basin installed in the wetland at Site 4 will be removed along with any captured sediment. Original wetland dimensions and natural grade or better will be reestablished. The wetland will be seeded with a native wetland seed mix and coir fiber matted. [15A NCAC 02H.0506(b)(3) and (c)(3)]

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 doeument 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. Sam M. Hayes, General Counsel
Department of Environmental Quality
1601 Mail Service Center

This the 28th day of April 2017

DIVISION OF WATER RESOURCES

S. Jay Zimmerman, Director

WQC No. 004001

Environmental Quality

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

LINDA CULPEPPER
Interim Director

June 26, 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 US 221 Widening from US 421 to US 221 Business/NC88 in Jefferson located in Watauga and Ashe Counties. Federal Aid Project No. STP-0221(13); TIP No. R-2915. WBS 34518.1.1. NCDWR Project No. 20140762v4

Dear Mr. Harris:

Attached hereto is a modification of Certification No. 004001 issued to The North Carolina Department of Transportation (NCDOT) originally dated September 8, 2014, subsequently modified on August 23, 2016 and again on April 28, 2017.

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:
- Steve Kichefski, US Army Corps of Engineers, Asheville Field Office
- Heath Slaughter, Division 11 Environmental Officer
- Colin Mellor, NC Department of Transportation
- Carla Dagnino, NC Department of Transportation
- Marella Buncick, US Fish and Wildlife Service
- Marla Chambers, NC Wildlife Resources Commission
- File Copy

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 Publie 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. This certification authorizes the NCDOT to impact an additional 20.0 linear feet of permanent impacts for stream bank stabilization purposes in Ashe County. The project shall be constructed pursuant to the modification dated received June 15, 2018. The anthorized impacts are as described below:

Stream Impacts in the New River Basin, R-2915 B-Section

Site	Permanent Fill in Perennial Stream (linear ft)		Temporary Fill in Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
	Bank Stabilization	Culvert			
Original approved impacts at Site 1B	35	15	6	56	15
New impacts with this approval at Site 1B	20	-	-	20	-
Totals	**55**	**15**	**6**	**76**	**15**

Total Stream Impact for Site: 76 linear feet

The application provides adequate assurance that the discharge of fill material into the waters of the New 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 aecordance 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 June 15, 2018. All the authorized activities and conditions associated with the original Water Quality Certification dated September 8, 2017, subsequently modified on August 23, 2016 and again on April 28, 2017 still apply except where superseded 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 300 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. All the authorized activities and conditions associated with the original Water Quality Certification dated September 8, 2017, subsequently modified on August 23, 2016 and again on April 28, 2017 still apply except where superseded by this eertification.

Violations of any condition herein set forth may result in revoeation of this Certification and may result in criminal and/or eivil 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

This the 26th day of June 2018

DIVISION OF WATER RESOURCES

Linda Culpepper, Interim Director

WQC No. 004001

DocuSign Envelope ID: 953B19B4-669B-4444-ADAC-54C7DB001E63

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
LINDA CULPEPPER
Director

NORTH CAROLINA
Environmental Quality

May 22, 2019

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 US 221 Widening from US 421 to US 221 Business/NC88 in Jefferson located in Watauga and Ashe Counties. Federal Aid Project No. STP-0221(13); TIP No. R-2915. WBS 34518.1.FR6. NCDWR Project No. 20140762v5

Dear Mr. Harris:

Attached hereto is a copy of Certification No. 004001 issued to The North Carolina Department of Transportation (NCDOT) dated May 22, 2019.

If we can be of further assistance, do not hesitate to contact us.

Sincerely,

DocuSigned by:
Amy Chapman
9C9886312DCD474...
Linda Culpepper, Director
Division of Water Resources

Attachments

Electronic copy only distribution:
- Steve Kichefsky, US Army Corps of Engineers, Asheville Field Office
- Kevin Hining, Division 11 Environmental Officer
- Erin Cheely, NC Department of Transportation
- Chris Militscher, US Environmental Protection Agency
- Claire Ellwanger, US Fish and Wildlife Service
- Marla Chambers, NC Wildlife Resources Commission
- File Copy

DocuSign Envelope ID: 953B19B4-669B-4444-ADAC-54C7DB001E63

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. This certification authorizes the NCDOT to impact an additional 907 linear feet of permanent fill impacts, 576 linear feet for temporary impacts, 459 linear feet for bank stabilization and 0.46 acres of wetland impacts in Ashe County for R-2915 Section E. The project shall be constructed pursuant to the modification dated received April 24, 2019. The authorized impacts are as described below:

Stream Impacts in the New River Basin for R-2915E

Site	Permanent Fill in Perennial Stream (linear ft)		Temporary Fill in Perennial Stream (linear ft)	Fill in Intermittent Stream		Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
	Fill	Bank Stabilization		Fill	Bank Stabilization		
2A	-	14	17	-	-	31	-
2B	57	-	21	-	-	78	-
4B	-	-	-	10*	11	21	-
6A	52	-	10	-	-	62	-
6B	-	27	10	-	-	37	-
7	-	-	24	-	-	24	-
8A	-	-	32	-	-	32	-
8B	-	-	20	-	-	20	-
9A	-	-	-	33, 7*	10	50	-
9B	-	-	19	-	-	19	-
11A	-	-	22	-	-	22	-
11B	-	-	10	-	-	10	-
11C	-	-	11	-	-	11	-
11D	27	-	10	-	-	37	-
12	-	17	10	-	-	27	-
13A	31	11	10	-	-	52	-
13B	60	-	-	-	-	60	-
13C	-	-	-	25, 23*	-	48	-
14A	23	23	10	-	-	56	-

DocuSign Envelope ID: 953B19B4-669B-4444-ADAC-54C7DB001E63

Stream Impacts in the New River Basin for R-2915E

Site	Permanent Fill in Perennial Stream (linear ft)		Temporary Fill in Perennial Stream (linear ft)	Fill in Intermittent Stream		Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
	Fill	Bank Stabilization		Fill	Bank Stabilization		
14B	63	-	-	-	-	63	-
15A	31	15	10	-	-	56	-
15B	-	-	23	-	-	23	-
17A	115	-	-	-	-	115	-
17B	-	-	-	146	-	146	-
18	39	-	12	-	-	51	-
19	22	8	10	-	-	40	-
20	-	-	25	-	-	25	-
22A	-	-	22	-	-	22	-
22B	61	31	10	-	-	102	-
23	55	-	-	-	-	55	-
24A	30	-	22	-	-	52	-
24B	-	18	-	-	-	18	-
24C	-	20	20	-	-	40	-
25A	13	-	12	-	-	25	-
25B	-	17	20	-	-	37	-
26A	19	-	8	-	-	27	-
26B	-	8	-	-	-	8	-
26C	-	32	20	-	-	52	-
27A	-	15	-	-	-	15	-
27B	-	18	30	-	-	48	-
28A	-	88	10	-	-	98	-
28B	-	59	10	-	-	69	-
29	5	-	15	-	-	20	-
30	-	17	21	-	-	38	-

DocuSign Envelope ID: 953B19B4-669B-4444-ADAC-54C7DB001E63

Stream Impacts in the New River Basin for R-2915E

Site	Permanent Fill in Perennial Stream (linear ft)		Temporary Fill in Perennial Stream (linear ft)	Fill in Intermittent Stream		Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
	Fill	Bank Stabilization		Fill	Bank Stabilization		
Totals	**703**	**438**	**536**	**204, 40***	**21**	**1,942**	**-**

***Temporary Fill** **Total Stream Impacts for Project: 1,942 linear feet**

Wetland Impacts in the New River Basin for R-2915E

Site	Fill (ac)	Excavation (ac)	Mechanized Clearing (ac)	Total Wetland Impact (ac)
1	-	-	<0.01	<0.01
2B	0.02	-	<0.01	0.03
3	<0.01	-	0.03	0.03
4A	<0.01	-	-	<0.01
4B	<0.01	-	0.03	0.03
5	<0.01	-	0.01	0.01
6A	0.04	-	0.02	0.07
8B	<0.01*	-	-	
9A	0.09	-	-	0.09
10	<0.01	-	<0.01	<0.01
13B	0.01	-	-	0.01
15A	0.01	-	<0.01	0.02
15B	-	-	0.01	0.01
16	0.03	-	-	0.03
21	0.03	0.01	<0.01	0.04
26A	0.01	0.04	-	0.05
31	0.02	-	-	0.02
Total	**0.28, <0.01***	**0.05**	**0.13**	**0.46**

*** Temporary Fill** **Total Preliminary Wetland Impact for Project: 0.46 acres.**

DocuSign Envelope ID: 953B19B4-669B-4444-ADAC-54C7DB001E63

The application provides adequate assurance that the discharge of fill material into the waters of the New 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 receive April 24, 2019. All the authorized activities and conditions associated with the original Water Quality Certification dated September 8, 2014, subsequently modified on August 23, 2016, April 28, 2017, November 27, 2017 by email and again on June 26, 2018, still apply except where superseded 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. Compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7) for any additional wetland impacts or stream impacts that exceed 300 linear feet for this project (now or in the future). 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:

Specific Conditions

* 1. Compensatory mitigation for 0.46 acres of impact to wetlands is required. We understand that you have chosen to perform compensatory mitigation for impacts to streams through the North Carolina Division of Mitigation Service (DMS) (formerly NCEEP), and that the DMS has agreed to implement the mitigation for the project. The DMS has indicated in a letter dated March 29, 2019 that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with the DMS Mitigation Banking Instrument signed July 28, 2010.

2. All the authorized activities and conditions associated with the original Water Quality Certification dated September 8, 2014, subsequently modified on August 23, 2016, April 28, 2017, November 27, 2017 by email and June 26, 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-providing 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

DocuSign Envelope ID: 953B19B4-669B-4444-ADAC-54C7DB001E63

Telephone: (919) 431-3000, Faesimile: (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

This the 22nd day of May 2019

DIVISION OF WATER RESOURCES

DocuSigned by:
Amy Chapman
9C9886312DCD474...

Linda Culpepper, Interim Director

WQC No. 004001

TIP PROJECT: R-2915B

CONTRACT:

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ASHE COUNTY

LOCATION: US 221 FROM SR 1003 (IDLEWILD ROAD) TO NORTH OF SOUTH FORK NEW RIVER

TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2915B	1	

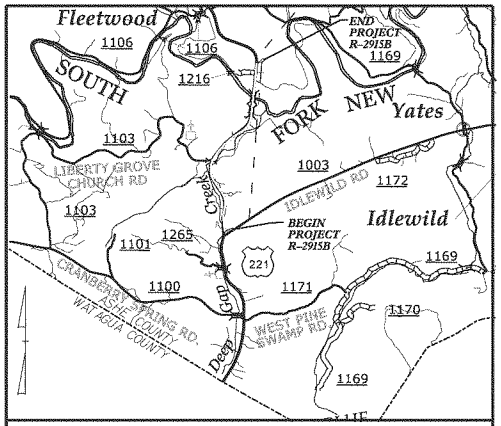
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34518.1.3	STP-0221(40)	P.E.
34518.2.FR2	STP-0221(40)	R /W
34518.2.UFR2	STP-0221(40)	UTILITIES

PERMIT DRAWING
SHEET 1 OF 31

Revised 4/6/17

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



VICINITY MAP

RW PLANS

NAD 83/CORS

-L- CS Sta. 158+31.70 LA. =
-L- CS Sta. 160+01.83 LB.
BEGIN TIP PROJECT R-2915B
END TIP PROJECT R-2915A

-L- POS Sta. 161+32.67
BEGIN CULVERT
-L- POT Sta. 161+65.04
END CULVERT

-L- POC Sta. 174+55.08=
-Y9- POT Sta. 10+00.00

END BRIDGE
-L- POC STA. 199+24.38
BEGIN BRIDGE
-L- POC STA. 198+00.60

BEGIN BRIDGE
-L- POC STA. 198+03.43
END BRIDGE
-L- POC STA. 199+29.58

-Y9- POT Sta. 16+90.08
END CONSTRUCTION

-L- POC Sta. 200+76.32=
-Y10- POT Sta. 17+98.86

-Y10- PC Sta. 12+75.00
BEGIN CONSTRUCTION

-L- POC Sta. 222+42.64=
-Y11- POT Sta. 13+02.04

-L- POC Sta. 229+72.13=
-Y12- POT Sta. 15+24.25

BEGIN BRIDGE
-L- POT STA. 233+40.93
END BRIDGE
-L- POT STA. 234+74.46

-Y11- POT Sta. 10+55.00
BEGIN CONSTRUCTION

-Y12- POC Sta. 12+85.00
BEGIN CONSTRUCTION

END BRIDGE
-L- POT STA. 244+01.60
BEGIN BRIDGE
-L- POT STA. 241+41.43

END BRIDGE
-L- POT STA. 243+93.41
BEGIN BRIDGE
-L- POT STA. 241+33.23

-DET- POS Sta. 256+08.81=
-Y13- POT Sta. 13+08.70

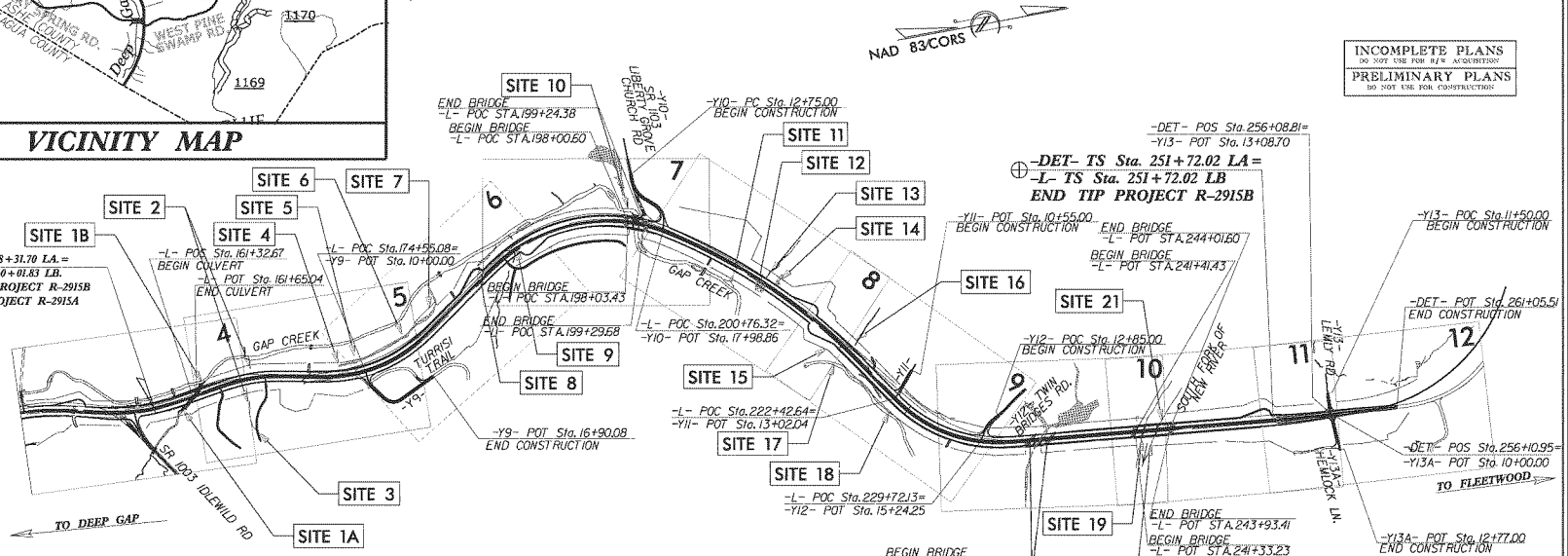
-DET- TS Sta. 251+72.02 LA =
-L- TS Sta. 251+72.02 LB
END TIP PROJECT R-2915B

-Y13- POC Sta. 11+50.00
BEGIN CONSTRUCTION

-DET- POT Sta. 261+05.51
END CONSTRUCTION

-DET- POS Sta. 256+10.95=
-Y13A- POT Sta. 10+00.00

-Y13A- POT Sta. 12+77.00
END CONSTRUCTION



NOTE : THIS IS A PARTIAL CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO ONE DRIVEWAY PER PARCEL.

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III

WETLAND AND SURFACE WATER IMPACTS PERMIT

NCDOT CONTACT: BRENDA L. MOORE, P.E.

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 12,089
ADT 2035 = 20,204
DHV = 10 %
D = 65 %
T = 9 % *
V = 50 MPH
* TTST 2% DUAL 7%
FUNC CLASS = ARTERIAL
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2915B = 1.675 MILES
LENGTH STRUCTURE TIP PROJECT R-2915B = 0.094 MILES
TOTAL LENGTH TIP PROJECT R-2915B = 1.769 MILES

Prepared In the Office of:
CDM Smith
5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 30, 2013

LETTING DATE:
JUNE 16, 2015

DOUGLAS B. SAUNDERS, P.E.
PROJECT ENGINEER

RICKY E. STATON
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

P-17

6/6/2014
R:\Roadway\Proj\34518_wet_bath_01.dgn

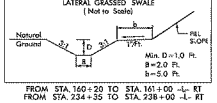
PERMIT DRAWING SHEET 2 OF 31

Revised 4/6/17

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	2D-1
R/W SHEET NO.	

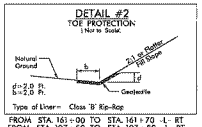
HYDRAULICS ENGINEER

DETAIL #1
LATERAL GRASSED SWALE
(Not to Scale)



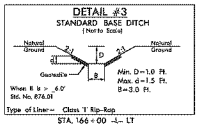
FROM STA. 160+20 TO STA. 161+00 -L- RT
FROM STA. 234+35 TO STA. 238+00 -L- RT

DETAIL #2
TOE PROTECTION
(Not to Scale)



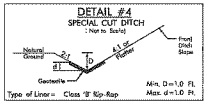
FROM STA. 161+00 TO STA. 161+70 -L- RT
FROM STA. 197+50 TO STA. 197+80 -L- RT
FROM STA. 250+00 TO STA. 251+50 -L- RT
FROM STA. 251+00 TO STA. 252+50 -L- LT
FROM STA. 15+05 TO STA. 15+50 -DR1REV- RT
FROM STA. 15+00 TO STA. 15+50 -DR1REV- LT

DETAIL #3
STANDARD BASE DITCH
(Not to Scale)



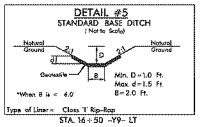
STA. 166+00 -L- LT

DETAIL #4
SPECIAL CUT DITCH
(Not to Scale)



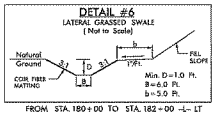
FROM STA. 16+20 TO STA. 16+90 -Y9- RT

DETAIL #5
STANDARD BASE DITCH
(Not to Scale)



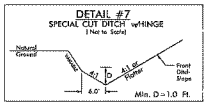
STA. 16+50 -Y9- LT

DETAIL #6
LATERAL GRASSED SWALE
(Not to Scale)



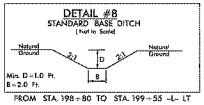
FROM STA. 180+00 TO STA. 182+00 -L- LT

DETAIL #7
SPECIAL CUT DITCH w/HINGE
(Not to Scale)



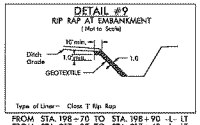
FROM STA. 196+50 TO STA. 197+00 -L- RT

DETAIL #8
STANDARD BASE DITCH
(Not to Scale)



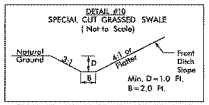
FROM STA. 198+80 TO STA. 199+55 -L- LT

DETAIL #9
RIP RAP AT EMBANKMENT
(Not to Scale)



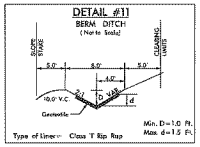
FROM STA. 198+70 TO STA. 198+90 -L- LT
FROM STA. 217+27 TO STA. 217+40 -L- LT
FROM STA. 242+50 TO STA. 242+70 -L- RT
FROM STA. 243+40 TO STA. 243+60 -L- LT

DETAIL #10
SPECIAL CUT GRASSED SWALE
(Not to Scale)



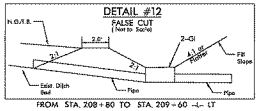
FROM STA. 211+80 TO STA. 215+55 -L- RT

DETAIL #11
BERM DITCH
(Not to Scale)



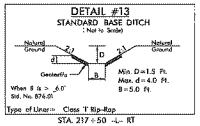
FROM STA. 171+50 TO STA. 172+75 -L- RT

DETAIL #12
FALSE CUT
(Not to Scale)



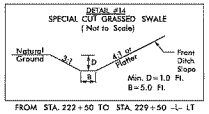
FROM STA. 208+80 TO STA. 209+60 -L- LT

DETAIL #13
STANDARD BASE DITCH
(Not to Scale)



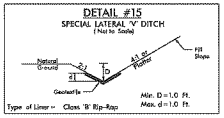
STA. 217+50 -L- RT

DETAIL #14
SPECIAL CUT GRASSED SWALE
(Not to Scale)



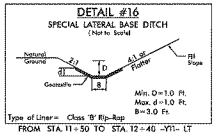
FROM STA. 222+50 TO STA. 229+50 -L- LT

DETAIL #15
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



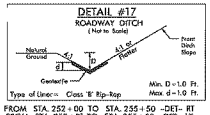
FROM STA. 10+55 TO STA. 12+18 -Y11- RT
FROM STA. 13+95 TO STA. 14+55 -Y12- RT

DETAIL #16
SPECIAL LATERAL BASE DITCH
(Not to Scale)



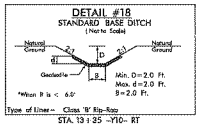
FROM STA. 11+50 TO STA. 12+40 -Y11- LT

DETAIL #17
ROADWAY DITCH
(Not to Scale)



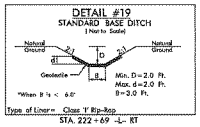
FROM STA. 252+00 TO STA. 255+50 -DET- RT
FROM STA. 253+71 TO STA. 255+50 -DET- LT
FROM STA. 256+42 TO STA. 261+05 -DET- RT
FROM STA. 256+56 TO STA. 260+50 -DET- LT

DETAIL #18
STANDARD BASE DITCH
(Not to Scale)



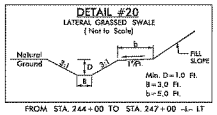
STA. 13+25 -Y10- RT

DETAIL #19
STANDARD BASE DITCH
(Not to Scale)



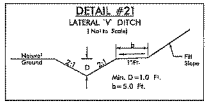
STA. 222+69 -L- RT

DETAIL #20
LATERAL GRASSED SWALE
(Not to Scale)



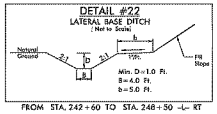
FROM STA. 244+00 TO STA. 247+00 -L- LT

DETAIL #21
LATERAL 'V' DITCH
(Not to Scale)



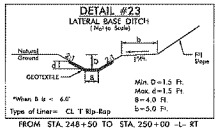
FROM STA. 247+00 TO STA. 249+00 -L- LT

DETAIL #22
LATERAL BASE DITCH
(Not to Scale)



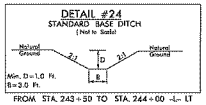
FROM STA. 242+60 TO STA. 248+50 -L- RT

DETAIL #23
LATERAL BASE DITCH
(Not to Scale)



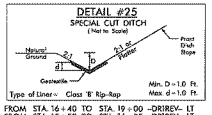
FROM STA. 248+50 TO STA. 250+00 -L- RT

DETAIL #24
STANDARD BASE DITCH
(Not to Scale)



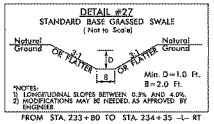
FROM STA. 243+50 TO STA. 244+00 -L- LT

DETAIL #25
SPECIAL CUT DITCH
(Not to Scale)



FROM STA. 16+40 TO STA. 19+00 -DR1REV- LT
FROM STA. 15+50 TO STA. 16+05 -DR1REV- LT
FROM STA. 10+20 TO STA. 10+50 -DR2REV- RT
FROM STA. 10+15 TO STA. 10+50 -DR2REV- LT

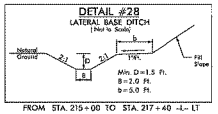
DETAIL #27
STANDARD BASE GRASSED SWALE
(Not to Scale)



*NOTES:
1) LONGITUDINAL SLOPES BETWEEN 0.3% AND 4.0%.
2) MODIFICATIONS MAY BE NEEDED, AS APPROVED BY ENGINEER.

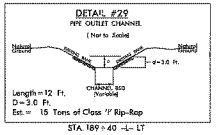
FROM STA. 233+80 TO STA. 234+35 -L- RT

DETAIL #28
LATERAL BASE DITCH
(Not to Scale)



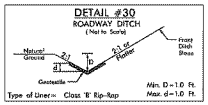
FROM STA. 215+00 TO STA. 217+40 -L- LT

DETAIL #29
PIPE OUTLET CHANNEL
(Not to Scale)



STA. 189+40 -L- LT

DETAIL #30
ROADWAY DITCH
(Not to Scale)



FROM STA. 10+50 TO STA. 15+00 -DR1REV- LT
FROM STA. 10+70 TO STA. 14+50 -DR1REV- RT
FROM STA. 15+50 TO STA. 16+50 -DR1REV- RT
FROM STA. 10+50 TO STA. 12+80 -DR2REV- RT
FROM STA. 10+50 TO STA. 12+00 -DR2REV- LT
FROM STA. 10+50 TO STA. 16+00 -Y9- LT & RT
FROM STA. 10+84 TO STA. 15+00 -DR3- LT
FROM STA. 11+30 TO STA. 15+00 -DR3- RT
FROM STA. 17+00 TO STA. 19+72 -DR3- RT
FROM STA. 17+00 TO STA. 19+30 -DR3- LT
FROM STA. 10+25 TO STA. 11+55 -DR5- LT
FROM STA. 10+25 TO STA. 11+00 -DR5- RT
FROM STA. 10+50 TO STA. 12+10 -Y13A- RT
FROM STA. 10+50 TO STA. 12+50 -Y13A- LT

P-18

5/14/99

1/23/2017
R2915B_hyd_DETAILS.dgn

PERMIT DRAWING
SHEET 3 OF 31

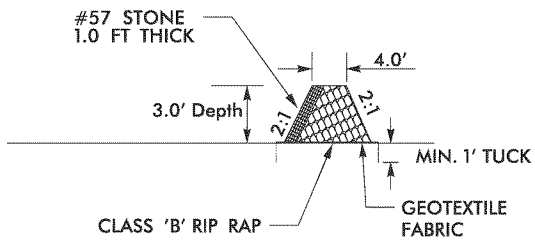
Revised 4/6/17

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	2D-2
R/W SHEET NO.	
	HYDRAULICS ENGINEER

DETAIL #31

FILTER BERM SECTION VIEW

(Not to Scale)



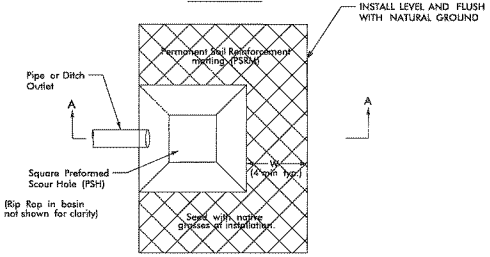
EST 10 TONS #57 STONE
EST 40 TONS CL B RIP RAP
EST 70 SY GEOTEXTILE

STA. 198+00 -L- RT

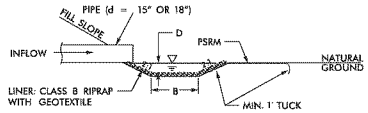
PREFORMED SCOUR HOLE

*NOT TO SCALE

PLAN VIEW



SECTION A-A



STATION	B FT.	D FT.
FOR 15" PIPE	4.0	1.0
165+00 -L- LT	4.0	1.0
171+50 -L- LT	4.0	1.0
200+00 -L- RT	4.0	1.0
204+00 -L- RT	4.0	1.0
206+50 -L- RT	4.0	1.0
211+27 -L- RT	4.0	1.0
216+75 -L- RT	4.0	1.0
221+95 -L- RT	4.0	1.0
231+50 -L- RT	4.0	1.0
232+80 -L- RT	4.0	1.0
238+00 -L- LT	4.0	1.0
FOR 18" PIPE	6.0	1.0
182+30 -L- LT	6.0	1.0

DETAIL #36

(NOT TO SCALE)

SKEWED MULTI-BARREL CULVERT LOW FLOW CHANNEL,SILLS AND FLOOD PLAIN

*NOTES:

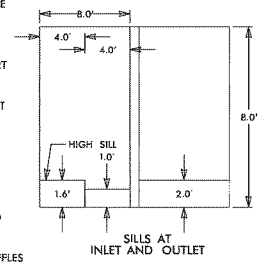
1) NATIVE MATERIAL BETWEEN SILLS/BAFFLES IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE THE STREAM OR FLOODPLAIN AT THE PROJECT SITE DURING CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE LOW FLOW CULVERT BARREL. RIP-RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARREL(S). IF RIP-RAP IS USED TO LINE THE HIGH FLOW CULVERT BARREL(S), NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

2) SILLS/BAFFLES ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

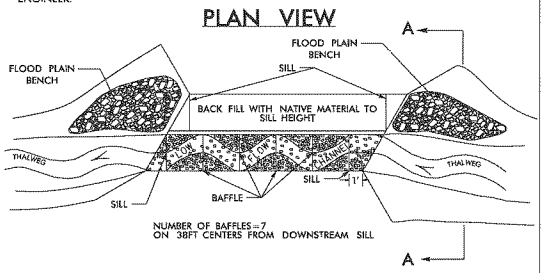
3) TOP OF LOW FLOW SILLS/BAFFLES SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM. (THALWEG)

4) DO NOT SET ELEVATION OF HIGH SILL/BAFFLES ABOVE BANK FULL.

5) NUMBER OF SILL/BAFFLES DETERMINED BY THE ENGINEER.

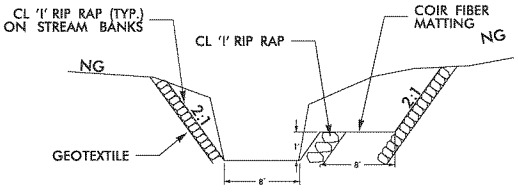


PLAN VIEW



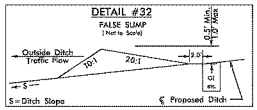
SECTION A-A

INLET AND OUTLET CHANNEL



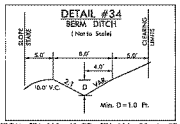
STA. 160+40.08 -L- RT
STA. 162+28.52 -L- LT

DETAIL #32
FALSE SUMP
(Not to Scale)



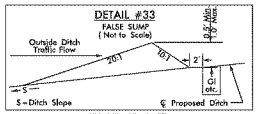
STA. 178+63 -L- RT
STA. 182+84 -L- RT
STA. 188+90 -L- RT
STA. 192+15 -L- RT
STA. 195+60 -L- RT
STA. 197+14 -L- RT
STA. 256+75 -DET- LT
STA. 14+86 -Y10- LT
STA. 15+72 -Y10- LT

DETAIL #34
BERM DITCH
(Not to Scale)



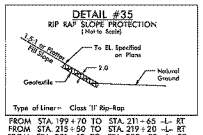
FROM STA. 165+45 TO STA. 166+05 -L- RT
FROM STA. 170+65 TO STA. 171+50 -L- RT

DETAIL #33
FALSE SUMP
(Not to Scale)



STA. 167+37 -L- RT
STA. 171+37 -L- RT
STA. 173+87 -L- RT
STA. 201+62 -L- LT
STA. 204+14 -L- LT
STA. 206+64 -L- LT
STA. 252+10 -DET- RT
STA. 12+90 -Y9- RT
STA. 16+10 -Y9- RT
STA. 14+32 -DR3- RT

DETAIL #35
RIP RAP SLOPE PROTECTION
(Not to Scale)



FROM STA. 199+70 TO STA. 211+65 -L- RT
FROM STA. 215+50 TO STA. 219+20 -L- RT
FROM STA. 221+63 TO STA. 223+80 -L- RT

P-19

5/14/93

8/9/2016
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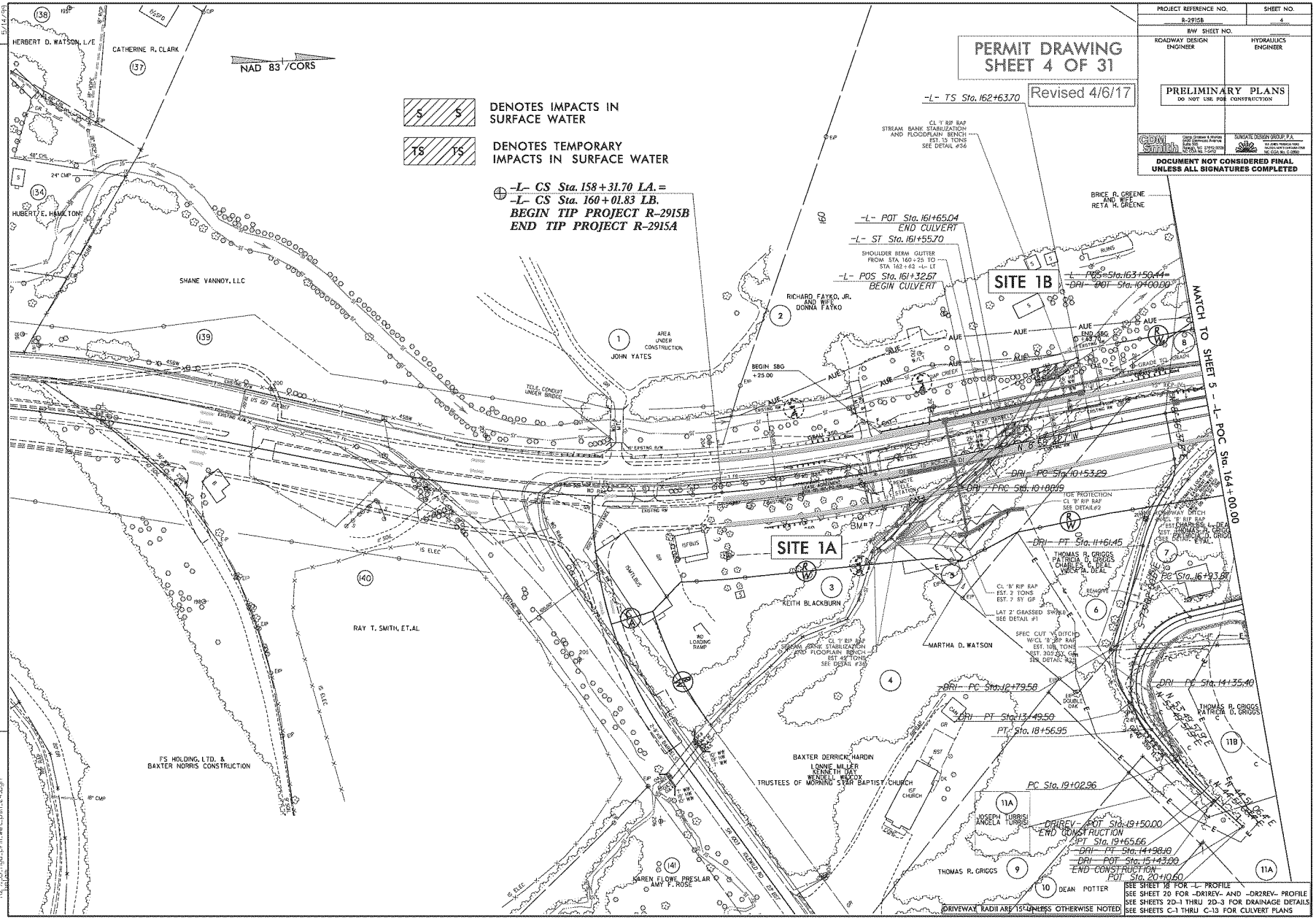
PROJECT REFERENCE NO.
R-2915B
SHEET NO.
4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 4 OF 31
Revised 4/6/17
NAD 83 /CORS
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
-L- CS Sta. 158+31.70 LA. =
-L- CS Sta. 160+01.83 LB.
BEGIN TIP PROJECT R-2915B
END TIP PROJECT R-2915A
-L- TS Sta. 162+63.70
-L- POT Sta. 161+65.04
END CULVERT
-L- ST Sta. 161+55.70
-L- POS Sta. 161+32.67
BEGIN CULVERT
SITE 1B
SITE 1A
MATCH TO SHEET 5 - -L- POC Sta. 164+00.00
HERBERT D. WATSON, L/E
CATHERINE R. CLARK
HUBERT E. HAMILTON
SHANE VANNOY, LLC
RICHARD FAYKO, JR. AND WIFE DONNA FAYKO
BRICE R. GREENE AND WIFE RETA H. GREENE
JOHN YATES
RAY T. SMITH, ET.AL
KEITH BLACKBURN
MARTHA D. WATSON
THOMAS R. GRIGGS PATRICIA D. GRIGGS CHARLES L. DEAL VICKI A. DEAL
FS HOLDING, LTD. & BAXTER NORRIS CONSTRUCTION
BAXTER DERRICK HARDIN LONNIE MILLER KENNETH DAY WENDELL WILCOX TRUSTEES OF MORNING STAR BAPTIST CHURCH
JOSEPH TURRISI ANGELA TURRISI
THOMAS R. GRIGGS
DEAN POTTER
KAREN FLOWE PRESLAR AMY P. ROSE
DRIVEWAY RADII ARE 15' UNLESS OTHERWISE NOTED
SEE SHEET 18 FOR -L- PROFILE
SEE SHEET 20 FOR -DR1REV- AND -DR2REV- PROFILE
SEE SHEETS 2D-1 THRU 2D-3 FOR DRAINAGE DETAILS
SEE SHEETS C-1 THRU C-13 FOR CULVERT PLANS
REVISIONS

P-20

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 5 OF 31

Revised 4/6/17

NAD 83 /CORS

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

-L- CS Sta. 158+31.70 LA. =
-L- CS Sta. 160+01.83 LB.
BEGIN TIP PROJECT R-2915B
END TIP PROJECT R-2915A

-L- TS Sta. 162+63.70

SITE 1A

SITE 1B

MATCH TO SHEET 5 - -L- POC Sta. 164+00.00

HERBERT D. WATSON, L/E
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HUBERT G. HAMILTON
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ANGELA TURNER
KAREN FLOWE PRESLAR AND AMY P. ROSE
DEAN POTTER

DRIVEWAY RADII ARE 15' UNLESS OTHERWISE NOTED

SEE SHEET 3A FOR -L- PROFILE
SEE SHEET 2D FOR -DRIREV- AND -DR2REV- PROFILE
SEE SHEETS 2D-1 THRU 2D-3 FOR DRAINAGE DETAILS
SEE SHEETS C-1 THRU C-13 FOR CULVERT PLANS

REVISIONS

P-21

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

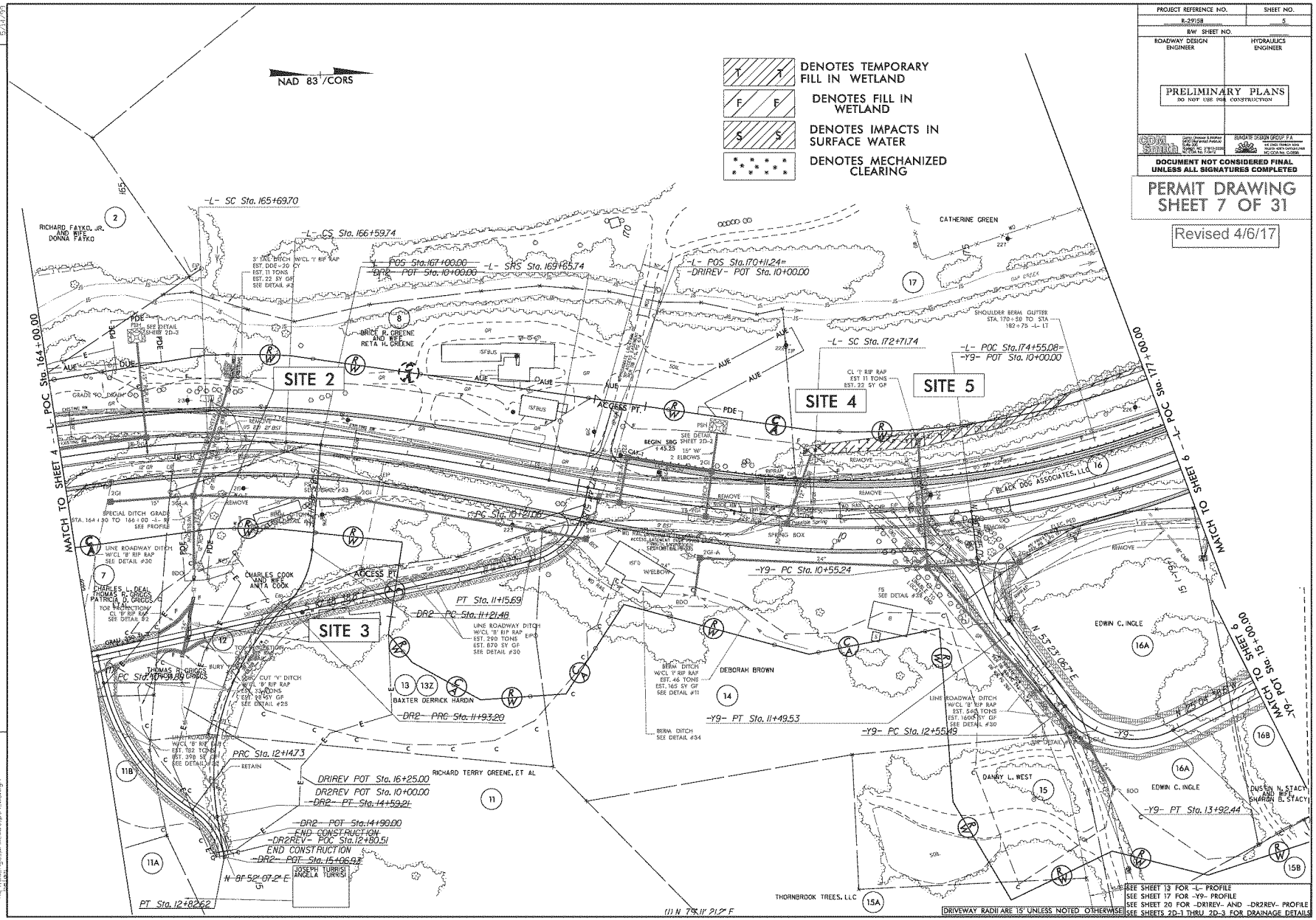
CDM Smith — Cox Design & Engineering, PA
2000 Regent Parkway, Suite 330, Durham, NC 27707-2200
NC Firm No. F-0979

SUNDATE DESIGN GROUP P.A.
1415 Raleigh Road, Suite 435, Chapel Hill, NC 27514
NC Firm No. C-0392

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 7 OF 31

Revised 4/6/17



REVISIONS

5/31/07

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P-22

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

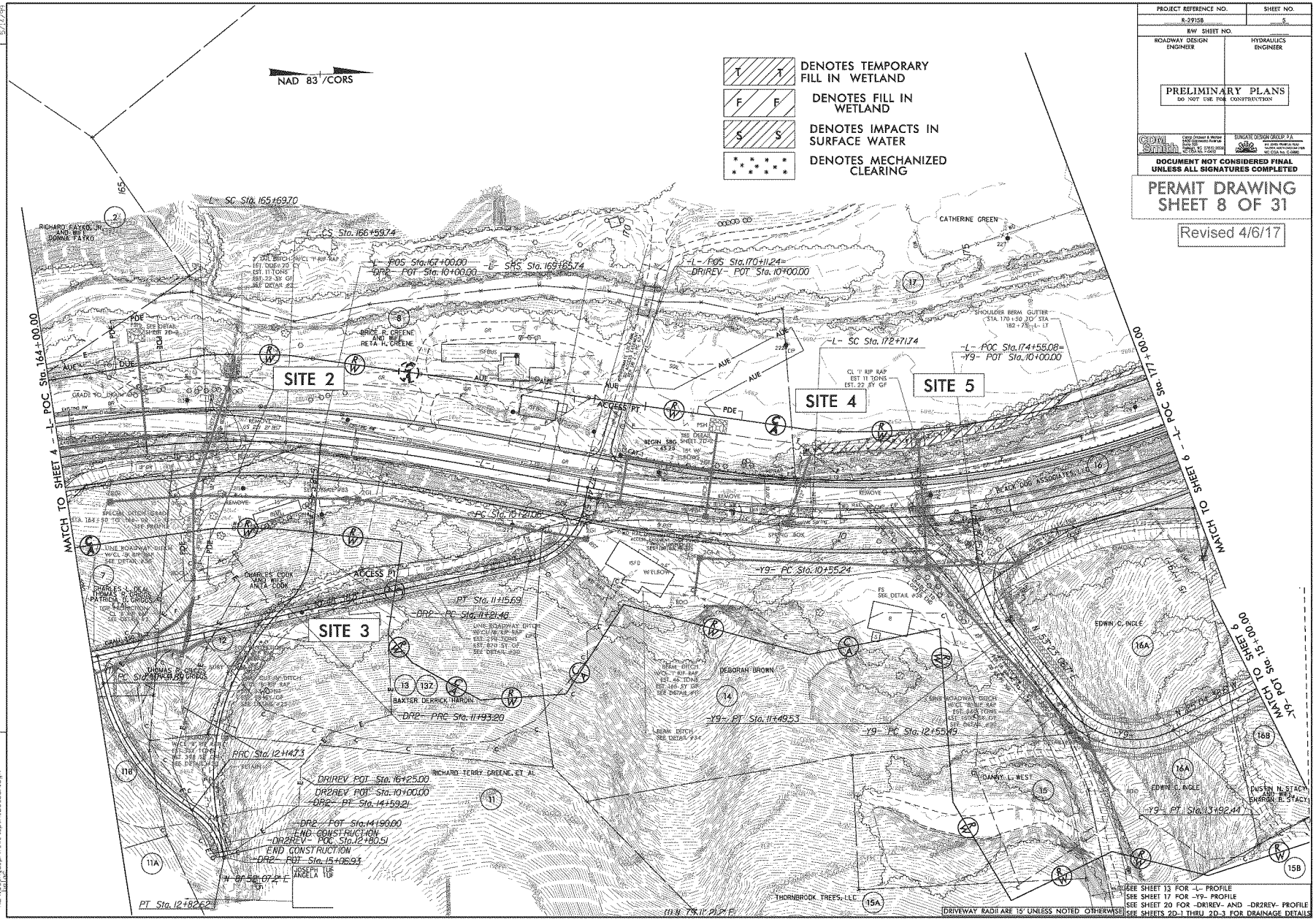
CDM Smith — Cavros Christian & Martine, PLLC (formerly Kimley-Horn and Associates, Inc.) Raleigh, NC 27610 (919) 872-5115 NC FIRM No. F-0470

BUNGATE DESIGN GROUP, P.A. 8412 Glenwood Avenue Raleigh, North Carolina 27608 (919) 781-1311 NC FIRM No. C-0892

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 8 OF 31

Revised 4/6/17



REVISIONS

5/14/99

14/9.CDT
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P-23

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Gray Smith — Gray Smith Engineering, PLLC, 1000 Corporate Drive, Raleigh, NC 27610, NC License No. P-0470

SUNGATE DESIGN GROUP, P.A. — 400 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0880

PERMIT DRAWING
SHEET 9 OF 31

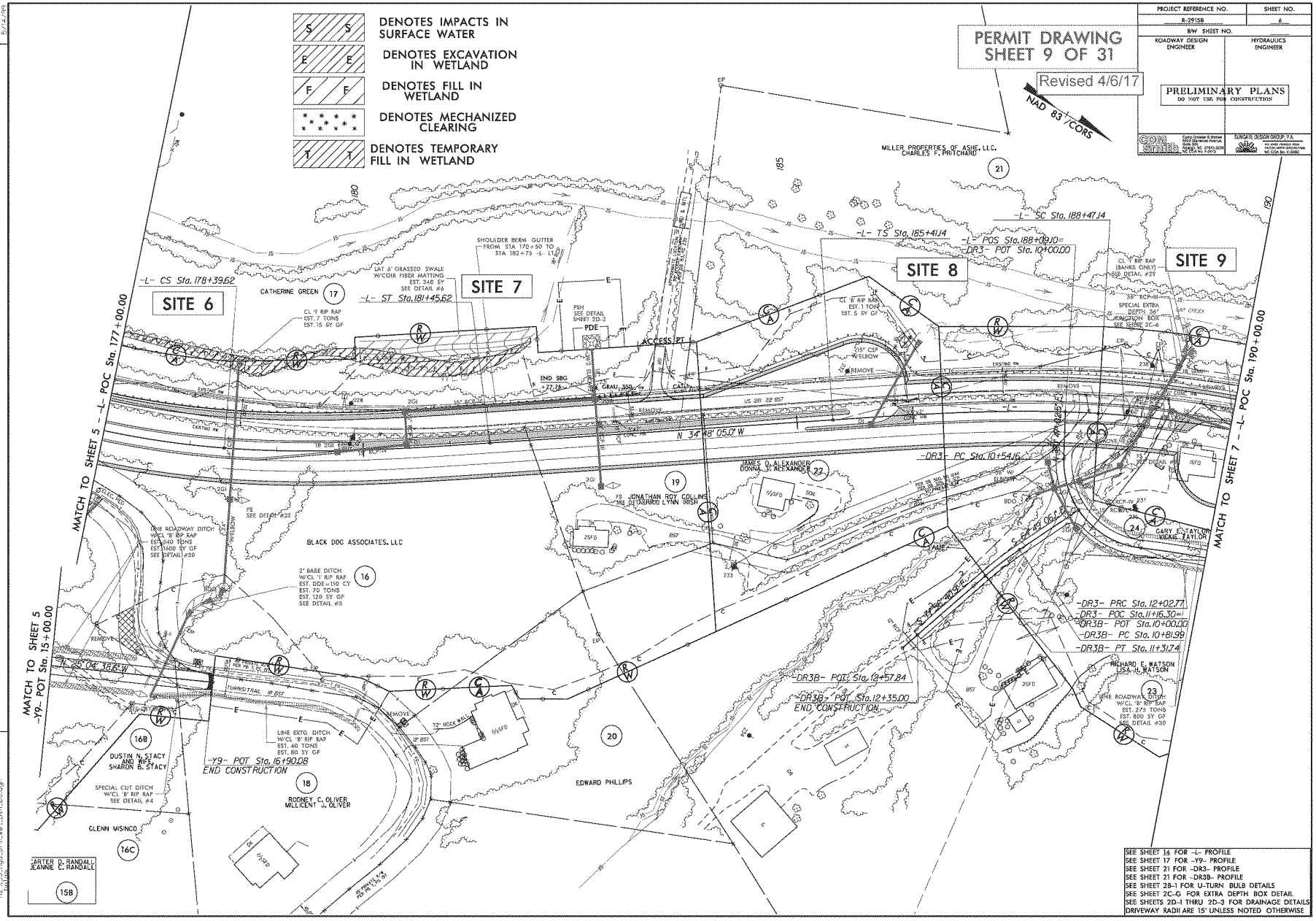
Revised 4/6/17

NAD 83 / CORS

REVISIONS

01/31/14 - R/W REVISIONS: UPDATED PROPERTY OWNER NAMES AND DEED REFERENCES ON PARCELS 16, 20 AND 21; SUBDIVIDED PARCEL 16 CREATING PARCELS 16, 16B AND 16C. - PJS
09/08/14 - R/W REVISIONS: UPDATING THE PROPERTY LINES ON PARCEL 16C, CREATED PARCELS 15A; UPDATED PROPERTY OWNER NAME AND DEED REFERENCE ON PARCEL 21. - DJC
04/10/15 - R/W REVISIONS: REVISED THE PROPOSED R/W AND TCE ON PARCEL 23. - CJT
05/20/15 - R/W REVISIONS: UPDATED PROPERTY OWNER NAMES AND DEED REFERENCE ON PARCEL 16B. - DJC

5/14/99



P-24

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith — 2030 Drake's Branch Parkway, Suite 100, Charlotte, NC 28270-8209, NC FIRM No. F-0910

SUNGATE DESIGN GROUP, P.A. — 301 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC FIRM No. C-0180

PERMIT DRAWING
SHEET 10 OF 31

Revised 4/6/17

NAD 83 / CORS

REVISIONS

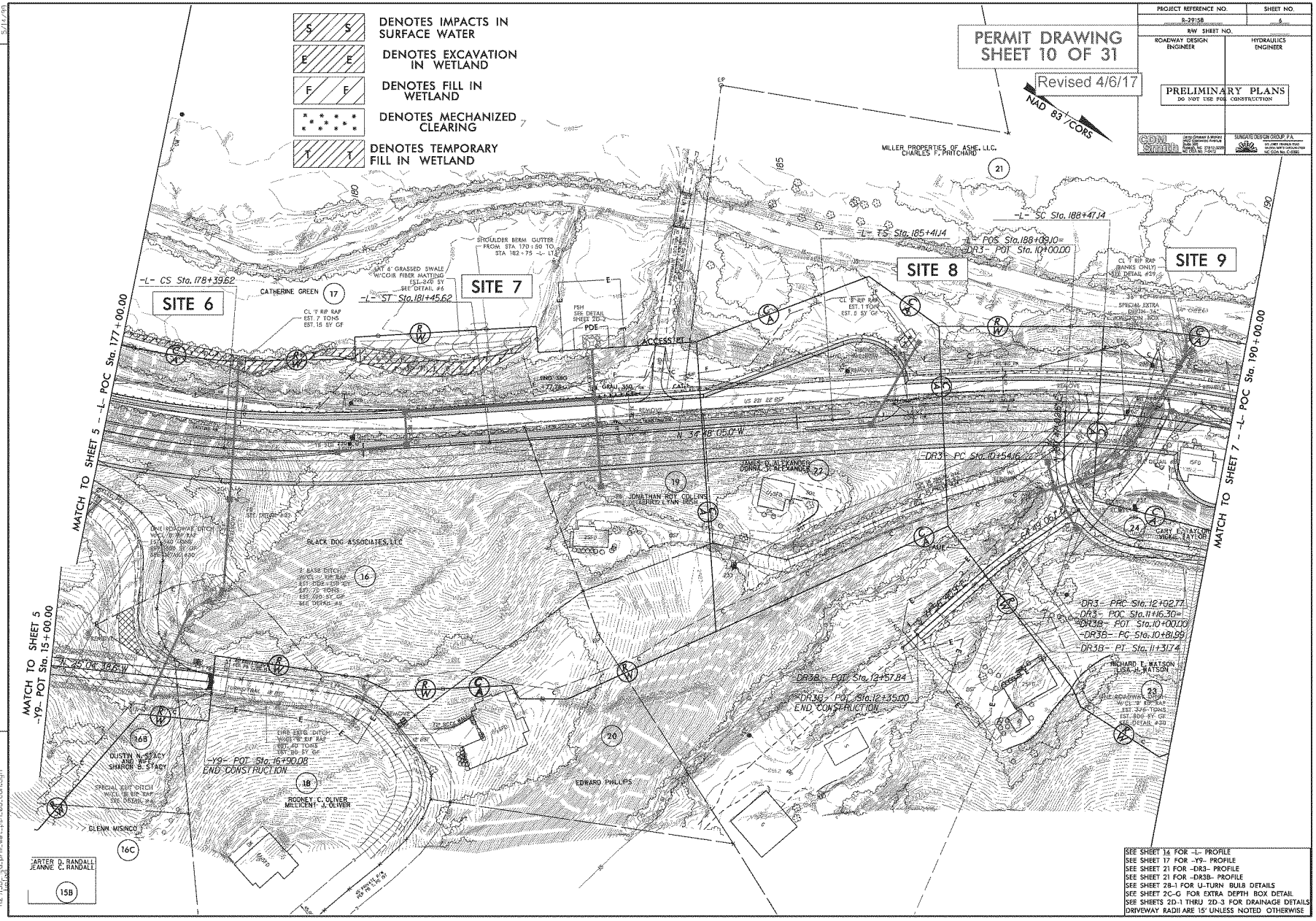
01/31/14 - R/W REVISIONS: UPDATED PROPERTY OWNER NAMES AND DEED REFERENCES ON PARCELS 16, 20 AND 21; SUBDIVIDED PARCEL 16 CREATING PARCELS 16, 16B AND 16C. - PJS

09/08/14 - R/W REVISIONS: UPDATING THE PROPERTY LINES ON PARCEL 16C, CREATED PARCELS 15A, UPDATED PROPERTY OWNER NAME AND DEED REFERENCE ON PARCEL 21. - DJC

04/10/15 - R/W REVISIONS: REVISED THE PROPOSED R/W AND TCE ON PARCEL 22. - CJT

05/20/15 - R/W REVISIONS: UPDATED PROPERTY OWNER NAMES AND DEED REFERENCE ON PARCEL 16B. - DJC

5/14/99



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P-25

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND 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)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1A	159+80 / 160+40 -L- RT	BANK STABILIZATION (TRIB.)						0.01	< 0.01	44	21	
	160+40 / 161+80 -L-	CULVERT (TRIB.)						0.05		170		
1B	162+15 / 162+30 -L- LT	CULVERT (GAP CREEK)						< 0.01	< 0.01	15	6	
	162+15 / 162+65 -L- LT	BANK STABILIZATION (GAP CREEK)						< 0.01		35		
2	165+73 -L-	BDO / 30" RCP						< 0.01		5		
	166+00 -L- LT	TAIL DITCH						< 0.01		29		
3	15+32 / 15+00 -DR1REV-	24" PIPE						< 0.01		71		
4	172+58 / 172+85 -L- LT	12" RCP	< 0.01	0.15		< 0.01						
5	174+00 -L- LT	30" CSP	< 0.01									
6	178+50 -L- LT	24" CSP	< 0.01									
7	180+00 / 182+00 -L- LT	ROAD FILL	0.05		0.03							
8	186+21 / 186+43 -L- LT	ROAD FILL	< 0.01			< 0.01						
9	187+63 / 189+15 -L-	36" RCP						0.01		124		
	189+35 / 189+45 -L- LT	BANK STABILIZATION						< 0.01		23		
10	197+20 / 198+90 -L-	BANK STABILIZATION						0.02		154		
	198+80 / 198+90 -L-	WORKPAD / CULVERT REMOVAL							0.02		57	
11	207+00 / 207+05 -L- RT	ROAD FILL	< 0.01			< 0.01						
12	208+72 / 209+51 -L- RT	ROAD FILL	0.12			< 0.01						
13	209+23 -L- LT	24" Pipe						< 0.01	< 0.01	52	8	
14	210+01 / 210+36 -L- LT	ROAD FILL			0.01	< 0.01						
15	215+54 / 217+43 -L- RT	ROAD FILL	0.14			0.05						
16	217+48 -L- LT	60" RCP						< 0.01		27		
	217+45 -L- LT	BANK STABILIZATION						< 0.01		9		
SUBTOTALS*:			0.32	0.15	0.04	0.06		0.12	0.03	758	92	

*Rounded totals are sum of actual impacts

NOTES:
Site 10: Total Permanent Pier Impacts = 25.1 SF = 0.0006 AC
Site 15: Fill Imapcts = 0.14 ac, Mechanized Clearing Impacts=0.013, Total Take Impacts=0.036

Revised 4/6/17

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
4-4-2017
R-2915B ASHE COUNTY
ON US 221 FROM SR 1003 (IDLEWILD RD)
TO NORTH OF SOUTH FORK NEW RIVER
SHEET 30 OF 31

ATN Revised 3/12/13

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND 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)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
17	217+22 / 217+75 -L- RT	BANK STABILIZATION						< 0.01		54		
18	222+55 / 222+83 -L- RT	BANK STABILIZATION						< 0.01		53		
19	241+75 / 243+25 -L-	WORK PAD							0.12		115	
20	242+41 / 242+54 -L- RT	BANK STABILIZATION						< 0.01		19		
21	243+31 / 243+46 -L- LT	BANK STABILIZATION						< 0.01		20		
SUBTOTALS*:								0.02	0.12	146	115	
SUBTOTALS FROM PAGE 1*:			0.32	0.15	0.04	0.06		0.12	0.03	758	92	
TOTALS*:			0.32	0.15	0.04	0.06		0.14	0.15	904	207	

*Rounded totals are sum of actual impacts

NOTES:
Site 19: Total Permanent Pier Impacts = 150.8 SF = 0.003 AC

Revised 4/6/17

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
4-4-2017
R-2915B ASHE COUNTY
ON US 221 FROM SR 1003 (IDLEWILD RD)
TO NORTH OF SOUTH FORK NEW RIVER
SHEET 31 OF 31

ATN Revised 3/12/13

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 4 OF 31

Revised 6/15/18

See new sheet 5A of 31 for updated wing wall location at Site

Additional 20' of bank stabilization added

NAD 83 /CORS

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

-L- CS Sta. 158+31.70 LA. =
-L- CS Sta. 160+01.83 LB.
BEGIN TIP PROJECT R-2915B
END TIP PROJECT R-2915A

-L- TS Sta. 162+63.7

-L- POT Sta. 161+65.04
END CULVERT

-L- ST Sta. 161+55.70

-L- POS Sta. 161+32.67
BEGIN CULVERT

-L- POS Sta. 163+50.44
-DRI- POT Sta. 10+00.00

SITE 1B

SITE 1A

MATCH TO SHEET 5 - -L- POC Sta. 164+00.00

-DRI- PC Sta. 10+53.29

-DRI- PRC Sta. 10+80.19

-DRI- PT Sta. 11+61.45

PC Sta. 16+23.87

-DRI- PC Sta. 12+79.58

-DRI- PT Sta. 13+49.50

PT Sta. 18+56.95

-DRI- PC Sta. 14+35.40

PC Sta. 19+02.96

-DRIREV- POT Sta. 19+50.00
END CONSTRUCTION

-DRI- PT Sta. 14+98.10

-DRI- POT Sta. 15+43.00
END CONSTRUCTION

POT Sta. 20+10.60

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KAREN FLOWE PRESLAR AMY P. ROSE

DRIVEWAY RADII ARE 15' UNLESS OTHERWISE NOTED

SEE SHEET 18 FOR -L- PROFILE
SEE SHEET 20 FOR -DRIREV- AND -DR2REV- PROFILE
SEE SHEETS 2D-1 THRU 2D-3 FOR DRAINAGE DETAILS
SEE SHEETS C-1 THRU C-13 FOR CULVERT PLANS

REVISIONS

5/14/18

P-28

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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See new sheet 5A of 31 for updated wing wall location at Site

PERMIT DRAWING
SHEET 5 OF 31

Revised

Additional 20' of bank

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

-L- CS Sta. 158+31.70 LA. =
-L- CS Sta. 160+01.83 LB.
BEGIN TIP PROJECT R-2915B
END TIP PROJECT R-2915A

-L- TS Sta. 162+63.70

SITE 1A

SITE 1B

MATCH TO SHEET 5 - -L- POC Sta. 164+00.00

NAD 83 /CORS

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HETA N. GREENE

DRIVEWAY RADII ARE 15' UNLESS OTHERWISE NOTED

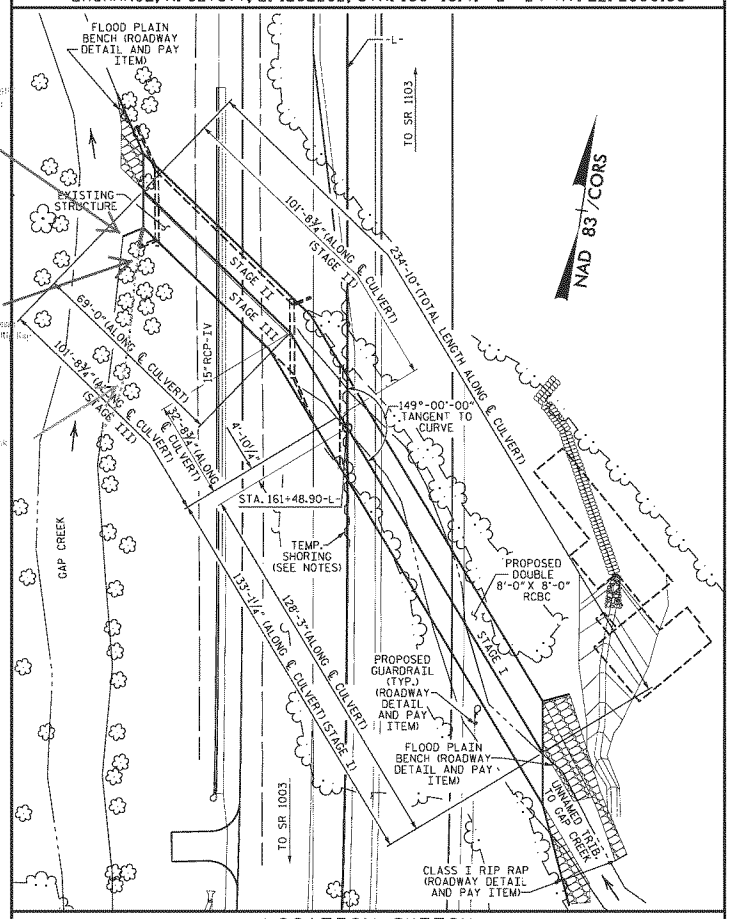
SEE SHEET 2A FOR -L- PROFILE
SEE SHEET 2D FOR -DRIREV- AND -DR2REV- PROFILE
SEE SHEETS 2D-1 THRU 2D-3 FOR DRAINAGE DETAILS
SEE SHEETS C-1 THRU C-13 FOR CULVERT PLANS

REVISIONS

P-29

B.M. #7: CHISELED SQUARE IN CONCRETE FLOOR OF TELEPHONE EXCHANGE, N. 927977, E. 1262292, STA. 160+18.41 -L- 24' RT. EL. 2900.68

F. A. PROJECT No.: STP-0221(40)



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

DESIGN FILL = 11.29 (MIN.), 11.68 (MAX.)

FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTES SHEET.

AFTER SERVING AS A TEMPORARY STRUCTURE THE EXISTING DOUBLE BARREL 8 FT. X 8 FT. REINFORCED CONCRETE BOX CULVERT LOCATED AT THE SAME LOCATION AS THE PROPOSED CULVERT SHALL BE REMOVED.

3" Ø WEEP HOLES INDICATED ARE TO BE IN ACCORDANCE WITH THE SPECIFICATIONS.

CONCRETE IN THE CULVERT TO BE POURED IN THE FOLLOWING ORDER:

STAGE I

1. WING FOOTINGS FOR WING 1 AND WING 2, FLOOR SLAB AND EDGE BEAM INCLUDING 4" VERTICAL WALLS TO THE CONSTRUCTION JOINT FOR STAGE I.
2. REMAINING PORTIONS OF WALLS FULL HEIGHT, WING 1 AND WING 2 FULL HEIGHT FOLLOWED BY CONCRETE SILLS AND ROOF SLAB WITH EDGE BEAM TO THE STAGE I CONSTRUCTION JOINT.

STAGE II

1. REMOVE EXISTING CULVERT.
2. WING 3 FOOTING AND FLOOR SLAB INCLUDING 4" OF ALL VERTICAL WALLS, EDGE BEAM AND CURTAIN WALL TO STAGE II CONSTRUCTION JOINTS.
3. REMAINING PORTIONS OF WALLS FULL HEIGHT AND WING 3 FULL HEIGHT, CONCRETE SILLS.

STAGE III

1. WING 4 FOOTING AND REMAINING FLOOR SLAB WITH EDGE BEAM INCLUDING 4" OF EXTERIOR VERTICAL WALL AND REMAINING CURTAIN WALL.
2. REMAINING PORTIONS OF WALLS FULL HEIGHT, WING 4 FULL HEIGHT AND CONCRETE SILLS.
3. ROOF SLAB FOR STAGES II & III. HEADWALL AND EDGE BEAM.

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF THE CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

STEEL IN THE BOTTOM SLAB OF STAGE I ONLY MAY BE SPLICED AT THE PERMITTED CONSTRUCTION JOINT AT THE CONTRACTOR'S OPTION. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES WILL BE PAID FOR BY THE CONTRACTOR.

TRANSVERSE CONSTRUCTION JOINTS SHALL BE USED IN THE BARREL, SPACED TO LIMIT THE POURS TO A MAXIMUM OF 70 FEET. LOCATION OF JOINTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

FOR CULVERT DIVERSION DETAILS AND PAY ITEM, SEE EROSION CONTROL PLANS.

A 3 FOOT STRIP OF FILTER FABRIC SHALL BE ATTACHED TO THE FILL FACE OF THE WING COVERING THE ENTIRE LENGTH OF THE EXPANSION JOINT.

AT THE CONTRACTOR'S OPTION HE MAY SUBMIT, TO THE ENGINEER FOR APPROVAL, DESIGN AND DETAIL DRAWINGS FOR A PRECAST REINFORCED CONCRETE BOX CULVERT IN LIEU OF THE CAST-IN-PLACE CULVERT SHOWN ON THE PLANS. THE DESIGN SHALL PROVIDE THE SAME SIZE AND NUMBER OF BARRELS AS USED ON THE CAST-IN-PLACE DESIGN. FOR OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT, SEE SPECIAL PROVISIONS. THE CONTRACTOR ATTENTION NEEDS TO BE DRAWN TO THE FACT THAT THE OUTLET END OF THE CULVERT WILL HAVE TO BE SKEWED TO KEEP FROM INTERFEARING WITH THE STREAM FLOW.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE REINFORCED CONCRETE BOX CULVERT SHALL BE PLACED ON THE STANDARD 1.0 FOOT BLANKET OF FOUNDATION CONDITIONING MATERIAL. SEE SECTION 414 OF THE STANDARD SPECIFICATIONS.

THE REQUIRED BEARING CAPACITY AT THE BASE OF THE CULVERT IS 1 TSF. THE REQUIRED BEARING CAPACITY SHALL BE VERIFIED.

FOR CONSTRUCTION SEQUENCE, SEE EROSION CONTROL PLANS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR TRAFFIC PHASING, SEE TRAFFIC CONTROL PLANS.

AT THE CONTRACTOR'S OPTION, HE MAY SPLICE THE VERTICAL REINFORCING STEEL IN THE INTERIOR FACE OF EXTERIOR WALL AND BOTH FACES OF INTERIOR WALLS ABOVE LOWER WALL CONSTRUCTION JOINT. THE SPLICE LENGTH SHALL BE AS PROVIDED IN THE SPLICE LENGTH CHART SHOWN ON THE PLANS. EXTRA WEIGHT OF STEEL DUE TO THE SPLICES SHALL BE PAID FOR BY THE CONTRACTOR.

TEMPORARY SHORING WILL BE REQUIRED IN THE AREA INDICATED IN THE LOCATION SKETCH.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

ROADWAY DATA

GRADE POINT ELEV. @ STA 161+48.90-L- = 2905.10
BED ELEV. @ STA. 161+48.90-L- = 2885.70
ROADWAY SLOPES = 2:1

HYDRAULIC DATA

DESIGN DISCHARGE	= 550 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YR.
DESIGN HIGH WATER ELEV.	= 2893.00
DRAINAGE AREA	= 1.2 SQ MI.
BASE DISCHARGE (Q100)	= 650 CFS
BASE HIGH WATER ELEV.	= 2893.43

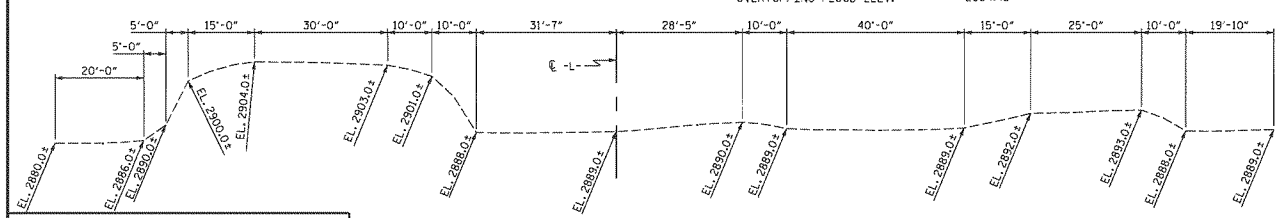
OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= > 900 CFS
FREQUENCY OF OVERTOPPING FLOOD	= > 500 YR.
OVERTOPPING FLOOD ELEV.	= 2904.40

CULVERT EXCAVATION	LUMP SUM
REMOVAL OF EXISTING STRUCTURE	LUMP SUM
FOUNDATION CONDITIONING MATERIAL	
STAGE I	207 TONS
STAGE II & III	158 TONS
TOTAL	365 TONS

TOTAL STRUCTURE QUANTITIES

STAGE I		STAGE I	
CLASS A CONCRETE		REINFORCING STEEL	
BARREL @ 1.823 C.Y./FT.	242.6 C.Y.	BARREL	32681 LBS.
WINGS, ETC.	27.7 C.Y.	WINGS, ETC.	2662 LBS.
TOTAL	270.3 C.Y.	TOTAL	35343 LBS.
STAGE II & III		**STAGE II & III**	
CLASS A CONCRETE		REINFORCING STEEL	
BARREL @ 1.823 C.Y./FT.	185.5 C.Y.	BARREL	26626 LBS.
WINGS, ETC.	19.7 C.Y.	WINGS, ETC.	941 LBS.
TOTAL	205.2 C.Y.	TOTAL	27567 LBS.
TOTAL CLASS A CONCRETE	475.5 C.Y.	TOTAL REINFORCING STEEL	62910 LBS.



PROFILE ALONG ℄ CULVERT

PERMIT DRAWING
SHEET 5A of 31
added 6/15/18

NORTH CAROLINA PROFESSIONAL SEAL 14855 ENGINEER DOUGLAS R. CULVER — Douglas R. Culver — 7/22/2015

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CREECH, JR. — Marshall G. Creech, Jr. — 7/22/2015

PROJECT NO. R-2915B
ASHE COUNTY
STATION: 161+48.90 -L-

SHEET 1 OF 13 CULVERT No. 542

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DOUBLE
8 FT. X 8 FT.
CONCRETE BOX CULVERT

DRAWN BY : H. T. BARBOUR	DATE : 4-11-14	
CHECKED BY : S. B. WILLIAMS	DATE : 5-14	
DESIGN ENGINEER OF RECORD: B. A. DUKE	DATE : 4-15	

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C06-1
1			3			TOTAL SHEETS
2			4			13

STR. #6

P-30

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND 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)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1A	159+80 / 160+40 -L- RT	BANK STABILIZATION (TRIB.)						0.01	< 0.01	44	21	
	160+40 / 161+80 -L-	CULVERT (TRIB.)						0.05		170		
1B	162+15 / 162+30 -L- LT	CULVERT (GAP CREEK)						< 0.01	< 0.01	15	6	
	162+15 / 162+65 -L- LT	BANK STABILIZATION (GAP CREEK)						< 0.01		55		
2	165+73 -L-	BDO / 30" RCP						< 0.01		5		
	166+00 -L- LT	TAIL DITCH						< 0.01		29		
3	15+32 / 15+00 -DR1REV-	24" PIPE						< 0.01		71		
4	172+58 / 172+85 -L- LT	12" RCP	< 0.01	0.15		< 0.01						
5	174+00 -L- LT	30" CSP	< 0.01									
6	178+50 -L- LT	24" CSP	< 0.01									
7	180+00 / 182+00 -L- LT	ROAD FILL	0.05		0.03							
8	186+21 / 186+43 -L- LT	ROAD FILL	< 0.01			< 0.01						
9	187+63 / 189+15 -L-	36" RCP						0.01		124		
	189+35 / 189+45 -L- LT	BANK STABILIZATION						< 0.01		23		
10	197+20 / 198+90 -L-	BANK STABILIZATION						0.02		154		
	198+80 / 198+90 -L-	WORKPAD / CULVERT REMOVAL							0.02		57	
11	207+00 / 207+05 -L- RT	ROAD FILL	< 0.01			< 0.01						
12	208+72 / 209+51 -L- RT	ROAD FILL	0.12			< 0.01						
13	209+23 -L- LT	24" Pipe						< 0.01	< 0.01	52	8	
14	210+01 / 210+36 -L- LT	ROAD FILL			0.01	< 0.01						
15	215+54 / 217+43 -L- RT	ROAD FILL	0.14			0.05						
16	217+48 -L- LT	60" RCP						< 0.01		27		
	217+45 -L- LT	BANK STABILIZATION						< 0.01		9		
SUBTOTALS*:			0.32	0.15	0.04	0.06		0.12	0.03	778	92	

*Rounded totals are sum of actual impacts

NOTES:
Site 10: Total Permanent Pier Impacts = 25.1 SF = 0.0006 AC
Site 15: Fill Imapcts = 0.14 ac, Mechanized Clearing Impacts=0.013, Total Take Impacts=0.036

Revised 6/15/18

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
4-4-2017
R-2915B ASHE COUNTY
ON US 221 FROM SR 1003 (IDLEWILD RD)
TO NORTH OF SOUTH FORK NEW RIVER
SHEET 30 OF 31

ATN Revised 3/12/13

P-31

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND 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)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
17	217+22 / 217+75 -L- RT	BANK STABILIZATION						< 0.01		54		
18	222+55 / 222+83 -L- RT	BANK STABILIZATION						< 0.01		53		
19	241+75 / 243+25 -L-	WORK PAD							0.12		115	
20	242+41 / 242+54 -L- RT	BANK STABILIZATION						< 0.01		19		
21	243+31 / 243+46 -L- LT	BANK STABILIZATION						< 0.01		20		
SUBTOTALS*:								0.02	0.12	146	115	
SUBTOTALS FROM PAGE 1*:			0.32	0.15	0.04	0.06		0.12	0.03	778	92	
TOTALS*:			0.32	0.15	0.04	0.06		0.14	0.15	924	207	

*Rounded totals are sum of actual impacts

NOTES:
Site 19: Total Permanent Pier Impacts = 150.8 SF = 0.003 AC

Revised 6/15/18

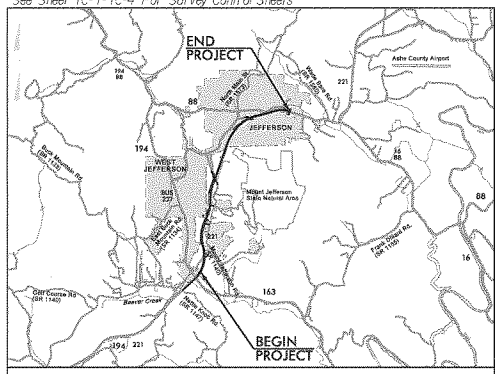
ATN Revised 3/12/13

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
4-4-2017
R-2915B ASHE COUNTY
ON US 221 FROM SR 1003 (IDLEWILD RD)
TO NORTH OF SOUTH FORK NEW RIVER
SHEET 31 OF 31

TIP PROJECT: R-2915E

CONTRACT: C204356

See Sheet 1-A For Index of Sheets, General Notes, and List of Standards
See Sheet 1-B For Conventional Symbols
See Sheet 1C-1-1C-4 For Survey Control Sheets



VICINITY MAP (NTS)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ASHE COUNTY

LOCATION: US 221 FROM US 221 BYPASS TO US 221 BUSINESS/NC 88 IN JEFFERSON

TYPE OF WORK: GRADING, DRAINAGE, PAVING, WIDENING, RESURFACING, CULVERTS, AND SIGNALS

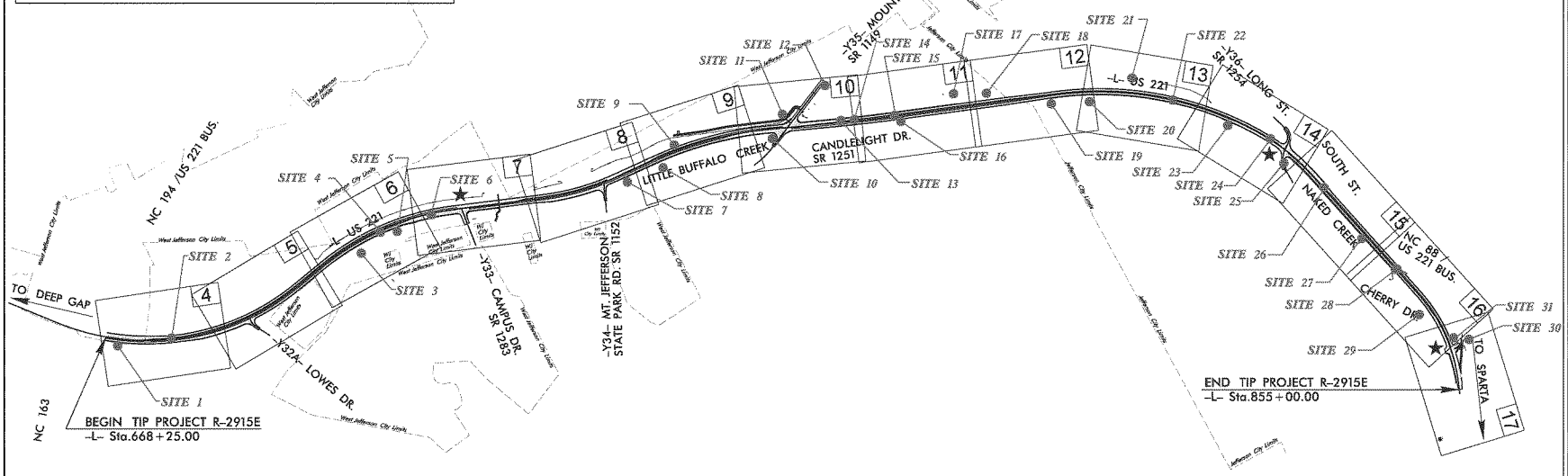
WETLAND AND STREAM IMPACTS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2915E	1	

STATE PROJ. NO.	F.A. PROJ NO.	DESCRIPTION
34518.1.FR6	STP-0221(45)	PE
34518.2.6	STP-0221(45)	R/W
34518.2.7	STP-0221(45)	UTIL.
34518.3.8	STP-0221(45)	CONST.

NAD 83/ NSRS 2007

PERMIT DRAWING SHEET 1 OF 46



THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON PLANS.

★ PROPOSED TRAFFIC SIGNAL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100 — PLANS

50 25 0 50 100 — PROFILE (HORIZONTAL)

10 5 0 10 20 — PROFILE (VERTICAL)

DESIGN DATA

ADT 2019 = 15,900
ADT 2039 = 19,400
K = 8%
D = 55%
T = 6%*
V = 60 MPH
FUNC. CLASSIFICATION = RURAL ARTERIAL

* TTST = 3% + DUALS = 3%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2915E..... 3.533 mi
LENGTH CULVERT TIP PROJECT R-2915E..... 0.004 mi
TOTAL LENGTH TIP PROJECT R-2915E..... 3.537 mi

NCDOT CONTACT

Joe Laws, P.E.
PROJECT ENGINEER - DIVISION 11

PLANS PREPARED BY:

RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE, SUITE 350
RALEIGH, NORTH CAROLINA 27609
NC LICENSE NO. F-0112

FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MAY 8, 2018

LETTING DATE: SEPTEMBER 17, 2019

Scott D. Blevins, P.E.
PROJECT ENGINEER
RK&K, LLP

Cathy S. Houser, P.E.
PROJECT DESIGN ENGINEER
RK&K, LLP

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

3/19/2019
C:\Users\dulfrey\AD\Jobs\PERMITS_Environmental\Drawings\46\R-2915E_PRM_WET_Tsh.dgn
dulfrey

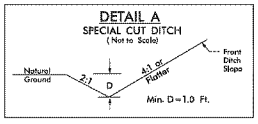
P-33

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	2D-1
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

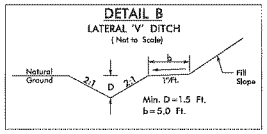
PERMIT DRAWING
SHEET 2 OF 46

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)



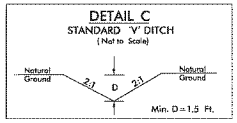
-L- STA. 669+50 TO STA. 670+00 LT
-L- STA. 675+25 TO STA. 676+00 RT
-L- STA. 677+00 TO STA. 691+50 LT
-L- STA. 767+50 TO STA. 772+00 RT

DETAIL B
LATERAL 'V' DITCH
(Not to Scale)



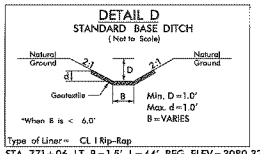
-L- STA. 670+25 TO STA. 670+50 RT
-L- STA. 676+00 TO STA. 677+03 RT
-L- STA. 677+21 TO STA. 677+50 RT
-L- STA. 693+00 TO STA. 694+50 LT
-L- STA. 707+50 TO STA. 708+25 LT
-L- STA. 805+05 TO STA. 805+19 LT
-L- STA. 816+50 TO STA. 817+75 RT
-L- STA. 826+80 TO STA. 827+50 LT
-Y36- STA. 15+24 TO STA. 16+43 RT

DETAIL C
STANDARD 'V' DITCH
(Not to Scale)



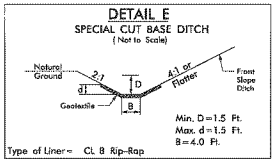
-L- STA. 734+90 RT, L=55', BEG. ELEV=3116.00,
END ELEV=3114.99, S=1.84%

DETAIL D
STANDARD BASE DITCH
(Not to Scale)



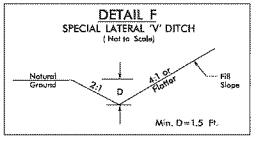
Type of Liner= CL I Rip-Rap
-L- STA. 771+06 LT, B=1.5', L=44', BEG. ELEV=3080.32,
END ELEV=3085.00, S=10.8%
-L- STA. 780+92 LT, B=4', L=34', BEG. ELEV=3087.26,
END ELEV=3090.0, S=8.1%
-L- STA. 793+00 RT, B=4', L=48', BEG. ELEV=3035.50,
END ELEV=3025.26, S=21.3%
-L- STA. 812+65 LT, B=4', L=24', BEG. ELEV=2907.0,
END ELEV=2904.96, S=8.5%

DETAIL E
SPECIAL CUT BASE DITCH
(Not to Scale)



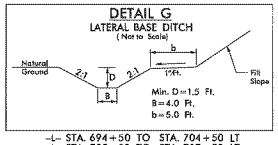
Type of Liner= CL B Rip-Rap
-L- STA. 839+00 TO STA. 841+77 RT

DETAIL F
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



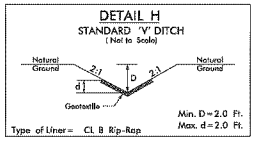
-L- STA. 729+50 TO STA. 732+15 RT
-L- STA. 741+50 TO STA. 743+00 LT
-L- STA. 757+00 TO STA. 758+00 RT
-Y34- STA. 11+00 TO STA. 12+30 RT

DETAIL G
LATERAL BASE DITCH
(Not to Scale)



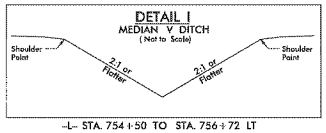
-L- STA. 694+50 TO STA. 704+50 LT
-L- STA. 705+32 TO STA. 707+50 LT
-L- STA. 708+25 TO STA. 711+00 LT
-L- STA. 796+00 TO STA. 797+50 LT
-L- STA. 810+50 TO STA. 816+50 RT
-L- STA. 820+00 TO STA. 826+80 LT

DETAIL H
STANDARD 'V' DITCH
(Not to Scale)



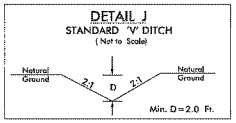
Type of Liner= CL B Rip-Rap
-L- STA. 740+00 TO STA. 740+37 RT, L=37'
BEG. ELEV=3101.0, END ELEV=3100.0, S=2.7%
-L- STA. 836+82 TO STA. 837+14 RT, L=43'
BEG. ELEV=2872.0, END ELEV=2870.28, S=4.0%

DETAIL I
MEDIAN V DITCH
(Not to Scale)



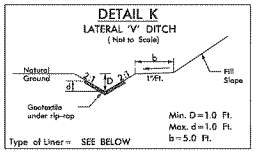
-L- STA. 754+50 TO STA. 756+72 LT

DETAIL J
STANDARD 'V' DITCH
(Not to Scale)



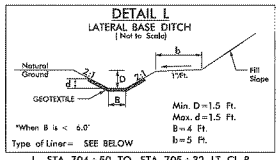
-L- STA. 700+00 TO STA. 701+29 RT
BEG. ELEV=3068.15, END ELEV=3067.75, S=0.3%

DETAIL K
LATERAL 'V' DITCH
(Not to Scale)



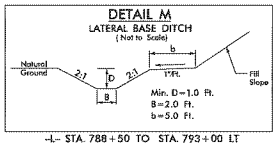
Type of Liner= SEE BELOW
-L- STA. 670+50 TO STA. 671+50 RT, PSRM
-L- STA. 802+00 TO STA. 805+05 LT, CL I
-L- STA. 804+00 TO STA. 806+00 RT, CL B

DETAIL L
LATERAL BASE DITCH
(Not to Scale)



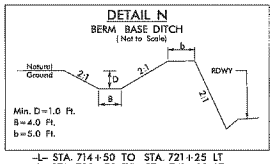
Type of Liner= SEE BELOW
-L- STA. 704+50 TO STA. 705+32 LT, CL B
-L- STA. 797+50 TO STA. 799+13 LT, CL B
-L- STA. 809+73 TO STA. 810+50 RT, CL I
-L- STA. 838+00 TO STA. 838+92 LT, CL B

DETAIL M
LATERAL BASE DITCH
(Not to Scale)



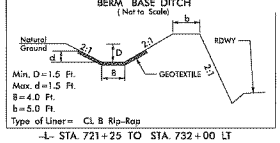
-L- STA. 788+50 TO STA. 793+00 LT

DETAIL N
BERM BASE DITCH
(Not to Scale)



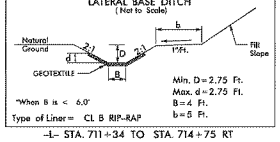
-L- STA. 714+50 TO STA. 721+25 LT
-L- STA. 738+50 TO STA. 741+00 LT
-SR1- STA. 15+16 TO STA. 17+38 LT

DETAIL O
BERM BASE DITCH
(Not to Scale)



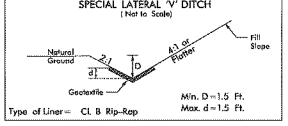
Type of Liner= CL B Rip-Rap
-L- STA. 721+25 TO STA. 732+00 LT

DETAIL P
LATERAL BASE DITCH
(Not to Scale)



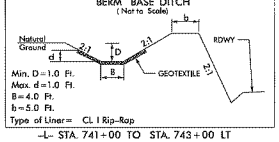
Type of Liner= CL B RIP-RAP
-L- STA. 711+34 TO STA. 714+75 RT

DETAIL Q
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



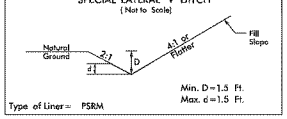
Type of Liner= CL B Rip-Rap
-SR1- STA. 10+00 TO STA. 10+53 LT

DETAIL R
BERM BASE DITCH
(Not to Scale)



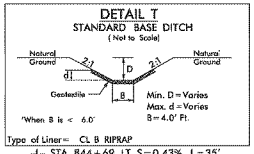
Type of Liner= CL I Rip-Rap
-L- STA. 741+00 TO STA. 743+00 LT

DETAIL S
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



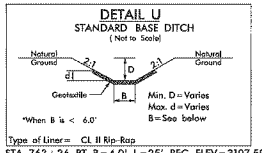
Type of Liner= PSRM
-SR1- STA. 11+70 TO STA. 15+16 LT

DETAIL T
STANDARD BASE DITCH
(Not to Scale)



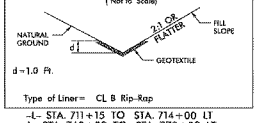
Type of Liner= CL B RIPRAP
-L- STA. 844+69 LT, S=0.43% L=35'
BEG. ELEV=2862.50, END ELEV=2862.35, D & d=2.0'

DETAIL U
STANDARD BASE DITCH
(Not to Scale)



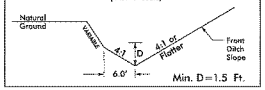
Type of Liner= CL II Rip-Rap
-L- STA. 763+26 RT, B=4.0', L=25', BEG. ELEV=3107.59,
END ELEV.=3104.72, S=11.5%, D=1.0', d=1.0'
-L- STA. 765+60 RT, B=5', L=15', BEG. ELEV=3109.0,
END ELEV=3108.5, S=3.3%, D=2.5', d=2.5'

DETAIL V
TOE PROTECTION
(Not to Scale)



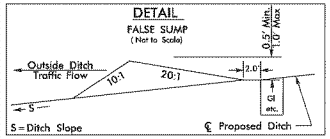
Type of Liner= CL B Rip-Rap
-L- STA. 711+15 TO STA. 714+00 LT
-L- STA. 768+50 TO STA. 770+30 LT
-L- STA. 793+50 TO STA. 795+42 LT

DETAIL W
SPECIAL CUT DITCH w/HINGE
(Not to Scale)

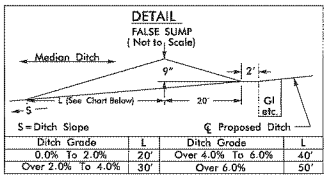


-L- STA. 720+15 TO STA. 723+50 RT
-L- STA. 726+00 TO STA. 727+50 RT
-L- STA. 761+50 TO STA. 767+50 RT
-L- STA. 774+00 TO STA. 783+50 RT
-L- STA. 841+77 TO STA. 849+50 RT

DETAIL
FALSE SUMP
(Not to Scale)

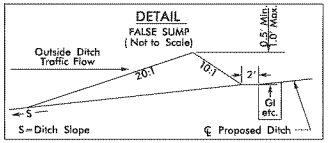


DETAIL
FALSE SUMP
(Not to Scale)



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'

DETAIL
FALSE SUMP
(Not to Scale)



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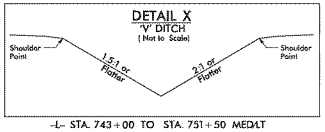
P-34

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	2D-2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

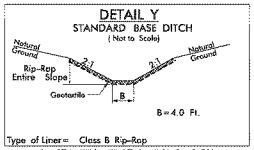
PERMIT DRAWING
SHEET 3 OF 46

DETAIL X
"V" DITCH
(Not to Scale)



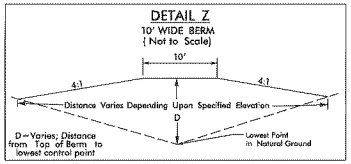
-L- STA. 743+00 TO STA. 751+50 MEDIAN

DETAIL Y
STANDARD BASE DITCH
(Not to Scale)



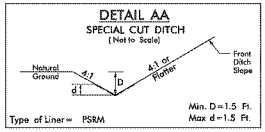
-L- STA. 776+71 LT, L=50', S=0.3%
BEG. ELEV=3093.65, END ELEV=3093.50

DETAIL Z
10' WIDE BERM
(Not to Scale)



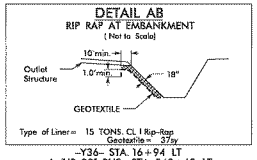
-L- STA. 693+00 LT, TOP ELEV=3079.5, D=2.5'
-L- STA. 697+87 LT, TOP ELEV=3088.0', D=2.0'
-L- STA. 704+50 LT, TOP ELEV=3087.0', D=2.0'
-L- STA. 711+00 LT, TOP ELEV=3102.5', D=3.1'
-L- STA. 802+90 RT, TOP ELEV=2964.0', D=8.3'
-L- STA. 812+30 RT, TOP ELEV=2928.0', D=2.5'
-L- STA. 816+50 RT, TOP ELEV=2914.0', D=3.1'
-L- STA. 827+50 LT, TOP ELEV=2887.0', D=1.6'

DETAIL AA
SPECIAL CUT DITCH
(Not to Scale)



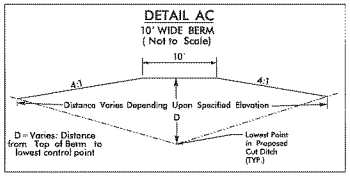
-L- STA. 783+50 TO STA. 787+00 RT

DETAIL AB
RIP RAP AT EMBANKMENT
(Not to Scale)



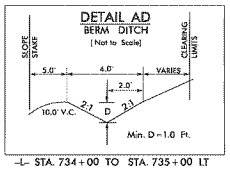
-Y36- STA. 16+94 LT
-L /US 221 BUS- STA. 849+62 LT

DETAIL AC
10' WIDE BERM
(Not to Scale)



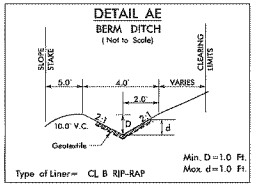
-L- STA. 675+25 RT, TOP ELEV=3031.0', D=2.1'
-L- STA. 767+00 RT, TOP ELEV=3117.0', D=1.8'
-L- STA. 761+50 RT, TOP ELEV=3108.0', D=2.5'
-L- STA. 765+00 RT, TOP ELEV=3114.5', D=2.4'
-L- STA. 844+00 RT, TOP ELEV=2870.5', D=2.5'

DETAIL AD
BERM DITCH
(Not to Scale)



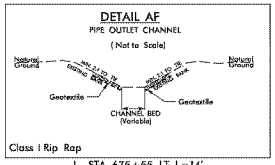
-L- STA. 734+00 TO STA. 735+00 LT

DETAIL AE
BERM DITCH
(Not to Scale)



-L- STA. 732+00 TO STA. 734+00 LT
-L- STA. 735+00 TO STA. 736+00 LT

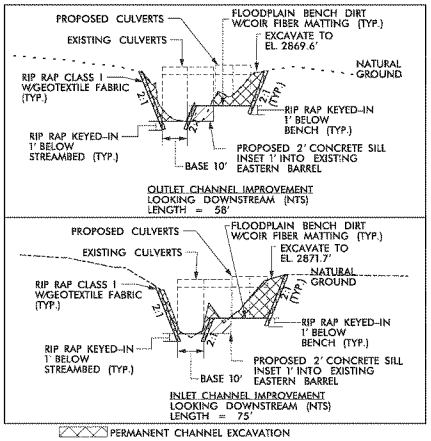
DETAIL AF
PIPE OUTLET CHANNEL
(Not to Scale)



Class I Rip Rap

-L- STA. 675+55 LT, L=14'
-L- STA. 702+52 RT, L=11'
-L- STA. 704+71 RT, L=10'
-L- STA. 711+37 RT, L=20'
-L- STA. 742+12 RT, L=10'
-Y35- STA. 9+49 LT, L=22'
-L- STA. 762+56 LT, L=10'
-L- STA. 763+56 LT, L=20'
-L- STA. 768+48 LT, L=14'
-L- STA. 788+24 RT, L=8'
-L- STA. 804+92 LT, L=30'
-L- STA. 816+26 LT, L=18'
-L- STA. 827+06 RT, L=10'
-L- STA. 832+60 RT, L=10'

CULVERT @ -L- STA. 838+56



PERMANENT CHANNEL EXCAVATION

TOTAL CHANNEL EXCAVATION = 485 CY
TOTAL CL II RIP RAP = 255 TONS
TOTAL GEOTEXTILE FAB. = 270 SY

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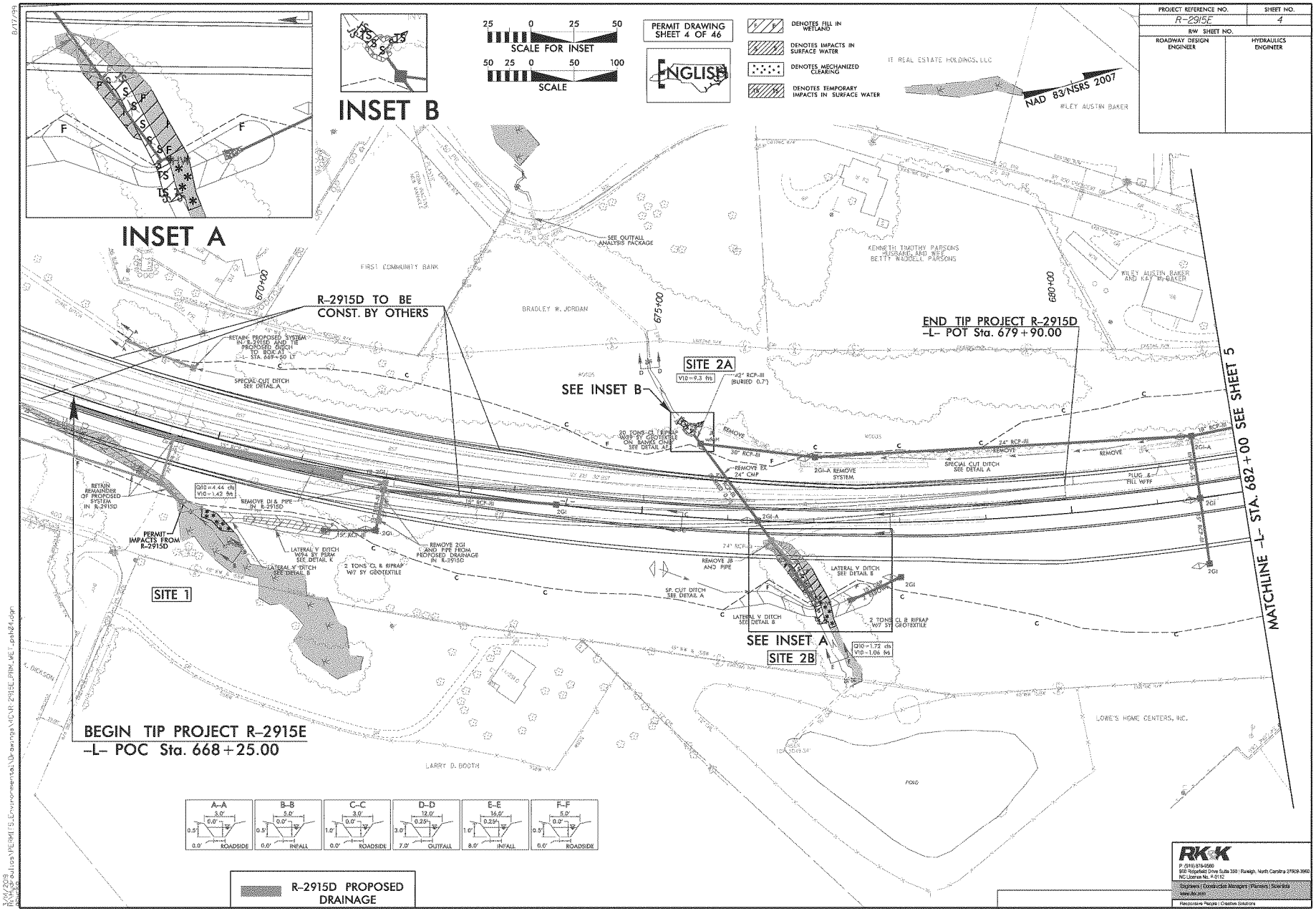
P-35


PROJECT REFERENCE NO.
R-2915E
SHEET NO.
4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PERMIT DRAWING SHEET 4 OF 46
ENGLISH
SCALE FOR INSET
SCALE
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
NAD 83/NSRS 2007
INSET A
INSET B
R-2915D TO BE CONST. BY OTHERS
END TIP PROJECT R-2915D
-L- POT Sta. 679+90.00
SEE INSET B
SITE 2A
SITE 1
SITE 2B
SEE INSET A
BEGIN TIP PROJECT R-2915E
-L- POC Sta. 668+25.00
MATCHLINE -L- STA. 682+00 SEE SHEET 5
FIRST COMMUNITY BANK
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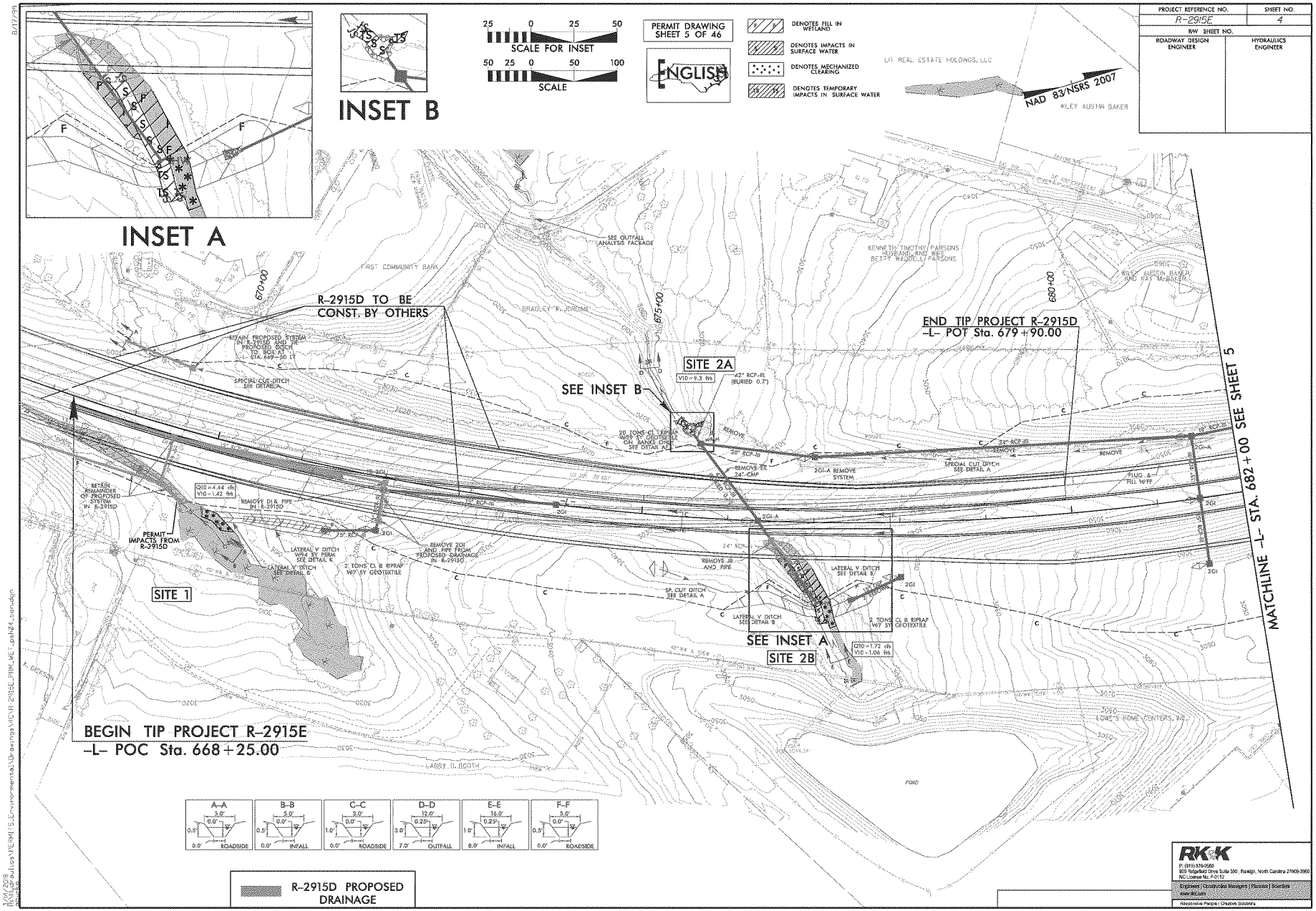
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R-2915E
SHEET NO.
4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PERMIT DRAWING SHEET 5 OF 46
ENGLISH
SCALE FOR INSET
SCALE
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
NAD 83/NSRS 2007
INSET A
INSET B
R-2915D TO BE CONST. BY OTHERS
END TIP PROJECT R-2915D
-L- POT Sta. 679+90.00
SITE 2A
SEE INSET B
SITE 1
SITE 2B
SEE INSET A
BEGIN TIP PROJECT R-2915E
-L- POC Sta. 668+25.00
MATCHLINE -L- STA. 682+00 SEE SHEET 5
R-2915D PROPOSED DRAINAGE
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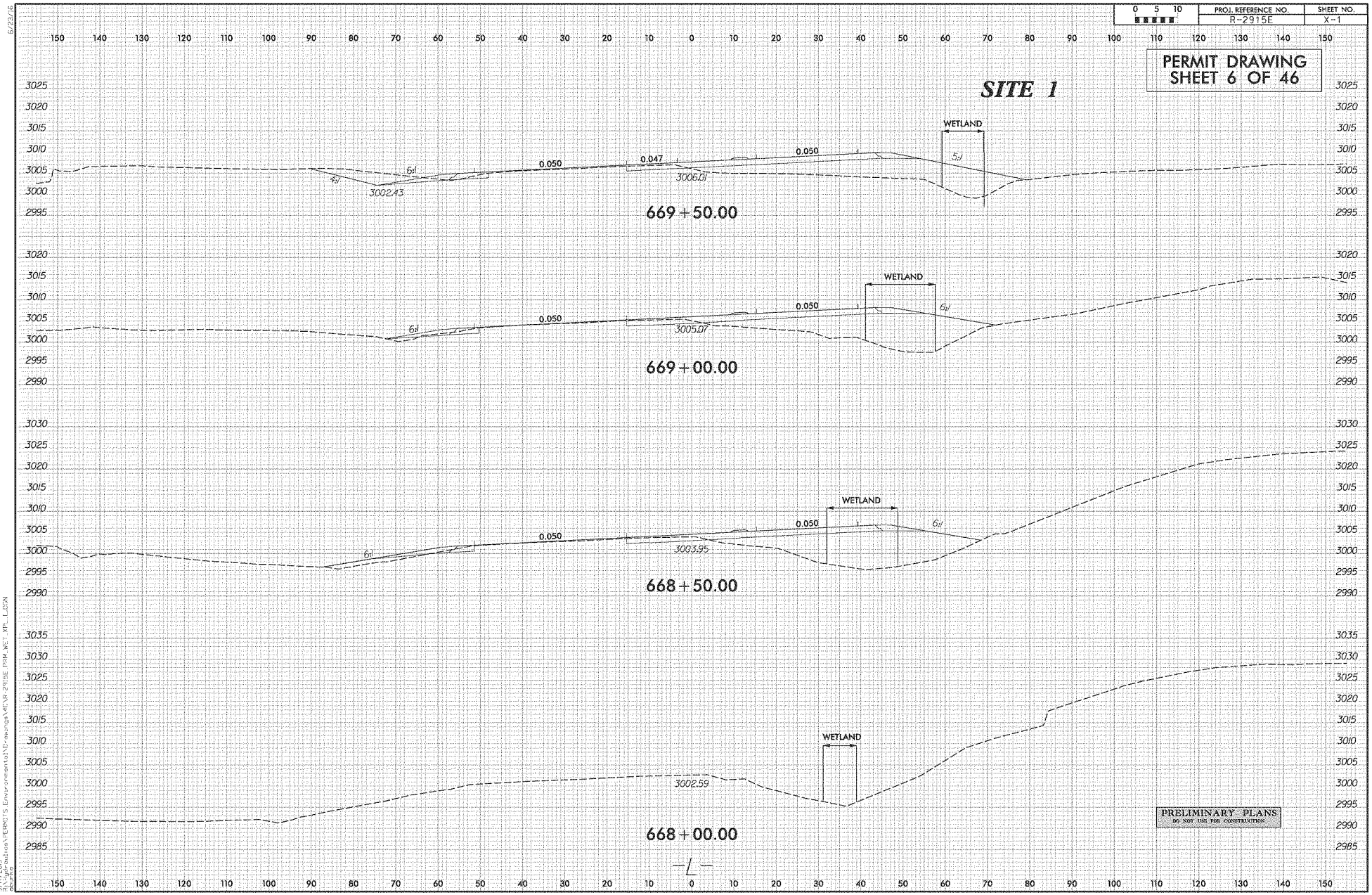
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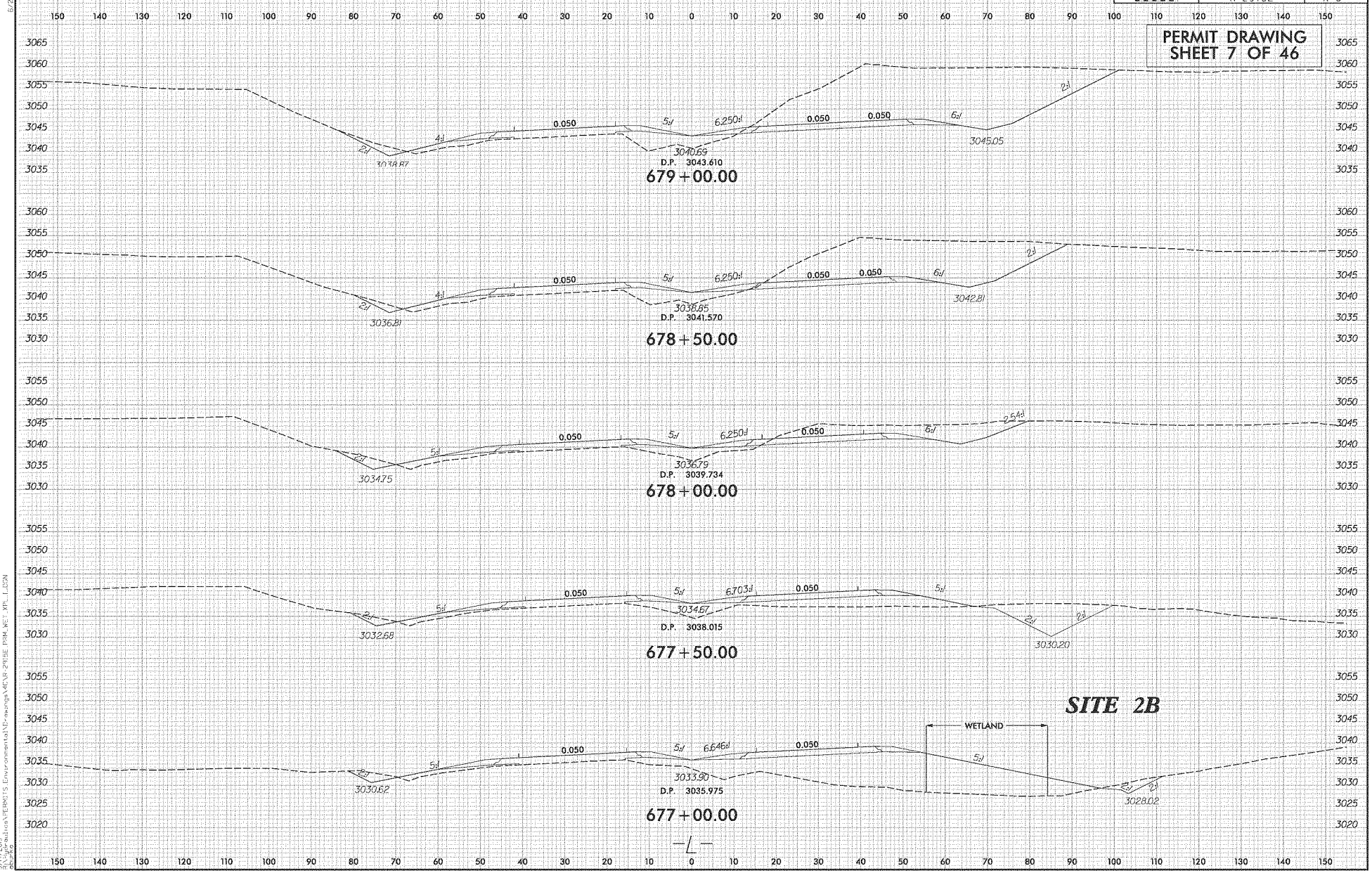
R-2915E
SHEET NO.
X-1
PERMIT DRAWING
SHEET 6 OF 46
SITE 1
WETLAND
0.050
0.047
4:1
6:1
5:1
3002.43
3006.01
669+50.00
3005.07
669+00.00
3003.95
668+50.00
3002.59
668+00.00
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

P-38

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915E	X-6

PERMIT DRAWING
SHEET 7 OF 46



PROJECT REFERENCE NO.	SHEET NO.
R-2915E	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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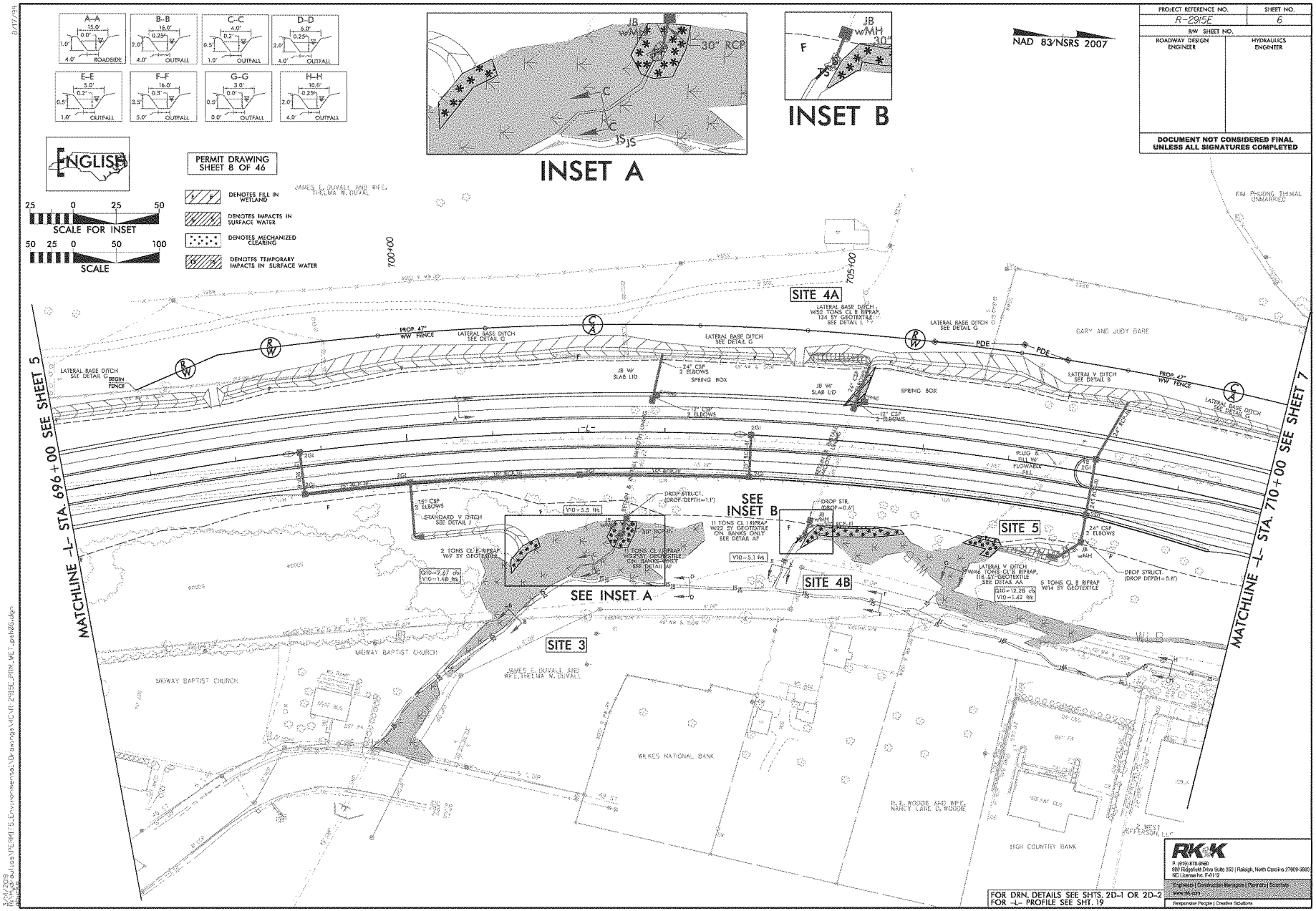

8/17/99

3/16/2009
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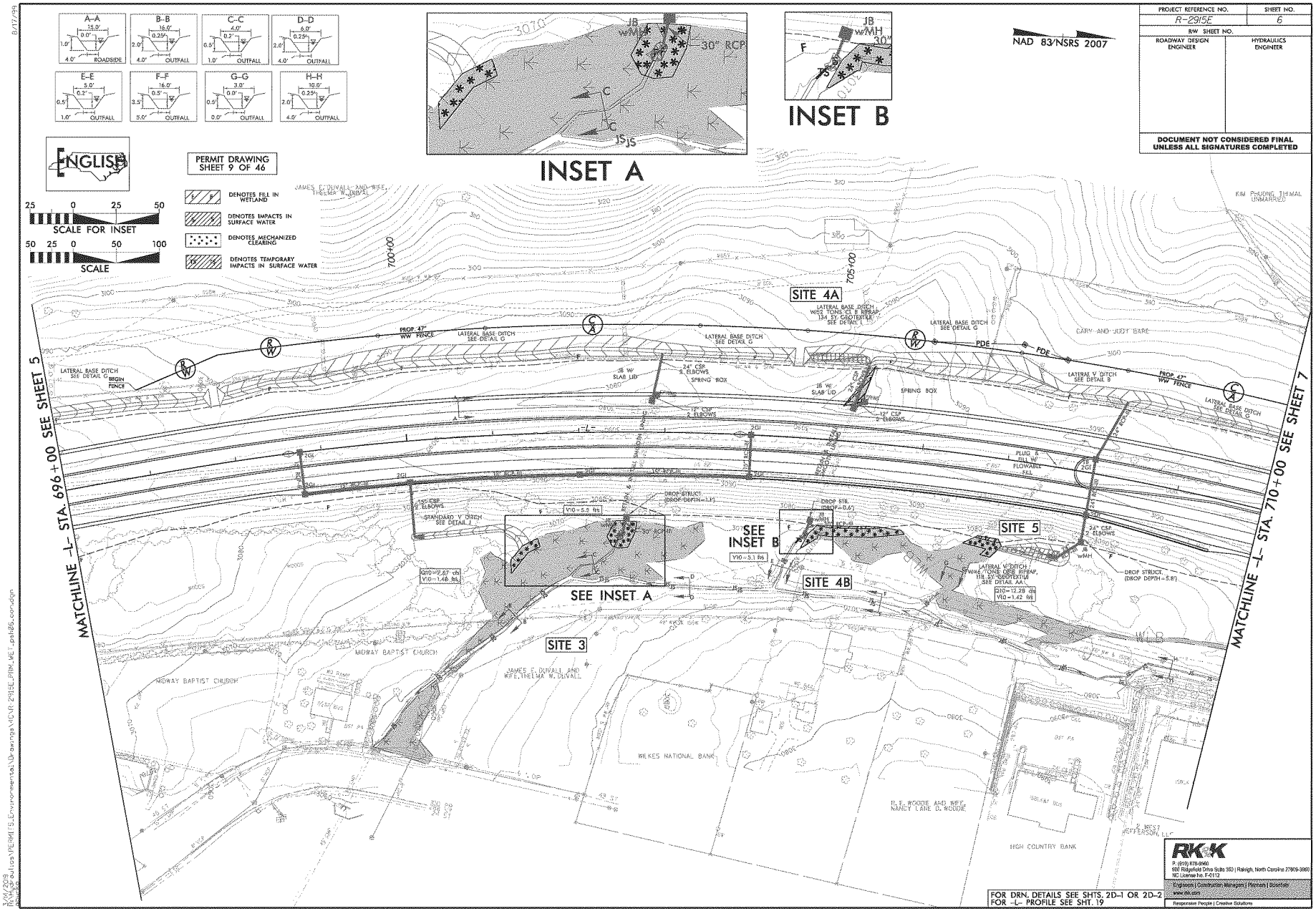
P-40

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/NSRS 2007



8/17/99

3/16/2009
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P-41

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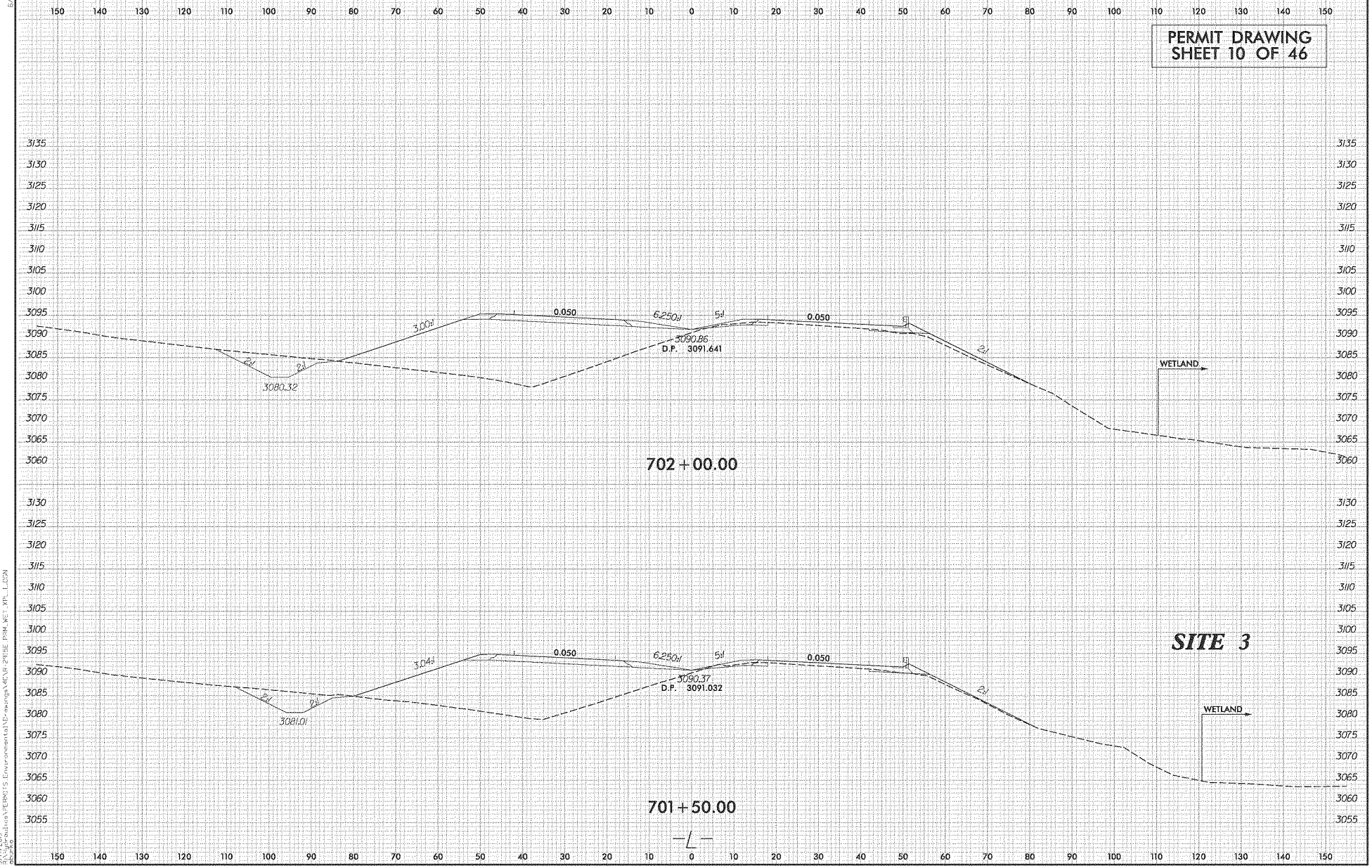
	R-2915E	X-24

PERMIT DRAWING
SHEET 10 OF 46



6/23/16
3/14/2010
3/1/2010
dbrack
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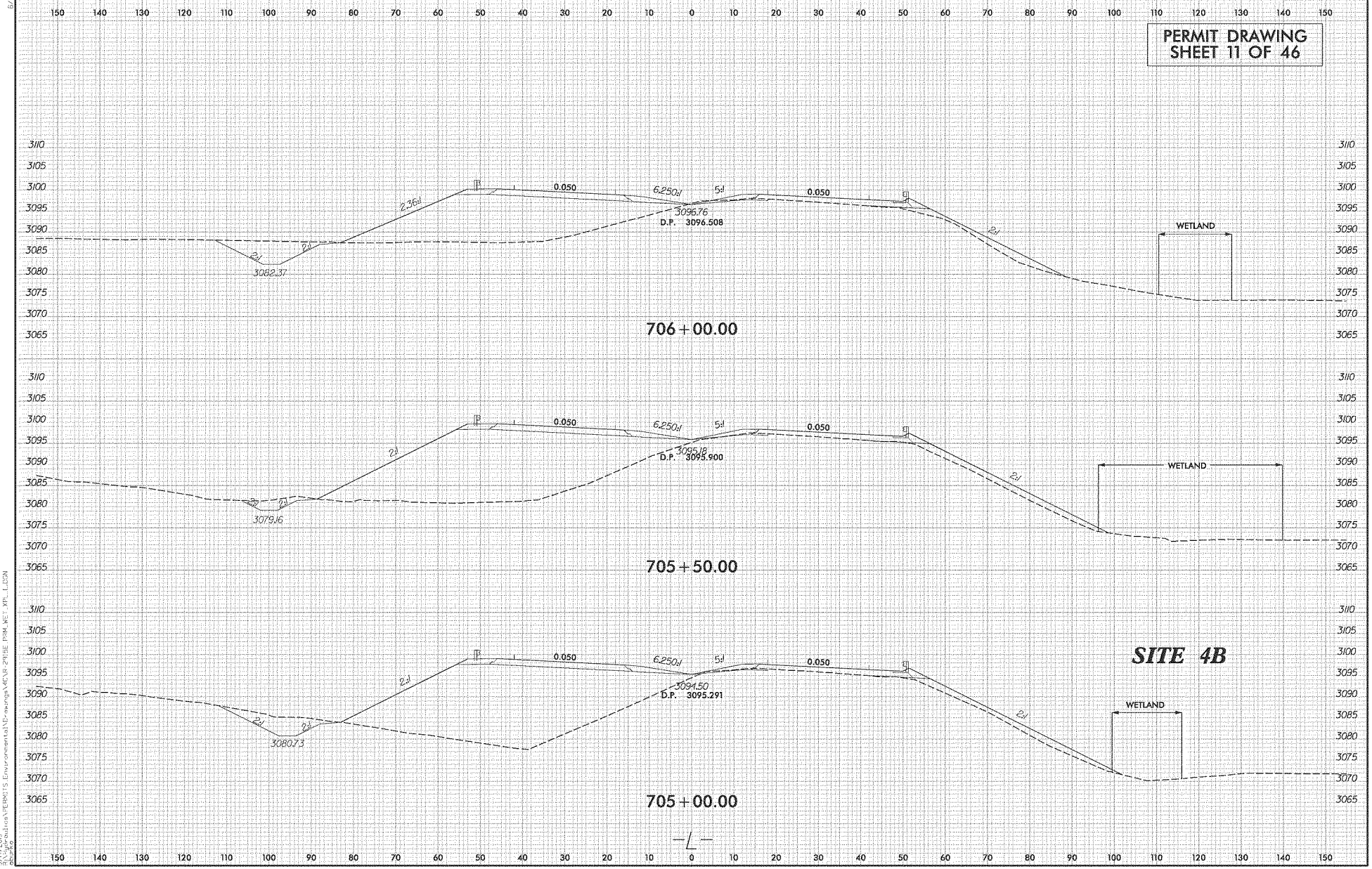
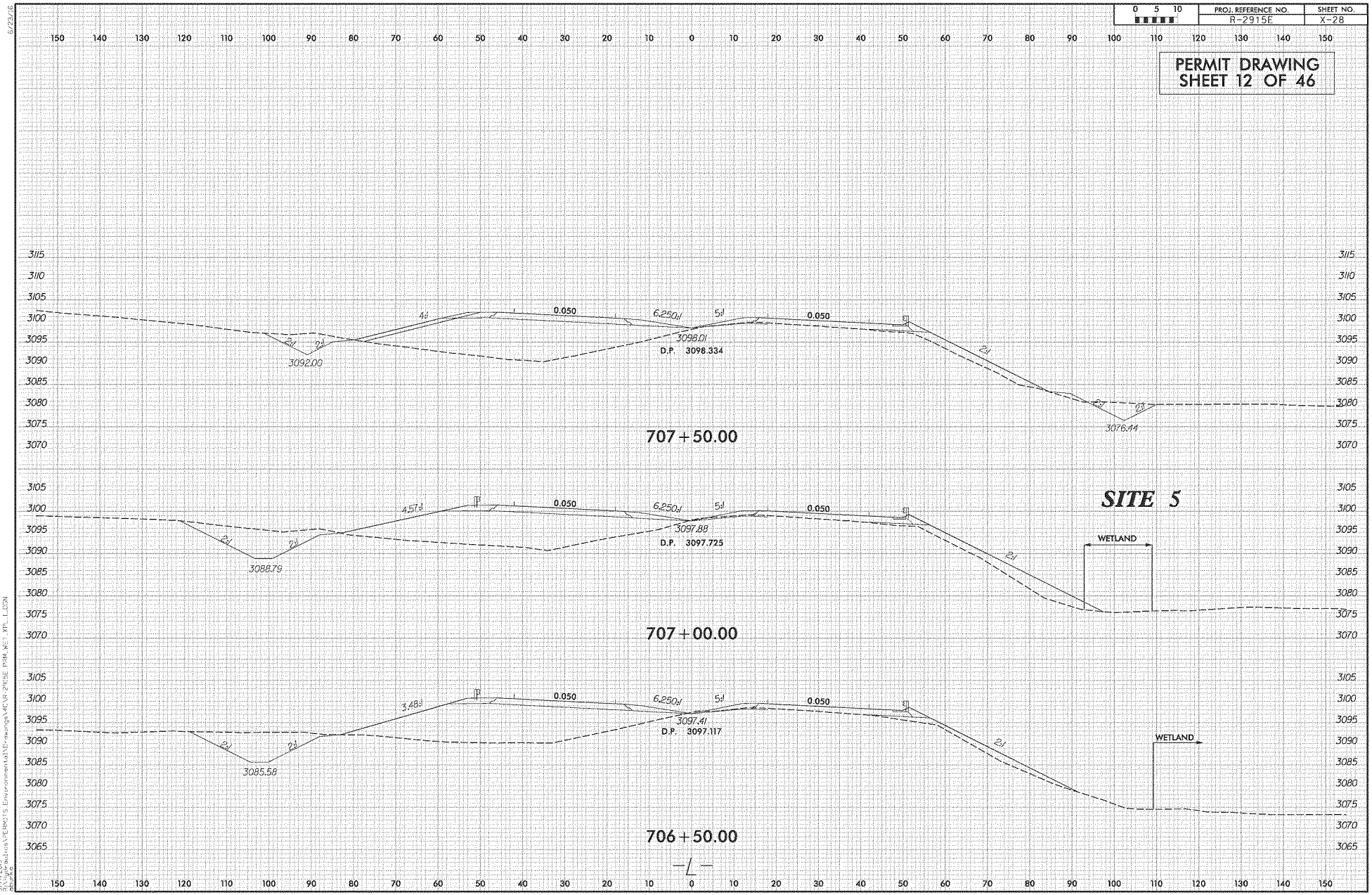
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915E	X-27

PERMIT DRAWING
SHEET 11 OF 46




0 5 10
PROJ. REFERENCE NO.
R-2915E
SHEET NO.
X-28
PERMIT DRAWING
SHEET 12 OF 46
SITE 5
707+50.00
3092.00
4:1
0.050
6.250:1
5:1
0.050
3098.01
D.P. 3098.334
2:1
3076.44
707+00.00
3088.79
4.57:1
3097.88
D.P. 3097.725
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D.P. 3097.117
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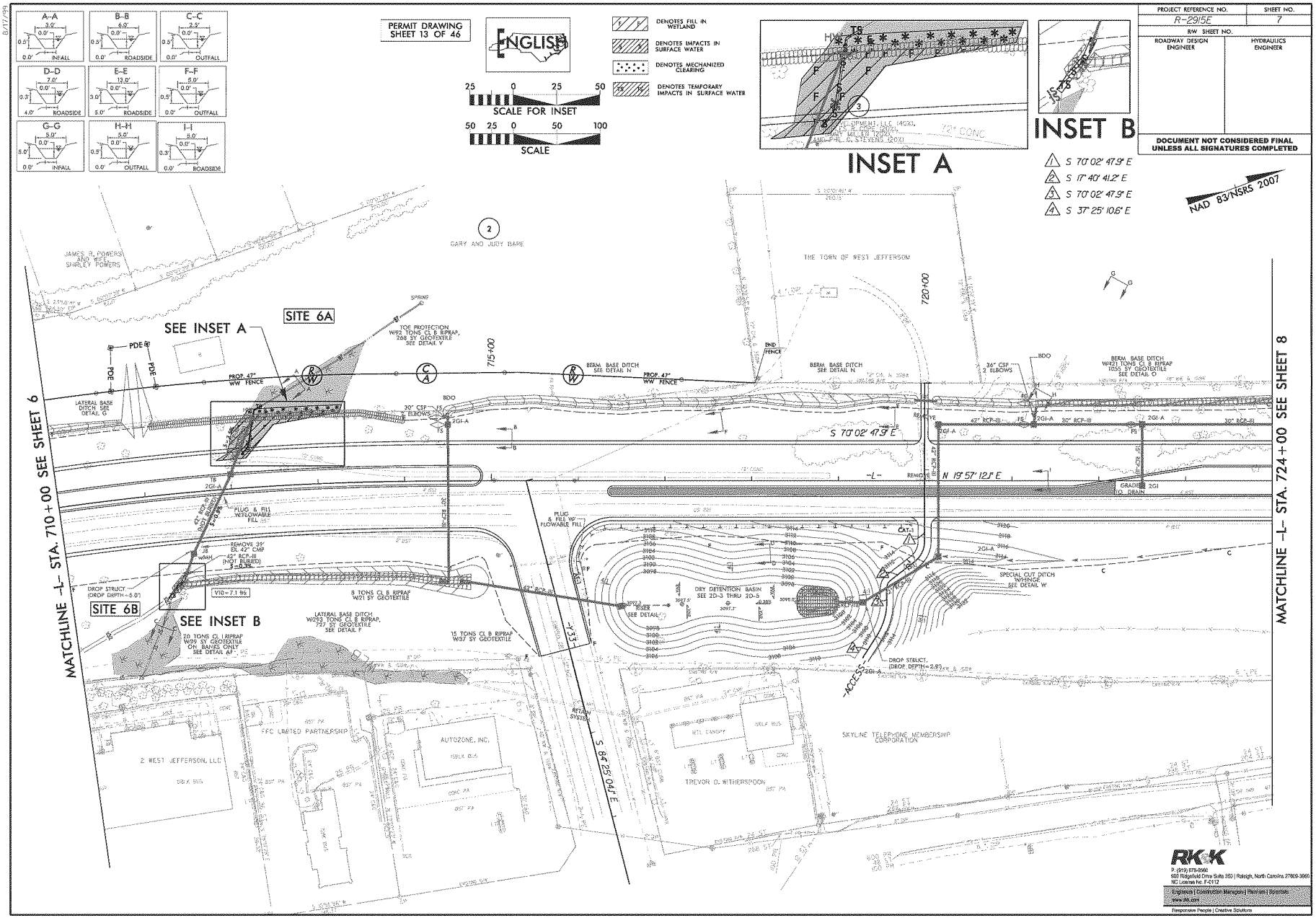
P-44


PERMIT DRAWING
SHEET 13 OF 46
ENGLISH
SCALE FOR INSET
SCALE
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
INSET A
INSET B
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
7
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
NAD 83/NSRS 2007
S 70° 02' 47.9" E
S 17° 40' 41.2" E
S 70° 02' 47.9" E
S 37° 25' 10.6" E
SEE INSET A
SITE 6A
SITE 6B
SEE INSET B
MATCHLINE -L- STA. 710+00 SEE SHEET 6
MATCHLINE -L- STA. 724+00 SEE SHEET 8
JAMES R. POWERS AND WIFE, SHIRLEY POWERS
GARY AND JUDY BARE
THE TOWN OF WEST JEFFERSON
TOE PROTECTION W/92 TONS CL B RIPRAP, 268 SY GEOTEXTILE SEE DETAIL V
BERM BASE DITCH SEE DETAIL N
BERM BASE DITCH W/421 TONS CL B RIPRAP 1055 SY GEOTEXTILE SEE DETAIL O
LATERAL BASE DITCH SEE DETAIL G
PROP. 47" WW FENCE
END FENCE
30" CSP 2 ELBOWS
36" CSP 2 ELBOWS
42" RCP-III
30" RCP-III
S 70° 02' 47.9" E
N 19° 57' 12.1" E
-L-
REMOVE 47" RCP
GRADING TO DRAIN
PLUG & FILL NEXLOWABLE FILL
PLUG & FILL W/ FLOWABLE FILL
REMOVE 39' EX. 42" CMP
42" RCP-III (NOT BURIED) 8 ±0.0%
DROP STRUCT. (DROP DEPTH=5.0')
V10=7.1 ft/s
8 TONS CL B RIPRAP W/21 SY GEOTEXTILE
LATERAL BASE DITCH W/263 TONS CL B RIPRAP, 727 SY GEOTEXTILE SEE DETAIL F
20 TONS CL I RIPRAP W/99 SY GEOTEXTILE ON BANKS ONLY SEE DETAIL AF
15 TONS CL B RIPRAP W/37 SY GEOTEXTILE
DRY DETENTION BASIN SEE 2D-3 THRU 2D-5
SPECIAL CUT DITCH W/HINGE SEE DETAIL W
DROP STRUCT. (DROP DEPTH=2.8')
-ACCESS-
S 84° 25' 04.1" E
FFC LIMITED PARTNERSHIP
AUTOZONE, INC.
2 WEST JEFFERSON, LLC
TREVOR D. WITHERSPOON
SKYLINE TELEPHONE MEMBERSHIP CORPORATION
RK&K
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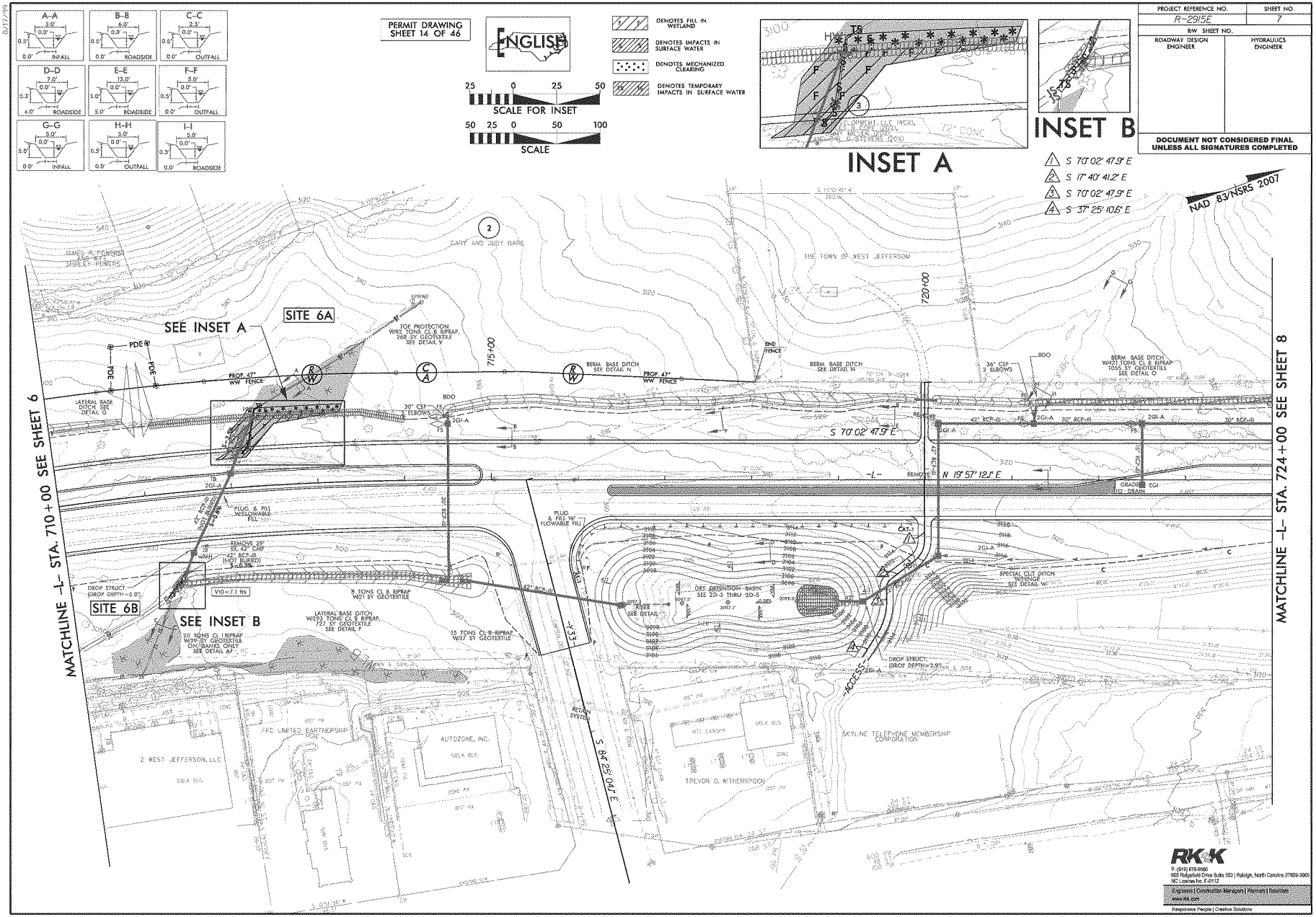
P-45


PERMIT DRAWING
SHEET 14 OF 46
ENGLISH
SCALE FOR INSET
SCALE
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
INSET A
INSET B
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
7
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
S 70° 02' 47.9" E
S 17° 40' 41.2" E
S 70° 02' 47.9" E
S 37° 25' 10.6" E
NAD 83/NSRS 2007
MATCHLINE -L- STA. 710+00 SEE SHEET 6
MATCHLINE -L- STA. 724+00 SEE SHEET 8
SITE 6A
SITE 6B
SEE INSET A
SEE INSET B
TOE PROTECTION W/92 TONS CL B RIPRAP, 268 SY GEOTEXTILE SEE DETAIL V
BERM BASE DITCH SEE DETAIL N
BERM BASE DITCH W/921 TONS CL B RIPRAP 1055 SY GEOTEXTILE SEE DETAIL O
LATERAL BASE DITCH SEE DETAIL G
PROP. 47" WW FENCE
PLUG & FILL WELCOWABLE FILL
PLUG & FILL W FLOWABLE FILL
REMOVE 39" EX. 42" CMP (NOT BURIED)
DROP STRUCT. (DROP DEPTH=5.0')
LATERAL BASE DITCH W/293 TONS CL B RIPRAP, 727 SY GEOTEXTILE SEE DETAIL F
20 TONS CL I RIPRAP W/99 SY GEOTEXTILE (INCIDENTAL ONLY) SEE DETAIL AF
8 TONS CL B RIPRAP W/21 SY GEOTEXTILE
15 TONS CL B RIPRAP W/37 SY GEOTEXTILE
DRY DETENTION BASIN SEE 20-3 THRU 20-5
SPECIAL CUT DITCH W/HINGE SEE DETAIL W
DROP STRUCT. (DROP DEPTH=2.5')
RETAIN SYSTEM
ACCESS
S 84° 25' 04.7" E
N 19° 57' 12.1" E
S 70° 02' 47.9" E
715+00
720+00
GARY AND JUDY BARE
THE TOWN OF WEST JEFFERSON
JAMES R. POWERS AND WIFE STOBLEY POWERS
2 WEST JEFFERSON, LLC
FFC LIMITED PARTNERSHIP
AUTOZONE, INC.
TREVOR D. WITHERSPOON
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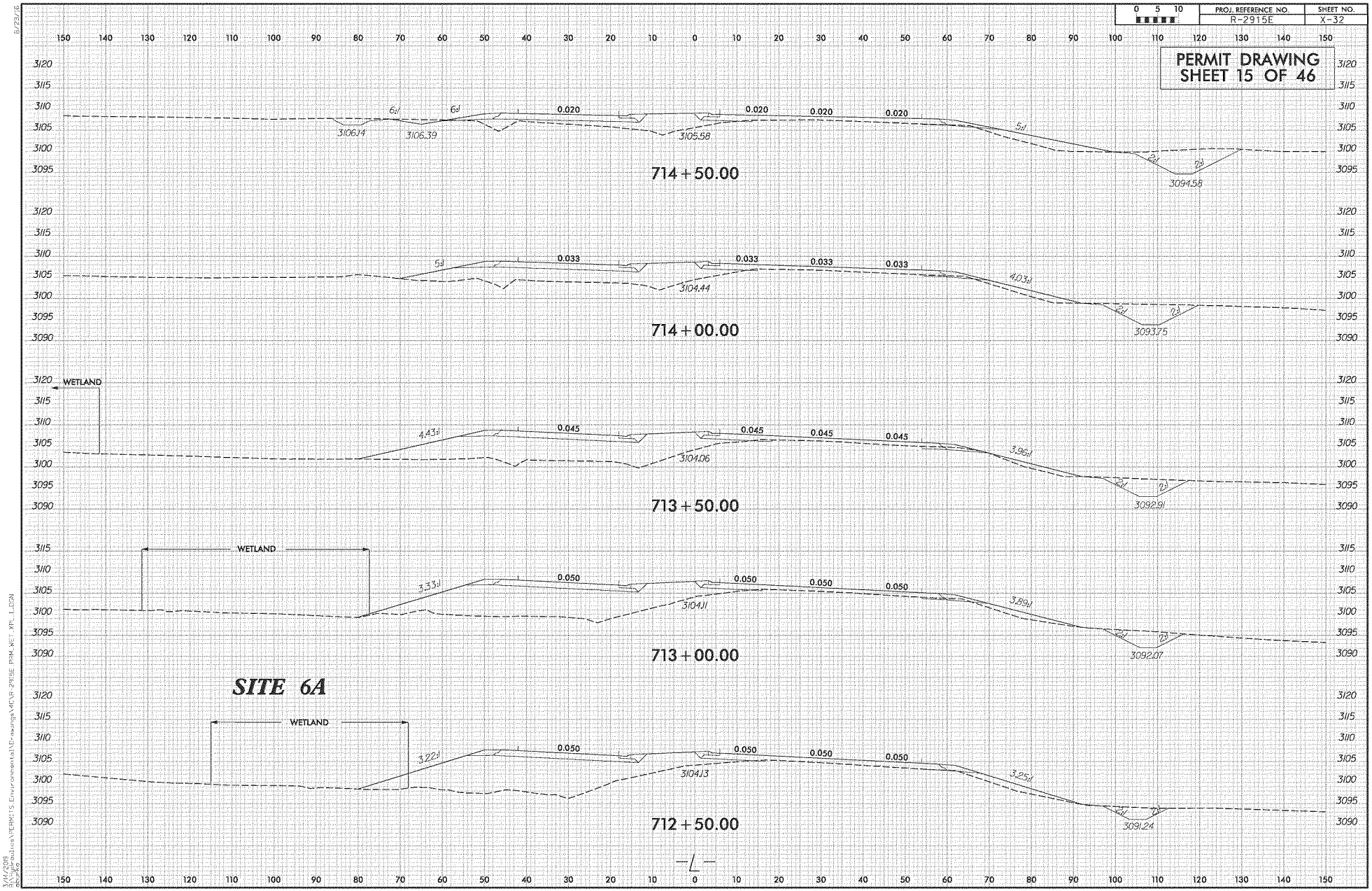
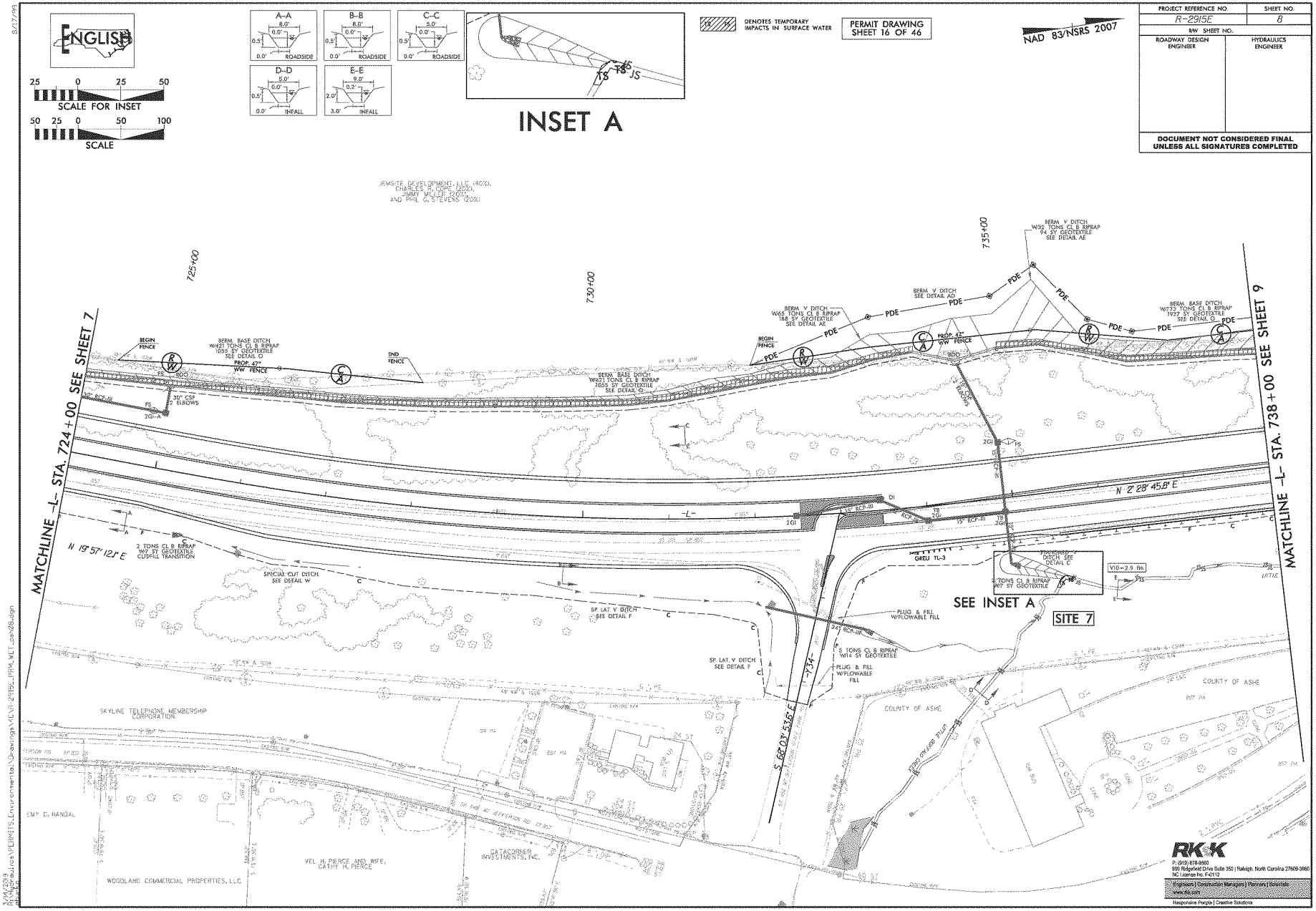

0 5 10
PROJ. REFERENCE NO.
R-2915E
SHEET NO.
X-32
PERMIT DRAWING
SHEET 15 OF 46
714+50.00
714+00.00
713+50.00
713+00.00
712+50.00
WETLAND
SITE 6A
0.020
0.033
0.045
0.050
3106.14
3106.39
3105.58
3104.44
3104.06
3104.11
3104.13
3094.58
3093.75
3092.91
3092.07
3091.24
-L-

P-47


ENGLISH
25 0 25 50
SCALE FOR INSET
50 25 0 50 100
SCALE
A-A
B-B
C-C
D-D
E-E
ROADSIDE
INFALL
INSET A
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING
SHEET 16 OF 46
NAD 83/NSRS 2007
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
8
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
JEMSITE DEVELOPMENT, LLC (40%)
CHARLES R. LOPE (20%)
JIMMY MILLER (20%)
AND PAUL C. STEVENS (20%)
725+00
730+00
735+00
MATCHLINE -L- STA. 724+00 SEE SHEET 7
MATCHLINE -L- STA. 738+00 SEE SHEET 9
BEGIN FENCE
END FENCE
BERM, BASE DITCH
W421 TONS CL B RIPRAP
1055 SY GEOTEXTILE
SEE DETAIL O
PROP. 47" W/W FENCE
30" CSP
2 ELBOWS
BERM, V DITCH
W65 TONS CL B RIPRAP
186 SY GEOTEXTILE
SEE DETAIL AE
BERM, V DITCH
SEE DETAIL AO
BERM, V DITCH
W92 TONS CL B RIPRAP
94 SY GEOTEXTILE
SEE DETAIL AE
BERM, BASE DITCH
W773 TONS CL B RIPRAP
1937 SY GEOTEXTILE
SEE DETAIL O
PDE
N 19° 57' 12.1" E
2 TONS CL B RIPRAP
W/ 51 SY GEOTEXTILE
CUTOFF TRANSITION
SPECIAL CUT DITCH
SEE DETAIL W
SP. LAT. V DITCH
SEE DETAIL F
SP. LAT. V DITCH
SEE DETAIL P
N 2° 28' 45.8" E
GREU TL-3
TEMPORARY DITCH SEE DETAIL C
5 TONS CL B RIPRAP
W67 SY GEOTEXTILE
V10=2.9 fps
SEE INSET A
SITE 7
PLUG & FILL W/FLOWABLE FILL
5 TONS CL B RIPRAP
W14 SY GEOTEXTILE
S 62° 03' 53.6" E
-734-
COUNTY OF ASHE
SKYLINE TELEPHONE MEMBERSHIP CORPORATION
EMY C. HANDAL
VEL H. PIERCE AND WIFE, CATHY H. PIERCE
CATACORNER INVESTMENTS, INC.
WOODLAND COMMERCIAL PROPERTIES, LLC
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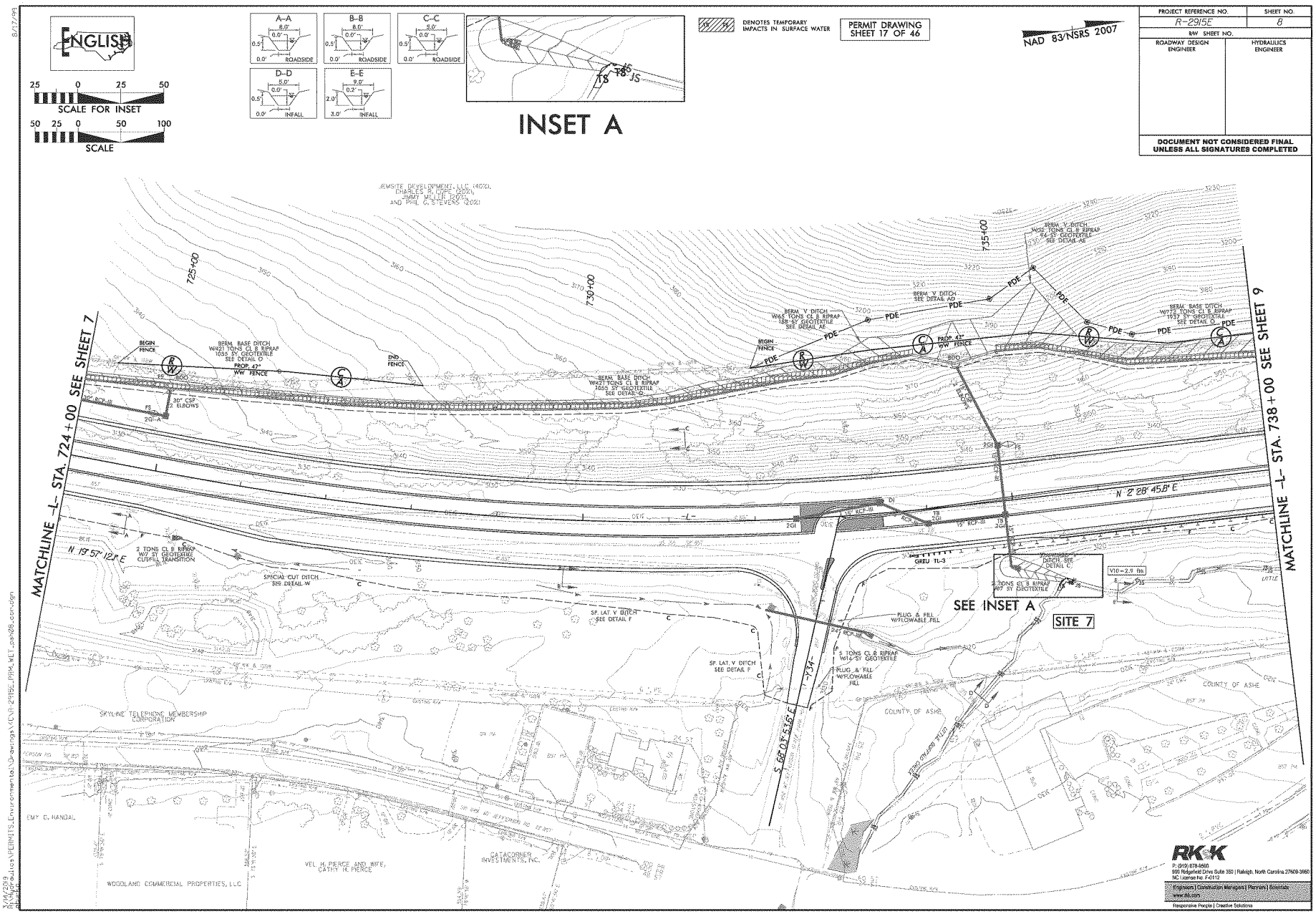
ENGLISH
25 0 25 50
SCALE FOR INSET
50 25 0 50 100
SCALE
A-A
B-B
C-C
D-D
E-E
ROADSIDE
INFALL
INSET A
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING SHEET 17 OF 46
NAD 83/NSRS 2007
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
8
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
JEMSITE DEVELOPMENT, LLC (40%)
CHARLES R. HYPE (20%)
JIMMY MILLER (20%)
AND PAUL C. STEVENS (20%)
MATCHLINE -L- STA. 724+00 SEE SHEET 7
MATCHLINE -L- STA. 738+00 SEE SHEET 9
725+00
730+00
735+00
BEGIN FENCE
END FENCE
PROP. 47" WW FENCE
BERM, BASE DITCH W/421 TONS CL B RIPRAP 1038 SY GEOTEXTILE SEE DETAIL O
BERM, BASE DITCH W/421 TONS CL B RIPRAP 1055 SY GEOTEXTILE SEE DETAIL Q
BERM, V DITCH W/465 TONS CL B RIPRAP 188 SY GEOTEXTILE SEE DETAIL AE
BERM, V DITCH W/72 TONS CL B RIPRAP 54 SY GEOTEXTILE SEE DETAIL AE
BERM, V DITCH SEE DETAIL AD
BERM, BASE DITCH W/772 TONS CL B RIPRAP 1032 SY GEOTEXTILE SEE DETAIL O
PDE
30" CSP 2 ELBOWS
2 TONS CL B RIPRAP W/ 51 GEOTEXTILE CUTFILL TRANSITION
N 19° 57' 12.8" E
SPECIAL CUT DITCH SEE DETAIL W
SP. LAT. V DITCH SEE DETAIL F
SP. LAT. V DITCH SEE DETAIL F
N 2° 28' 45.8" E
GREU TL-3
V10=2.9 ac
2 TONS CL B RIPRAP W/ 67 SY GEOTEXTILE
SEE INSET A
SITE 7
PLUG & FILL W/FLOWABLE FILL
5 TONS CL B RIPRAP W/14 SY GEOTEXTILE
PLUG & FILL W/FLOWABLE FILL
S 62° 03' 53.6" E
-L-734
COUNTY OF ASHE
SKYLINE TELEPHONE MEMBERSHIP CORPORATION
EMY C. HANDAL
VEL H. PIERCE AND WIFE, CATHY H. PIERCE
CATACORNER INVESTMENTS, INC.
WOODLAND COMMERCIAL PROPERTIES, LLC
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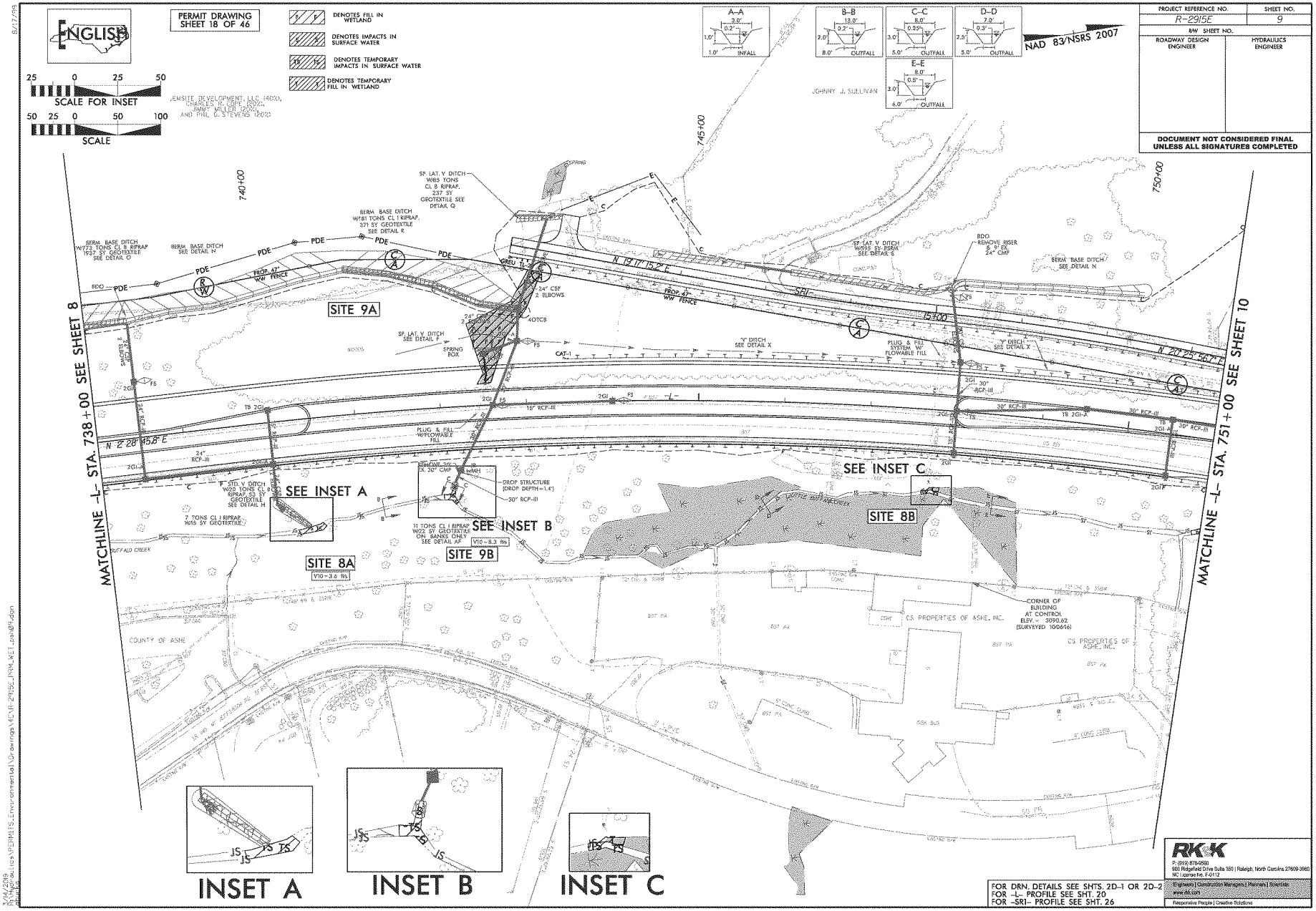
P-49


ENGLISH
PERMIT DRAWING
SHEET 18 OF 46
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES TEMPORARY FILL IN WETLAND
SCALE FOR INSET
SCALE
NAD 83/NSRS 2007
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
9
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
A-A
B-B
C-C
D-D
E-E
INFALL
OUTFALL
JOHNNY J. SULLIVAN
MATCHLINE -L- STA. 738+00 SEE SHEET 8
MATCHLINE -L- STA. 751+00 SEE SHEET 10
740+00
745+00
750+00
SITE 9A
SITE 8A
SITE 9B
SITE 8B
SEE INSET A
SEE INSET B
SEE INSET C
INSET A
INSET B
INSET C
BUFFALO CREEK
COUNTY OF ASHE
C.S. PROPERTIES OF ASHE, INC.
CORNER OF BUILDING AT CONTROL ELEV. = 3090.62 (SURVEYED 10/06/16)
FOR DRN. DETAILS SEE SHTS. 2D-1 OR 2D-2
FOR -L- PROFILE SEE SHT. 20
FOR -SR1- PROFILE SEE SHT. 26
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P-50

ENGLISH

PERMIT DRAWING
SHEET 19 OF 46

DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES TEMPORARY FILL IN WETLAND

25 0 25 50
SCALE FOR INSET

50 25 0 50 100
SCALE

JEMSITE DEVELOPMENT, LLC (4820),
CHARLES R. COPE (2024),
NANCY MILLER (2024),
AND PHIL C. STEVENS (2010)

A–A: 3.0', 0.3', 1.0', 1.0', INFALL
B–B: 12.0', 0.3', 2.0', 8.0', OUTFALL
C–C: 8.0', 0.25', 3.0', 5.0', OUTFALL
D–D: 7.0', 0.3', 2.5', 5.0', OUTFALL
E–E: 6.0', 0.5', 3.0', 6.0', OUTFALL

NAD 83/NSRS 2007

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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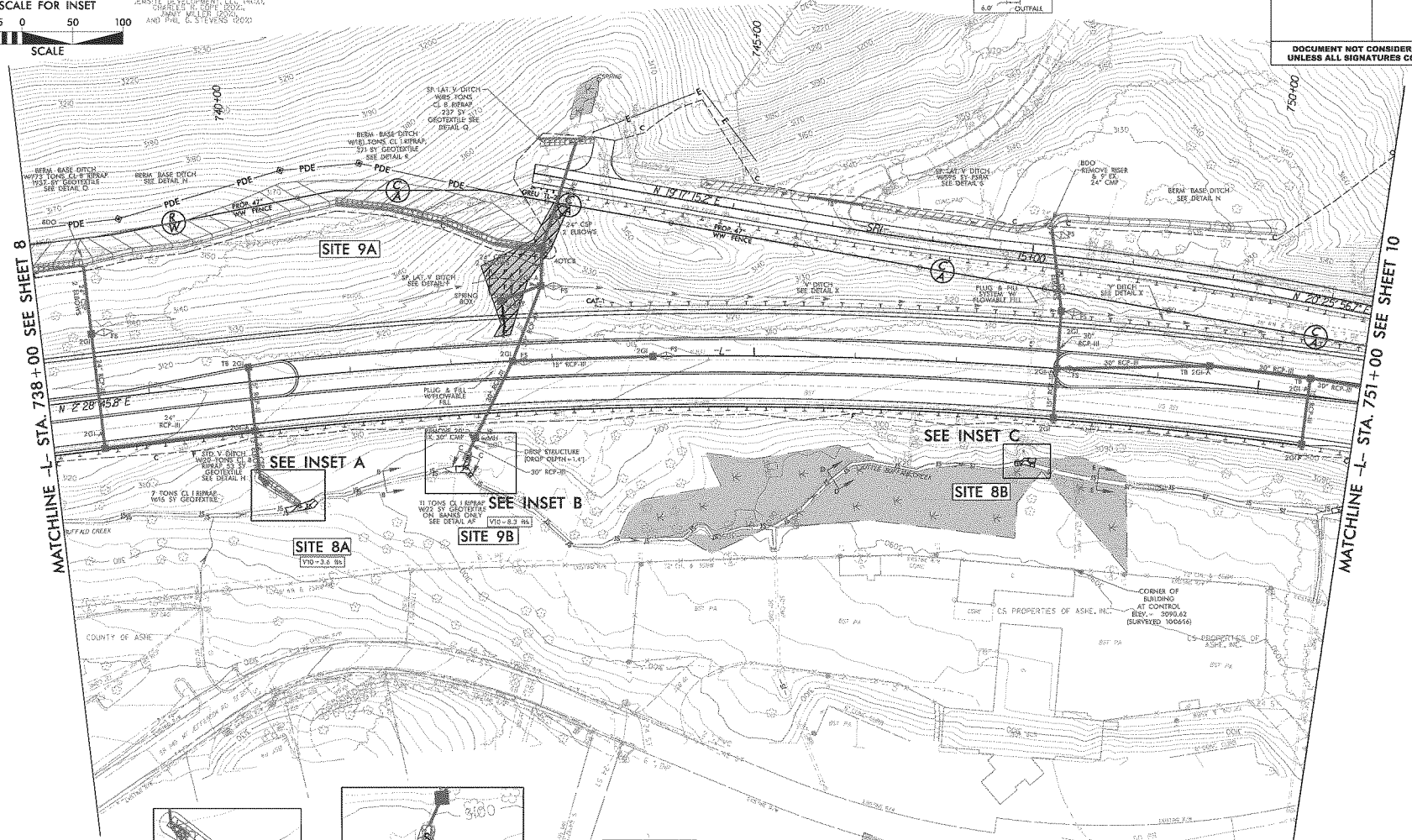

FOR DRN. DETAILS SEE SHTS. 2D-1 OR 2D-2
FOR -L- PROFILE SEE SHT. 20
FOR -SR1- PROFILE SEE SHT. 26

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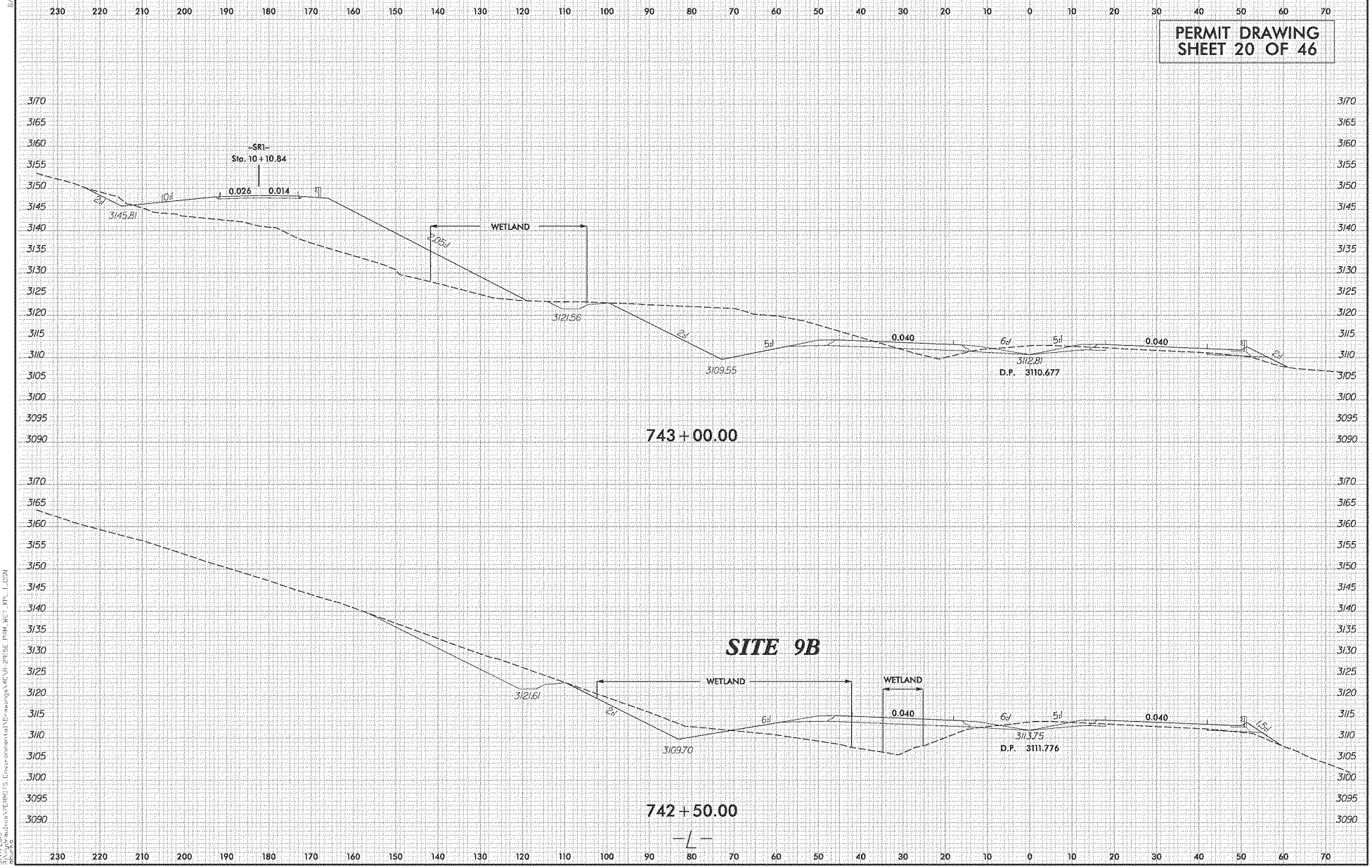
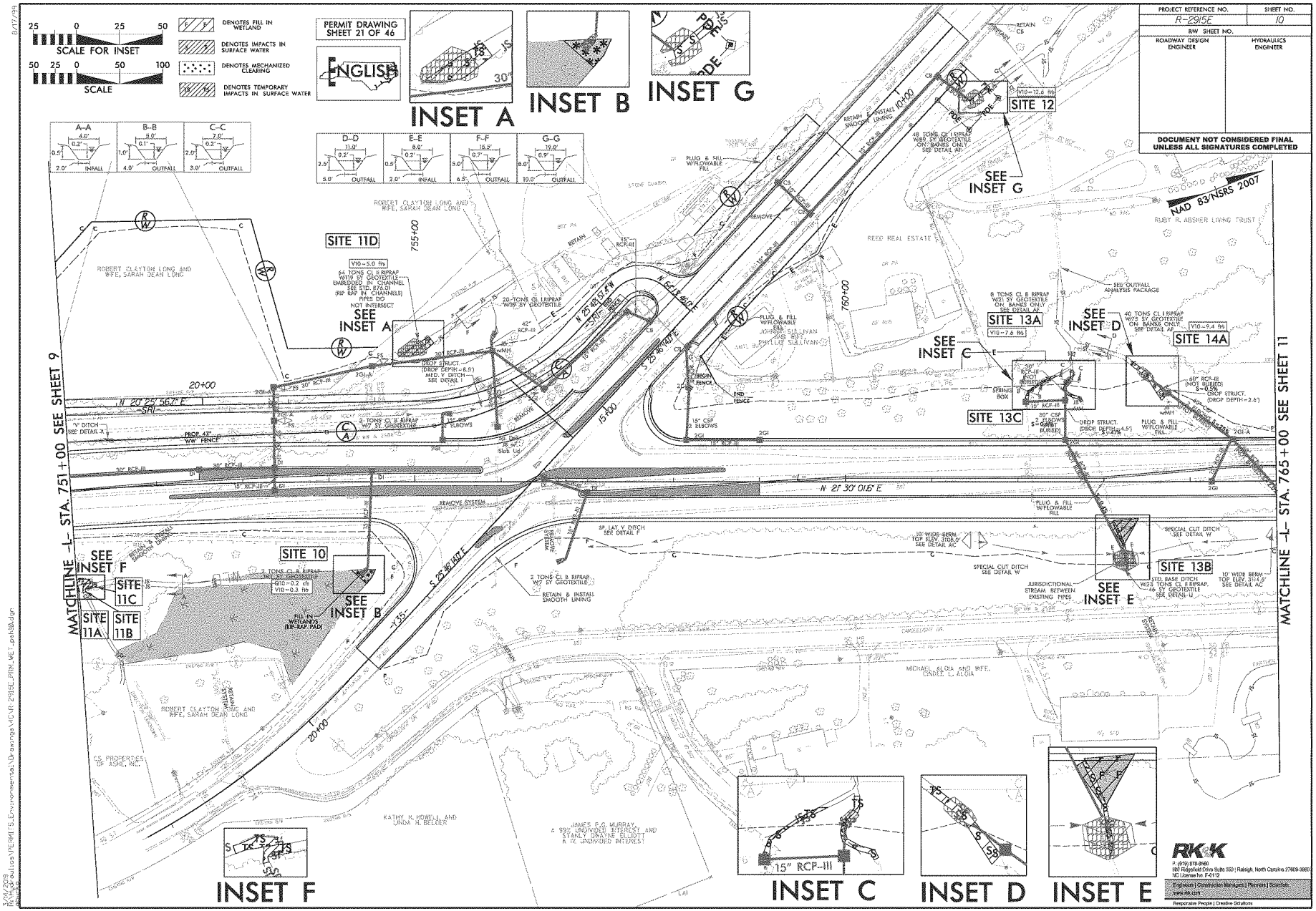
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915E	X-53

PERMIT DRAWING
SHEET 20 OF 46



P-52


SCALE FOR INSET
SCALE
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING SHEET 21 OF 46
ENGLISH
INSET A
INSET B
INSET G
INSET F
INSET C
INSET D
INSET E
SITE 10
SITE 11A
SITE 11B
SITE 11C
SITE 11D
SITE 12
SITE 13A
SITE 13B
SITE 13C
SITE 14A
SEE INSET A
SEE INSET B
SEE INSET C
SEE INSET D
SEE INSET E
SEE INSET F
SEE INSET G
MATCHLINE -L- STA. 751+00 SEE SHEET 9
MATCHLINE -L- STA. 765+00 SEE SHEET 11
NAD 83/NSRS 2007
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
10
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
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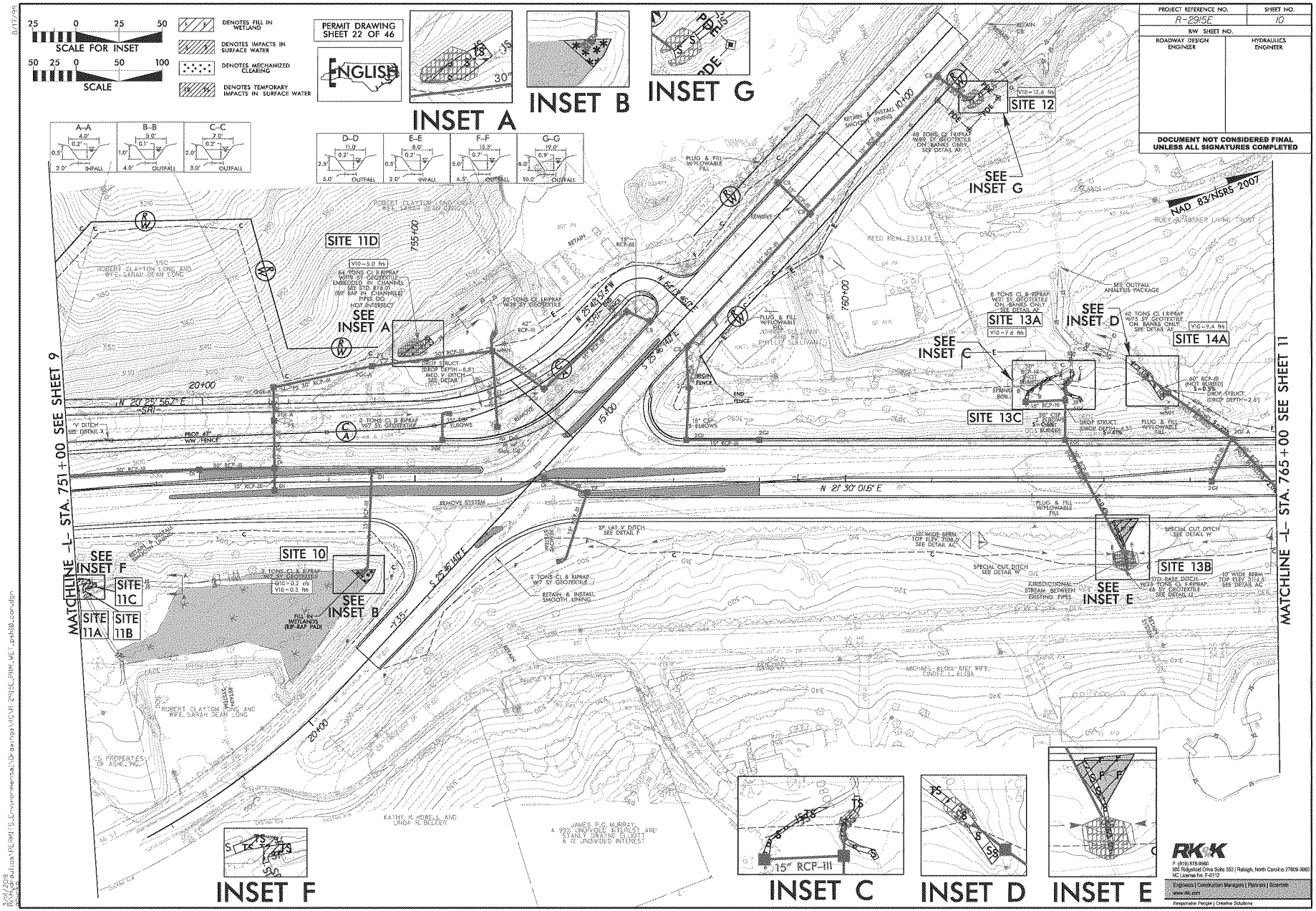
25 0 25 50
SCALE FOR INSET
50 25 0 50 100
SCALE
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING SHEET 22 OF 46
ENGLISH
INSET A
INSET B
INSET G
A–A
B–B
C–C
D–D
E–E
F–F
G–G
INFALL
OUTFALL
SITE 11D
SITE 12
SITE 13A
SITE 13B
SITE 13C
SITE 14A
SITE 10
SITE 11A
SITE 11B
SITE 11C
SEE INSET A
SEE INSET B
SEE INSET C
SEE INSET D
SEE INSET E
SEE INSET F
SEE INSET G
MATCHLINE -L- STA. 751+00 SEE SHEET 9
MATCHLINE -L- STA. 765+00 SEE SHEET 11
NAD 83/NSRS 2007
N 20°28'56.2" E
N 21°30'01.5" E
S 25°36'14.0" E
N 25°40'57.4" W
N 85°13'46.0" E
REMOVE SYSTEM
PLUG & FILL W/FLOWABLE FILL
RETAIN & INSTALL SMOOTH LINING
FILL IN WETLANDS (RIP-RAP PAD)
ROBERT CLAYTON LONG AND WIFE, SARAH DEAN LONG
C.S. PROPERTIES OF ASHE, INC.
KATHY H. HOWELL AND LINDA H. BELDER
JAMES R.C. MURRAY, A 99% UNDIVIDED INTEREST AND STANLY DWAYNE ELLIOTT A 1% UNDIVIDED INTEREST
MICHAEL ALONZO REED WIFE, LINDEE T. ALONA
REED REAL ESTATE
RUBY W. MOSHER LIVING TRUST
15" RCP-III
SPECIAL CUT DITCH SEE DETAIL W
JURISDICTIONAL STREAM SCREEN EXISTING PIPES
STD. BASE DITCH W/3 TONS CL II RIPRAP, 46 SY GEOTEXTILE SEE DETAIL U
10' WIDE BERM TOP ELEV. 314.0' SEE DETAIL AC
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
10
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
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P-54

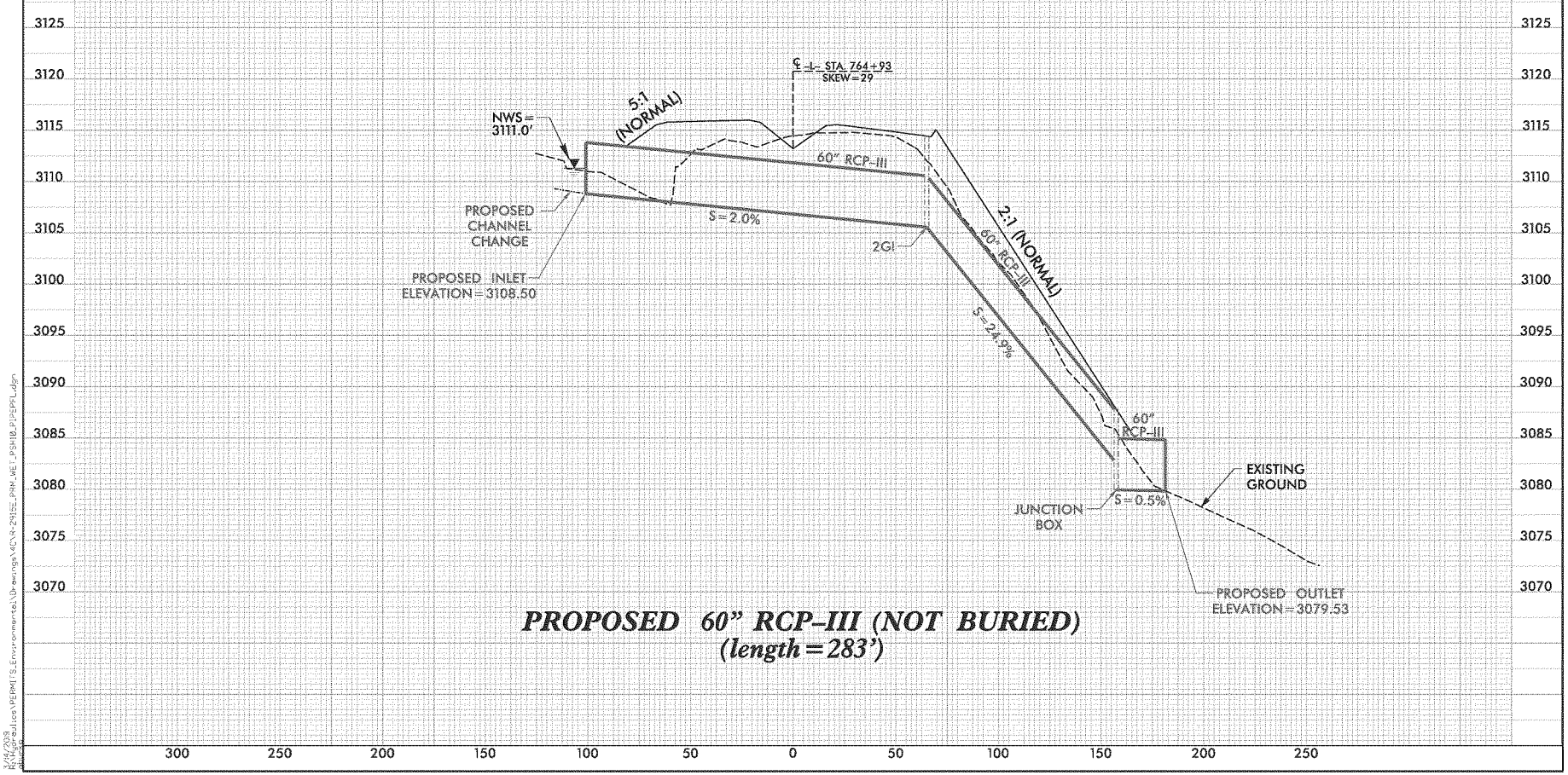
PROJECT REFERENCE NO.	SHEET NO.
R-2915E	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 23 OF 46

SITE 14
-L- 764+93

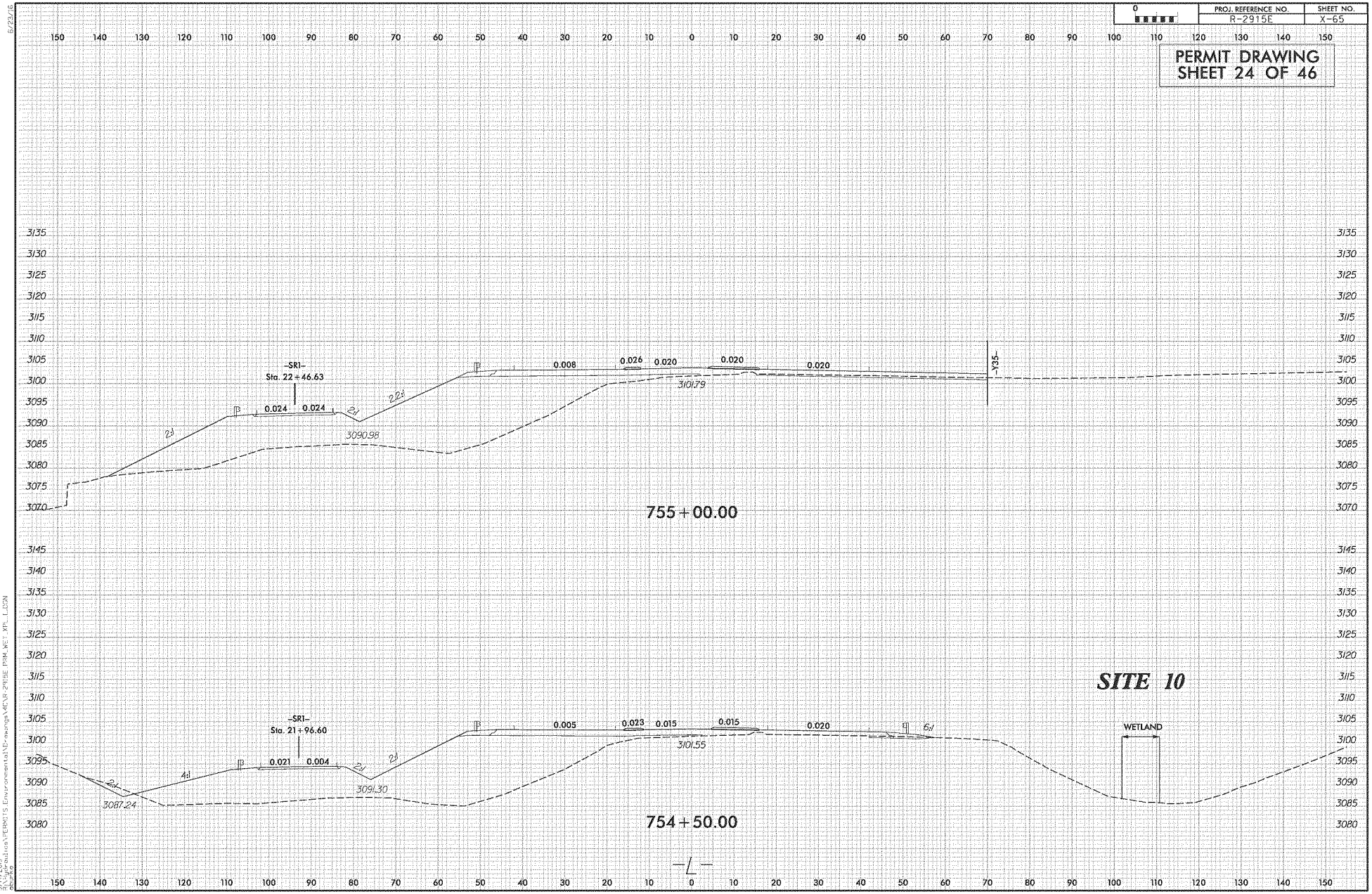


PROPOSED 60" RCP-III (NOT BURIED)
(length=283')

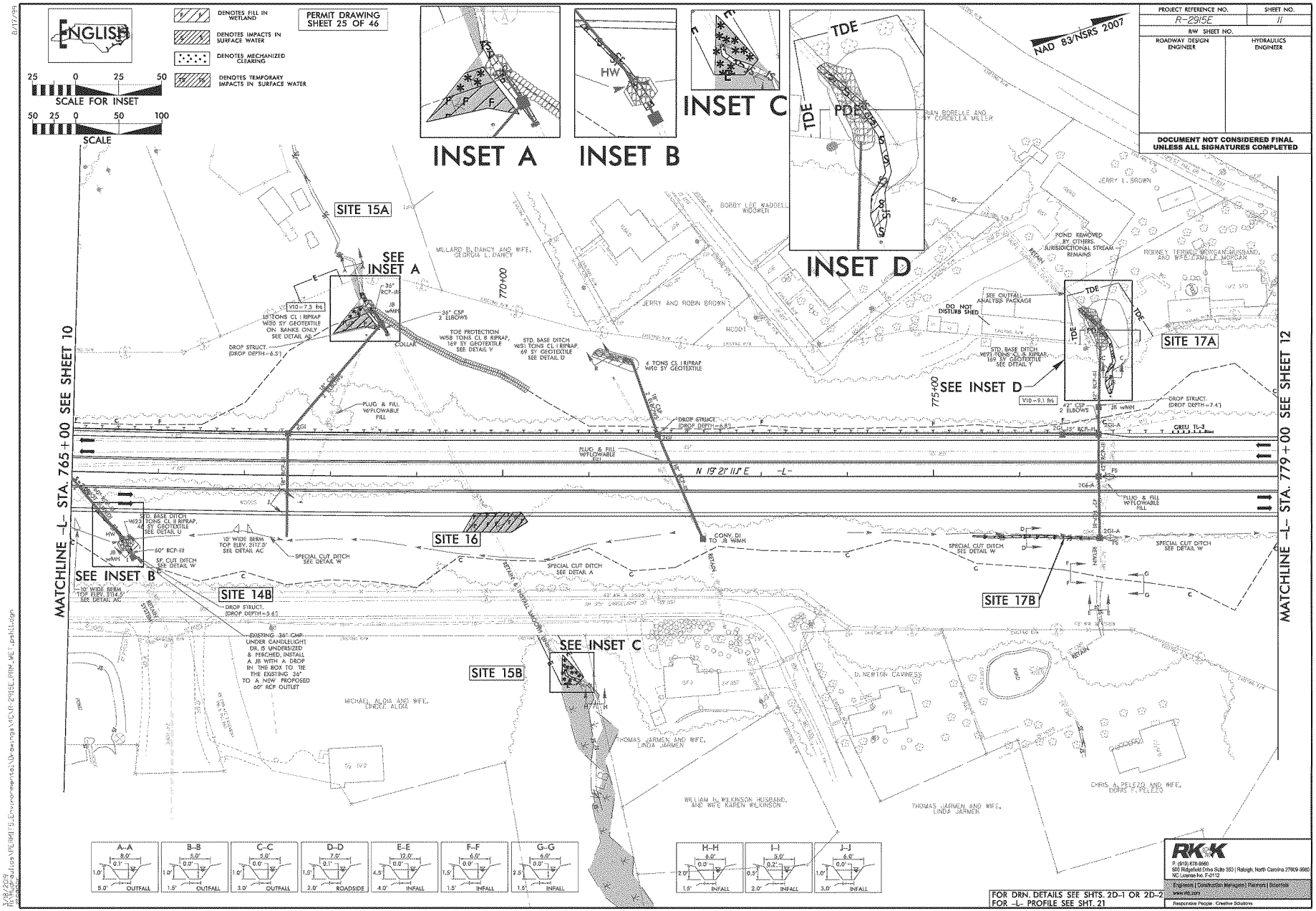
5/14/19

3/4/2019
R:\Hydraulics\PERMIT\S_Environmental\Drawings\4C\R-2915E_PHM_WET_PSH10_PIPEPFL.dgn
Bentley

P-55


PROJ. REFERENCE NO.
R-2915E
SHEET NO.
X-65
PERMIT DRAWING
SHEET 24 OF 46
-SR1-
Sta. 22+46.63
0.024
0.024
2:1
2:1
3090.98
0.008
0.026
0.020
0.020
0.020
3101.79
-Y35-
755+00.00
SITE 10
-SR1-
Sta. 21+96.60
0.021
0.004
2:1
4:1
2:1
3087.24
3091.30
0.005
0.023
0.015
0.015
0.020
6:1
3101.55
WETLAND
754+50.00
-L-

P-56


ENGLISH
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING SHEET 25 OF 46
SCALE FOR INSET
SCALE
INSET A
INSET B
INSET C
INSET D
NAD 83/NSRS 2007
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
11
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
SITE 15A
SEE INSET A
SITE 16
SEE INSET B
SITE 14B
SITE 15B
SEE INSET C
SITE 17A
SEE INSET D
SITE 17B
MATCHLINE -L- STA. 765+00 SEE SHEET 10
MATCHLINE -L- STA. 779+00 SEE SHEET 12
N 19° 21' 11.1" E -L-
770+00
775+00
MILLARD B. DANCY AND WIFE, GEORGIA L. DANCY
JERRY AND ROBIN BROWN
BOBBY LEE WADDELL
JERRY T. BROWN
RODNEY TERRY MORGAN, HUSBAND, AND WIFE, CAMILLE MORGAN
MICHAEL ALGIA AND WIFE, CINDY ALGIA
THOMAS JARMEN AND WIFE, LINDA JARMEN
WILLIAM H. WILKINSON HUSBAND, AND WIFE, KAREN WILKINSON
D. NEWTON CAVNESS
CHRIS A. PELEZO AND WIFE, DORIS F. PELEZO
POND REMOVED BY OTHERS. JURISDICTIONAL STREAM REMAINS
DO NOT DISTURB SHED
SEE OUTFALL ANALYSIS PACKAGE
TOE PROTECTION W58 TONS CL II RIPRAP, 169 SY GEOTEXTILE SEE DETAIL V
STD. BASE DITCH W51 TONS CL I RIPRAP, 69 SY GEOTEXTILE SEE DETAIL D
STD. BASE DITCH W73 TONS CL II RIPRAP, 169 SY GEOTEXTILE SEE DETAIL Y
STD. BASE DITCH W23 TONS CL II RIPRAP, 46 SY GEOTEXTILE SEE DETAIL U
10' WIDE BERM TOP ELEV. 2117.5' SEE DETAIL AC
10' WIDE BERM TOP ELEV. 2114.5' SEE DETAIL AC
SPECIAL CUT DITCH SEE DETAIL W
SPECIAL CUT DITCH SEE DETAIL A
SPECIAL CUT DITCH SEE DETAIL W
EXISTING 36" CMP UNDER CANDLELIGHT DR. IS UNDERSIZED & PERCHED, INSTALL A JB WITH A DROP IN THE BOX TO TIE THE EXISTING 36" TO A NEW PROPOSED 60" RCP OUTLET
DROP STRUCT. (DROP DEPTH=6.5')
DROP STRUCT. (DROP DEPTH=6.8')
DROP STRUCT. (DROP DEPTH=7.4')
DROP STRUCT. (DROP DEPTH=5.6')
PLUG & FILL W/FLOWABLE FILL
CONV. DI TO JB WMH
A-A 8.0' 0.3' 1.0' 5.0' OUTFALL
B-B 5.0' 0.0' 1.0' 1.5' OUTFALL
C-C 5.0' 0.0' 1.0' 3.0' OUTFALL
D-D 7.0' 0.3' 1.0' 2.0' ROADSIDE
E-E 12.0' 0.0' 4.5' 4.0' INFALL
F-F 6.0' 0.0' 1.5' 1.5' INFALL
G-G 6.0' 0.0' 2.0' 1.5' INFALL
H-H 6.0' 0.0' 2.0' 1.5' INFALL
I-I 5.0' 0.2' 0.5' 2.0' INFALL
J-J 6.0' 0.0' 1.0' 3.0' INFALL
FOR DRN. DETAILS SEE SHTS. 2D-1 OR 2D-2
FOR -L- PROFILE SEE SHT. 21
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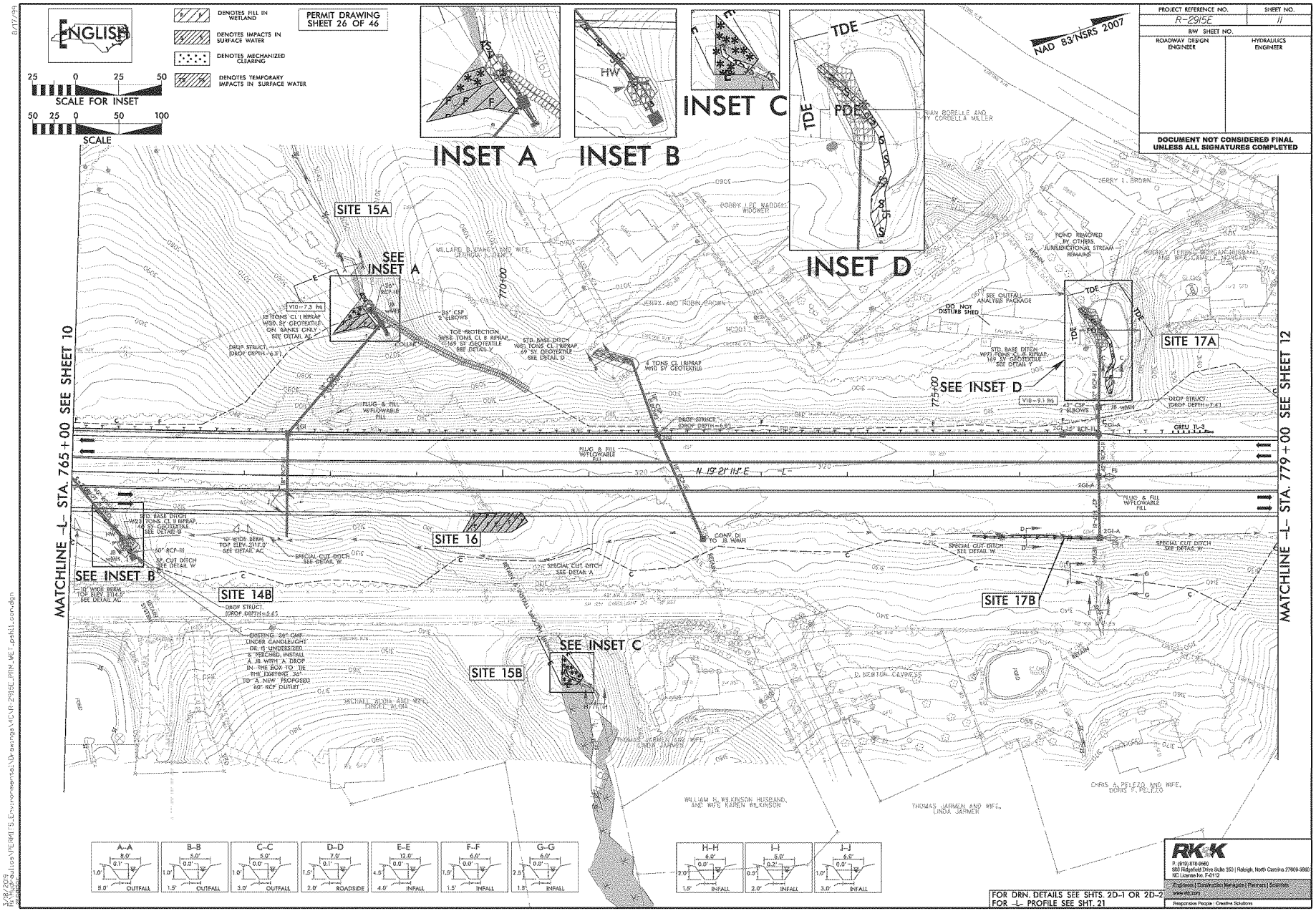
P-57


ENGLISH
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING SHEET 26 OF 46
SCALE FOR INSET
SCALE
INSET A
INSET B
INSET C
INSET D
NAD 83/NSRS 2007
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
11
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
SITE 15A
SITE 14B
SITE 15B
SITE 16
SITE 17A
SITE 17B
SEE INSET A
SEE INSET B
SEE INSET C
SEE INSET D
MATCHLINE -L- STA. 765+00 SEE SHEET 10
MATCHLINE -L- STA. 779+00 SEE SHEET 12
N 19°21'11.5" E
DROP STRUCT. (DROP DEPTH=6.3')
PLUG & FILL W/FLOWABLE FILL
SPECIAL CUT DITCH SEE DETAIL W
DO NOT DISTURB SHED
SEE OUTFALL ANALYSIS PACKAGE
POND REMOVED BY OTHERS. JURISDICTIONAL STREAM REMAINS
EXISTING 36" CMP UNDER CANDLELIGHT DR. IS UNDERSIZED & PERCHED. INSTALL A JB WITH A DROP IN THE BOX TO TIE THE EXISTING 36" TO A NEW PROPOSED 60" RCP OUTLET
A-A 8.0' 0.3' 1.0' 5.0' OUTFALL
B-B 5.0' 0.0' 1.0' 1.5' OUTFALL
C-C 5.0' 0.0' 1.0' 3.0' OUTFALL
D-D 7.0' 0.3' 1.5' 2.0' ROADSIDE
E-E 12.0' 0.0' 4.5' 4.0' INFALL
F-F 6.0' 0.0' 1.0' 1.5' INFALL
G-G 6.0' 0.0' 2.0' 1.5' INFALL
H-H 6.0' 0.0' 2.0' 1.5' INFALL
I-I 5.0' 0.2' 0.5' 2.0' INFALL
J-J 6.0' 0.0' 1.0' 3.0' INFALL
FOR DRN. DETAILS SEE SHTS. 2D-1 OR 2D-2
FOR -L- PROFILE SEE SHT. 21
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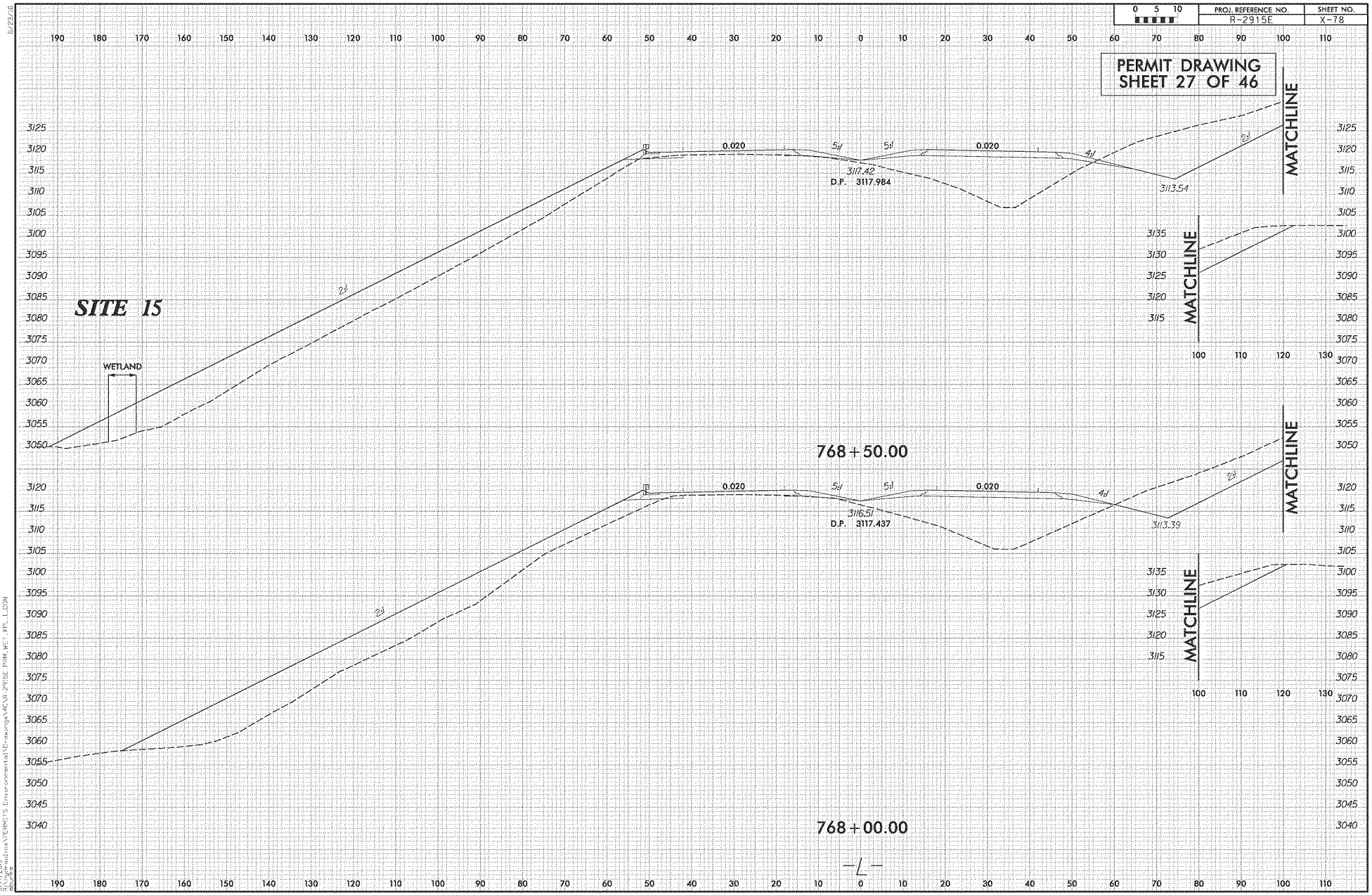
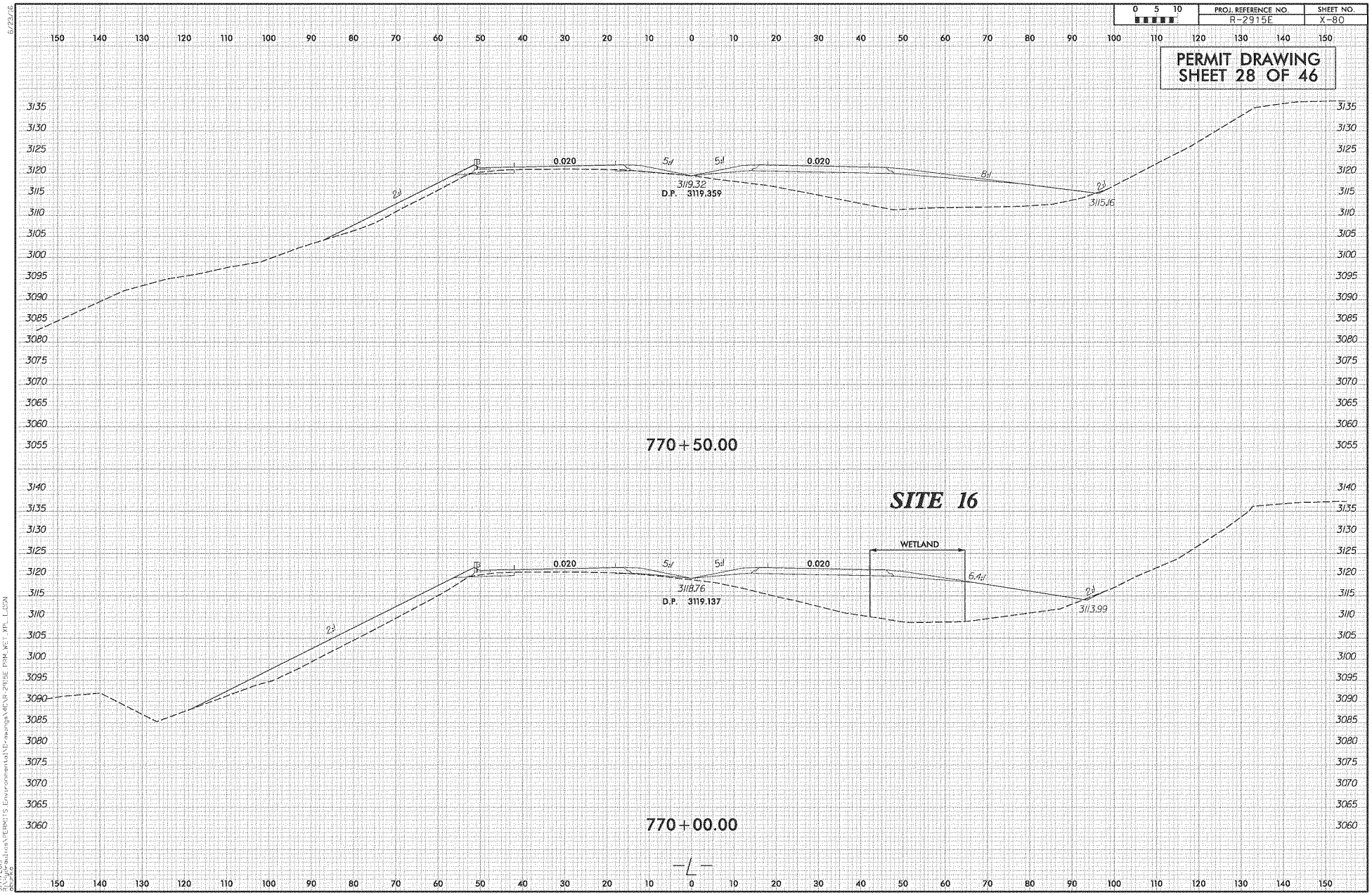
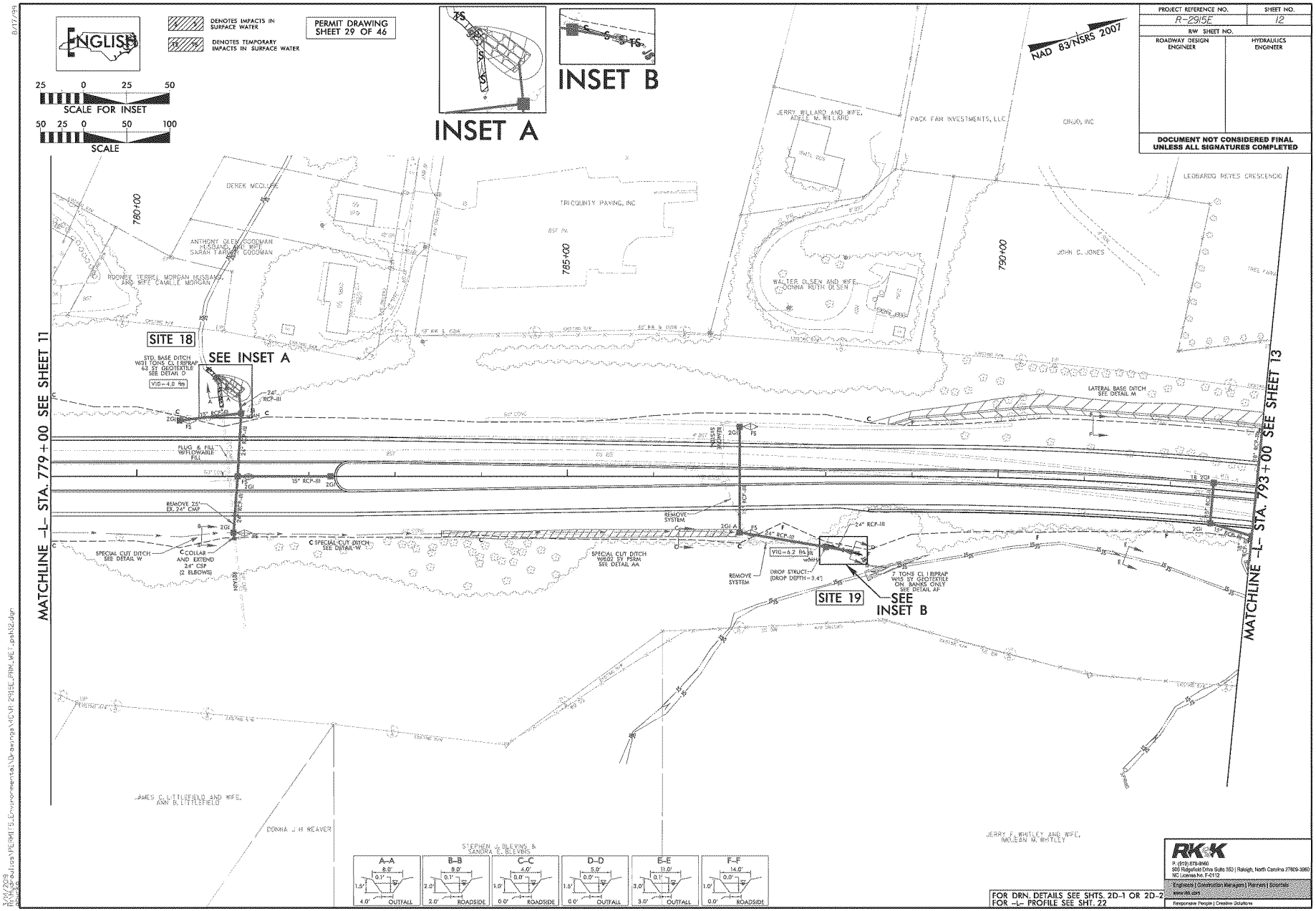

0 5 10
PROJ. REFERENCE NO.
R-2915E
SHEET NO.
X-78
PERMIT DRAWING
SHEET 27 OF 46
SITE 15
WETLAND
768+50.00
768+00.00
0.020
5:1
2:1
4:1
3117.42
D.P. 3117.984
3113.54
3116.51
D.P. 3117.437
3113.39
MATCHLINE
-L-


0 5 10
PROJ. REFERENCE NO.
R-2915E
SHEET NO.
X-80
PERMIT DRAWING
SHEET 28 OF 46
0.020
5:1
5:1
0.020
2:1
8:1
2:1
3119.32
D.P. 3119.359
3115.16
770+50.00
SITE 16
WETLAND
0.020
5:1
5:1
0.020
2:1
6.4:1
2:1
3118.76
D.P. 3119.137
3113.99
770+00.00
-L-

P-60


ENGLISH
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING SHEET 29 OF 46
SCALE FOR INSET
SCALE
INSET A
INSET B
NAD 83/NSRS 2007
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
12
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
MATCHLINE -L- STA. 779+00 SEE SHEET 11
MATCHLINE -L- STA. 793+00 SEE SHEET 13
SITE 18
SEE INSET A
SITE 19
SEE INSET B
STD. BASE DITCH W031 TONS CL I RIPRAP 6.2 SY GEOTEXTILE SEE DETAIL D
PLUG & FILL WITH COMPACTABLE FILL
REMOVE 25' OF 24" CMP
SPECIAL CUT DITCH SEE DETAIL W
COLLAR AND EXTEND 24" CSP (2 ELBOWS)
SPECIAL CUT DITCH SEE DETAIL W
SPECIAL CUT DITCH W002 SY PSRM SEE DETAIL AA
REMOVE SYSTEM
DROP STRUCT. (DROP DEPTH = 3.4')
7 TONS CL I RIPRAP WAS SY GEOTEXTILE ON BANKS ONLY SEE DETAIL AF
LATERAL BASE DITCH SEE DETAIL M
TRI COUNTY PAVING, INC
JOHN C. JONES
LEOBARDO REYES CRESCENCIO
PACK FAM INVESTMENTS, LLC
CINJO, INC
JERRY WILLARD AND WIFE, ADELE N. WILLARD
WALTER OLSEN AND WIFE, DONNA RUTH OLSEN
DEREK MCCLURE
ANTHONY GLEN GOODMAN HUSBAND AND WIFE, SARAH TARRANT GOODMAN
RODNEY TERRELL MORGAN HUSBAND AND WIFE CAMILLE MORGAN
JAMES C. LITTLEFIELD AND WIFE, ANN B. LITTLEFIELD
DONNA J. H. WEAVER
STEPHEN V. BLEVINS & SANDRA E. BLEVINS
JERRY F. WHITLEY AND WIFE, MELISSA M. WHITLEY
A-A 8.0' 0.1' 1.5' 4.0' OUTFALL
B-B 8.0' 0.1' 2.0' 2.0' ROADSIDE
C-C 4.0' 0.0' 1.0' 0.0' ROADSIDE
D-D 5.0' 0.0' 1.5' 0.0' OUTFALL
E-E 11.0' 0.1' 3.0' 3.0' OUTFALL
F-F 14.0' 0.0' 1.0' 0.0' ROADSIDE
FOR DRN. DETAILS SEE SHTS. 2D-1 OR 2D-2
FOR -L- PROFILE SEE SHT. 22
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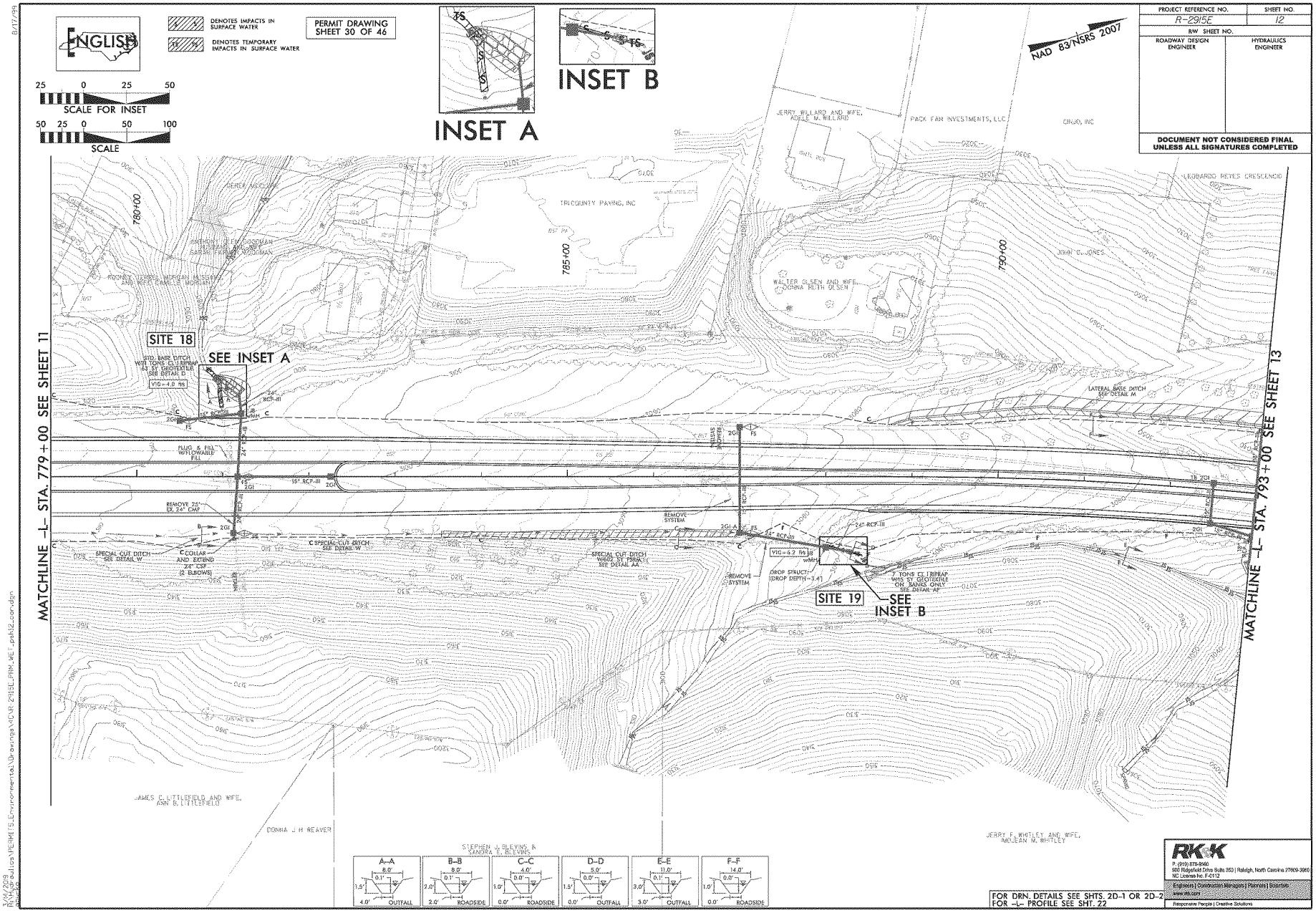
ENGLISH
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING SHEET 30 OF 46
SCALE FOR INSET
SCALE
INSET A
INSET B
NAD 83/NSRS 2007
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
12
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
MATCHLINE -L- STA. 779+00 SEE SHEET 11
MATCHLINE -L- STA. 793+00 SEE SHEET 13
SITE 18
SEE INSET A
SITE 19
SEE INSET B
TRICOUNTY PAVING, INC
WALTER OLSEN AND WIFE, DONNA RUTH OLSEN
JERRY WILLARD AND WIFE, ADELE N. WILLARD
PACK FAM INVESTMENTS, LLC
LEOBARDO REYES CRESCENCIO
JOHN C. JONES
JAMES C. LITTLEFIELD AND WIFE, ANN B. LITTLEFIELD
DONNA J. H. WEAVER
JERRY F. WHITLEY AND WIFE, MOLEAN N. WHITLEY
A-A 8.0' 0.1' 1.5' 4.0' OUTFALL
B-B 8.0' 0.1' 2.0' 2.0' ROADSIDE
C-C 4.0' 0.0' 1.0' 0.0' ROADSIDE
D-D 5.0' 0.0' 1.5' 0.0' OUTFALL
E-E 11.0' 0.1' 3.0' 3.0' OUTFALL
F-F 14.0' 0.0' 1.0' 0.0' ROADSIDE
FOR DRN. DETAILS SEE SHTS. 2D-1 OR 2D-2
FOR -L- PROFILE SEE SHT. 22
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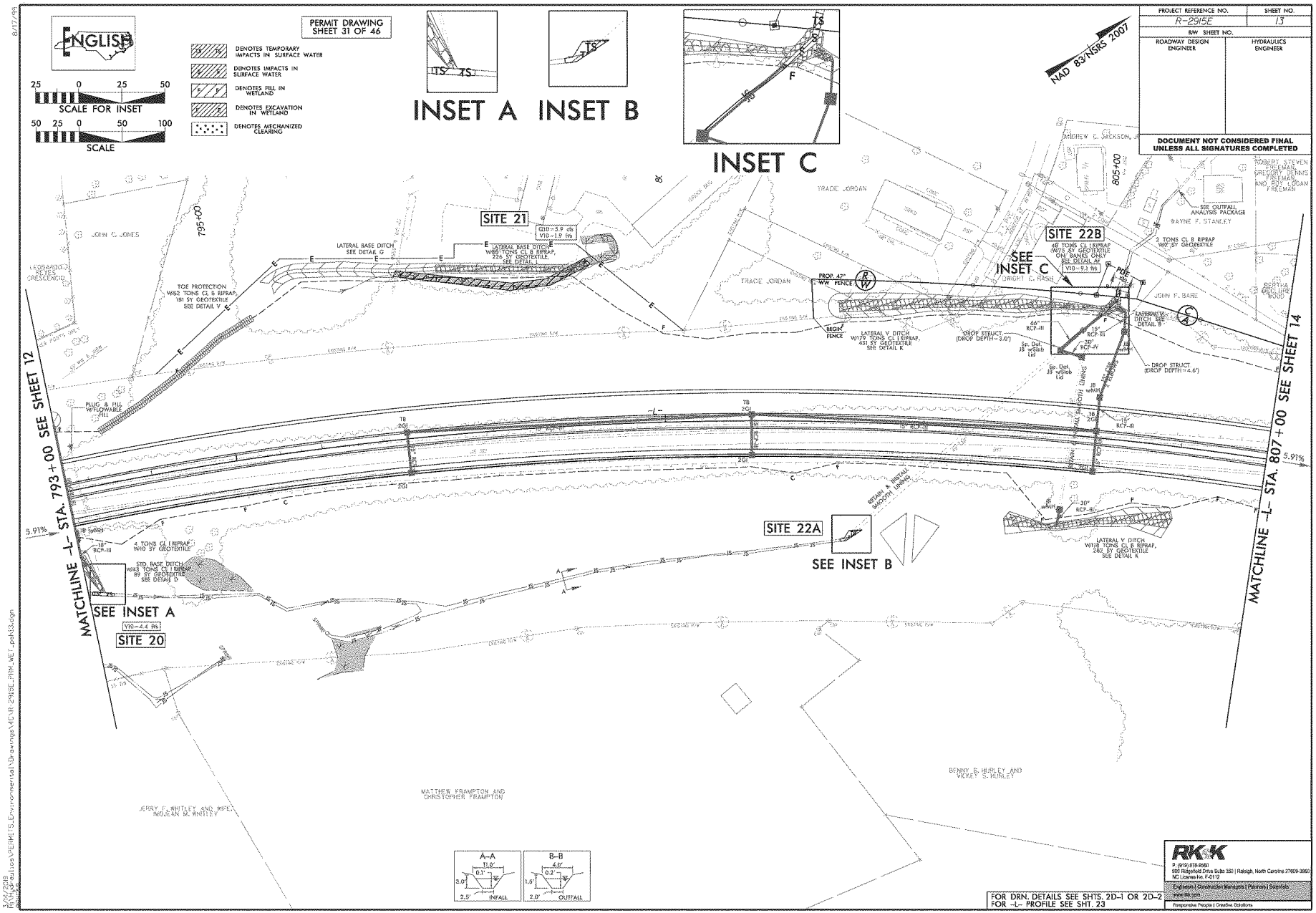
ENGLISH
25 0 25 50
SCALE FOR INSET
50 25 0 50 100
SCALE
PERMIT DRAWING
SHEET 31 OF 46
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
INSET A
INSET B
INSET C
NAD 83/NSRS 2007
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
13
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
SITE 21
Q10=3.9 cfs
V10=1.9 fps
LATERAL BASE DITCH SEE DETAIL G
LATERAL BASE DITCH W160 TONS CL B RIPRAP, 226 SY GEOTEXTILE SEE DETAIL L
TOE PROTECTION W62 TONS CL B RIPRAP, 181 SY GEOTEXTILE SEE DETAIL V
SITE 22B
48 TONS CL I RIPRAP W73 SY GEOTEXTILE ON BANKS ONLY SEE DETAIL AE
V10=9.1 fps
SEE INSET C
PROP. 47" WW FENCE
BEGIN FENCE
LATERAL V DITCH W179 TONS CL I RIPRAP, 431 SY GEOTEXTILE SEE DETAIL R
DROP STRUCT (DROP DEPTH=3.0')
DROP STRUCT (DROP DEPTH=4.6')
LATERAL V DITCH SEE DETAIL B
SEE OUTFALL ANALYSIS PACKAGE
2 TONS CL B RIPRAP W67 SY GEOTEXTILE
PLUG & FILL W/FLOWABLE FILL
6 TONS CL I RIPRAP W10 SY GEOTEXTILE
STD. BASE DITCH W143 TONS CL I RIPRAP 89 SY GEOTEXTILE SEE DETAIL D
SITE 20
V10=4.4 fps
SEE INSET A
SITE 22A
SEE INSET B
RETAIN & INSTALL SMOOTH LINING
LATERAL V DITCH W118 TONS CL B RIPRAP, 282 SY GEOTEXTILE SEE DETAIL K
MATCHLINE -L- STA. 793+00 SEE SHEET 12
MATCHLINE -L- STA. 807+00 SEE SHEET 14
5.91%
795+00
805+00
JOHN C. JONES
TRACIE JORDAN
DWIGHT C. RASH
JOHN F. BARE
WAYNE F. STANLEY
ROBERT STEVEN FREEMAN, GREGORY DENNIS FREEMAN, SHELMAR AND RITA LOGAN FREEMAN
BENNY B. HURLEY AND VICKEY S. HURLEY
MATTHEW FRAMPTON AND CHRISTOPHER FRAMPTON
JERRY E. WHITLEY AND WIFE, NOJEAN M. WHITLEY
A-A
11.0'
0.1'
3.0'
2.5'
INFALL
B-B
4.0'
0.2'
1.5'
2.0'
OUTFALL
FOR DRN. DETAILS SEE SHTS. 2D-1 OR 2D-2
FOR -L- PROFILE SEE SHT. 23
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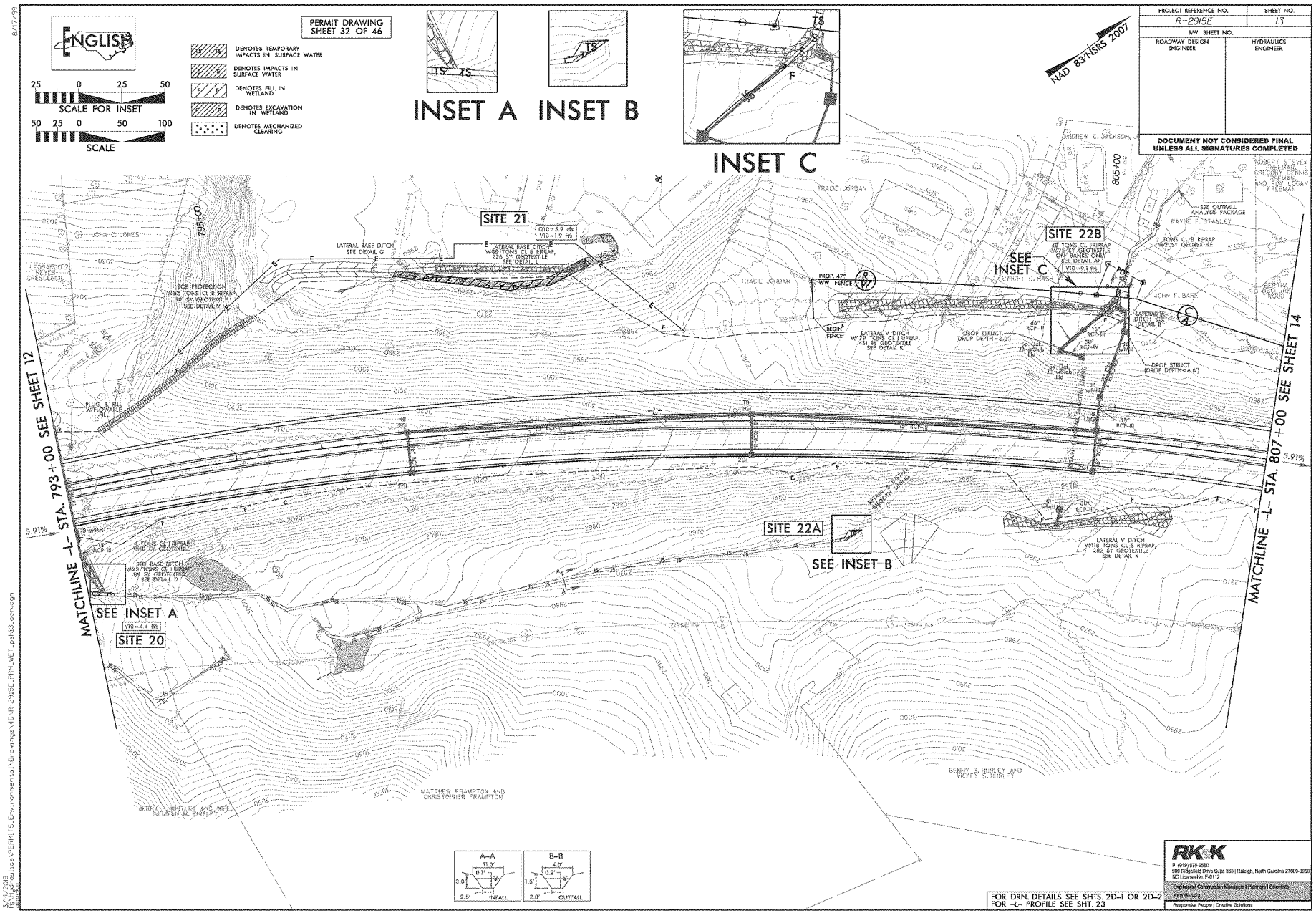
ENGLISH
25 0 25 50
SCALE FOR INSET
50 25 0 50 100
SCALE
PERMIT DRAWING
SHEET 32 OF 46
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
INSET A
INSET B
INSET C
NAD 83/NSRS 2007
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
13
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
SITE 21
Q10=3.9 cfs
V10=1.9 fps
LATERAL BASE DITCH
SEE DETAIL G
LATERAL BASE DITCH
W/62 TONS CL B RIPRAP,
226 SY GEOTEXTILE
SEE DETAIL I
TOE PROTECTION
W/62 TONS CL B RIPRAP,
181 SY GEOTEXTILE
SEE DETAIL V
PLUG & FILL
WITH WASTE
FILL
SITE 22B
SEE INSET C
40 TONS CL I RIPRAP
W/75 SY GEOTEXTILE
ON BANKS ONLY
SEE DETAIL AE
V10=9.1 fps
2 TONS CL B RIPRAP
W/0 SY GEOTEXTILE
SEE OUTFALL ANALYSIS PACKAGE
LATERAL V DITCH
SEE DETAIL B
PROP. 477' WW FENCE
BEGIN FENCE
LATERAL V DITCH
W/170 TONS CL I RIPRAP,
431 SY GEOTEXTILE
SEE DETAIL K
DROP STRUCT.
(DROP DEPTH=3.8')
DROP STRUCT.
(DROP DEPTH=4.6')
15" RCP-III
30" RCP-IV
66" RCP-III
SITE 22A
SEE INSET B
LATERAL V DITCH
W/118 TONS CL B RIPRAP,
282 SY GEOTEXTILE
SEE DETAIL K
20" RCP-III
STR. BASE DITCH
W/43 TONS CL I RIPRAP
89 SY GEOTEXTILE
SEE DETAIL D
2 TONS CL I RIPRAP
W/10 SY GEOTEXTILE
SEE INSET A
V10=4.4 fps
SITE 20
MATCHLINE -L- STA. 793+00 SEE SHEET 12
MATCHLINE -L- STA. 807+00 SEE SHEET 14
5.91%
795+00
805+00
JOHN C. JONES
TRACIE JORDAN
ANDREW C. JACKSON, JR.
ROBERT STEVEN FREEMAN
GREGORY DENNIS FREEMAN
AND RICHARD OGAN FREEMAN
WAYNE F. STANLEY
JOHN F. BARE
BENNY B. HURLEY AND VICKEY S. HURLEY
MATTHEW FRAMPTON AND CHRISTOPHER FRAMPTON
JOHNNY L. HURLEY AND WIFE, WILLIAM M. HURLEY
A-A
11.0'
0.1'
3.0'
2.5'
INFALL
B-B
4.0'
0.2'
1.5'
2.0'
OUTFALL
FOR DRN. DETAILS SEE SHTS. 2D-1 OR 2D-2
FOR -L- PROFILE SEE SHT. 23
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8/17/99
3/4/2019
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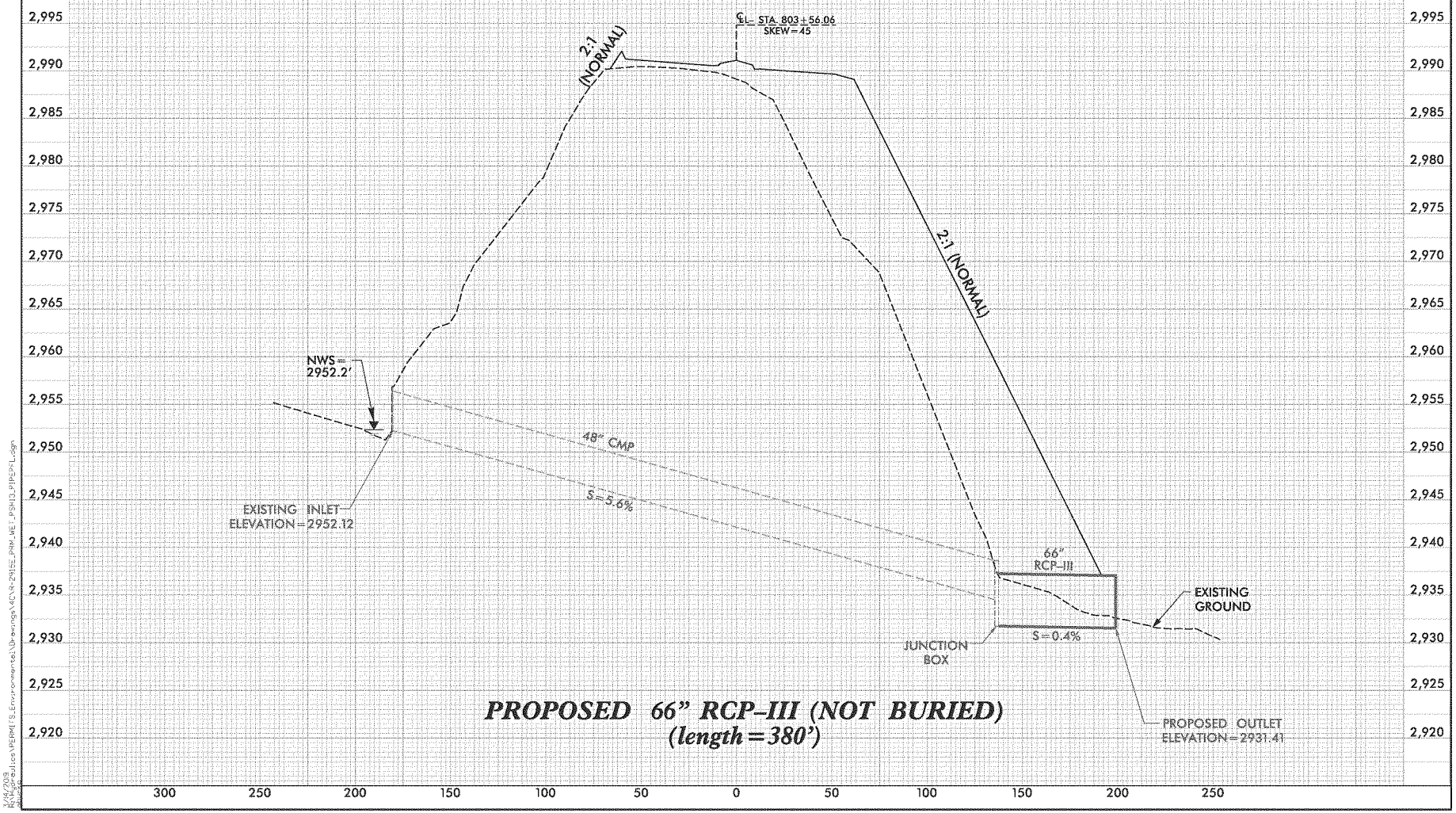
PROJECT REFERENCE NO.	SHEET NO.
R-2915E	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 33 OF 46

SITE 22
–L– 803+56



PROPOSED 66" RCP–III (NOT BURIED)
(length=380')

5/14/19

3/18/2019
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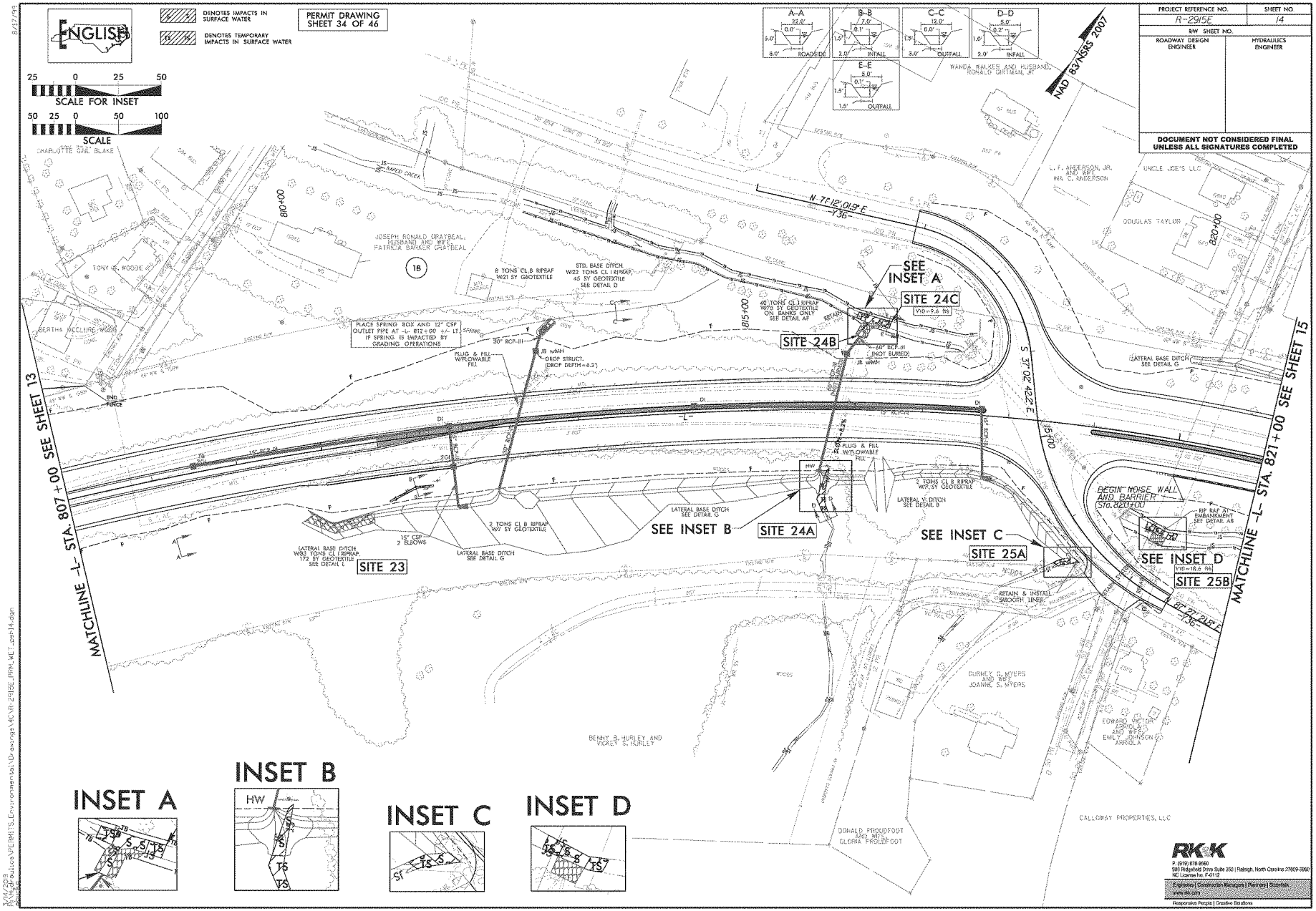
P-65


ENGLISH
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING SHEET 34 OF 46
25 0 25 50
SCALE FOR INSET
50 25 0 50 100
SCALE
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
14
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
NAD 83/NSRS 2007
A-A
B-B
C-C
D-D
E-E
ROADSIDE
INFALL
OUTFALL
MATCHLINE -L- STA. 807+00 SEE SHEET 13
MATCHLINE -L- STA. 821+00 SEE SHEET 15
N 71°12'01.9" E
S 37°02'42.2" E
SEE INSET A
SITE 24C
SITE 24B
SEE INSET B
SITE 24A
SEE INSET C
SITE 25A
SEE INSET D
SITE 25B
SITE 23
BEGIN NOISE WALL AND BARRIER STA.820+00
PLACE SPRING BOX AND 12" CSP OUTLET PIPE AT -L- 812+00 +/- LT. IF SPRING IS IMPACTED BY GRADING OPERATIONS
JOSEPH RONALD DRAYBEAL, HUSBAND AND WIFE, PATRICIA BARKER DRAYBEAL
TONY N. WOODIE
BERTHA MCCLURE WOOD
WANDA WALKER AND HUSBAND, RONALD GIFTMAN, JR.
L. F. ANDERSON, JR. AND WIFE, INA C. ANDERSON
UNCLE JOE'S LLC
DOUGLAS TAYLOR
CURNEY G. MYERS AND WIFE, JOANNE S. MYERS
EDWARD VICTOR ARRIOLA AND WIFE, EMILY JOHNSON ARRIOLA
CALLOWAY PROPERTIES, LLC
DONALD PROUDFOOT AND WIFE, GLORIA PROUDFOOT
BENNY B. HURLEY AND VICKEY S. HURLEY
INSET A
INSET B
INSET C
INSET D
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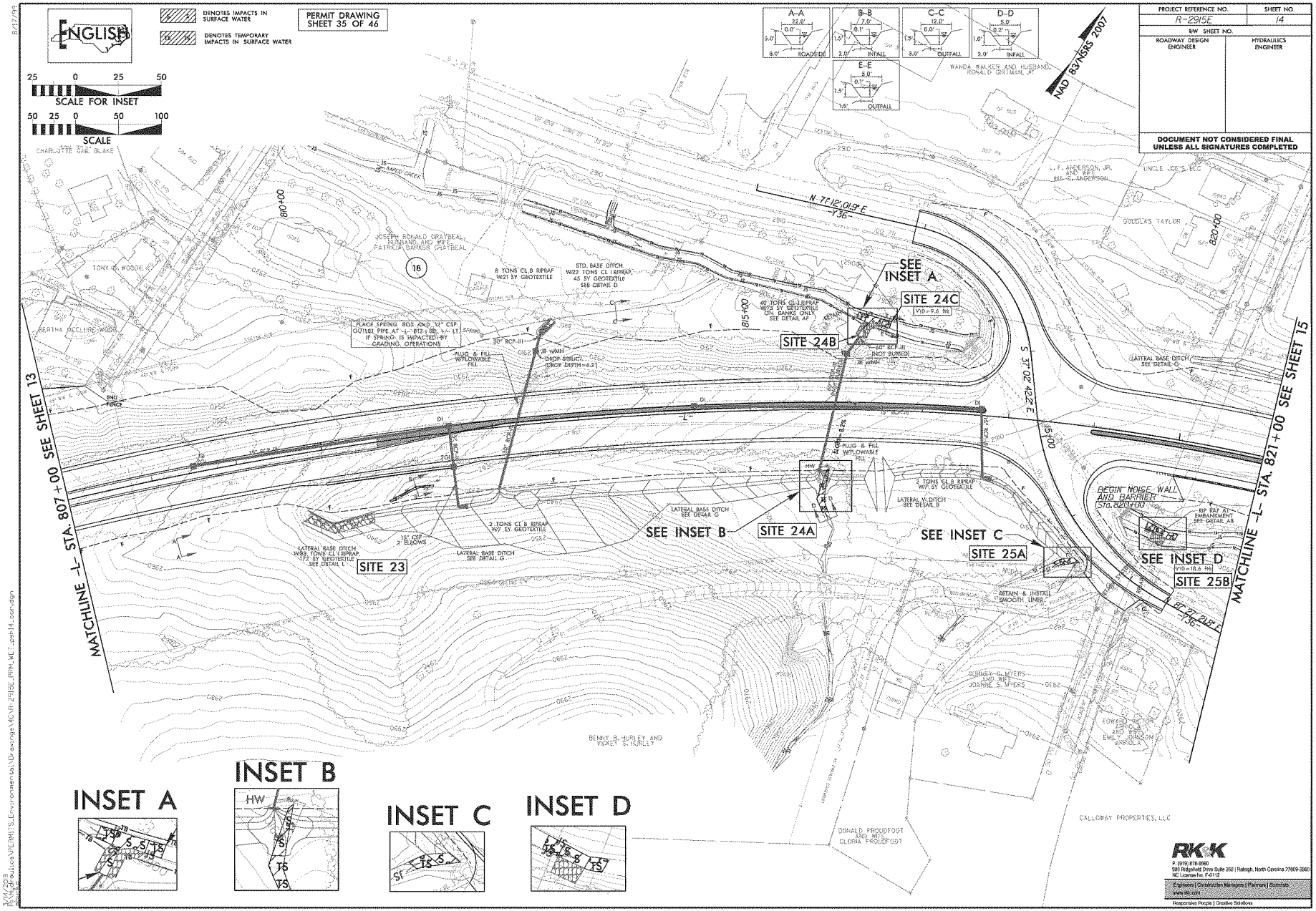
ENGLISH
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING SHEET 35 OF 46
25 0 25 50
SCALE FOR INSET
50 25 0 50 100
SCALE
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
14
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
A-A
B-B
C-C
D-D
E-E
ROADSIDE
INFALL
OUTFALL
NAD 83/NSRS 2007
MATCHLINE -L- STA. 807+00 SEE SHEET 13
MATCHLINE -L- STA. 821+00 SEE SHEET 15
N 71°12'01.9" E
-L36-
S 37°02'42.2" E
SEE INSET A
SITE 24C
SITE 24B
SEE INSET B
SITE 24A
SEE INSET C
SITE 25A
SEE INSET D
SITE 25B
SITE 23
BEGIN NOISE WALL AND BARRIER STA.820+00
RIP RAP AT EMBANKMENT SEE DETAIL AB
RETAIN & INSTALL SMOOTH LINER
PLUG & FILL W/FLOWABLE FILL
LATERAL BASE DITCH SEE DETAIL G
LATERAL V-DITCH SEE DETAIL B
2 TONS CL B RIPRAP W/7 SY GEOTEXTILE
8 TONS CL B RIPRAP W/21 SY GEOTEXTILE
STD. BASE DITCH W/22 TONS CL I RIPRAP, 45 SY GEOTEXTILE SEE DETAIL D
40 TONS CL I RIPRAP W/74 SY GEOTEXTILE ON BANKS ONLY SEE DETAIL AF
PLACE SPRING BOX AND 12" CSP OUTLET PIPE AT -L- 812+00 +/- 11' IF SPRING IS IMPACTED BY GRADING OPERATIONS
30" RCP III
60" RCP III (NOT BURIED)
LATERAL BASE DITCH W/83 TONS CL I RIPRAP, 172 SY GEOTEXTILE SEE DETAIL L
15" CSP 2 ELBOWS
CHARLOTTE GAIL BLAKE
JOSEPH RONALD CRAYBEAL, HUSBAND AND WIFE, PATRICIA BARKER CRAYBEAL
TONY & WOODIE
BERTHA MCCLURE WOODS
WANDA WALKER AND HUSBAND, RONALD GRIFFMAN, JR
L.F. ANDERSON, JR. AND WIFE, BEA C. ANDERSON
UNCLE JOE'S ELC
DOUGLAS TAYLOR
BENNY B. HURLEY AND VICKEY S. HURLEY
DONALD PROUDFOOT AND WIFE, GLORIA PROUDFOOT
CALLOWAY PROPERTIES, LLC
EDWARD TAYLOR ARIOLA AND WIFE, EMILY JOHNSON ARIOLA
BURNEY C. MYERS AND WIFE, JOANNE S. MYERS
INSET A
INSET B
INSET C
INSET D
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P-67

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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PRELIMINARY PLANS
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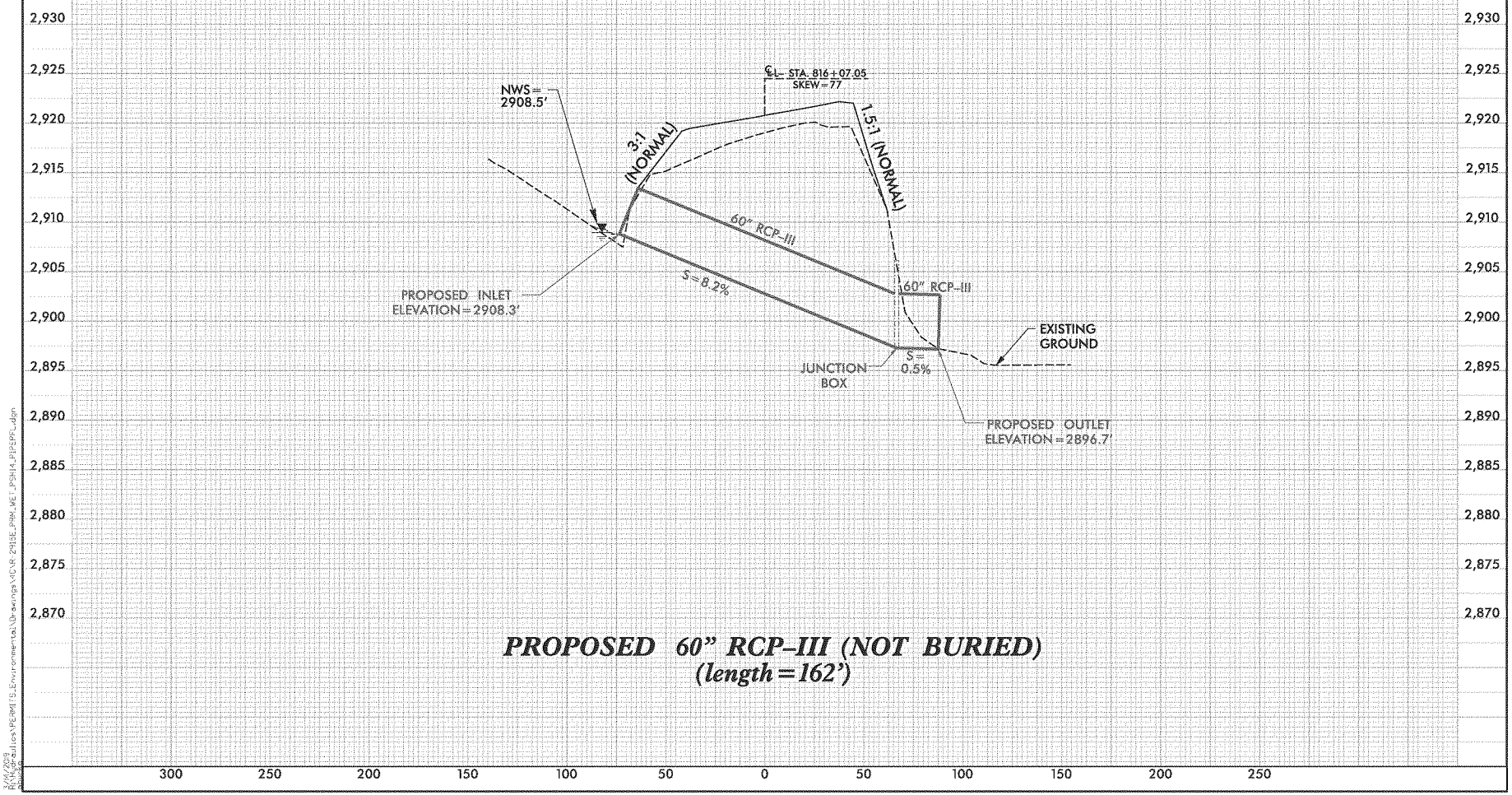
PERMIT DRAWING
SHEET 36 OF 46

SITE 24
-L- 816+07



PROPOSED 60" RCP-III (NOT BURIED)
(length = 162')

5/14/99

3/16/2009
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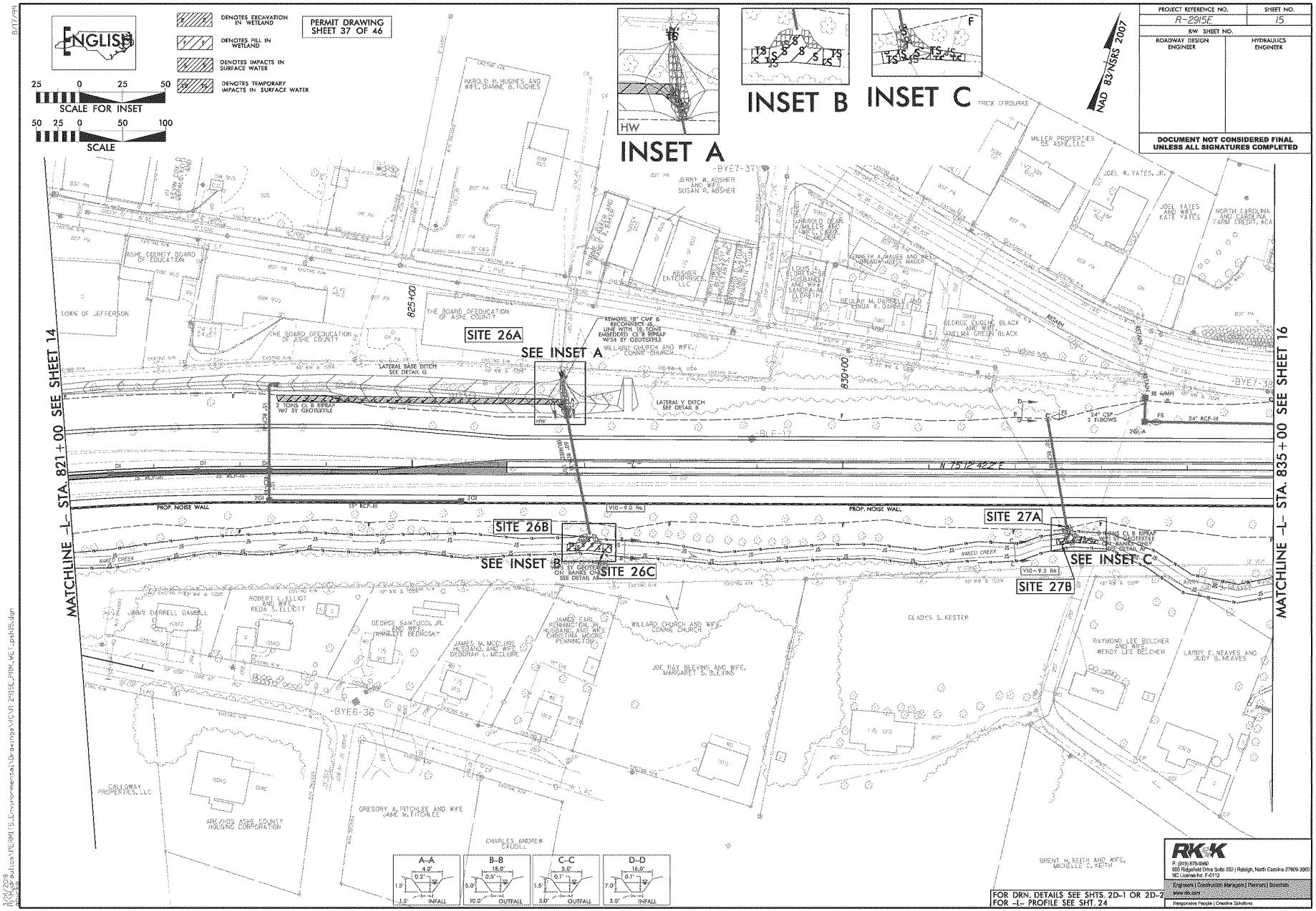
P-68


ENGLISH
DENOTES EXCAVATION IN WETLAND
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING SHEET 37 OF 46
SCALE FOR INSET
SCALE
INSET A
INSET B
INSET C
NAD 83/NSRS 2007
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
15
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
MATCHLINE -L- STA. 821+00 SEE SHEET 14
MATCHLINE -L- STA. 835+00 SEE SHEET 16
SITE 26A
SITE 26B
SITE 26C
SITE 27A
SITE 27B
SEE INSET A
SEE INSET B
SEE INSET C
PROP. NOISE WALL
WAKE CREEK
A-A
B-B
C-C
D-D
FOR DRN. DETAILS SEE SHTS. 2D-1 OR 2D-2
FOR -L- PROFILE SEE SHT. 24
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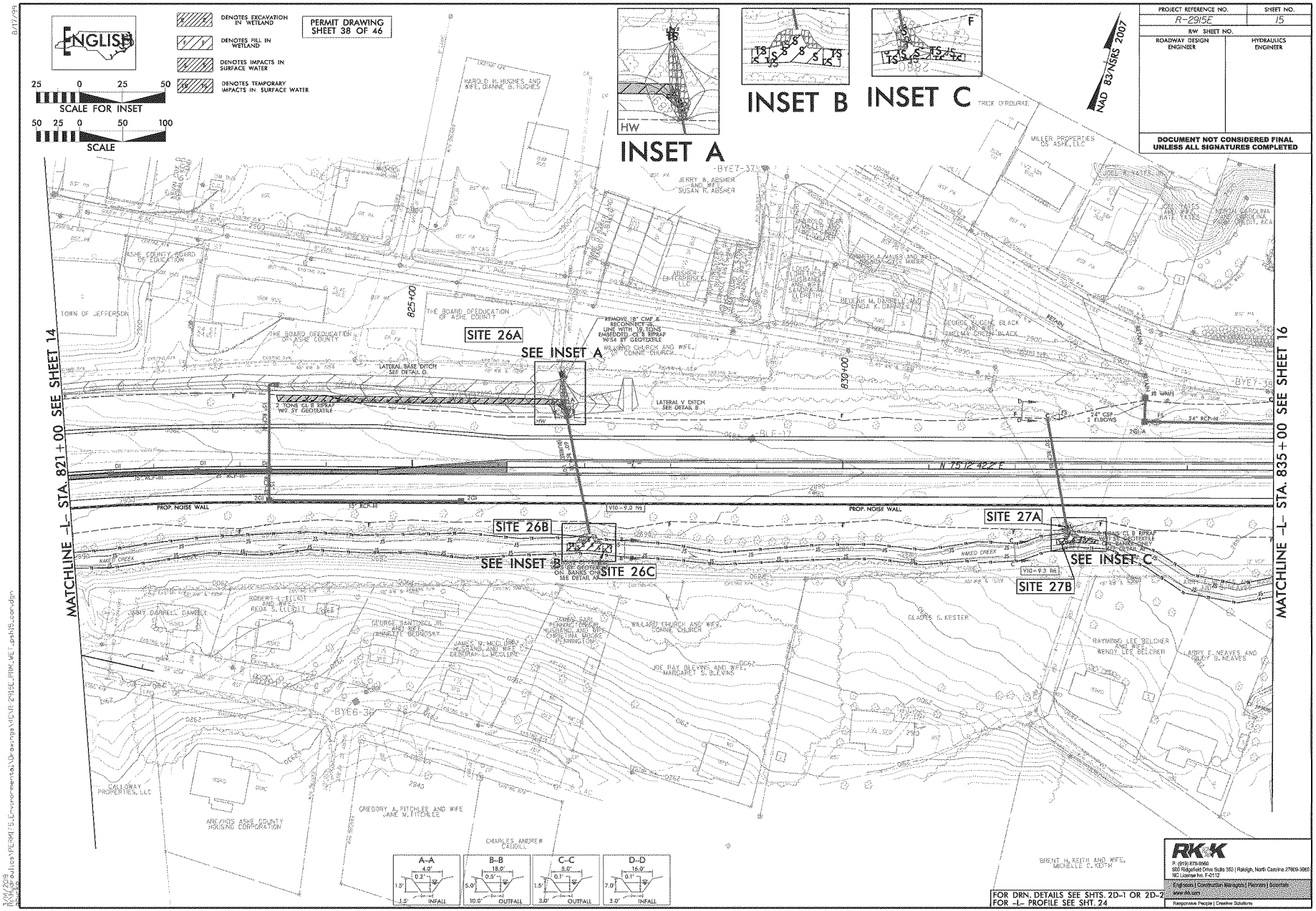
P-69


ENGLISH
DENOTES EXCAVATION IN WETLAND
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING SHEET 38 OF 46
25 0 25 50
SCALE FOR INSET
50 25 0 50 100
SCALE
INSET A
INSET B
INSET C
NAD 83/NSRS 2007
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
15
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
MATCHLINE -L- STA. 821+00 SEE SHEET 14
MATCHLINE -L- STA. 835+00 SEE SHEET 16
SITE 26A
SEE INSET A
SITE 26B
SEE INSET B
SITE 26C
SITE 27A
SEE INSET C
SITE 27B
PROP. NOISE WALL
LATERAL BASE DITCH SEE DETAIL D
LATERAL V DITCH SEE DETAIL B
2 TONS CL B RIPRAP W/ 3Y GEOTEXTILE
REMOVE 18" CMP & RECONNECT US. LINE WITH 19 TONS EMBEDDED CL B RIPRAP W/34 SY GEOTEXTILE
NAKED CREEK
825+00
830+00
THE BOARD OF EDUCATION OF ASHE COUNTY
TOWN OF JEFFERSON
ASHE COUNTY BOARD OF EDUCATION
HAROLD H. HUGHES AND WIFE, DIANNE B. HUGHES
JERRY B. ARSMER AND WIFE, SUSAN R. ARSMER
MILLER PROPERTIES OF ASHE, LLC
WILLARD CHURCH AND WIFE, CONNIE CHURCH
GLADYS S. KESTER
RAYMOND LEE BELCHER AND WIFE, WENDY LEE BELCHER
JOE RAY BLEVINS AND WIFE, MARGARET S. BLEVINS
GREGORY A. FITCHLEE AND WIFE JANE M. FITCHLEE
CHARLES ANDREW CAUDILL
ARC/HOS ASHE COUNTY HOUSING CORPORATION
GALLOWAY PROPERTIES, LLC
BRENT H. KEITH AND WIFE, MICHELLE C. KEITH
A-A 4.0' 0.2' 1.5' 1.5' INFALL
B-B 18.0' 0.5' 5.0' 10.0' OUTFALL
C-C 8.0' 0.1' 1.5' 3.0' OUTFALL
D-D 16.0' 0.1' 7.0' 3.0' INFALL
FOR DRN. DETAILS SEE SHTS. 2D-1 OR 2D-2
FOR -L- PROFILE SEE SHT. 24
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P-70

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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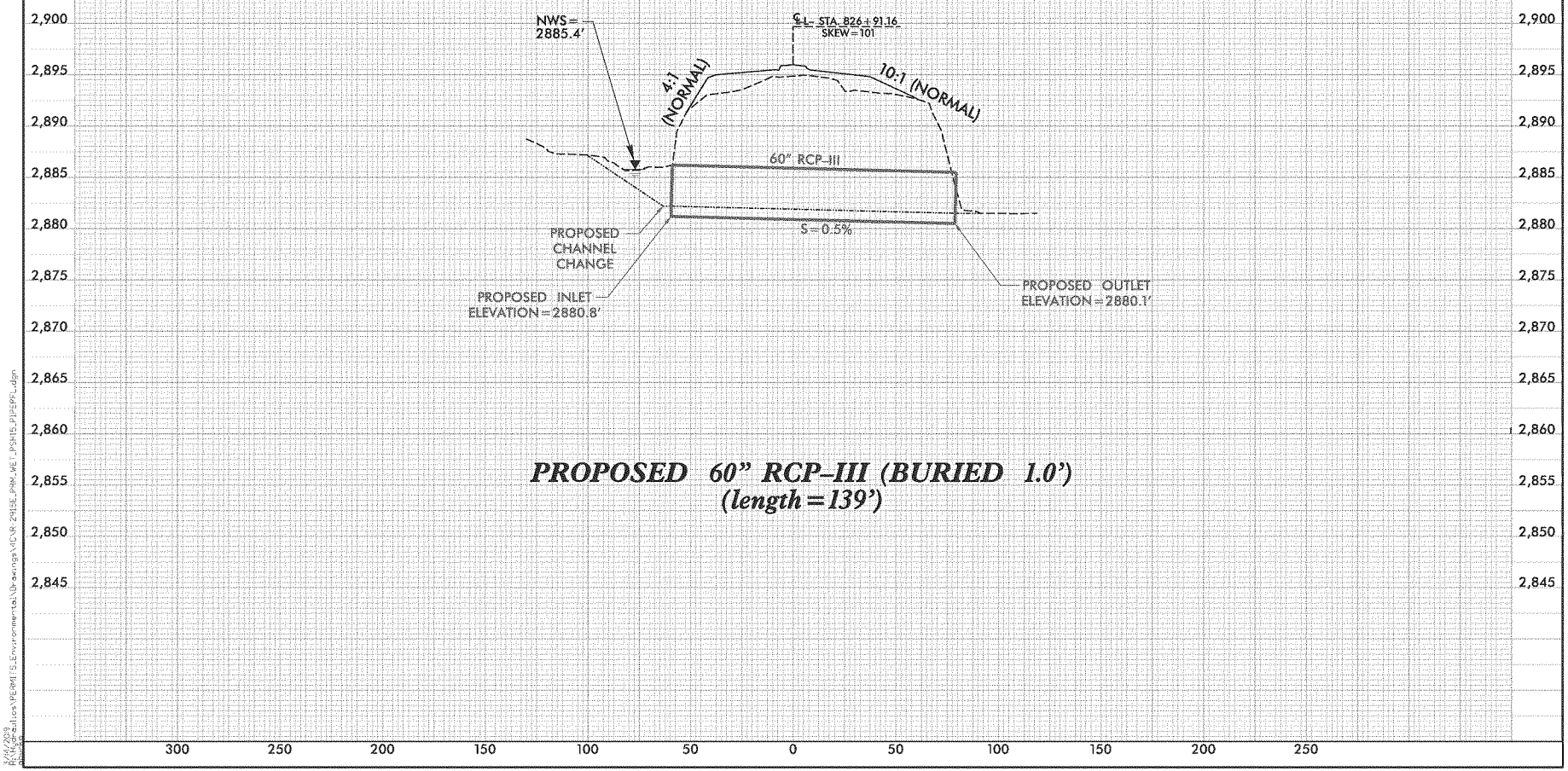
PERMIT DRAWING
SHEET 39 OF 46

SITE 26
-L- 826+91



PROPOSED 60" RCP-III (BURIED 1.0')
(length = 139')

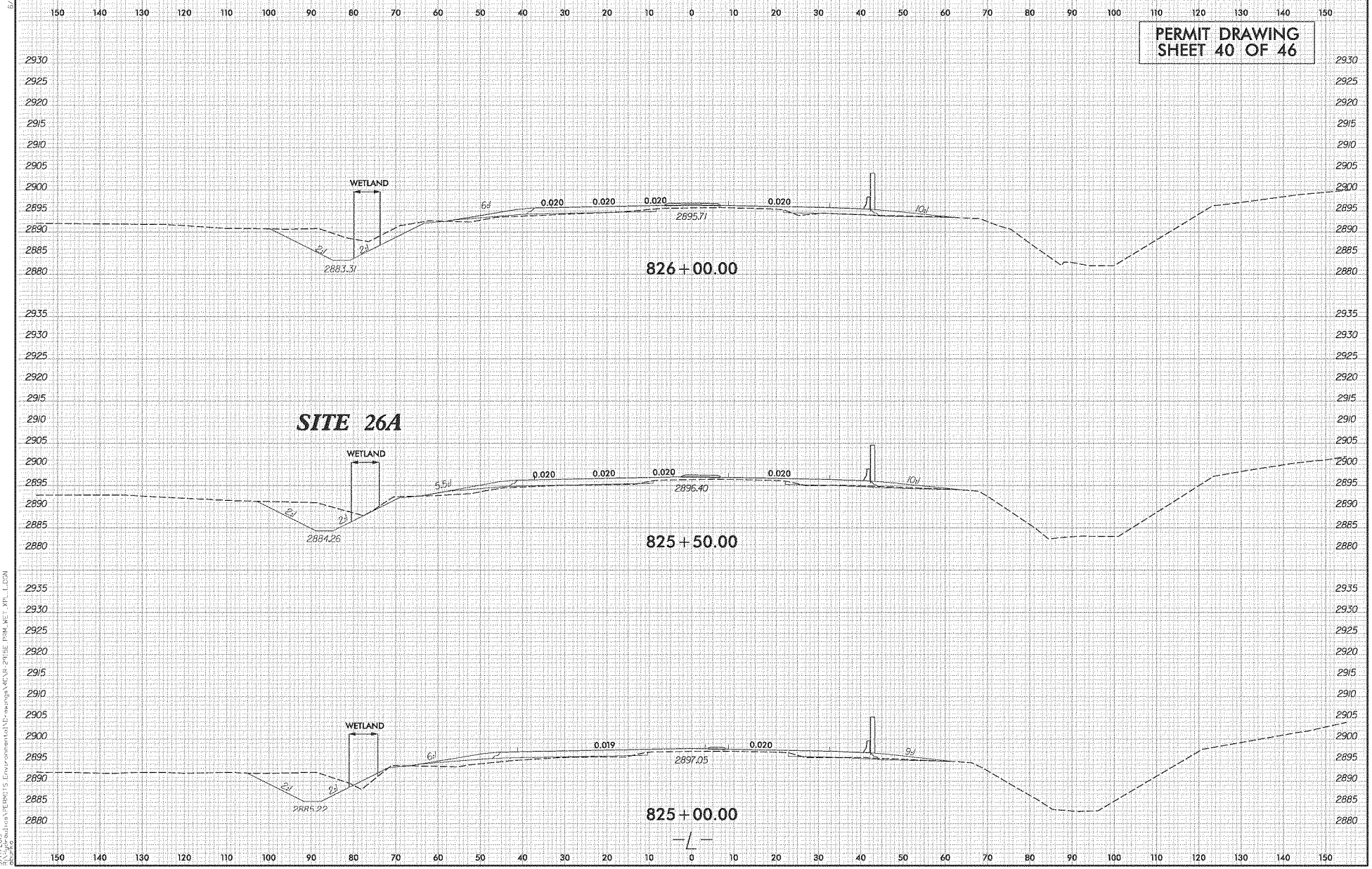
5/14/99

3/16/2009
R:\Hydraulics\PERMIT\Environmental\Drawings\VC\R-2915E_PRM_WET_PSH15_PIPEPFL.dgn

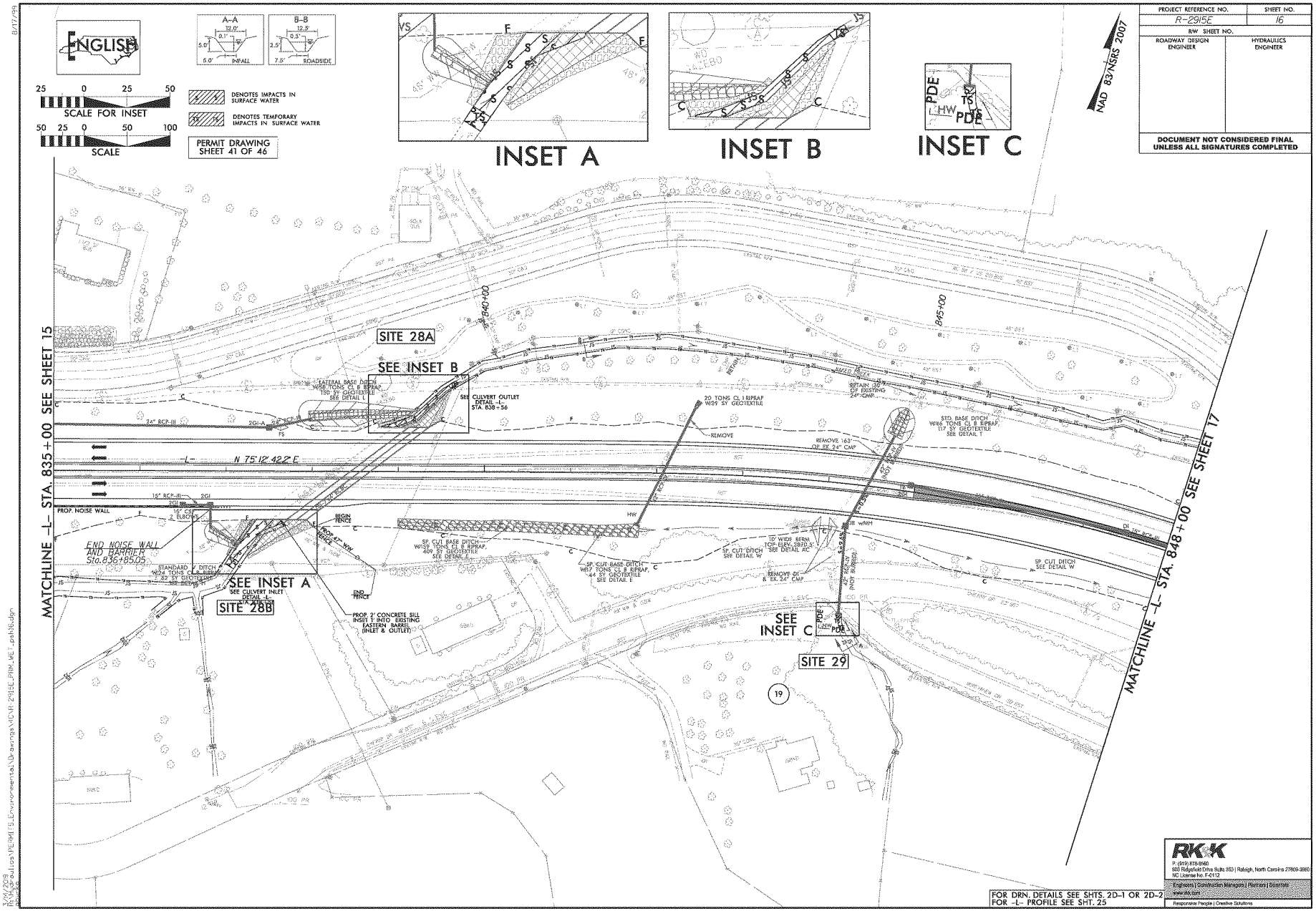
P-71

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915E	X-130

PERMIT DRAWING
SHEET 40 OF 46



P-72


ENGLISH
A-A
B-B
SCALE FOR INSET
SCALE
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING SHEET 41 OF 46
INSET A
INSET B
INSET C
NAD 83/NSRS 2007
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
16
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
MATCHLINE -L- STA. 835+00 SEE SHEET 15
MATCHLINE -L- STA. 848+00 SEE SHEET 17
SITE 28A
SEE INSET B
SEE INSET A
SITE 28B
SEE INSET C
SITE 29
N 75°12'42.2" E
END NOISE WALL AND BARRIER Sta.836+85.05
PROP. NOISE WALL
REMOVE
FOR DRN. DETAILS SEE SHTS. 2D-1 OR 2D-2
FOR -L- PROFILE SEE SHT. 25
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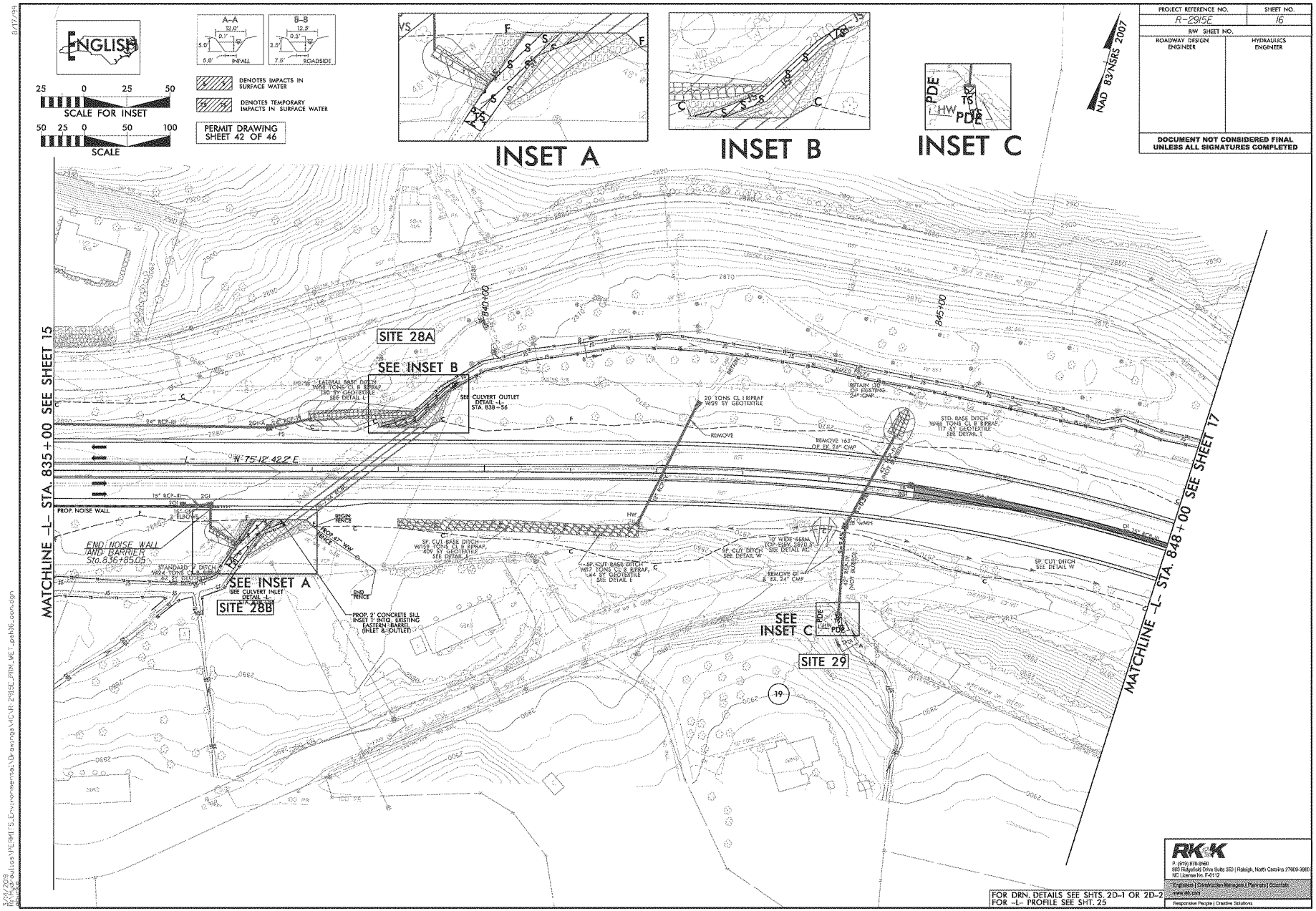
ENGLISH
A-A
B-B
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING SHEET 42 OF 46
SCALE FOR INSET
SCALE
INSET A
INSET B
INSET C
NAD 83/NSRS 2007
PROJECT REFERENCE NO.
R-2915E
SHEET NO.
16
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
MATCHLINE -L- STA. 835+00 SEE SHEET 15
MATCHLINE -L- STA. 848+00 SEE SHEET 17
SITE 28A
SEE INSET B
SEE INSET A
SITE 28B
SEE INSET C
SITE 29
N 75°12'42.2" E
END NOISE WALL
TIMID BARRIER
Sta.836+65.05
PROP. NOISE WALL
FOR DRN. DETAILS SEE SHTS. 2D-1 OR 2D-2
FOR -L- PROFILE SEE SHT. 25
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P-74

SITE 28
-L- 838+56

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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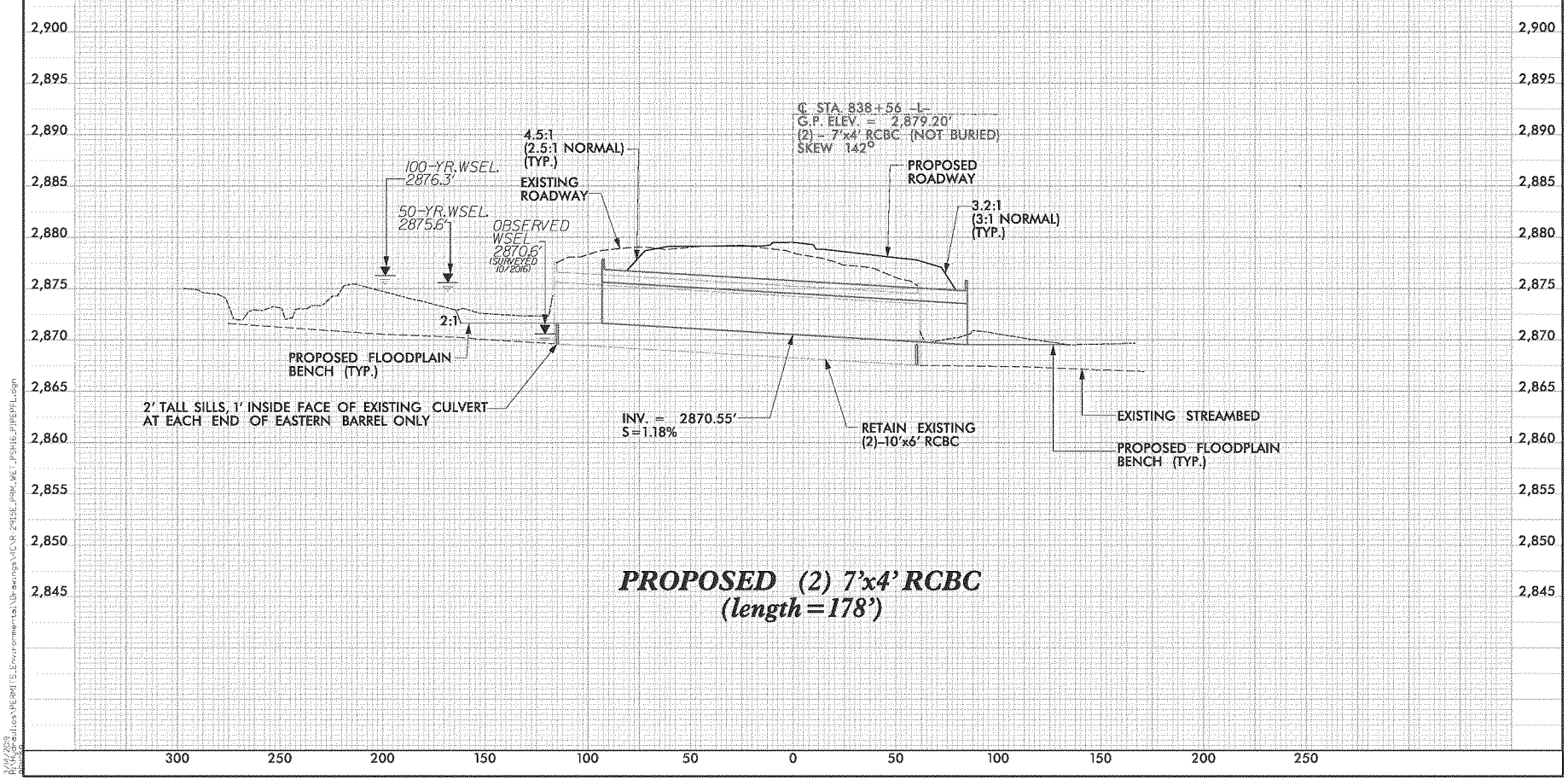
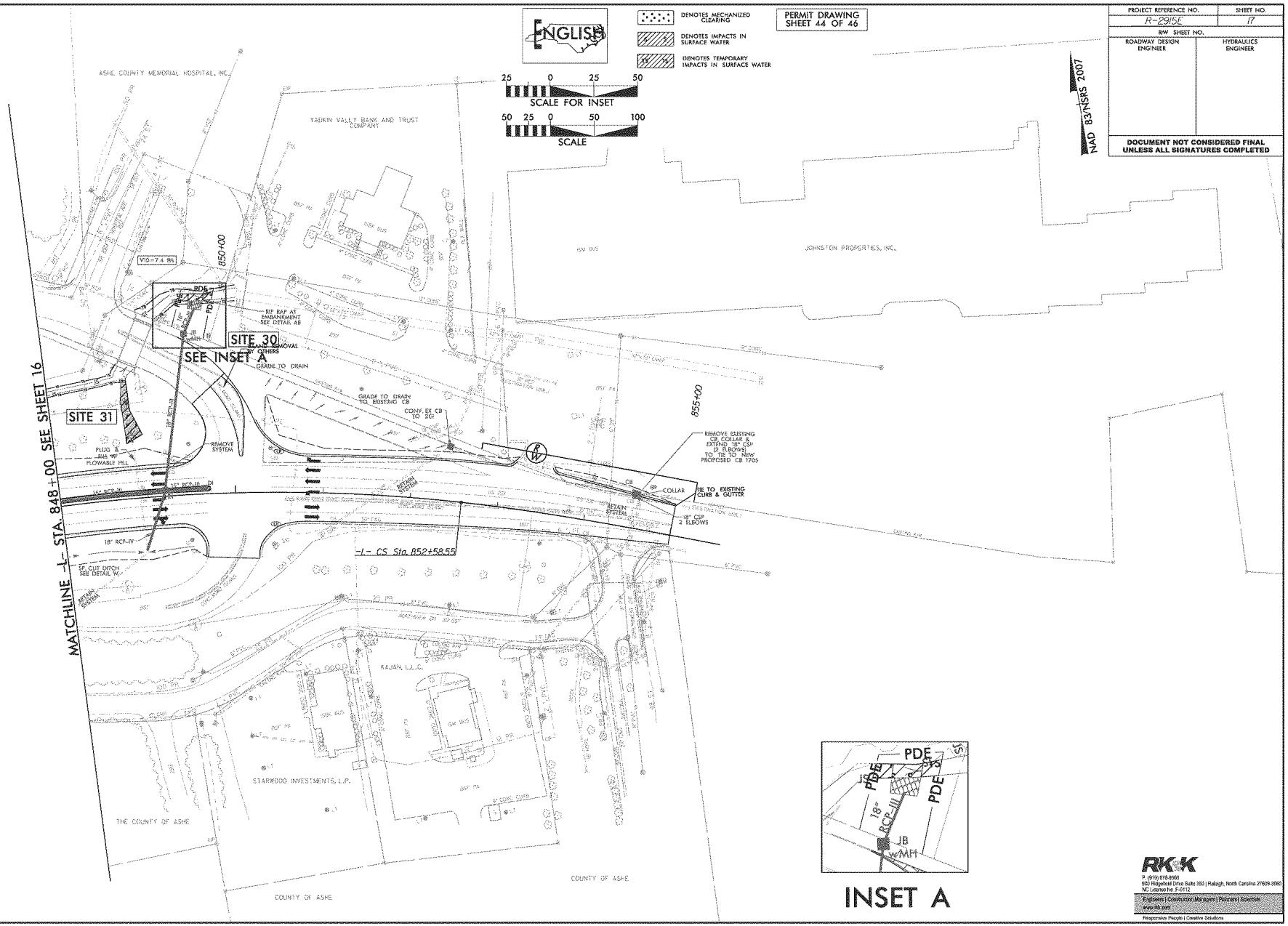
SHEET 43 OF 46



PROPOSED (2) 7'x4' RCBC
(length=178')


ENGLISH
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING SHEET 44 OF 46
25 0 25 50
SCALE FOR INSET
50 25 0 50 100
SCALE
NAD 83/NSRS 2007
PROJECT REFERENCE NO.
R-2915L
SHEET NO.
17
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
ASHE COUNTY MEMORIAL HOSPITAL, INC.
YADKIN VALLY BANK AND TRUST COMPANY
JOHNSTON PROPERTIES, INC.
KAJAN, L.L.C.
STARWOOD INVESTMENTS, L.P.
THE COUNTY OF ASHE
COUNTY OF ASHE
COUNTY OF ASHE
MATCHLINE -L- STA. 848+00 SEE SHEET 16
850+00
855+00
SITE 30
SEE INSET A
SITE 31
V10=7.4 m/s
RIP RAP AT EMBANKMENT SEE DETAIL AB
GRADE TO DRAIN
GRADE TO DRAIN TO EXISTING CB
CONV. EX CB TO 2G
REMOVE SYSTEM
PLUG & RIP RAP
FLOWABLE FILL
18" RCP-III
18" RCP-IV
SF CUT DITCH SEE DETAIL W
RETAIN SYSTEM
REMOVE EXISTING CB COLLAR & EXTEND 18" CSP (2 ELBOWS) TO TIE TO NEW PROPOSED CB 1705
COLLAR
TIE TO EXISTING CURB & GUTTER
18" CSP 2 ELBOWS
-L- CS Sta. 852+58.55
PDE
JB
w/MH
INSET A
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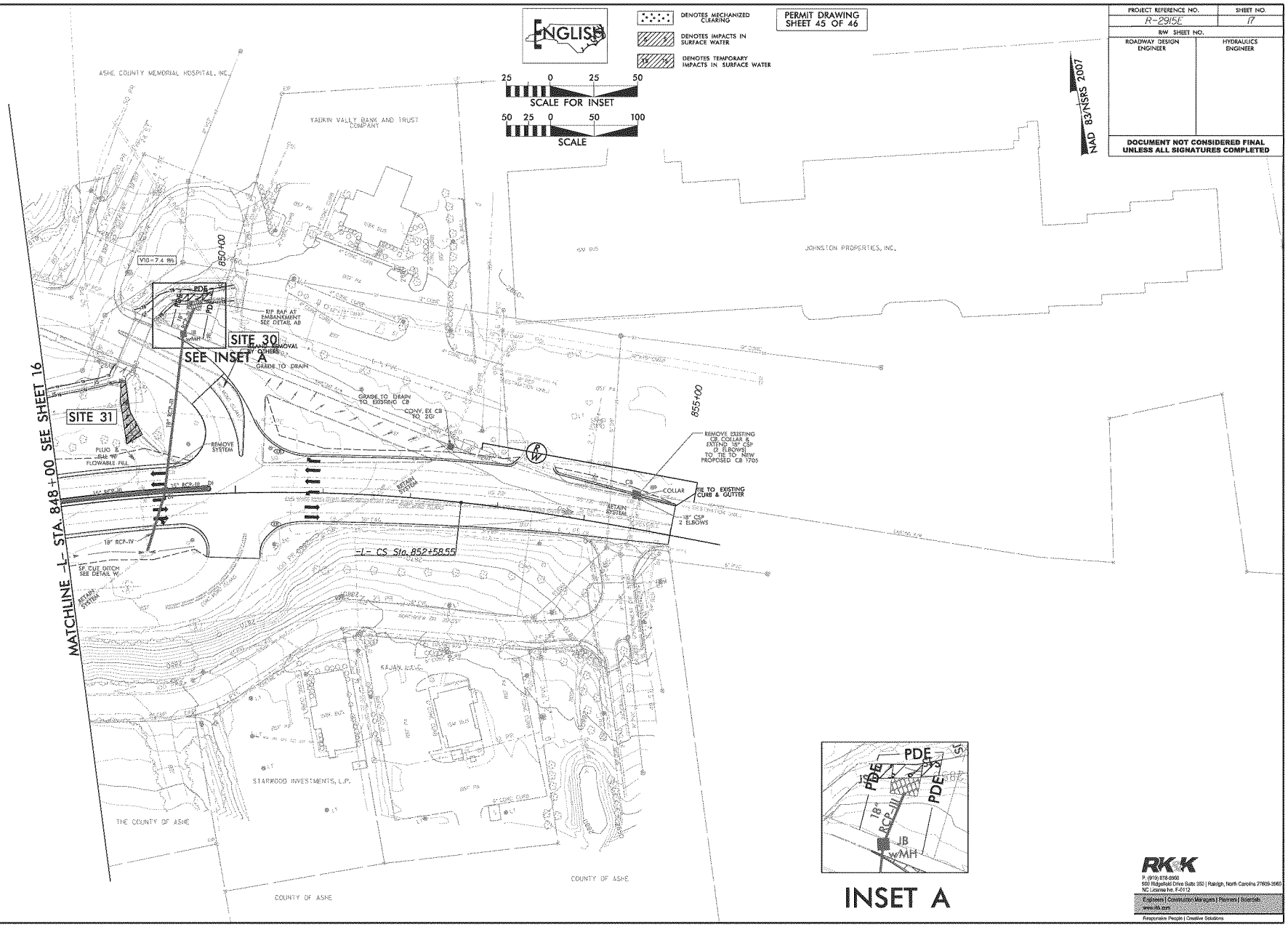

P-77

8/17/99

3/14/2019
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WETLAND AND SURACE WATER IMPACTS 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)
1	-L- 670+03 to 670+45 RT	DITCH				< 0.01						
2A	-L- 675+33 to 675+66 LT	BANK STABILIZATION						< 0.01	< 0.01	14	17	
2B	-L- 676+43 to 677+27 RT	42" RCP-III	0.02			< 0.01		0.01	< 0.01	57	21	
3	-L- 701+14 to 702+66 RT	DITCH				0.01						
		30" RCP-III	< 0.01			0.02						
4A	-L- 705+04 to 705+37 LT	FILL	< 0.01									
4B	-L- 704+66 to 704+84 RT	30" RCP-III	< 0.01			0.03						
		BANK STABILIZATION						< 0.01	< 0.01	11	10	
5	-L- 706+60 to 707+07 RT	DITCH & EXIST. 18" CMP	< 0.01			0.01						
6A	-L- 711+85 to 713+30 LT	42" RCP-III	0.04			0.02		< 0.01	< 0.01	52	10	
6B	-L- 711+15 to 711+42 RT	BANK STABILIZATION						< 0.01	< 0.01	27	10	
7	-L- 735+40 to 735+61 RT	DITCH							< 0.01		24	
8A	-L- 740+22 to 740+56 RT	DITCH							< 0.01		32	
8B	-L- 747+64 to 747+86 RT	PLUG/FILL & HEADCUT		< 0.01					< 0.01		20	
9A	-L- 742+35 to 743+21 LT	24" CSP, 30" RCP-III	0.09					< 0.01		33		
	-L- 742+06 to 742+11 RT	BANK STABILIZATION-TRIB						< 0.01	< 0.01	10	7	
9B	-L- 741+98 to 742+15 RT	BANK STABILIZATION- LITTLE BUFFALO CREEK							< 0.01		19	
10	-L- 754+26 to 754+54 RT	15" RCP-III	< 0.01			< 0.01						
11A	-L- 750+89 to 751+24 RT	Existing 66" CMP							< 0.01		22	
11B									< 0.01		10	
11C									< 0.01		11	
11D								< 0.01	< 0.01	27	10	
12	-Y35- 9+25 to 9+50 LT	BANK STABILIZATION						< 0.01	< 0.01	17	10	
13A	-L- 762+53 to 762+76 LT	30" RCP-III						< 0.01		31		
		BANK STABILIZATION						< 0.01	< 0.01	11	10	
13B	-L- 763+07 to 763+40 RT	30" RCP-III	0.01					< 0.01		60		
13C	-L- 762+53 to 762+38 LT	SPRING BOX						< 0.01	< 0.01	25	23	
14A	-L- 763+31 to 763+73 LT	60" RCP-III						< 0.01		23		
		BANK STABILIZATION						< 0.01	< 0.01	23	10	
14B	-L- 765+28 to 765+72 RT	60" RCP-III						< 0.01		63		
15A	-L- 768+02 to 768+66 LT	36" RCP-III	0.01			< 0.01		< 0.01		31		
		BANK STABILIZATION						< 0.01	< 0.01	15	10	
15B	-L- 770+68 to 770+93 RT	EXIST. 36" CMP				0.01			< 0.01		23	
16	-L- 769+54 to 770+29 RT	EXIST. 36" CMP	0.03									
17A	-L- 776+79 to 777+26 LT	42" RCP-III						0.01		115		
17B	-L- 775+45 to 776+91 RT	DITCH						< 0.01		146		
18	-L- 780+80 to 781+00 LT	24" RCP-III & DITCH						< 0.01	< 0.01	39	12	
19	-L- 788+03 to 788+42 RT	24" RCP-III						< 0.01		22		
		BANK STABILIZATION						< 0.01	< 0.01	8	10	
20	-L- 793+05 to 793+30 RT	DITCH							< 0.01		25	
21	-L- 797+03 to 799+22 LT	FILL & DITCH	0.03		0.01	< 0.01						
22A	-L- 802+05 to 802+32 RT	EXIST. 48" CMP							< 0.01		22	
22B	-L- 804+49 to 805+11 LT	66" RCP-III						< 0.01		61		
		BANK STABILIZATION						< 0.01	< 0.01	31	10	
23	-L- 810+70 to 811+24 RT	FILL						< 0.01		55		
24A	-L- 815+76 to 815+87 RT	60" RCP-III						< 0.01	< 0.01	30	22	
24B	-L- 816+22 to 816+61 LT	BANK STABILIZATION- TRIB						< 0.01		18		
24C		BANK STABILIZATION- NAKED CREEK						< 0.01	< 0.01	20	20	
25A	-Y36- 16+29 to 16+46 RT	EXIST. 24" CMP						< 0.01	< 0.01	13	12	
25B	-Y36- 16+72 to 17+17 LT	BANK STABILIZATION						< 0.01	< 0.01	17	20	
26A	-L- 823+43 to 826+83 LT	DITCH & 60" RCP-III	0.01		0.04			< 0.01	< 0.01	19	8	
26B	-L- 826+80 to 827+32 RT	BANK STABILIZATION-TRIB						< 0.01		8		
26C		BANK STABILIZATION- NAKED CREEK						< 0.01	< 0.01	32	20	
27A	-L- 832+48 to 832+87 RT	BANK STABILIZATION-TRIB						< 0.01		15		
27B		BANK STABILIZATION- NAKED CREEK						< 0.01	< 0.01	18	30	
28A	-L- 838+81 to 839+70 LT	BANK STABILIZATION						0.01	< 0.01	88	10	
28B	-L- 837+00 to 837+71 RT	BANK STABILIZATION						0.02	< 0.01	59	10	
29	-L- 844+25 to 844+38 RT	42" RCP-IV						< 0.01	< 0.01	5	15	
30	-L- 849+47 to 849+82 LT	BANK STABILIZATION						< 0.01	< 0.01	17	21	
31	-L- 848+81 to 848+99 LT	PLUG/FILL	0.02									
TOTALS*:			0.28	< 0.01	0.05	0.13		0.14	0.07	1366	576	0

*Rounded totals are sum of actual impacts

NOTES:
1. Temporary Surface Water Impacts are expected during installation of the existing pipes that require a smooth liner

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MARCH 2019
ASHE
R-2915E

SHEET 46 OF 46

Revised 10/15/20 11

County : Ashe

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	2 ACR		
0005	0022000000-E	225	UNCLASSIFIED EXCAVATION	220,830 CY		
0006	0036000000-E	225	UNDERCUT EXCAVATION	2,400 CY		
0007	0106000000-E	230	BORROW EXCAVATION	35,080 CY		
0008	0134000000-E	240	DRAINAGE DITCH EXCAVATION	18,200 CY		
0009	0141000000-E	240	BERM DITCH CONSTRUCTION	400 LF		
0010	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	32,700 SY		
0011	0177000000-E	250	BREAKING OF EXISTING ASPHALT PAVEMENT	810 SY		
0012	0192000000-N	260	PROOF ROLLING	20 HR		
0013	0195000000-E	265	SELECT GRANULAR MATERIAL	2,000 CY		
0014	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZATION	7,150 SY		
0015	0199000000-E	SP	TEMPORARY SHORING	16,000 SF		
0016	0223000000-E	275	ROCK PLATING	3,900 SY		
0017	0318000000-E	300	FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES	1,750 TON		
0018	0320000000-E	300	FOUNDATION CONDITIONING GEOTEXTILE	5,500 SY		
0019	0335200000-E	305	15" DRAINAGE PIPE	100 LF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0020	0335300000-E	305	18" DRAINAGE PIPE	28 LF		
0021	0366000000-E	310	15" RC PIPE CULVERTS, CLASS III	6,992 LF		
0022	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	1,140 LF		
0023	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	1,768 LF		
0024	0384000000-E	310	30" RC PIPE CULVERTS, CLASS III	2,060 LF		
0025	0390000000-E	310	36" RC PIPE CULVERTS, CLASS III	20 LF		
0026	0396000000-E	310	42" RC PIPE CULVERTS, CLASS III	1,244 LF		
0027	0414000000-E	310	60" RC PIPE CULVERTS, CLASS III	520 LF		
0028	0420000000-E	310	66" RC PIPE CULVERTS, CLASS III	64 LF		
0029	0448300000-E	310	18" RC PIPE CULVERTS, CLASS IV	72 LF		
0030	0448500000-E	310	30" RC PIPE CULVERTS, CLASS IV	196 LF		
0031	0448700000-E	310	42" RC PIPE CULVERTS, CLASS IV	380 LF		
0032	0570000000-E	310	6" CS PIPE CULVERTS, 0.064" THICK (SPRING BOX)	32 LF		
0033	0576000000-E	310	**" CS PIPE CULVERTS, *****" THICK (36", 0.079")	40 LF		
0034	0576000000-E	310	**" CS PIPE CULVERTS, *****" THICK (42", 0.109")	36 LF		
0035	0576000000-E	310	**" CS PIPE CULVERTS, *****" THICK (60", 0.138")	96 LF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0036	0582000000-E	310	15" CS PIPE CULVERTS, 0.064" THICK	472 LF		
0037	0588000000-E	310	18" CS PIPE CULVERTS, 0.064" THICK	268 LF		
0038	0594000000-E	310	24" CS PIPE CULVERTS, 0.064" THICK	536 LF		
0039	0600000000-E	310	30" CS PIPE CULVERTS, 0.079" THICK	224 LF		
0040	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (15", 0.064")	16 EA		
0041	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (18", 0.064")	6 EA		
0042	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (24", 0.064")	18 EA		
0043	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (30", 0.079")	10 EA		
0044	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (36", 0.079")	4 EA		
0045	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (42", 0.109")	2 EA		
0046	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (6", 0.064")	4 EA		
0047	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (60", 0.138")	2 EA		
0048	0973100000-E	330	**" WELDED STEEL PIPE, ****" THICK, GRADE B IN SOIL (30", 0.500")	92 LF		
0049	0973300000-E	330	**" WELDED STEEL PIPE, ****" THICK, GRADE B NOT IN SOIL (30", 0.500")	92 LF		

County : Ashe

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0050	0986000000-E	SP	GENERIC PIPE ITEM 24" PIPE REHABILITATION CIPP LINER	567 LF		
0051	0986000000-E	SP	GENERIC PIPE ITEM 30" PIPE REHABILITATION CIPP LINER	180 LF		
0052	0986000000-E	SP	GENERIC PIPE ITEM 36" PIPE REHAB CEMENTITIOUS/ GEOPOLYMER SPRAY LINER	440 LF		
0053	0986000000-E	SP	GENERIC PIPE ITEM 48" PIPE REHAB CEMENTITIOUS/ GEOPOLYMER SPRAY LINER	317 LF		
0054	0986000000-E	SP	GENERIC PIPE ITEM 66" PIPE REHAB CEMENTITIOUS/ GEOPOLYMER SPRAY LINER	698 LF		
0055	0986000000-E	SP	GENERIC PIPE ITEM PRE INSTALLATION INSPECTION	2,202 LF		
0056	0995000000-E	340	PIPE REMOVAL	1,882 LF		
0057	1011000000-N	500	FINE GRADING	Lump Sum	L.S.	
0058	1044000000-E	501	LIME TREATED SOIL (SLURRY METHOD)	46,500 SY		
0059	1066000000-E	501	LIME FOR LIME TREATED SOIL	560 TON		
0060	1099500000-E	505	SHALLOW UNDERCUT	250 CY		
0061	1099700000-E	505	CLASS IV SUBGRADE STABILIZA-TION	500 TON		
0062	1110000000-E	510	STABILIZER AGGREGATE	500 TON		
0063	1115000000-E	SP	GEOTEXTILE FOR PAVEMENT STA-BILIZATION	23,700 SY		
0064	1121000000-E	520	AGGREGATE BASE COURSE	54,115 TON		
0065	1176000000-E	542	SOIL CEMENT BASE	46,500 SY		
0066	1187000000-E	542	PORTLAND CEMENT FOR SOIL CE-MENT BASE	1,310 TON		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0067	1209000000-E	543	ASPHALT CURING SEAL	13,950 GAL		
0068	1220000000-E	545	INCIDENTAL STONE BASE	500 TON		
0069	1297000000-E	607	MILLING ASPHALT PAVEMENT, ***" DEPTH (1-1/2")	1,900 SY		
0070	1330000000-E	607	INCIDENTAL MILLING	2,610 SY		
0071	1491000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0C	18,640 TON		
0072	1503000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C	31,745 TON		
0073	1523000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5C	25,915 TON		
0074	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	3,875 TON		
0075	1693000000-E	654	ASPHALT PLANT MIX, PAVEMENT REPAIR	1,888 TON		
0076	2000000000-N	806	RIGHT-OF-WAY MARKERS	13 EA		
0077	2020000000-N	806	CONTROL-OF-ACCESS MARKERS	26 EA		
0078	2022000000-E	815	SUBDRAIN EXCAVATION	3,461 CY		
0079	2026000000-E	815	GEOTEXTILE FOR SUBSURFACE DRAINS	7,300 SY		
0080	2033000000-E	815	SUBDRAIN FINE AGGREGATE	504 CY		
0081	2036000000-E	815	SUBDRAIN COARSE AGGREGATE	1,227 CY		
0082	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	10,300 LF		
0083	2070000000-N	815	SUBDRAIN PIPE OUTLET	21 EA		
0084	2077000000-E	815	6" OUTLET PIPE	126 LF		
0085	2143000000-E	818	BLOTTING SAND	20 TON		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0086	2209000000-E	838	ENDWALLS	18 CY		
0087	2220000000-E	838	REINFORCED ENDWALLS	16.8 CY		
0088	2253000000-E	840	PIPE COLLARS	1.76 CY		
0089	2275000000-E	SP	FLOWABLE FILL	468 CY		
0090	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	147 EA		
0091	2297000000-E	840	MASONRY DRAINAGE STRUCTURES	30.83 CY		
0092	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	218 LF		
0093	2364000000-N	840	FRAME WITH TWO GRATES, STD 840.16	17 EA		
0094	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	44 EA		
0095	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	48 EA		
0096	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	5 EA		
0097	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	3 EA		
0098	2396000000-N	840	FRAME WITH COVER, STD 840.54	24 EA		
0099	2451000000-N	852	CONCRETE TRANSITIONAL SECTION FOR DROP INLET	17 EA		
0100	2462000000-E	836	**" SLUICE GATE (8")	1 EA		
0101	2473000000-N	SP	GENERIC DRAINAGE ITEM 6" PVC CLEANOUTS	1 EA		
0102	2473000000-N	SP	GENERIC DRAINAGE ITEM REBAR TRASH RACK	1 EA		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0103	2473000000-N	SP	GENERIC DRAINAGE ITEM REMOVEABLE ORIFICE TRASH RACK	1 EA		
0104	2484000000-E	SP	GENERIC DRAINAGE ITEM 6" PIPE - PERFORATED WITH FILTER SOCK	50 LF		
0105	2492000000-E	SP	GENERIC DRAINAGE ITEM WASHED #57 STONE	6 TON		
0106	2495000000-E	SP	GENERIC DRAINAGE ITEM ANTI-FLOTATION CONCRETE	3.3 CY		
0107	2495000000-E	SP	GENERIC DRAINAGE ITEM ENGINEERED SOIL MEDIA	2 CY		
0108	2538000000-E	846	**'-**" CONCRETE CURB & GUTTER (2'-9")	14,860 LF		
0109	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	1,550 LF		
0110	2556000000-E	846	SHOULDER BERM GUTTER	6,680 LF		
0111	2591000000-E	848	4" CONCRETE SIDEWALK	250 SY		
0112	2605000000-N	848	CONCRETE CURB RAMPS	2 EA		
0113	2619000000-E	850	4" CONCRETE PAVED DITCH	166 SY		
0114	2655000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)	3,300 SY		
0115	2724000000-E	857	PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED	1,690 LF		
0116	2830000000-N	858	ADJUSTMENT OF MANHOLES	1 EA		
0117	2845000000-N	858	ADJUSTMENT OF METER BOXES OR VALVE BOXES	1 EA		
0118	2875000000-N	859	CONVERT EXISTING CATCH BASIN TO DROP INLET	1 EA		
0119	2938000000-N	859	CONVERT EXISTING DROP INLET TO JUNCTION BOX WITH MANHOLE	1 EA		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0120	3030000000-E	862	STEEL BEAM GUARDRAIL	15,075 LF		
0121	3045000000-E	862	STEEL BEAM GUARDRAIL, SHOP CURVED	762.5 LF		
0122	3140000000-E	862	25' CLEAR SPAN GUARDRAIL SEC-TIONS	1 EA		
0123	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	15 EA		
0124	3195000000-N	862	GUARDRAIL END UNITS, TYPE AT-1	1 EA		
0125	3210000000-N	862	GUARDRAIL END UNITS, TYPE CAT-1	13 EA		
0126	3287000000-N	SP	GUARDRAIL END UNITS, TYPE TL-3	10 EA		
0127	3288000000-N	SP	GUARDRAIL END UNITS, TYPE TL-2	7 EA		
0128	3317000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE B-77	2 EA		
0129	3360000000-E	863	REMOVE EXISTING GUARDRAIL	10,820 LF		
0130	3380000000-E	862	TEMPORARY STEEL BEAM GUARDRAIL	1,700 LF		
0131	3389150000-N	SP	TEMPORARY GUARDRAIL END UNITS, TYPE ***** (TL-3)	3 EA		
0132	3436000000-N	862	GENERIC GUARDRAIL ITEM TEMPORARY GUARDRAIL END UNITS, TYPE CAT-1	1 EA		
0133	3503000000-E	866	WOVEN WIRE FENCE, 47" FABRIC	6,400 LF		
0134	3509000000-E	866	4" TIMBER FENCE POSTS, 7'-6" LONG	370 EA		
0135	3515000000-E	866	5" TIMBER FENCE POSTS, 8'-0" LONG	96 EA		
0136	3557000000-E	866	ADDITIONAL BARBED WIRE	100 LF		
0137	3628000000-E	876	RIP RAP, CLASS I	1,345 TON		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0138	3635000000-E	876	RIP RAP, CLASS II	115 TON		
0139	3649000000-E	876	RIP RAP, CLASS B	2,685 TON		
0140	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	11,205 SY		
0141	4054000000-E	902	PLAIN CONCRETE SIGN FOUNDA-TIONS	1 CY		
0142	4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	492 LB		
0143	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	1,695 LF		
0144	4096000000-N	904	SIGN ERECTION, TYPE D	6 EA		
0145	4102000000-N	904	SIGN ERECTION, TYPE E	70 EA		
0146	4108000000-N	904	SIGN ERECTION, TYPE F	16 EA		
0147	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	2 EA		
0148	4116100000-N	904	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (D)	5 EA		
0149	4116100000-N	904	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (E)	3 EA		
0150	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	58 EA		
0151	4158000000-N	907	DISPOSAL OF SIGN SYSTEM, WOOD	7 EA		
0152	4192000000-N	907	DISPOSAL OF SUPPORT, U-CHANNEL	5 EA		
0153	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	550 SF		
0154	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	384 SF		
0155	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	215 SF		

County : Ashe

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0156	4415000000-N	1115	FLASHING ARROW BOARD	3 EA		
0157	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	4 EA		
0158	4430000000-N	1130	DRUMS	718 EA		
0159	4435000000-N	1135	CONES	718 EA		
0160	4445000000-E	1145	BARRICADES (TYPE III)	160 LF		
0161	4455000000-N	1150	FLAGGER	240 DAY		
0162	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	18 EA		
0163	4470000000-N	1160	REMOVE & RESET TEMPORARY CRASH CUSHION	25 EA		
0164	4480000000-N	1165	TMA	2 EA		
0165	4485000000-E	1170	PORTABLE CONCRETE BARRIER	8,990 LF		
0166	4500000000-E	1170	REMOVE & RESET PORTABLE CONC-RETE BARRIER	9,160 LF		
0167	4510000000-N	1190	LAW ENFORCEMENT	800 HR		
0168	4516000000-N	1180	SKINNY DRUM	500 EA		
0169	4520000000-N	1266	TUBULAR MARKERS (FIXED)	46 EA		
0170	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	1,302 EA		
0171	4695000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)	300 LF		
0172	4700000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)	675 LF		
0173	4720000000-E	1205	THERMOPLASTIC PAVEMENT MARKING CHARACTER (90 MILS)	8 EA		
0174	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	97 EA		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0175	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	446,770 LF		
0176	4820000000-E	1205	PAINT PAVEMENT MARKING LINES (8")	1,418 LF		
0177	4825000000-E	1205	PAINT PAVEMENT MARKING LINES (12")	23,060 LF		
0178	4835000000-E	1205	PAINT PAVEMENT MARKING LINES (24")	2,388 LF		
0179	4840000000-N	1205	PAINT PAVEMENT MARKING CHARAC-TER	32 EA		
0180	4845000000-N	1205	PAINT PAVEMENT MARKING SYMBOL	324 EA		
0181	4847010000-E	1205	POLYUREA PAVEMENT MARKING LINES (4", 20 MILS)	81,782 LF		
0182	4847050000-E	1205	POLYUREA PAVEMENT MARKING LINES (8", 20 MILS)	2,698 LF		
0183	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	70,440 LF		
0184	4860000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (8")	978 LF		
0185	4865000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (12")	6,405 LF		
0186	4870000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (24")	442 LF		
0187	4875000000-N	1205	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	94 EA		
0188	4891000000-E	1205	GENERIC PAVEMENT MARKING ITEM THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MILS)	428 LF		
0189	4905000000-N	1253	SNOWPLOWABLE PAVEMENT MARKERS	1,302 EA		
0190	5325000000-E	1510	**" WATER LINE (1")	12 LF		
0191	5325200000-E	1510	2" WATER LINE	46 LF		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0192	5325600000-E	1510	6" WATER LINE	2,928 LF		
0193	5326000000-E	1510	10" WATER LINE	384 LF		
0194	5329000000-E	1510	DUCTILE IRON WATER PIPE FITTINGS	3,310 LB		
0195	5536000000-E	1515	2" VALVE	1 EA		
0196	5540000000-E	1515	6" VALVE	7 EA		
0197	5666000000-N	1515	FIRE HYDRANT	2 EA		
0198	5672000000-N	1515	RELOCATE FIRE HYDRANT	1 EA		
0199	5673000000-E	1515	FIRE HYDRANT LEG	47 LF		
0200	5686500000-E	1515	WATER SERVICE LINE	12 LF		
0201	5800000000-E	1530	ABANDON 6" UTILITY PIPE	2,517 LF		
0202	5802000000-E	1530	ABANDON 10" UTILITY PIPE	324 LF		
0203	5815500000-N	1530	REMOVE FIRE HYDRANT	3 EA		
0204	5835600000-E	1540	12" ENCASEMENT PIPE	781 LF		
0205	5836000000-E	1540	24" ENCASEMENT PIPE	173 LF		
0206	6000000000-E	1605	TEMPORARY SILT FENCE	47,485 LF		
0207	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	1,750 TON		
0208	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	14,460 TON		
0209	6012000000-E	1610	SEDIMENT CONTROL STONE	5,970 TON		
0210	6015000000-E	1615	TEMPORARY MULCHING	113 ACR		
0211	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	5,500 LB		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0212	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEED-ING	29 TON		
0213	6024000000-E	1622	TEMPORARY SLOPE DRAINS	4,470 LF		
0214	6029000000-E	SP	SAFETY FENCE	24,460 LF		
0215	6030000000-E	1630	SILT EXCAVATION	37,050 CY		
0216	6036000000-E	1631	MATTING FOR EROSION CONTROL	234,250 SY		
0217	6037000000-E	SP	COIR FIBER MAT	1,860 SY		
0218	6038000000-E	SP	PERMANENT SOIL REINFORCEMENT MAT	10,400 SY		
0219	6042000000-E	1632	1/4" HARDWARE CLOTH	5,155 LF		
0220	6045000000-E	SP	**" TEMPORARY PIPE (15")	35 LF		
0221	6045000000-E	SP	**" TEMPORARY PIPE (18")	25 LF		
0222	6045000000-E	SP	**" TEMPORARY PIPE (36")	110 LF		
0223	6048000000-E	SP	FLOATING TURBIDITY CURTAIN	95 SY		
0224	6069000000-E	1638	STILLING BASINS	58 CY		
0225	6071010000-E	SP	WATTLE	140 LF		
0226	6071012000-E	SP	COIR FIBER WATTLE	2,660 LF		
0227	6071013000-E	SP	WATTLE BARRIER	8,800 LF		
0228	6071020000-E	SP	POLYACRYLAMIDE (PAM)	3,690 LB		
0229	6071030000-E	1640	COIR FIBER BAFFLE	5,800 LF		
0230	6071050000-E	SP	**" SKIMMER (1-1/2")	23 EA		

County : Ashe

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0231	6071050000-E	SP	**" SKIMMER (2")	6 EA		
0232	6071050000-E	SP	**" SKIMMER (2.5")	3 EA		
0233	6071050000-E	SP	**" SKIMMER (3")	1 EA		
0234	6084000000-E	1660	SEEDING & MULCHING	78 ACR		
0235	6087000000-E	1660	MOWING	69 ACR		
0236	6090000000-E	1661	SEED FOR REPAIR SEEDING	1,150 LB		
0237	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	3 TON		
0238	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	1,850 LB		
0239	6108000000-E	1665	FERTILIZER TOPDRESSING	55 TON		
0240	6111000000-E	SP	IMPERVIOUS DIKE	100 LF		
0241	6114500000-N	1667	SPECIALIZED HAND MOWING	10 MHR		
0242	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	100 EA		
0243	6117500000-N	SP	CONCRETE WASHOUT STRUCTURE	11 EA		
0244	6123000000-E	1670	REFORESTATION	0.1 ACR		
0245	6132000000-N	SP	GENERIC EROSION CONTROL ITEM DEWATERING	9 EA		
0246	7048500000-E	1705	PEDESTRIAN SIGNAL HEAD (16", 1 SECTION W/COUNTDOWN)	2 EA		
0247	7060000000-E	1705	SIGNAL CABLE	6,330 LF		
0248	7120000000-E	1705	VEHICLE SIGNAL HEAD (12", 3 SECTION)	46 EA		
0249	7132000000-E	1705	VEHICLE SIGNAL HEAD (12", 4 SECTION)	4 EA		

County : Ashe

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0250	7144000000-E	1705	VEHICLE SIGNAL HEAD (12", 5 SECTION)	6 EA		
0251	7264000000-E	1710	MESSENGER CABLE (3/8")	2,780 LF		
0252	7300000000-E	1715	UNPAVED TRENCHING (**********) (1, 2")	3,100 LF		
0253	7300100000-E	1715	UNPAVED TRENCHING FOR TEMP-ORARY LEAD-IN	30 LF		
0254	7301000000-E	1715	DIRECTIONAL DRILL (**********) (1, 2")	70 LF		
0255	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	34 EA		
0256	7360000000-N	1720	WOOD POLE	6 EA		
0257	7372000000-N	1721	GUY ASSEMBLY	14 EA		
0258	7420000000-E	1722	2" RISER WITH WEATHERHEAD	5 EA		
0259	7444000000-E	1725	INDUCTIVE LOOP SAWCUT	3,940 LF		
0260	7456000000-E	1726	LEAD-IN CABLE (**********) (14-2)	15,390 LF		
0261	7481000000-N	SP	SITE SURVEY	4 EA		
0262	7481200000-N	SP	LUMINAIRE ARM FOR VIDEO SYSTEM	7 EA		
0263	7481240000-N	SP	CAMERA WITHOUT INTERNAL LOOP EMULATOR PROCESSING UNIT	18 EA		
0264	7481260000-N	SP	EXTERNAL LOOP EMULATOR PRO-CESSING UNIT	4 EA		
0265	7481280000-N	SP	RELOCATE CAMERA SENSOR UNIT	27 EA		
0266	7576000000-N	SP	METAL STRAIN SIGNAL POLE	12 EA		
0267	7613000000-N	SP	SOIL TEST	12 EA		
0268	7614100000-E	SP	DRILLED PIER FOUNDATION	96 CY		

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0269	7636000000-N	1745	SIGN FOR SIGNALS	2 EA		
0270	7642100000-N	1743	TYPE I POST WITH FOUNDATION	1 EA		
0271	7744000000-N	1751	DETECTOR CARD (TYPE 170)	26 EA		
0272	7756000000-N	1751	CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED)	3 EA		
0273	7901000000-N	1753	CABINET BASE EXTENDER	3 EA		

CULVERT ITEMS

0274	8126000000-N	414	CULVERT EXCAVATION, STA ****** (838+56.00 -L-)	Lump Sum	L.S.	
0275	8133000000-E	414	FOUNDATION CONDITIONING MATERIAL, BOX CULVERT	202 TON		
0276	8196000000-E	420	CLASS A CONCRETE (CULVERT)	245.9 CY		
0277	8245000000-E	425	REINFORCING STEEL (CULVERT)	33,075 LB		

WALL ITEMS

0278	8847000000-E	SP	GENERIC RETAINING WALL ITEM ARCHITECTURAL SURFACE TREATMENT (SOUND BARRIER WALL)	34,160 SF		
0279	8847000000-E	SP	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL NW7B	20,100 SF		

DBE GOAL SET: 8%
DBE GOAL OBT: 8.01%

Vendor 1 of 4: JAMES R VANNOY & SONS CONSTRUCTION COMPANY INC (3687)
Call Order 009 (Proposal: C204356)

Bid Information

Proposal County:	ASHE	**Bid Checksum:**	6CAE981DCB
Vendor Address:		**Bid Total:**	$27,409,543.90
Signature Check:	Douglas Lee Moxley	**Items Total:**	$27,409,543.90
Time Bid Received:	March 17, 2020 01:49 PM	**Time Total:**	$0.00
Amendment Count:	1		

Bidding Errors:
None.

Vendor 1 of 4: JAMES R VANNOY & SONS CONSTRUCTION COMPANY INC (3687)
Call Order 009 (Proposal: C204356)

Bid Bond Information

Projects:		**Bond Maximum:**	
Counties:		**State of Incorporation:**	Connecticut
Bond ID:	SNC20675172	**Agency Execution Date:**	3/12/2020 9
Paid by Check:	No	**Surety Name:**	Surety2000
Bond Percent:	5%	**Bond Agency Name:**	Travelers Casualty and Surety Company of America

DBE Load Information

Letting ID: L200317
Letting Date: 03/17/2020
Call Order: 009
Contract ID: C204356
Project: STATE FUNDEDSTATE FUNDEDSTATE FUNDEDSTATE FUNDED
Bid Total: $27,409,543.90
DBE Goal: 8.00% ($2,192,763.51)

Vendor ID: 3687
Vendor Name: James R. Vannoy & Sons Const. Co., Inc.
DBE Entered: 8.01% ($2,195,010.43)

Vendor ID	DBE Name	Is Supplier?	City/State	Goods/Service	Amount
10129	CONCRETE SPECIALTY CONTRACTORS INC	False	POST OFFICE BOX 2303 , SHELBY, NC 28151	SubContractor	856,936.00 COMMITTED
4388	FOOTHILLS CONSTRUCTION SERVICES INC	False	6081 PEA RIDGE PASS , HAMPTONVILLE, NC 27020	SubContractor	933,623.80 COMMITTED
12802	NICKELSTON INDUSTRIES INC	False	POST OFFICE BOX 133 , LAWSONVILLE, NC 27022	SubContractor	319,915.63 COMMITTED
4761	TRAFFIC CONTROL SAFETY SERVICES, INC.	False	POST OFFICE BOX 24511 , WINSTON-SALEM, NC 27114	SubContractor	37,215.00 COMMITTED
4247	SEAL BROTHERS CONTRACTING LLC	False	131 W. CLEVE STREET , MOUNT AIRY, NC 27030	SubContractor	38,605.00 COMMITTED
4761	TRAFFIC CONTROL SAFETY SERVICES, INC.	True	POST OFFICE BOX 24511 , WINSTON-SALEM, NC 27114	Supplier	8,715.00 COMMITTED

BondID: SNC20675172
Surety Registry Agency: Surety2000
Verified?: 1
Surety Agency: Travelers Casualty and Surety Company of America
Bond Execution Date: 3/12/2020 9:48:18 AM

Line Number	Item Number	Quantity	Unit	Unit Price	Extension Price
Section 0001 ROADWAY ITEMS					
0001	0000100000-N MOBILIZATION	1.000	LS	$1,370,000.0000	$1,370,000.00
0002	0000400000-N CONSTRUCTION SURVEYING	1.000	LS	$450,000.0000	$450,000.00
0003	0001000000-E CLEARING & GRUBBING .. ACRE(S)	1.000	LS	$1,400,000.0000	$1,400,000.00
0004	0008000000-E SUPPLEMENTARY CLEARING & GRUB-BING	2.000	ACR	$13,000.0000	$26,000.00
0005	0022000000-E UNCLASSIFIED EXCAVATION	220830.000	CY	$6.1000	$1,347,063.00
0006	0036000000-E UNDERCUT EXCAVATION	2400.000	CY	$20.0000	$48,000.00
0007	0106000000-E BORROW EXCAVATION	35080.000	CY	$0.0100	$350.80
0008	0134000000-E DRAINAGE DITCH EXCAVATION	18200.000	CY	$6.5000	$118,300.00
0009	0141000000-E BERM DITCH CONSTRUCTION	400.000	LF	$4.0000	$1,600.00
0010	0156000000-E REMOVAL OF EXISTING ASPHALT PAVEMENT	32700.000	SY	$4.5000	$147,150.00
0011	0177000000-E BREAKING OF EXISTING ASPHALT PAVEMENT	810.000	SY	$3.5000	$2,835.00
0012	0192000000-N PROOF ROLLING	20.000	HR	$300.0000	$6,000.00
0013	0195000000-E SELECT GRANULAR MATERIAL	2000.000	CY	$42.0000	$84,000.00
0014	0196000000-E GEOTEXTILE FOR SOIL STABILIZA-TION	7150.000	SY	$1.5000	$10,725.00
0015	0199000000-E TEMPORARY SHORING	16000.000	SF	$45.0000	$720,000.00
0016	0223000000-E ROCK PLATING	3900.000	SY	$41.0000	$159,900.00
0017	0318000000-E FOUNDATION CONDITIONING MATE- RIAL, MINOR STRUCTURES	1750.000	TON	$37.0000	$64,750.00
0018	0320000000-E FOUNDATION CONDITIONING GEO- TEXTILE	5500.000	SY	$3.5000	$19,250.00
0019	0335200000-E 15" DRAINAGE PIPE	100.000	LF	$42.0000	$4,200.00
0020	0335300000-E 18" DRAINAGE PIPE	28.000	LF	$52.0000	$1,456.00
0021	0366000000-E 15" RC PIPE CULVERTS, CLASS III	6992.000	LF	$43.0000	$300,656.00
0022	0372000000-E 18" RC PIPE CULVERTS, CLASS III	1140.000	LF	$47.5000	$54,150.00
0023	0378000000-E 24" RC PIPE CULVERTS, CLASS III	1768.000	LF	$62.0000	$109,616.00

0024	0384000000-E	2060.000	LF	$80.0000	$164,800.00
	30" RC PIPE CULVERTS, CLASS III				
0025	0390000000-E	20.000	LF	$112.0000	$2,240.00
	36" RC PIPE CULVERTS, CLASS III				
0026	0396000000-E	1244.000	LF	$133.0000	$165,452.00
	42" RC PIPE CULVERTS, CLASS III				
0027	0414000000-E	520.000	LF	$245.0000	$127,400.00
	60" RC PIPE CULVERTS, CLASS III				
0028	0420000000-E	64.000	LF	$346.0000	$22,144.00
	66" RC PIPE CULVERTS, CLASS III				
0029	0448300000-E	72.000	LF	$48.0000	$3,456.00
	18" RC PIPE CULVERTS, CLASS IV				
0030	0448500000-E	196.000	LF	$88.0000	$17,248.00
	30" RC PIPE CULVERTS, CLASS IV				
0031	0448700000-E	380.000	LF	$146.0000	$55,480.00
	42" RC PIPE CULVERTS, CLASS IV				
0032	0570000000-E	32.000	LF	$35.0000	$1,120.00
	6" CS PIPE CULVERTS, 0.064" THICK (SPRING BOX)				
0033	0576000000-E	40.000	LF	$115.0000	$4,600.00
	" CS PIPE CULVERTS, ***" THICK (36", 0.079")				
0034	0576000000-E	36.000	LF	$148.0000	$5,328.00
	" CS PIPE CULVERTS, ***" THICK (42", 0.109")				
0035	0576000000-E	96.000	LF	$216.0000	$20,736.00
	" CS PIPE CULVERTS, ***" THICK (60", 0.138")				
0036	0582000000-E	472.000	LF	$55.0000	$25,960.00
	15" CS PIPE CULVERTS, 0.064" THICK				
0037	0588000000-E	268.000	LF	$60.0000	$16,080.00
	18" CS PIPE CULVERTS, 0.064" THICK				
0038	0594000000-E	536.000	LF	$66.0000	$35,376.00
	24" CS PIPE CULVERTS, 0.064" THICK				
0039	0600000000-E	224.000	LF	$91.0000	$20,384.00
	30" CS PIPE CULVERTS, 0.079" THICK				
0040	0636000000-E	16.000	EA	$402.0000	$6,432.00
	" CS PIPE ELBOWS, ***" THICK (15", 0.064")				
0041	0636000000-E	6.000	EA	$465.0000	$2,790.00
	" CS PIPE ELBOWS, ***" THICK (18", 0.064")				
0042	0636000000-E	18.000	EA	$570.0000	$10,260.00
	" CS PIPE ELBOWS, ***" THICK (24", 0.064")				
0043	0636000000-E	10.000	EA	$655.0000	$6,550.00
	" CS PIPE ELBOWS, ***" THICK (30", 0.079")				
0044	0636000000-E	4.000	EA	$795.0000	$3,180.00
	" CS PIPE ELBOWS, ***" THICK (36", 0.079")				
0045	0636000000-E	2.000	EA	$1,100.0000	$2,200.00
	" CS PIPE ELBOWS, ***" THICK (42", 0.109")				
0046	0636000000-E	4.000	EA	$35.0000	$140.00
	" CS PIPE ELBOWS, ***" THICK (6", 0.064")				
0047	0636000000-E	2.000	EA	$2,750.0000	$5,500.00
	" CS PIPE ELBOWS, ***" THICK (60", 0.138")				
0048	0973100000-E	92.000	LF	$600.0000	$55,200.00

	" WELDED STEEL PIPE, **" THICK, GRADE B IN SOIL (30", 0.500")				
0049	0973300000-E	92.000	LF	$2,620.0000	$241,040.00
	" WELDED STEEL PIPE, **" THICK, GRADE B NOT IN SOIL (30", 0.500")				
0050	0986000000-E	567.000	LF	$400.0000	$226,800.00
	GENERIC PIPE ITEM 24" PIPE REHABILITATION CIPP LINER				
0051	0986000000-E	180.000	LF	$500.0000	$90,000.00
	GENERIC PIPE ITEM 30" PIPE REHABILITATION CIPP LINER				
0052	0986000000-E	440.000	LF	$200.0000	$88,000.00
	GENERIC PIPE ITEM 36" PIPE REHAB CEMENTITIOUS/ GEOPOLYMER SPRAY LINER				
0053	0986000000-E	317.000	LF	$300.0000	$95,100.00
	GENERIC PIPE ITEM 48" PIPE REHAB CEMENTITIOUS/ GEOPOLYMER SPRAY LINER				
0054	0986000000-E	698.000	LF	$400.0000	$279,200.00
	GENERIC PIPE ITEM 66" PIPE REHAB CEMENTITIOUS/ GEOPOLYMER SPRAY LINER				
0055	0986000000-E	2202.000	LF	$1.0000	$2,202.00
	GENERIC PIPE ITEM PRE INSTALLATION INSPECTION				
0056	0995000000-E	1882.000	LF	$33.0000	$62,106.00
	PIPE REMOVAL				
0057	1011000000-N	1.000	LS	$682,000.0000	$682,000.00
	FINE GRADING				
0058	1044000000-E	46500.000	SY	$3.0000	$139,500.00
	LIME TREATED SOIL (SLURRY METHOD)				
0059	1066000000-E	560.000	TON	$200.0000	$112,000.00
	LIME FOR LIME TREATED SOIL				
0060	1099500000-E	250.000	CY	$20.0000	$5,000.00
	SHALLOW UNDERCUT				
0061	1099700000-E	500.000	TON	$28.0000	$14,000.00
	CLASS IV SUBGRADE STABILIZA- TION				
0062	1110000000-E	500.000	TON	$27.0000	$13,500.00
	STABILIZER AGGREGATE				
0063	1115000000-E	23700.000	SY	$2.5000	$59,250.00
	GEOTEXTILE FOR PAVEMENT STA- BILIZATION				
0064	1121000000-E	54115.000	TON	$28.0000	$1,515,220.00
	AGGREGATE BASE COURSE				
0065	1176000000-E	46500.000	SY	$3.0000	$139,500.00
	SOIL CEMENT BASE				
0066	1187000000-E	1310.000	TON	$200.0000	$262,000.00
	PORTLAND CEMENT FOR SOIL CE- MENT BASE				
0067	1209000000-E	13950.000	GAL	$3.0000	$41,850.00
	ASPHALT CURING SEAL				
0068	1220000000-E	500.000	TON	$26.0000	$13,000.00
	INCIDENTAL STONE BASE				
0069	1297000000-E	1900.000	SY	$9.5000	$18,050.00
	MILLING ASPHALT PAVEMENT, ***"DEPTH (1-1/2")				
0070	1330000000-E	2610.000	SY	$10.0000	$26,100.00
	INCIDENTAL MILLING				
0071	1491000000-E	18640.000	TON	$50.0000	$932,000.00
	ASPHALT CONC BASE COURSE, TYPE B25.0C				
0072	1503000000-E	31745.000	TON	$50.0000	$1,587,250.00
	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C				

0073	1523000000-E	25915.000	TON	$50.0000	$1,295,750.00
	ASPHALT CONC SURFACE COURSE, TYPE S9.5C				
0074	1575000000-E	3875.000	TON	$700.0000	$2,712,500.00
	ASPHALT BINDER FOR PLANT MIX				
0075	1693000000-E	1888.000	TON	$200.0000	$377,600.00
	ASPHALT PLANT MIX, PAVEMENT REPAIR				
0076	2000000000-N	13.000	EA	$200.0000	$2,600.00
	RIGHT-OF-WAY MARKERS				
0077	2020000000-N	26.000	EA	$200.0000	$5,200.00
	CONTROL-OF-ACCESS MARKERS				
0078	2022000000-E	3461.000	CY	$27.0000	$93,447.00
	SUBDRAIN EXCAVATION				
0079	2026000000-E	7300.000	SY	$3.5000	$25,550.00
	GEOTEXTILE FOR SUBSURFACE DRAINS				
0080	2033000000-E	504.000	CY	$55.0000	$27,720.00
	SUBDRAIN FINE AGGREGATE				
0081	2036000000-E	1227.000	CY	$62.0000	$76,074.00
	SUBDRAIN COARSE AGGREGATE				
0082	2044000000-E	10300.000	LF	$12.0000	$123,600.00
	6" PERFORATED SUBDRAIN PIPE				
0083	2070000000-N	21.000	EA	$300.0000	$6,300.00
	SUBDRAIN PIPE OUTLET				
0084	2077000000-E	126.000	LF	$17.0000	$2,142.00
	6" OUTLET PIPE				
0085	2143000000-E	20.000	TON	$50.0000	$1,000.00
	BLOTTING SAND				
0086	2209000000-E	18.000	CY	$2,000.0000	$36,000.00
	ENDWALLS				
0087	2220000000-E	16.800	CY	$2,000.0000	$33,600.00
	REINFORCED ENDWALLS				
0088	2253000000-E	1.760	CY	$1,000.0000	$1,760.00
	PIPE COLLARS				
0089	2275000000-E	468.000	CY	$200.0000	$93,600.00
	FLOWABLE FILL				
0090	2286000000-N	147.000	EA	$2,000.0000	$294,000.00
	MASONRY DRAINAGE STRUCTURES				
0091	2297000000-E	30.830	CY	$2,000.0000	$61,660.00
	MASONRY DRAINAGE STRUCTURES				
0092	2308000000-E	218.000	LF	$300.0000	$65,400.00
	MASONRY DRAINAGE STRUCTURES				
0093	2364000000-N	17.000	EA	$700.0000	$11,900.00
	FRAME WITH TWO GRATES, STD 840.16				
0094	2364200000-N	44.000	EA	$800.0000	$35,200.00
	FRAME WITH TWO GRATES, STD 840.20				
0095	2365000000-N	48.000	EA	$700.0000	$33,600.00
	FRAME WITH TWO GRATES, STD 840.22				
0096	2374000000-N	5.000	EA	$700.0000	$3,500.00
	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)				
0097	2374000000-N	3.000	EA	$700.0000	$2,100.00

	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)				
0098	2396000000-N	24.000	EA	$600.0000	$14,400.00
	FRAME WITH COVER, STD 840.54				
0099	2451000000-N	17.000	EA	$700.0000	$11,900.00
	CONCRETE TRANSITIONAL SECTION FOR DROP INLET				
0100	2462000000-E	1.000	EA	$3,000.0000	$3,000.00
	**" SLUICE GATE (8")				
0101	2473000000-N	1.000	EA	$1,000.0000	$1,000.00
	GENERIC DRAINAGE ITEM 6" PVC CLEANOUTS				
0102	2473000000-N	1.000	EA	$1,950.0000	$1,950.00
	GENERIC DRAINAGE ITEM REBAR TRASH RACK				
0103	2473000000-N	1.000	EA	$325.0000	$325.00
	GENERIC DRAINAGE ITEM REMOVEABLE ORIFICE TRASH RACK				
0104	2484000000-E	50.000	LF	$17.0000	$850.00
	GENERIC DRAINAGE ITEM 6" PIPE - PERFORATED WITH FILTER SOCK				
0105	2492000000-E	6.000	TON	$45.0000	$270.00
	GENERIC DRAINAGE ITEM WASHED #57 STONE				
0106	2495000000-E	3.300	CY	$500.0000	$1,650.00
	GENERIC DRAINAGE ITEM ANTI-FLOTATION CONCRETE				
0107	2495000000-E	2.000	CY	$600.0000	$1,200.00
	GENERIC DRAINAGE ITEM ENGINEERED SOIL MEDIA				
0108	2538000000-E	14860.000	LF	$28.0000	$416,080.00
	'-" CONCRETE CURB & GUTTER (2'-9")				
0109	2549000000-E	1550.000	LF	$27.0000	$41,850.00
	2'-6" CONCRETE CURB & GUTTER				
0110	2556000000-E	6680.000	LF	$26.0000	$173,680.00
	SHOULDER BERM GUTTER				
0111	2591000000-E	250.000	SY	$42.0000	$10,500.00
	4" CONCRETE SIDEWALK				
0112	2605000000-N	2.000	EA	$1,750.0000	$3,500.00
	CONCRETE CURB RAMPS				
0113	2619000000-E	166.000	SY	$73.0000	$12,118.00
	4" CONCRETE PAVED DITCH				
0114	2655000000-E	3300.000	SY	$68.0000	$224,400.00
	5" MONOLITHIC CONCRETE ISLANDS(KEYED IN)				
0115	2724000000-E	1690.000	LF	$75.0000	$126,750.00
	PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED				
0116	2830000000-N	1.000	EA	$1,200.0000	$1,200.00
	ADJUSTMENT OF MANHOLES				
0117	2845000000-N	1.000	EA	$600.0000	$600.00
	ADJUSTMENT OF METER BOXES OR VALVE BOXES				
0118	2875000000-N	1.000	EA	$1,300.0000	$1,300.00
	CONVERT EXISTING CATCH BASIN TO DROP INLET				
0119	2938000000-N	1.000	EA	$1,500.0000	$1,500.00
	CONVERT EXISTING DROP INLET TOJUNCTION BOX WITH MANHOLE				
0120	3030000000-E	15075.000	LF	$16.0000	$241,200.00
	STEEL BEAM GUARDRAIL				
0121	3045000000-E	762.500	LF	$17.0000	$12,962.50
	STEEL BEAM GUARDRAIL, SHOP CURVED				

0122	3140000000-E	1.000	EA	$2,000.0000	$2,000.00
	25' CLEAR SPAN GUARDRAIL SEC- TIONS				
0123	3150000000-N	15.000	EA	$32.0000	$480.00
	ADDITIONAL GUARDRAIL POSTS				
0124	3195000000-N	1.000	EA	$520.0000	$520.00
	GUARDRAIL END UNITS, TYPE AT-1				
0125	3210000000-N	13.000	EA	$620.0000	$8,060.00
	GUARDRAIL END UNITS, TYPE CAT-1				
0126	3287000000-N	10.000	EA	$2,800.0000	$28,000.00
	GUARDRAIL END UNITS, TYPE TL-3				
0127	3288000000-N	7.000	EA	$2,750.0000	$19,250.00
	GUARDRAIL END UNITS, TYPE TL-2				
0128	3317000000-N	2.000	EA	$1,700.0000	$3,400.00
	GUARDRAIL ANCHOR UNITS, TYPE B-77				
0129	3360000000-E	10820.000	LF	$1.0000	$10,820.00
	REMOVE EXISTING GUARDRAIL				
0130	3380000000-E	1700.000	LF	$7.5000	$12,750.00
	TEMPORARY STEEL BEAM GUARDRAIL				
0131	3389150000-N	3.000	EA	$2,100.0000	$6,300.00
	TEMPORARY GUARDRAIL END UNITS, TYPE ***** (TL-3)				
0132	3436000000-N	1.000	EA	$515.0000	$515.00
	GENERIC GUARDRAIL ITEM TEMPORARY GUARDRAIL END UNITS, TYPE CAT-1				
0133	3503000000-E	6400.000	LF	$4.5000	$28,800.00
	WOVEN WIRE FENCE, 47" FABRIC				
0134	3509000000-E	370.000	EA	$26.0000	$9,620.00
	4" TIMBER FENCE POSTS, 7'-6" LONG				
0135	3515000000-E	96.000	EA	$32.0000	$3,072.00
	5" TIMBER FENCE POSTS, 8'-0" LONG				
0136	3557000000-E	100.000	LF	$1.1000	$110.00
	ADDITIONAL BARBED WIRE				
0137	3628000000-E	1345.000	TON	$37.0000	$49,765.00
	RIP RAP, CLASS I				
0138	3635000000-E	115.000	TON	$52.0000	$5,980.00
	RIP RAP, CLASS II				
0139	3649000000-E	2685.000	TON	$35.0000	$93,975.00
	RIP RAP, CLASS B				
0140	3656000000-E	11205.000	SY	$2.5000	$28,012.50
	GEOTEXTILE FOR DRAINAGE				
0141	4054000000-E	1.000	CY	$10.5000	$10.50
	PLAIN CONCRETE SIGN FOUNDA- TIONS				
0142	4060000000-E	492.000	LB	$16.0000	$7,872.00
	SUPPORTS, BREAKAWAY STEEL BEAM				
0143	4072000000-E	1695.000	LF	$9.5000	$16,102.50
	SUPPORTS, 3-LB STEEL U-CHANNEL				
0144	4096000000-N	6.000	EA	$155.0000	$930.00
	SIGN ERECTION, TYPE D				
0145	4102000000-N	70.000	EA	$105.0000	$7,350.00
	SIGN ERECTION, TYPE E				
0146	4108000000-N	16.000	EA	$200.0000	$3,200.00

	SIGN ERECTION, TYPE F				
0147	4110000000-N	2.000	EA	$2,000.0000	$4,000.00
	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)				
0148	4116100000-N	5.000	EA	$155.0000	$775.00
	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (D)				
0149	4116100000-N	3.000	EA	$155.0000	$465.00
	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (E)				
0150	4155000000-N	58.000	EA	$1.0500	$60.90
	DISPOSAL OF SIGN SYSTEM, U- CHANNEL				
0151	4158000000-N	7.000	EA	$1.0500	$7.35
	DISPOSAL OF SIGN SYSTEM, WOOD				
0152	4192000000-N	5.000	EA	$1.0500	$5.25
	DISPOSAL OF SUPPORT, U-CHANNEL				
0153	4400000000-E	550.000	SF	$11.0000	$6,050.00
	WORK ZONE SIGNS (STATIONARY)				
0154	4405000000-E	384.000	SF	$29.0000	$11,136.00
	WORK ZONE SIGNS (PORTABLE)				
0155	4410000000-E	215.000	SF	$11.0000	$2,365.00
	WORK ZONE SIGNS (BARRICADE MOUNTED)				
0156	4415000000-N	3.000	EA	$3,650.0000	$10,950.00
	FLASHING ARROW BOARD				
0157	4420000000-N	4.000	EA	$14,000.0000	$56,000.00
	PORTABLE CHANGEABLE MESSAGE SIGN				
0158	4430000000-N	718.000	EA	$47.0000	$33,746.00
	DRUMS				
0159	4435000000-N	718.000	EA	$21.0000	$15,078.00
	CONES				
0160	4445000000-E	160.000	LF	$36.0000	$5,760.00
	BARRICADES (TYPE III)				
0161	4455000000-N	240.000	DAY	$250.0000	$60,000.00
	FLAGGER				
0162	4465000000-N	18.000	EA	$10,000.0000	$180,000.00
	TEMPORARY CRASH CUSHIONS				
0163	4470000000-N	25.000	EA	$3,000.0000	$75,000.00
	REMOVE & RESET TEMPORARY CRASH CUSHION				
0164	4480000000-N	2.000	EA	$15,000.0000	$30,000.00
	TMA				
0165	4485000000-E	8990.000	LF	$36.0000	$323,640.00
	PORTABLE CONCRETE BARRIER				
0166	4500000000-E	9160.000	LF	$8.0000	$73,280.00
	REMOVE & RESET PORTABLE CONC- RETE BARRIER				
0167	4510000000-N	800.000	HR	$84.0000	$67,200.00
	LAW ENFORCEMENT				
0168	4516000000-N	500.000	EA	$33.0000	$16,500.00
	SKINNY DRUM				
0169	4520000000-N	46.000	EA	$80.0000	$3,680.00
	TUBULAR MARKERS (FIXED)				
0170	4650000000-N	1302.000	EA	$13.0000	$16,926.00
	TEMPORARY RAISED PAVEMENT MARKERS				

0171	4695000000-E	300.000	LF	$3.3500	$1,005.00
	THERMOPLASTIC PAVEMENT MARKINGLINES (8", 90 MILS)				
0172	4700000000-E	675.000	LF	$6.3000	$4,252.50
	THERMOPLASTIC PAVEMENT MARKINGLINES (12", 90 MILS)				
0173	4720000000-E	8.000	EA	$150.0000	$1,200.00
	THERMOPLASTIC PAVEMENT MARKINGCHARACTER (90 MILS)				
0174	4725000000-E	97.000	EA	$230.0000	$22,310.00
	THERMOPLASTIC PAVEMENT MARKINGSYMBOL (90 MILS)				
0175	4810000000-E	446770.000	LF	$0.3600	$160,837.20
	PAINT PAVEMENT MARKING LINES (4")				
0176	4820000000-E	1418.000	LF	$0.5500	$779.90
	PAINT PAVEMENT MARKING LINES (8")				
0177	4825000000-E	23060.000	LF	$1.0000	$23,060.00
	PAINT PAVEMENT MARKING LINES (12")				
0178	4835000000-E	2388.000	LF	$5.2500	$12,537.00
	PAINT PAVEMENT MARKING LINES (24")				
0179	4840000000-N	32.000	EA	$79.0000	$2,528.00
	PAINT PAVEMENT MARKING CHARAC-TER				
0180	4845000000-N	324.000	EA	$95.0000	$30,780.00
	PAINT PAVEMENT MARKING SYMBOL				
0181	4847010000-E	81782.000	LF	$1.5000	$122,673.00
	POLYUREA PAVEMENT MARKING LINES (4", 20 MILS)				
0182	4847050000-E	2698.000	LF	$2.5000	$6,745.00
	POLYUREA PAVEMENT MARKING LINES (8", 20 MILS)				
0183	4850000000-E	70440.000	LF	$0.7000	$49,308.00
	REMOVAL OF PAVEMENT MARKING LINES (4")				
0184	4860000000-E	978.000	LF	$2.0000	$1,956.00
	REMOVAL OF PAVEMENT MARKING LINES (8")				
0185	4865000000-E	6405.000	LF	$2.5000	$16,012.50
	REMOVAL OF PAVEMENT MARKING LINES (12")				
0186	4870000000-E	442.000	LF	$4.5000	$1,989.00
	REMOVAL OF PAVEMENT MARKING LINES (24")				
0187	4875000000-N	94.000	EA	$95.0000	$8,930.00
	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS				
0188	4891000000-E	428.000	LF	$14.0000	$5,992.00
	GENERIC PAVEMENT MARKING ITEM THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MILS)				
0189	4905000000-N	1302.000	EA	$31.0000	$40,362.00
	SNOWPLOWABLE PAVEMENT MARKERS				
0190	5325000000-E	12.000	LF	$220.0000	$2,640.00
	**" WATER LINE (1")				
0191	5325200000-E	46.000	LF	$92.0000	$4,232.00
	2" WATER LINE				
0192	5325600000-E	2928.000	LF	$85.0000	$248,880.00
	6" WATER LINE				
0193	5326000000-E	384.000	LF	$100.0000	$38,400.00
	10" WATER LINE				
0194	5329000000-E	3310.000	LB	$7.0000	$23,170.00
	DUCTILE IRON WATER PIPE FITTINGS				

0195	5536000000-E 2" VALVE	1.000	EA	$2,500.0000	$2,500.00
0196	5540000000-E 6" VALVE	7.000	EA	$8,500.0000	$59,500.00
0197	5666000000-N FIRE HYDRANT	2.000	EA	$7,500.0000	$15,000.00
0198	5672000000-N RELOCATE FIRE HYDRANT	1.000	EA	$6,000.0000	$6,000.00
0199	5673000000-E FIRE HYDRANT LEG	47.000	LF	$150.0000	$7,050.00
0200	5686500000-E WATER SERVICE LINE	12.000	LF	$220.0000	$2,640.00
0201	5800000000-E ABANDON 6" UTILITY PIPE	2517.000	LF	$15.0000	$37,755.00
0202	5802000000-E ABANDON 10" UTILITY PIPE	324.000	LF	$21.0000	$6,804.00
0203	5815500000-N REMOVE FIRE HYDRANT	3.000	EA	$1,400.0000	$4,200.00
0204	5835600000-E 12" ENCASEMENT PIPE	781.000	LF	$300.0000	$234,300.00
0205	5836000000-E 24" ENCASEMENT PIPE	173.000	LF	$320.0000	$55,360.00
0206	6000000000-E TEMPORARY SILT FENCE	47485.000	LF	$1.5500	$73,601.75
0207	6006000000-E STONE FOR EROSION CONTROL, CLASS A	1750.000	TON	$36.0000	$63,000.00
0208	6009000000-E STONE FOR EROSION CONTROL, CLASS B	14460.000	TON	$36.0000	$520,560.00
0209	6012000000-E SEDIMENT CONTROL STONE	5970.000	TON	$37.0000	$220,890.00
0210	6015000000-E TEMPORARY MULCHING	113.000	ACR	$1,100.0000	$124,300.00
0211	6018000000-E SEED FOR TEMPORARY SEEDING	5500.000	LB	$1.0000	$5,500.00
0212	6021000000-E FERTILIZER FOR TEMPORARY SEED-ING	29.000	TON	$520.0000	$15,080.00
0213	6024000000-E TEMPORARY SLOPE DRAINS	4470.000	LF	$8.5000	$37,995.00
0214	6029000000-E SAFETY FENCE	24460.000	LF	$1.5500	$37,913.00
0215	6030000000-E SILT EXCAVATION	37050.000	CY	$14.0000	$518,700.00
0216	6036000000-E MATTING FOR EROSION CONTROL	234250.000	SY	$1.5000	$351,375.00
0217	6037000000-E COIR FIBER MAT	1860.000	SY	$4.5000	$8,370.00
0218	6038000000-E PERMANENT SOIL REINFORCEMENT MAT	10400.000	SY	$4.5000	$46,800.00
0219	6042000000-E	5155.000	LF	$3.5000	$18,042.50

	1/4" HARDWARE CLOTH				
0220	6045000000-E	35.000	LF	$22.0000	$770.00
	**" TEMPORARY PIPE (15")				
0221	6045000000-E	25.000	LF	$24.0000	$600.00
	**" TEMPORARY PIPE (18")				
0222	6045000000-E	110.000	LF	$49.0000	$5,390.00
	**" TEMPORARY PIPE (36")				
0223	6048000000-E	95.000	SY	$29.0000	$2,755.00
	FLOATING TURBIDITY CURTAIN				
0224	6069000000-E	58.000	CY	$55.0000	$3,190.00
	STILLING BASINS				
0225	6071010000-E	140.000	LF	$10.0000	$1,400.00
	WATTLE				
0226	6071012000-E	2660.000	LF	$7.5000	$19,950.00
	COIR FIBER WATTLE				
0227	6071013000-E	8800.000	LF	$8.0000	$70,400.00
	WATTLE BARRIER				
0228	6071020000-E	3690.000	LB	$4.5000	$16,605.00
	POLYACRYLAMIDE (PAM)				
0229	6071030000-E	5800.000	LF	$4.5000	$26,100.00
	COIR FIBER BAFFLE				
0230	6071050000-E	23.000	EA	$975.0000	$22,425.00
	**" SKIMMER (1-1/2")				
0231	6071050000-E	6.000	EA	$1,100.0000	$6,600.00
	**" SKIMMER (2")				
0232	6071050000-E	3.000	EA	$1,200.0000	$3,600.00
	**" SKIMMER (2.5")				
0233	6071050000-E	1.000	EA	$1,600.0000	$1,600.00
	**" SKIMMER (3")				
0234	6084000000-E	78.000	ACR	$1,550.0000	$120,900.00
	SEEDING & MULCHING				
0235	6087000000-E	69.000	ACR	$115.0000	$7,935.00
	MOWING				
0236	6090000000-E	1150.000	LB	$1.7000	$1,955.00
	SEED FOR REPAIR SEEDING				
0237	6093000000-E	3.000	TON	$600.0000	$1,800.00
	FERTILIZER FOR REPAIR SEEDING				
0238	6096000000-E	1850.000	LB	$1.5500	$2,867.50
	SEED FOR SUPPLEMENTAL SEEDING				
0239	6108000000-E	55.000	TON	$700.0000	$38,500.00
	FERTILIZER TOPDRESSING				
0240	6111000000-E	100.000	LF	$76.0000	$7,600.00
	IMPERVIOUS DIKE				
0241	6114500000-N	10.000	MHR	$86.0000	$860.00
	SPECIALIZED HAND MOWING				
0242	6117000000-N	100.000	EA	$58.0000	$5,800.00
	RESPONSE FOR EROSION CONTROL				
0243	6117500000-N	11.000	EA	$700.0000	$7,700.00
	CONCRETE WASHOUT STRUCTURE				

0244	6123000000-E	0.100	ACR	$9,000.0000	$900.00
	REFORESTATION				
0245	6132000000-N	9.000	EA	$4,000.0000	$36,000.00
	GENERIC EROSION CONTROL ITEM DEWATERING				
0246	7048500000-E	2.000	EA	$1,000.0000	$2,000.00
	PEDESTRIAN SIGNAL HEAD (16", 1SECTION W/COUNTDOWN)				
0247	7060000000-E	6330.000	LF	$3.0000	$18,990.00
	SIGNAL CABLE				
0248	7120000000-E	46.000	EA	$1,000.0000	$46,000.00
	VEHICLE SIGNAL HEAD (12", 3 SECTION)				
0249	7132000000-E	4.000	EA	$1,200.0000	$4,800.00
	VEHICLE SIGNAL HEAD (12", 4 SECTION)				
0250	7144000000-E	6.000	EA	$1,500.0000	$9,000.00
	VEHICLE SIGNAL HEAD (12", 5 SECTION)				
0251	7264000000-E	2780.000	LF	$4.0000	$11,120.00
	MESSENGER CABLE (3/8")				
0252	7300000000-E	3100.000	LF	$8.2500	$25,575.00
	UNPAVED TRENCHING (**********) (1, 2")				
0253	7300100000-E	30.000	LF	$10.0000	$300.00
	UNPAVED TRENCHING FOR TEMP- ORARY LEAD-IN				
0254	7301000000-E	70.000	LF	$26.0000	$1,820.00
	DIRECTIONAL DRILL (**********) (1, 2")				
0255	7324000000-N	34.000	EA	$400.0000	$13,600.00
	JUNCTION BOX (STANDARD SIZE)				
0256	7360000000-N	6.000	EA	$1,250.0000	$7,500.00
	WOOD POLE				
0257	7372000000-N	14.000	EA	$400.0000	$5,600.00
	GUY ASSEMBLY				
0258	7420000000-E	5.000	EA	$600.0000	$3,000.00
	2" RISER WITH WEATHERHEAD				
0259	7444000000-E	3940.000	LF	$11.0000	$43,340.00
	INDUCTIVE LOOP SAWCUT				
0260	7456000000-E	15390.000	LF	$2.0000	$30,780.00
	LEAD-IN CABLE (**********) (14-2)				
0261	7481000000-N	4.000	EA	$100.0000	$400.00
	SITE SURVEY				
0262	7481200000-N	7.000	EA	$500.0000	$3,500.00
	LUMINAIRE ARM FOR VIDEO SYSTEM				
0263	7481240000-N	18.000	EA	$3,300.0000	$59,400.00
	CAMERA WITHOUT INTERNAL LOOP EMULATOR PROCESSING UNIT				
0264	7481260000-N	4.000	EA	$7,000.0000	$28,000.00
	EXTERNAL LOOP EMULATOR PRO- CESSING UNIT				
0265	7481280000-N	27.000	EA	$260.0000	$7,020.00
	RELOCATE CAMERA SENSOR UNIT				
0266	7576000000-N	12.000	EA	$8,000.0000	$96,000.00
	METAL STRAIN SIGNAL POLE				
0267	7613000000-N	12.000	EA	$1,000.0000	$12,000.00
	SOIL TEST				
0268	7614100000-E	96.000	CY	$960.0000	$92,160.00

	DRILLED PIER FOUNDATION				
0269	7636000000-N	2.000	EA	$360.0000	$720.00
	SIGN FOR SIGNALS				
0270	7642100000-N	1.000	EA	$1,250.0000	$1,250.00
	TYPE I POST WITH FOUNDATION				
0271	7744000000-N	26.000	EA	$130.0000	$3,380.00
	DETECTOR CARD (TYPE 170)				
0272	7756000000-N	3.000	EA	$14,000.0000	$42,000.00
	CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED)				
0273	7901000000-N	3.000	EA	$460.0000	$1,380.00
	CABINET BASE EXTENDER				
Section 0001 Total					$26,224,886.15

Section 0002
CULVERT ITEMS

0274	8126000000-N	1.000	LS	$27,000.0000	$27,000.00
	CULVERT EXCAVATION, STA ****** (838+56.00 -L-)				
0275	8133000000-E	202.000	TON	$47.0000	$9,494.00
	FOUNDATION CONDITIONING MATER-IAL, BOX CULVERT				
0276	8196000000-E	245.900	CY	$950.0000	$233,605.00
	CLASS A CONCRETE (CULVERT)				
0277	8245000000-E	33075.000	LB	$0.0100	$330.75
	REINFORCING STEEL (CULVERT)				
Section 0002 Total					$270,429.75

Section 0003
WALL ITEMS

0278	8847000000-E	34160.000	SF	$2.0500	$70,028.00
	GENERIC RETAINING WALL ITEM ARCHITECTURAL SURFACE TREATMENT (SOUND BARRIER WALL)				
0279	8847000000-E	20100.000	SF	$42.0000	$844,200.00
	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL NW7B				
Section 0003 Total					$914,228.00

Item Total	$27,409,543.90

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: STATE FUNDED
Bid Total: 27,409,543.90
Goal: 8.00% (2,192,763.51)
Total Entered: 8.01% (2,195,010.43)

Bidder ID: 3687
Business Name: James R. Vannoy & Sons Const. C

ID	Name	Is Supplier?	Item Count	Amount	Is Complete?
10129	CONCRETE SPECIALTY CONTRACTORS INC	False	8	856,936.00	True
4388	FOOTHILLS CONSTRUCTION SERVICES INC	False	25	933,623.80	True
12802	NICKELSTON INDUSTRIES INC	False	13	319,915.63	True
4761	TRAFFIC CONTROL SAFETY SERVICES, INC.	False	13	37,215.00	True
4247	SEAL BROTHERS CONTRACTING LLC	False	4	38,605.00	True
4761	TRAFFIC CONTROL SAFETY SERVICES, INC.	True	1	8,715.00	True

Name: CONCRETE SPECIALTY CONTRACTORS INC ID: 10129

Address: POST OFFICE BOX 2303 , SHELBY, NC 28151

Used As: SubContractor DBE Items Total:$856,936.00

Items for CONCRETE SPECIALTY CONTRACTORS INC

0001 ROADWAY ITEMS					
0099	2451000000-N	17.000	EA	$700.0000	$11,900.00
	CONCRETE TRANSITIONAL SECTION FOR DROP INLET				
0108	2538000000-E	14860.000	LF	$26.8500	$398,991.00
	'-" CONCRETE CURB & GUTTER (2'-9")				
0109	2549000000-E	1550.000	LF	$25.5000	$39,525.00
	2'-6" CONCRETE CURB & GUTTER				
0110	2556000000-E	6680.000	LF	$25.0000	$167,000.00
	SHOULDER BERM GUTTER				
0111	2591000000-E	250.000	SY	$40.0000	$10,000.00
	4" CONCRETE SIDEWALK				
0112	2605000000-N	2.000	EA	$1,700.0000	$3,400.00
	CONCRETE CURB RAMPS				
0113	2619000000-E	166.000	SY	$70.0000	$11,620.00
	4" CONCRETE PAVED DITCH				
0114	2655000000-E	3300.000	SY	$65.0000	$214,500.00
	5" MONOLITHIC CONCRETE ISLANDS(KEYED IN)				
Section 0001 Total					$856,936.00
Item Total					$856,936.00

Name: FOOTHILLS CONSTRUCTION SERVICES INC ID: 4388

Address: 6081 PEA RIDGE PASS , HAMPTONVILLE, NC 27020

Used As: SubContractor DBE Items Total:$933,623.80

Items for FOOTHILLS CONSTRUCTION SERVICES INC

0001
ROADWAY ITEMS

0076	2000000000-N	13.000	EA	$198.0000	$2,574.00
	RIGHT-OF-WAY MARKERS				
0077	2020000000-N	26.000	EA	$198.0000	$5,148.00
	CONTROL-OF-ACCESS MARKERS				
0206	6000000000-E	47485.000	LF	$1.5200	$72,177.20
	TEMPORARY SILT FENCE				
0210	6015000000-E	113.000	ACR	$1,075.0000	$121,475.00
	TEMPORARY MULCHING				
0211	6018000000-E	5500.000	LB	$0.7600	$4,180.00
	SEED FOR TEMPORARY SEEDING				
0212	6021000000-E	29.000	TON	$505.0000	$14,645.00
	FERTILIZER FOR TEMPORARY SEED-ING				
0214	6029000000-E	24460.000	LF	$1.5200	$37,179.20
	SAFETY FENCE				
0216	6036000000-E	234250.000	SY	$1.4300	$334,977.50
	MATTING FOR EROSION CONTROL				
0217	6037000000-E	1860.000	SY	$4.1000	$7,626.00
	COIR FIBER MAT				
0218	6038000000-E	10400.000	SY	$4.1000	$42,640.00
	PERMANENT SOIL REINFORCEMENT MAT				
0219	6042000000-E	2000	LF	$3.1600	$6,320.00
	1/4" HARDWARE CLOTH				
0225	6071010000-E	140.000	LF	$10.0000	$1,400.00
	WATTLE				
0226	6071012000-E	2660.000	LF	$7.3500	$19,551.00
	COIR FIBER WATTLE				
0227	6071013000-E	6000	LF	$7.5000	$45,000.00
	WATTLE BARRIER				
0228	6071020000-E	3690.000	LB	$4.2600	$15,719.40
	POLYACRYLAMIDE (PAM)				
0229	6071030000-E	5800.000	LF	$4.5000	$26,100.00
	COIR FIBER BAFFLE				
0234	6084000000-E	78.000	ACR	$1,510.0000	$117,780.00
	SEEDING & MULCHING				
0235	6087000000-E	69.000	ACR	$110.0000	$7,590.00
	MOWING				

0236	6090000000-E SEED FOR REPAIR SEEDING	1150.000	LB	$1.6600	$1,909.00
0237	6093000000-E FERTILIZER FOR REPAIR SEEDING	3.000	TON	$550.0000	$1,650.00
0238	6096000000-E SEED FOR SUPPLEMENTAL SEEDING	1850.000	LB	$1.5500	$2,867.50
0239	6108000000-E FERTILIZER TOPDRESSING	55.000	TON	$689.0000	$37,895.00
0241	6114500000-N SPECIALIZED HAND MOWING	10.000	MHR	$82.0000	$820.00
0242	6117000000-N RESPONSE FOR EROSION CONTROL	100.000	EA	$55.0000	$5,500.00
0244	6123000000-E REFORESTATION	0.100	ACR	$9,000.0000	$900.00
Section 0001 Total					$933,623.80
Item Total					$933,623.80

Name: NICKELSTON INDUSTRIES INC ID: 12802

Address: POST OFFICE BOX 133 , LAWSONVILLE, NC 27022

Used As: SubContractor DBE Items Total:$319,915.63

Items for NICKELSTON INDUSTRIES INC

0001 ROADWAY ITEMS					
0120	3030000000-E	15075.000	LF	$14.7500	$222,356.25
	STEEL BEAM GUARDRAIL				
0121	3045000000-E	762.500	LF	$15.7500	$12,009.38
	STEEL BEAM GUARDRAIL, SHOP CURVED				
0122	3140000000-E	1.000	EA	$1,900.0000	$1,900.00
	25' CLEAR SPAN GUARDRAIL SEC- TIONS				
0123	3150000000-N	15.000	EA	$30.0000	$450.00
	ADDITIONAL GUARDRAIL POSTS				
0124	3195000000-N	1.000	EA	$500.0000	$500.00
	GUARDRAIL END UNITS, TYPE AT-1				
0125	3210000000-N	13.000	EA	$600.0000	$7,800.00
	GUARDRAIL END UNITS, TYPE CAT-1				
0126	3287000000-N	10.000	EA	$2,700.0000	$27,000.00
	GUARDRAIL END UNITS, TYPE TL-3				
0127	3288000000-N	7.000	EA	$2,600.0000	$18,200.00
	GUARDRAIL END UNITS, TYPE TL-2				
0128	3317000000-N	2.000	EA	$1,600.0000	$3,200.00
	GUARDRAIL ANCHOR UNITS, TYPE B-77				
0129	3360000000-E	9000	LF	$0.9000	$8,100.00
	REMOVE EXISTING GUARDRAIL				
0130	3380000000-E	1700.000	LF	$7.0000	$11,900.00
	TEMPORARY STEEL BEAM GUARDRAIL				
0131	3389150000-N	3.000	EA	$2,000.0000	$6,000.00
	TEMPORARY GUARDRAIL END UNITS, TYPE ***** (TL-3)				
0132	3436000000-N	1.000	EA	$500.0000	$500.00
	GENERIC GUARDRAIL ITEM TEMPORARY GUARDRAIL END UNITS, TYPE CAT-1				
Section 0001 Total					$319,915.63
Item Total					$319,915.63

Name: TRAFFIC CONTROL SAFETY SERVICES, INC. ID: 4761

Address: POST OFFICE BOX 24511 , WINSTON-SALEM, NC 27114

Used As: SubContractor DBE Items Total:$37,215.00

Items for TRAFFIC CONTROL SAFETY SERVICES, INC.

0001 ROADWAY ITEMS					
0141	4054000000-E	1.000	CY	$10.0000	$10.00
	PLAIN CONCRETE SIGN FOUNDA- TIONS				
0142	4060000000-E	492.000	LB	$15.0000	$7,380.00
	SUPPORTS, BREAKAWAY STEEL BEAM				
0143	4072000000-E	1695.000	LF	$9.0000	$15,255.00
	SUPPORTS, 3-LB STEEL U-CHANNEL				
0144	4096000000-N	6.000	EA	$150.0000	$900.00
	SIGN ERECTION, TYPE D				
0145	4102000000-N	70.000	EA	$100.0000	$7,000.00
	SIGN ERECTION, TYPE E				
0146	4108000000-N	16.000	EA	$150.0000	$2,400.00
	SIGN ERECTION, TYPE F				
0147	4110000000-N	2.000	EA	$1,500.0000	$3,000.00
	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)				
0148	4116100000-N	5.000	EA	$150.0000	$750.00
	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (D)				
0149	4116100000-N	3.000	EA	$150.0000	$450.00
	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (E)				
0150	4155000000-N	58.000	EA	$1.0000	$58.00
	DISPOSAL OF SIGN SYSTEM, U- CHANNEL				
0151	4158000000-N	7.000	EA	$1.0000	$7.00
	DISPOSAL OF SIGN SYSTEM, WOOD				
0152	4192000000-N	5.000	EA	$1.0000	$5.00
	DISPOSAL OF SUPPORT, U-CHANNEL				
0153	4400000000-E	0.000	SF	$10.0000	$0.00
	WORK ZONE SIGNS (STATIONARY)				
Section 0001 Total					$37,215.00
Item Total					$37,215.00

Name: SEAL BROTHERS CONTRACTING LLC ID: 4247

Address: 131 W. CLEVE STREET , MOUNT AIRY, NC 27030

Used As: SubContractor DBE Items Total:$38,605.00

Items for SEAL BROTHERS CONTRACTING LLC

0001 ROADWAY ITEMS					
0133	3503000000-E	6400.000	LF	$4.1500	$26,560.00
	WOVEN WIRE FENCE, 47" FABRIC				
0134	3509000000-E	370.000	EA	$24.5000	$9,065.00
	4" TIMBER FENCE POSTS, 7'-6" LONG				
0135	3515000000-E	96.000	EA	$30.0000	$2,880.00
	5" TIMBER FENCE POSTS, 8'-0" LONG				
0136	3557000000-E	100.000	LF	$1.0000	$100.00
	ADDITIONAL BARBED WIRE				
Section 0001 Total					$38,605.00
Item Total					$38,605.00

Name: TRAFFIC CONTROL SAFETY SERVICES, INC. ID: 4761

Address: POST OFFICE BOX 24511 , WINSTON-SALEM, NC 27114

Used As: Supplier DBE Items Total:$14,525.00

Items for TRAFFIC CONTROL SAFETY SERVICES, INC.

0001 ROADWAY ITEMS				
0158	4430000000-N DRUMS	350 EA	$41.5000	$14,525.00
Section 0001 Total				$14,525.00
Item Total				$14,525.00

THIS PROPOSAL CONTAINS THE FOLLOWING ERRORS/WARNINGS (IF ANY)

This Bid contains 1 amendment files

000001 03/02/2020 MODIFY ITEM

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 _____

Contract Item Sheets For C204356

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
			ROADWAY ITEMS			
0001	0000100000-N	800	MOBILIZATION	Lump Sum LS	1,370,000.00	1,370,000.00
0002	0000400000-N	801	CONSTRUCTION SURVEYING	Lump Sum LS	450,000.00	450,000.00
0003	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	Lump Sum LS	1,400,000.00	1,400,000.00
0004	0008000000-E	200	SUPPLEMENTARY CLEARING & GRUB-BING	2 ACR	13,000.00	26,000.00
0005	0022000000-E	225	UNCLASSIFIED EXCAVATION	220,830 CY	6.10	1,347,063.00
0006	0036000000-E	225	UNDERCUT EXCAVATION	2,400 CY	20.00	48,000.00
0007	0106000000-E	230	BORROW EXCAVATION	35,080 CY	0.01	350.80
0008	0134000000-E	240	DRAINAGE DITCH EXCAVATION	18,200 CY	6.50	118,300.00
0009	0141000000-E	240	BERM DITCH CONSTRUCTION	400 LF	4.00	1,600.00
0010	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	32,700 SY	4.50	147,150.00
0011	0177000000-E	250	BREAKING OF EXISTING ASPHALT PAVEMENT	810 SY	3.50	2,835.00
0012	0192000000-N	260	PROOF ROLLING	20 HR	300.00	6,000.00
0013	0195000000-E	265	SELECT GRANULAR MATERIAL	2,000 CY	42.00	84,000.00
0014	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZA-TION	7,150 SY	1.50	10,725.00
0015	0199000000-E	SP	TEMPORARY SHORING	16,000 SF	45.00	720,000.00
0016	0223000000-E	275	ROCK PLATING	3,900 SY	41.00	159,900.00
0017	0318000000-E	300	FOUNDATION CONDITIONING MATE-RIAL, MINOR STRUCTURES	1,750 TON	37.00	64,750.00
0018	0320000000-E	300	FOUNDATION CONDITIONING GEO-TEXTILE	5,500 SY	3.50	19,250.00
0019	0335200000-E	305	15" DRAINAGE PIPE	100 LF	42.00	4,200.00

Contract Item Sheets For C204356

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0020	0335300000-E	305	18" DRAINAGE PIPE	28 LF	52.00	1,456.00
0021	0366000000-E	310	15" RC PIPE CULVERTS, CLASS III	6,992 LF	43.00	300,656.00
0022	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	1,140 LF	47.50	54,150.00
0023	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	1,768 LF	62.00	109,616.00
0024	0384000000-E	310	30" RC PIPE CULVERTS, CLASS III	2,060 LF	80.00	164,800.00
0025	0390000000-E	310	36" RC PIPE CULVERTS, CLASS III	20 LF	112.00	2,240.00
0026	0396000000-E	310	42" RC PIPE CULVERTS, CLASS III	1,244 LF	133.00	165,452.00
0027	0414000000-E	310	60" RC PIPE CULVERTS, CLASS III	520 LF	245.00	127,400.00
0028	0420000000-E	310	66" RC PIPE CULVERTS, CLASS III	64 LF	346.00	22,144.00
0029	0448300000-E	310	18" RC PIPE CULVERTS, CLASS IV	72 LF	48.00	3,456.00
0030	0448500000-E	310	30" RC PIPE CULVERTS, CLASS IV	196 LF	88.00	17,248.00
0031	0448700000-E	310	42" RC PIPE CULVERTS, CLASS IV	380 LF	146.00	55,480.00
0032	0570000000-E	310	6" CS PIPE CULVERTS, 0.064" THICK (SPRING BOX)	32 LF	35.00	1,120.00
0033	0576000000-E	310	**" CS PIPE CULVERTS, *****" THICK (36", 0.079")	40 LF	115.00	4,600.00
0034	0576000000-E	310	**" CS PIPE CULVERTS, *****" THICK (42", 0.109")	36 LF	148.00	5,328.00
0035	0576000000-E	310	**" CS PIPE CULVERTS, *****" THICK (60", 0.138")	96 LF	216.00	20,736.00
0036	0582000000-E	310	15" CS PIPE CULVERTS, 0.064" THICK	472 LF	55.00	25,960.00

Contract Item Sheets For C204356

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0037	0588000000-E	310	18" CS PIPE CULVERTS, 0.064" THICK	268 LF	60.00	16,080.00
0038	0594000000-E	310	24" CS PIPE CULVERTS, 0.064" THICK	536 LF	66.00	35,376.00
0039	0600000000-E	310	30" CS PIPE CULVERTS, 0.079" THICK	224 LF	91.00	20,384.00
0040	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (15", 0.064")	16 EA	402.00	6,432.00
0041	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (18", 0.064")	6 EA	465.00	2,790.00
0042	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (24", 0.064")	18 EA	570.00	10,260.00
0043	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (30", 0.079")	10 EA	655.00	6,550.00
0044	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (36", 0.079")	4 EA	795.00	3,180.00
0045	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (42", 0.109")	2 EA	1,100.00	2,200.00
0046	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (6", 0.064")	4 EA	35.00	140.00
0047	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (60", 0.138")	2 EA	2,750.00	5,500.00
0048	0973100000-E	330	**" WELDED STEEL PIPE, ****" THICK, GRADE B IN SOIL (30", 0.500")	92 LF	600.00	55,200.00
0049	0973300000-E	330	**" WELDED STEEL PIPE, ****" THICK, GRADE B NOT IN SOIL (30", 0.500")	92 LF	2,620.00	241,040.00
0050	0986000000-E	SP	GENERIC PIPE ITEM 24" PIPE REHABILITATION CIPP LINER	567 LF	400.00	226,800.00

Contract Item Sheets For C204356

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0051	0986000000-E	SP	GENERIC PIPE ITEM 30" PIPE REHABILITATION CIPP LINER	180 LF	500.00	90,000.00
0052	0986000000-E	SP	GENERIC PIPE ITEM 36" PIPE REHAB CEMENTITIOUS/ GEOPOLYMER SPRAY LINER	440 LF	200.00	88,000.00
0053	0986000000-E	SP	GENERIC PIPE ITEM 48" PIPE REHAB CEMENTITIOUS/ GEOPOLYMER SPRAY LINER	317 LF	300.00	95,100.00
0054	0986000000-E	SP	GENERIC PIPE ITEM 66" PIPE REHAB CEMENTITIOUS/ GEOPOLYMER SPRAY LINER	698 LF	400.00	279,200.00
0055	0986000000-E	SP	GENERIC PIPE ITEM PRE INSTALLATION INSPECTION	2,202 LF	1.00	2,202.00
0056	0995000000-E	340	PIPE REMOVAL	1,882 LF	33.00	62,106.00
0057	1011000000-N	500	FINE GRADING	Lump Sum LS	682,000.00	682,000.00
0058	1044000000-E	501	LIME TREATED SOIL (SLURRY METHOD)	46,500 SY	3.00	139,500.00
0059	1066000000-E	501	LIME FOR LIME TREATED SOIL	560 TON	200.00	112,000.00
0060	1099500000-E	505	SHALLOW UNDERCUT	250 CY	20.00	5,000.00
0061	1099700000-E	505	CLASS IV SUBGRADE STABILIZA-TION	500 TON	28.00	14,000.00
0062	1110000000-E	510	STABILIZER AGGREGATE	500 TON	27.00	13,500.00
0063	1115000000-E	SP	GEOTEXTILE FOR PAVEMENT STA-BILIZATION	23,700 SY	2.50	59,250.00
0064	1121000000-E	520	AGGREGATE BASE COURSE	54,115 TON	28.00	1,515,220.00
0065	1176000000-E	542	SOIL CEMENT BASE	46,500 SY	3.00	139,500.00
0066	1187000000-E	542	PORTLAND CEMENT FOR SOIL CE-MENT BASE	1,310 TON	200.00	262,000.00
0067	1209000000-E	543	ASPHALT CURING SEAL	13,950 GAL	3.00	41,850.00

Contract Item Sheets For C204356

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0068	1220000000-E	545	INCIDENTAL STONE BASE	500 TON	26.00	13,000.00
0069	1297000000-E	607	MILLING ASPHALT PAVEMENT, ***" DEPTH (1-1/2")	1,900 SY	9.50	18,050.00
0070	1330000000-E	607	INCIDENTAL MILLING	2,610 SY	10.00	26,100.00
0071	1491000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0C	18,640 TON	50.00	932,000.00
0072	1503000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C	31,745 TON	50.00	1,587,250.00
0073	1523000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5C	25,915 TON	50.00	1,295,750.00
0074	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	3,875 TON	700.00	2,712,500.00
0075	1693000000-E	654	ASPHALT PLANT MIX, PAVEMENT REPAIR	1,888 TON	200.00	377,600.00
0076	2000000000-N	806	RIGHT-OF-WAY MARKERS	13 EA	200.00	2,600.00
0077	2020000000-N	806	CONTROL-OF-ACCESS MARKERS	26 EA	200.00	5,200.00
0078	2022000000-E	815	SUBDRAIN EXCAVATION	3,461 CY	27.00	93,447.00
0079	2026000000-E	815	GEOTEXTILE FOR SUBSURFACE DRAINS	7,300 SY	3.50	25,550.00
0080	2033000000-E	815	SUBDRAIN FINE AGGREGATE	504 CY	55.00	27,720.00
0081	2036000000-E	815	SUBDRAIN COARSE AGGREGATE	1,227 CY	62.00	76,074.00
0082	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	10,300 LF	12.00	123,600.00
0083	2070000000-N	815	SUBDRAIN PIPE OUTLET	21 EA	300.00	6,300.00
0084	2077000000-E	815	6" OUTLET PIPE	126 LF	17.00	2,142.00
0085	2143000000-E	818	BLOTTING SAND	20 TON	50.00	1,000.00
0086	2209000000-E	838	ENDWALLS	18 CY	2,000.00	36,000.00

Contract Item Sheets For C204356

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0087	2220000000-E	838	REINFORCED ENDWALLS	16.8 CY	2,000.00	33,600.00
0088	2253000000-E	840	PIPE COLLARS	1.76 CY	1,000.00	1,760.00
0089	2275000000-E	SP	FLOWABLE FILL	468 CY	200.00	93,600.00
0090	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	147 EA	2,000.00	294,000.00
0091	2297000000-E	840	MASONRY DRAINAGE STRUCTURES	30.83 CY	2,000.00	61,660.00
0092	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	218 LF	300.00	65,400.00
0093	2364000000-N	840	FRAME WITH TWO GRATES, STD 840.16	17 EA	700.00	11,900.00
0094	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	44 EA	800.00	35,200.00
0095	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	48 EA	700.00	33,600.00
0096	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	5 EA	700.00	3,500.00
0097	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	3 EA	700.00	2,100.00
0098	2396000000-N	840	FRAME WITH COVER, STD 840.54	24 EA	600.00	14,400.00
0099	2451000000-N	852	CONCRETE TRANSITIONAL SECTION FOR DROP INLET	17 EA	700.00	11,900.00
0100	2462000000-E	836	**" SLUICE GATE (8")	1 EA	3,000.00	3,000.00
0101	2473000000-N	SP	GENERIC DRAINAGE ITEM 6" PVC CLEANOUTS	1 EA	1,000.00	1,000.00
0102	2473000000-N	SP	GENERIC DRAINAGE ITEM REBAR TRASH RACK	1 EA	1,950.00	1,950.00
0103	2473000000-N	SP	GENERIC DRAINAGE ITEM REMOVEABLE ORIFICE TRASH RACK	1 EA	325.00	325.00

Contract Item Sheets For C204356

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0104	2484000000-E	SP	GENERIC DRAINAGE ITEM 6" PIPE - PERFORATED WITH FILTER SOCK	50 LF	17.00	850.00
0105	2492000000-E	SP	GENERIC DRAINAGE ITEM WASHED #57 STONE	6 TON	45.00	270.00
0106	2495000000-E	SP	GENERIC DRAINAGE ITEM ANTI-FLOTATION CONCRETE	3.3 CY	500.00	1,650.00
0107	2495000000-E	SP	GENERIC DRAINAGE ITEM ENGINEERED SOIL MEDIA	2 CY	600.00	1,200.00
0108	2538000000-E	846	**'-**" CONCRETE CURB & GUTTER (2'-9")	14,860 LF	28.00	416,080.00
0109	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	1,550 LF	27.00	41,850.00
0110	2556000000-E	846	SHOULDER BERM GUTTER	6,680 LF	26.00	173,680.00
0111	2591000000-E	848	4" CONCRETE SIDEWALK	250 SY	42.00	10,500.00
0112	2605000000-N	848	CONCRETE CURB RAMPS	2 EA	1,750.00	3,500.00
0113	2619000000-E	850	4" CONCRETE PAVED DITCH	166 SY	73.00	12,118.00
0114	2655000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)	3,300 SY	68.00	224,400.00
0115	2724000000-E	857	PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED	1,690 LF	75.00	126,750.00
0116	2830000000-N	858	ADJUSTMENT OF MANHOLES	1 EA	1,200.00	1,200.00
0117	2845000000-N	858	ADJUSTMENT OF METER BOXES OR VALVE BOXES	1 EA	600.00	600.00
0118	2875000000-N	859	CONVERT EXISTING CATCH BASIN TO DROP INLET	1 EA	1,300.00	1,300.00
0119	2938000000-N	859	CONVERT EXISTING DROP INLET TO JUNCTION BOX WITH MANHOLE	1 EA	1,500.00	1,500.00
0120	3030000000-E	862	STEEL BEAM GUARDRAIL	15,075 LF	16.00	241,200.00
0121	3045000000-E	862	STEEL BEAM GUARDRAIL, SHOP CURVED	762.5 LF	17.00	12,962.50

Contract Item Sheets For C204356

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0122	3140000000-E	862	25' CLEAR SPAN GUARDRAIL SEC-TIONS	1 EA	2,000.00	2,000.00
0123	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	15 EA	32.00	480.00
0124	3195000000-N	862	GUARDRAIL END UNITS, TYPE AT-1	1 EA	520.00	520.00
0125	3210000000-N	862	GUARDRAIL END UNITS, TYPE CAT-1	13 EA	620.00	8,060.00
0126	3287000000-N	SP	GUARDRAIL END UNITS, TYPE TL-3	10 EA	2,800.00	28,000.00
0127	3288000000-N	SP	GUARDRAIL END UNITS, TYPE TL-2	7 EA	2,750.00	19,250.00
0128	3317000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE B-77	2 EA	1,700.00	3,400.00
0129	3360000000-E	863	REMOVE EXISTING GUARDRAIL	10,820 LF	1.00	10,820.00
0130	3380000000-E	862	TEMPORARY STEEL BEAM GUARDRAIL	1,700 LF	7.50	12,750.00
0131	3389150000-N	SP	TEMPORARY GUARDRAIL END UNITS, TYPE ***** (TL-3)	3 EA	2,100.00	6,300.00
0132	3436000000-N	862	GENERIC GUARDRAIL ITEM TEMPORARY GUARDRAIL END UNITS, TYPE CAT-1	1 EA	515.00	515.00
0133	3503000000-E	866	WOVEN WIRE FENCE, 47" FABRIC	6,400 LF	4.50	28,800.00
0134	3509000000-E	866	4" TIMBER FENCE POSTS, 7'-6" LONG	370 EA	26.00	9,620.00
0135	3515000000-E	866	5" TIMBER FENCE POSTS, 8'-0" LONG	96 EA	32.00	3,072.00
0136	3557000000-E	866	ADDITIONAL BARBED WIRE	100 LF	1.10	110.00
0137	3628000000-E	876	RIP RAP, CLASS I	1,345 TON	37.00	49,765.00
0138	3635000000-E	876	RIP RAP, CLASS II	115 TON	52.00	5,980.00
0139	3649000000-E	876	RIP RAP, CLASS B	2,685 TON	35.00	93,975.00
0140	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	11,205 SY	2.50	28,012.50

Contract Item Sheets For C204356

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0141	4054000000-E	902	PLAIN CONCRETE SIGN FOUNDA-TIONS	1 CY	10.50	10.50
0142	4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	492 LB	16.00	7,872.00
0143	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	1,695 LF	9.50	16,102.50
0144	4096000000-N	904	SIGN ERECTION, TYPE D	6 EA	155.00	930.00
0145	4102000000-N	904	SIGN ERECTION, TYPE E	70 EA	105.00	7,350.00
0146	4108000000-N	904	SIGN ERECTION, TYPE F	16 EA	200.00	3,200.00
0147	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	2 EA	2,000.00	4,000.00
0148	4116100000-N	904	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (D)	5 EA	155.00	775.00
0149	4116100000-N	904	SIGN ERECTION, RELOCATE TYPE **** (GROUND MOUNTED) (E)	3 EA	155.00	465.00
0150	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	58 EA	1.05	60.90
0151	4158000000-N	907	DISPOSAL OF SIGN SYSTEM, WOOD	7 EA	1.05	7.35
0152	4192000000-N	907	DISPOSAL OF SUPPORT, U-CHANNEL	5 EA	1.05	5.25
0153	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	550 SF	11.00	6,050.00
0154	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	384 SF	29.00	11,136.00
0155	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	215 SF	11.00	2,365.00
0156	4415000000-N	1115	FLASHING ARROW BOARD	3 EA	3,650.00	10,950.00
0157	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	4 EA	14,000.00	56,000.00
0158	4430000000-N	1130	DRUMS	718 EA	47.00	33,746.00

Contract Item Sheets For C204356

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0159	4435000000-N	1135	CONES	718 EA	21.00	15,078.00
0160	4445000000-E	1145	BARRICADES (TYPE III)	160 LF	36.00	5,760.00
0161	4455000000-N	1150	FLAGGER	240 DAY	250.00	60,000.00
0162	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	18 EA	10,000.00	180,000.00
0163	4470000000-N	1160	REMOVE & RESET TEMPORARY CRASH CUSHION	25 EA	3,000.00	75,000.00
0164	4480000000-N	1165	TMA	2 EA	15,000.00	30,000.00
0165	4485000000-E	1170	PORTABLE CONCRETE BARRIER	8,990 LF	36.00	323,640.00
0166	4500000000-E	1170	REMOVE & RESET PORTABLE CONC-RETE BARRIER	9,160 LF	8.00	73,280.00
0167	4510000000-N	1190	LAW ENFORCEMENT	800 HR	84.00	67,200.00
0168	4516000000-N	1180	SKINNY DRUM	500 EA	33.00	16,500.00
0169	4520000000-N	1266	TUBULAR MARKERS (FIXED)	46 EA	80.00	3,680.00
0170	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	1,302 EA	13.00	16,926.00
0171	4695000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)	300 LF	3.35	1,005.00
0172	4700000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)	675 LF	6.30	4,252.50
0173	4720000000-E	1205	THERMOPLASTIC PAVEMENT MARKING CHARACTER (90 MILS)	8 EA	150.00	1,200.00
0174	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	97 EA	230.00	22,310.00
0175	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	446,770 LF	0.36	160,837.20
0176	4820000000-E	1205	PAINT PAVEMENT MARKING LINES (8")	1,418 LF	0.55	779.90

Contract Item Sheets For C204356

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0177	4825000000-E	1205	PAINT PAVEMENT MARKING LINES (12")	23,060 LF	1.00	23,060.00
0178	4835000000-E	1205	PAINT PAVEMENT MARKING LINES (24")	2,388 LF	5.25	12,537.00
0179	4840000000-N	1205	PAINT PAVEMENT MARKING CHARAC-TER	32 EA	79.00	2,528.00
0180	4845000000-N	1205	PAINT PAVEMENT MARKING SYMBOL	324 EA	95.00	30,780.00
0181	4847010000-E	1205	POLYUREA PAVEMENT MARKING LINES (4", 20 MILS)	81,782 LF	1.50	122,673.00
0182	4847050000-E	1205	POLYUREA PAVEMENT MARKING LINES (8", 20 MILS)	2,698 LF	2.50	6,745.00
0183	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	70,440 LF	0.70	49,308.00
0184	4860000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (8")	978 LF	2.00	1,956.00
0185	4865000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (12")	6,405 LF	2.50	16,012.50
0186	4870000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (24")	442 LF	4.50	1,989.00
0187	4875000000-N	1205	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	94 EA	95.00	8,930.00
0188	4891000000-E	1205	GENERIC PAVEMENT MARKING ITEM THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MILS)	428 LF	14.00	5,992.00
0189	4905000000-N	1253	SNOWPLOWABLE PAVEMENT MARKERS	1,302 EA	31.00	40,362.00
0190	5325000000-E	1510	**" WATER LINE (1")	12 LF	220.00	2,640.00
0191	5325200000-E	1510	2" WATER LINE	46 LF	92.00	4,232.00
0192	5325600000-E	1510	6" WATER LINE	2,928 LF	85.00	248,880.00
0193	5326000000-E	1510	10" WATER LINE	384 LF	100.00	38,400.00

Contract Item Sheets For C204356

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0194	5329000000-E	1510	DUCTILE IRON WATER PIPE FITTINGS	3,310 LB	7.00	23,170.00
0195	5536000000-E	1515	2" VALVE	1 EA	2,500.00	2,500.00
0196	5540000000-E	1515	6" VALVE	7 EA	8,500.00	59,500.00
0197	5666000000-N	1515	FIRE HYDRANT	2 EA	7,500.00	15,000.00
0198	5672000000-N	1515	RELOCATE FIRE HYDRANT	1 EA	6,000.00	6,000.00
0199	5673000000-E	1515	FIRE HYDRANT LEG	47 LF	150.00	7,050.00
0200	5686500000-E	1515	WATER SERVICE LINE	12 LF	220.00	2,640.00
0201	5800000000-E	1530	ABANDON 6" UTILITY PIPE	2,517 LF	15.00	37,755.00
0202	5802000000-E	1530	ABANDON 10" UTILITY PIPE	324 LF	21.00	6,804.00
0203	5815500000-N	1530	REMOVE FIRE HYDRANT	3 EA	1,400.00	4,200.00
0204	5835600000-E	1540	12" ENCASEMENT PIPE	781 LF	300.00	234,300.00
0205	5836000000-E	1540	24" ENCASEMENT PIPE	173 LF	320.00	55,360.00
0206	6000000000-E	1605	TEMPORARY SILT FENCE	47,485 LF	1.55	73,601.75
0207	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	1,750 TON	36.00	63,000.00
0208	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	14,460 TON	36.00	520,560.00
0209	6012000000-E	1610	SEDIMENT CONTROL STONE	5,970 TON	37.00	220,890.00
0210	6015000000-E	1615	TEMPORARY MULCHING	113 ACR	1,100.00	124,300.00
0211	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	5,500 LB	1.00	5,500.00
0212	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEED-ING	29 TON	520.00	15,080.00
0213	6024000000-E	1622	TEMPORARY SLOPE DRAINS	4,470 LF	8.50	37,995.00

Contract Item Sheets For C204356

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0214	6029000000-E	SP	SAFETY FENCE	24,460 LF	1.55	37,913.00
0215	6030000000-E	1630	SILT EXCAVATION	37,050 CY	14.00	518,700.00
0216	6036000000-E	1631	MATTING FOR EROSION CONTROL	234,250 SY	1.50	351,375.00
0217	6037000000-E	SP	COIR FIBER MAT	1,860 SY	4.50	8,370.00
0218	6038000000-E	SP	PERMANENT SOIL REINFORCEMENT MAT	10,400 SY	4.50	46,800.00
0219	6042000000-E	1632	1/4" HARDWARE CLOTH	5,155 LF	3.50	18,042.50
0220	6045000000-E	SP	**" TEMPORARY PIPE (15")	35 LF	22.00	770.00
0221	6045000000-E	SP	**" TEMPORARY PIPE (18")	25 LF	24.00	600.00
0222	6045000000-E	SP	**" TEMPORARY PIPE (36")	110 LF	49.00	5,390.00
0223	6048000000-E	SP	FLOATING TURBIDITY CURTAIN	95 SY	29.00	2,755.00
0224	6069000000-E	1638	STILLING BASINS	58 CY	55.00	3,190.00
0225	6071010000-E	SP	WATTLE	140 LF	10.00	1,400.00
0226	6071012000-E	SP	COIR FIBER WATTLE	2,660 LF	7.50	19,950.00
0227	6071013000-E	SP	WATTLE BARRIER	8,800 LF	8.00	70,400.00
0228	6071020000-E	SP	POLYACRYLAMIDE (PAM)	3,690 LB	4.50	16,605.00
0229	6071030000-E	1640	COIR FIBER BAFFLE	5,800 LF	4.50	26,100.00
0230	6071050000-E	SP	**" SKIMMER (1-1/2")	23 EA	975.00	22,425.00
0231	6071050000-E	SP	**" SKIMMER (2")	6 EA	1,100.00	6,600.00
0232	6071050000-E	SP	**" SKIMMER (2.5")	3 EA	1,200.00	3,600.00

Contract Item Sheets For C204356

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0233	6071050000-E	SP	**" SKIMMER (3")	1 EA	1,600.00	1,600.00
0234	6084000000-E	1660	SEEDING & MULCHING	78 ACR	1,550.00	120,900.00
0235	6087000000-E	1660	MOWING	69 ACR	115.00	7,935.00
0236	6090000000-E	1661	SEED FOR REPAIR SEEDING	1,150 LB	1.70	1,955.00
0237	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	3 TON	600.00	1,800.00
0238	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	1,850 LB	1.55	2,867.50
0239	6108000000-E	1665	FERTILIZER TOPDRESSING	55 TON	700.00	38,500.00
0240	6111000000-E	SP	IMPERVIOUS DIKE	100 LF	76.00	7,600.00
0241	6114500000-N	1667	SPECIALIZED HAND MOWING	10 MHR	86.00	860.00
0242	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	100 EA	58.00	5,800.00
0243	6117500000-N	SP	CONCRETE WASHOUT STRUCTURE	11 EA	700.00	7,700.00
0244	6123000000-E	1670	REFORESTATION	0.1 ACR	9,000.00	900.00
0245	6132000000-N	SP	GENERIC EROSION CONTROL ITEM DEWATERING	9 EA	4,000.00	36,000.00
0246	7048500000-E	1705	PEDESTRIAN SIGNAL HEAD (16", 1 SECTION W/COUNTDOWN)	2 EA	1,000.00	2,000.00
0247	7060000000-E	1705	SIGNAL CABLE	6,330 LF	3.00	18,990.00
0248	7120000000-E	1705	VEHICLE SIGNAL HEAD (12", 3 SECTION)	46 EA	1,000.00	46,000.00
0249	7132000000-E	1705	VEHICLE SIGNAL HEAD (12", 4 SECTION)	4 EA	1,200.00	4,800.00
0250	7144000000-E	1705	VEHICLE SIGNAL HEAD (12", 5 SECTION)	6 EA	1,500.00	9,000.00
0251	7264000000-E	1710	MESSENGER CABLE (3/8")	2,780 LF	4.00	11,120.00

Contract Item Sheets For C204356

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0252	7300000000-E	1715	UNPAVED TRENCHING (**********) (1, 2")	3,100 LF	8.25	25,575.00
0253	7300100000-E	1715	UNPAVED TRENCHING FOR TEMP-ORARY LEAD-IN	30 LF	10.00	300.00
0254	7301000000-E	1715	DIRECTIONAL DRILL (**********) (1, 2")	70 LF	26.00	1,820.00
0255	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	34 EA	400.00	13,600.00
0256	7360000000-N	1720	WOOD POLE	6 EA	1,250.00	7,500.00
0257	7372000000-N	1721	GUY ASSEMBLY	14 EA	400.00	5,600.00
0258	7420000000-E	1722	2" RISER WITH WEATHERHEAD	5 EA	600.00	3,000.00
0259	7444000000-E	1725	INDUCTIVE LOOP SAWCUT	3,940 LF	11.00	43,340.00
0260	7456000000-E	1726	LEAD-IN CABLE (**********) (14-2)	15,390 LF	2.00	30,780.00
0261	7481000000-N	SP	SITE SURVEY	4 EA	100.00	400.00
0262	7481200000-N	SP	LUMINAIRE ARM FOR VIDEO SYSTEM	7 EA	500.00	3,500.00
0263	7481240000-N	SP	CAMERA WITHOUT INTERNAL LOOP EMULATOR PROCESSING UNIT	18 EA	3,300.00	59,400.00
0264	7481260000-N	SP	EXTERNAL LOOP EMULATOR PRO-CESSING UNIT	4 EA	7,000.00	28,000.00
0265	7481280000-N	SP	RELOCATE CAMERA SENSOR UNIT	27 EA	260.00	7,020.00
0266	7576000000-N	SP	METAL STRAIN SIGNAL POLE	12 EA	8,000.00	96,000.00
0267	7613000000-N	SP	SOIL TEST	12 EA	1,000.00	12,000.00
0268	7614100000-E	SP	DRILLED PIER FOUNDATION	96 CY	960.00	92,160.00
0269	7636000000-N	1745	SIGN FOR SIGNALS	2 EA	360.00	720.00
0270	7642100000-N	1743	TYPE I POST WITH FOUNDATION	1 EA	1,250.00	1,250.00

Contract Item Sheets For C204356

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0271	7744000000-N	1751	DETECTOR CARD (TYPE 170)	26 EA	130.00	3,380.00
0272	7756000000-N	1751	CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED)	3 EA	14,000.00	42,000.00
0273	7901000000-N	1753	CABINET BASE EXTENDER	3 EA	460.00	1,380.00

Contract Item Sheets For C204356

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0274	8126000000-N	414	CULVERT EXCAVATION, STA ****** (838+56.00 -L-)	Lump Sum LS	27,000.00	27,000.00
0275	8133000000-E	414	FOUNDATION CONDITIONING MATER-IAL, BOX CULVERT	202 TON	47.00	9,494.00
0276	8196000000-E	420	CLASS A CONCRETE (CULVERT)	245.9 CY	950.00	233,605.00
0277	8245000000-E	425	REINFORCING STEEL (CULVERT)	33,075 LB	0.01	330.75

Contract Item Sheets For C204356

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0278	8847000000-E	SP	GENERIC RETAINING WALL ITEM ARCHITECTURAL SURFACE TREATMENT (SOUND BARRIER WALL)	34,160 SF	2.05	70,028.00
0279	8847000000-E	SP	GENERIC RETAINING WALL ITEM SOUND BARRIER WALL NW7B	20,100 SF	42.00	844,200.00
			TOTAL AMOUNT OF BID FOR ENTIRE PROJECT			**$27,409,543.90**

0840/Apr09/Q1961847.19/D1037774175000/E279

Contract No. C204356

County Ashe

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 bonafide 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

James R. Vannoy & Sons Construction Co., Inc.

Full name of Corporation

PO Box 635 Jefferson, NC 28640

Address as Prequalified

Attest _____ By _____

Secretary/Assistant Secretary
Select appropriate title

President/Vice President/Assistant Vice President
Select appropriate title

James B. Maloney

Print or type Signer's name

James Will Vannoy

Print or type Signer's name

CORPORATE SEAL

Contract No. C204356
County Ashe

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. C204356
County Ashe

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. **C204356**

County (ies): **Ashe**

ACCEPTED BY THE
DEPARTMENT OF TRANSPORTATION

DocuSigned by:
Ronald E. Davenport, Jr.
F81B6038A47A442...
Contract Officer

4/9/2020
Date

Execution of Contract and Bonds
Approved as to Form:

DocuSigned by:
Ebony Pittman
0792319F4AB64C2...
Attorney General

4/9/2020
Date

Signature Sheet (Bid - Acceptance by Department)

Contract No. C204356
County Ashe

Rev 5-17-11

CONTRACT PAYMENT BOND

Date of Payment Bond Execution	March 24, 2020
Name of Principal Contractor	James R. Vannoy & Sons Construction Co., Inc.
Name of Surety:	Travelers Casualty & Surety Company of America
Name of Contracting Body:	**North Carolina Department of Transportation**
	Raleigh, North Carolina
Amount of Bond:	$27,409,543.90
Contract ID No.:	C204356
County Name:	Ashe

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. C204356
County Ashe

Rev 5-17-11

CONTRACT PAYMENT BOND

Affix Seal of Surety Company

Travelers Casualty & Surety Company of America

Print or type Surety Company Name

By Lewis W. Shepherd

Print, stamp or type name of Attorney-in-Fact

Signature of Attorney-in-Fact

Cheryl H Little

Signature of Witness

Cheryl H. Little

Print or type Signer's name

PO Box 390, West Jefferson, NC 28694

Address of Attorney-in-Fact

Contract No. C204356
County Ashe

Rev 5-17-11

CONTRACT PAYMENT BOND

CORPORATION

SIGNATURE OF CONTRACTOR (Principal)

James R. Vannoy & Sons Construction Co., Inc.

Full name of Corporation

PO Box 635 Jefferson, NC 28640

Address as prequalified

By _____

Signature of President, Vice President, Assistant Vice President
Select appropriate title

James Will Vannoy

Print or type Signer's name

Affix Corporate Seal

JAMES R. VANNOY & SONS CONSTRUCTION CO., INC. CORPORATE SEAL

Attest _____

Signature of Secretary, Assistant Secretary
Select appropriate title

James B. Maloney

Print or type Signer's name

Contract No. C204356
County Ashe

Rev 5-17-11

CONTRACT PERFORMANCE BOND

Date of Performance Bond Execution: March 24,2020

Name of Principal Contractor: James R. Vannoy & Sons Construction Co. Inc.

Name of Surety: Travelers Casualty & Surety Company of America

Name of Contracting Body: **North Carolina Department of Transportation**

Raleigh, North Carolina

Amount of Bond: $27,409,543.90

Contract ID No.: C204356

County Name: Ashe

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. C204356
County Ashe

Rev 5-17-11

CONTRACT PERFORMANCE BOND

Affix Seal of Surety Company

Travelers Casualty & Surety Company of America

Print or type Surety Company Name

By Lewis W. Shepherd

Print, stamp or type name of Attorney-in-Fact

Signature of Attorney-in-Fact

Cheryl H. Little

Signature of Witness

Cheryl H Little

Print or type Signer's name

PO Box 390, West Jefferson, NC 28694

Address of Attorney-in-Fact

Contract No. C204356
County Ashe

Rev 5-17-11

CONTRACT PERFORMANCE BOND

CORPORATION

SIGNATURE OF CONTRACTOR (Principal)

James R. Vannoy & Sons Construction Co. Inc.

Full name of Corporation

PO Box 635, Jefferson, NC 28640

Address as prequalified

By

Signature of **President, Vice President, Assistant Vice President**
Select appropriate title

James Will Vannoy

Print or type Signer's name

Affix Corporate Seal

JAMES R. VANNOY & SONS CONSTRUCTION CO. INC. CORPORATE SEAL

Attest

Signature of **Secretary, Assistant Secretary**
Select appropriate title

James B. Maloney

Print or type Signer's name

TRAVELERS

Travelers Casualty and Surety Company of America
Travelers Casualty and Surety Company
St. Paul Fire and Marine Insurance Company

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and S Paul Fire and Marine Insurance Company are corporations duly organized under the laws of the State of Connecticut (herein collectively called th "Companies"), and that the Companies do hereby make, constitute and appoint **Lewis W. Shepherd** of **WEST JEFFERSON North Carolina**, their true and lawful Attorney-in-Fact to sign, execute, seal and acknowledge any and all bonds, recognizances conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in an actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed, and their corporate seals to be hereto affixed, this **17th** day of **January 2019.**

State of Connecticut

City of Hartford ss.

By: _____
Robert L. Raney, Senior Vice President

On this the **17th** day of **January, 2019**, before me personally appeared **Robert L. Raney**, who acknowledged himself to be the Senior Vice Presiden of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, an that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of sai Companies by himself as a duly authorized officer.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

My Commission expires the **30th** day of **June, 2021**

_____
Anna P. Nowik, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Travelers Casualty an Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, which resolutions are now in fu force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, an Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact an Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sig with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revok the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vic President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each suc delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditiona undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, an Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or an Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by on or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vic President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power c Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only c executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearin such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimil signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary of Travelers Casualty and Surety Company of America, Travelers Casualty and Suret Company, and St. Paul Fire and Marine Insurance Company, do hereby certify that the above and foregoing is a true and correct copy of the Power c Attorney executed by said Companies, which remains in full force and effect.

Dated this **24th** day of **March**, **2020**.

_____
Kevin E. Hughes, Assistant Secretary

To verify the authenticity of this Power of Attorney, please call us at 1-800-421-3880.
Please refer to the above-named Attorney-in-Fact and the details of the bond to which this Power of Attorney is attached.