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

C203991

CONTRACT AND CONTRACT BONDS

FOR CONTRACT NO. C203991

WBS	45429.3.3 STPDA-0540(39)
T.I.P NO.	U-5315A, U-5315B
COUNTY OF	WAKE
THIS IS THE	ROADWAY & CULVERT CONTRACT
ROUTE NUMBER	LENGTH 0.492 MILES
LOCATION	MORRISVILLE PKWY EXT FROM WEST OF HIGHCROFT DR TO EAST OF MILLS PARK DR IN CARY.
CONTRACTOR	BARNHILL CONTRACTING COMPANY
ADDRESS	P.O. BOX 7948 ROCKY MOUNT, NC 27804
BIDS OPENED	DECEMBER 19, 2017
CONTRACT EXECUTION	1/5/2018

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

PROPOSAL

INCLUDES ADDENDUM No. 1 DATED 12-12-2017

DATE AND TIME OF BID OPENING: **DECEMBER 19, 2017 AT 2:00 PM**

CONTRACT ID	C203991
WBS	45429.3.3

FEDERAL-AID NO.	STPDA-0540(39)
COUNTY	WAKE
T.I.P. NO.	U-5315A, U-5315B
MILES	0.492
ROUTE NO.	
LOCATION	MORRISVILLE PKWY EXT FROM WEST OF HIGHCROFT DR TO EAST OF MILLS PARK DR IN CARY.
TYPE OF WORK	GRADING, DRAINAGE, PAVING, SIGNING, TOLL INFRASTRUCTURE, & CULVERT.

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. C203991 IN WAKE 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. **C203991** 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 2012 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. **C203991** in **Wake 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 2012* with all amendments and supplements thereto, is by reference incorporated into and made a part of this contract; that, except as herein modified, all the construction and work included in this contract is to be done in accordance with the specifications contained in said volume, and amendments and supplements thereto, under the direction of the Engineer.

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

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

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

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



State Contract Officer

DocuSigned by:
Ronald E. Davenport, Jr.
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12/12/2017

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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 **January 29, 2018**, 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 **March 29, 2020**.

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 **January 29, 2018**.

The completion date for this intermediate contract time is **October 1, 2019**.

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 **NC 540, Ramps & Loops** during the following time restrictions:

DAY AND TIME RESTRICTIONS
Sunday thru Saturday
6:00 AM to 9:00 AM
4:00 PM to 7:00 PM

In addition, the Contractor shall not close or narrow a lane of traffic on **NC 540, Ramps & Loops**, detain and/or alter the traffic flow on or during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy, including the following schedules:

HOLIDAY AND HOLIDAY WEEKEND LANE CLOSURE RESTRICTIONS

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

2. For **New Year's Day**, between the hours of **6:00 AM** December 31st and **7:00 PM** January 3rd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until **6:00 AM** the following Tuesday.

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

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

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

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

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

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

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

Holidays and holiday weekends shall include New Year's Day, 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 **Five Hundred Dollars ($ 500.00)** per fifteen **(15)** minute time period.

INTERMEDIATE CONTRACT TIME NUMBER 3 AND LIQUIDATED DAMAGES:
(2-20-07) (Rev. 10-15-13) 108 SP1 G14 E

The Contractor shall complete the required work of installing, maintaining and removing the traffic control devices for road closures and restoring traffic to the existing traffic pattern. The Contractor shall not close **NC 540** during the following time restrictions:

DAY AND TIME RESTRICTIONS
Sunday thru Saturday
4:00 AM to 12:01 AM

The maximum allowable time for overhead sign installations is **thirty (30)** minutes for **NC 540** without an approved offsite detour. The Contractor shall reopen the travel lanes to traffic until any resulting traffic queue is depleted. With an approved offsite detour, the roadways listed may be closed Sunday thru Saturday, from 12:01 AM to 4:00 AM, for overhead sign installations.

The time of availability for this intermediate contract time will be the time the Contractor begins to install traffic control devices required for road closures according to the time restrictions stated herein.

The completion time for this intermediate contract time will be the time the Contractor is required to complete the removal of traffic control devices required for the road closures according to the time restrictions stated herein and restore traffic to the existing traffic pattern.

The liquidated damages are **One Thousand Dollars ($1,000.00)** per fifteen **(15)** minute time period.

INTERMEDIATE CONTRACT TIME NUMBER 4 AND LIQUIDATED DAMAGES:
(2-20-07) (Rev. 6-18-13) 108 SP1 G14 H

The Contractor shall complete the work required of **Phase II, Steps #2 and #3** as shown on Sheets **TMP-2, TMP-10, TMP-12 thru TMP-14, and TMP-16 thru TMP-19** 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 **One Hundred Twenty (120)** consecutive calendar days after the date of availability.

The liquidated damages are **Two Thousand Five Hundred Dollars ($ 2,500.00)** per calendar day.

INTERMEDIATE CONTRACT TIME NUMBER 5 AND LIQUIDATED DAMAGES:
(2-20-07) (Rev. 6-18-13) 108 SP1 G14 H

The Contractor shall complete the work required of **Phase II, Steps #6 and #7** as shown on Sheets **TMP-2, and TMP-16 thru TMP-20** 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 **One Hundred Twenty (120)** consecutive calendar days after the date of availability.

The liquidated damages are **Two Thousand Five Hundred Dollars ($ 2,500.00)** per calendar day.

INTERMEDIATE CONTRACT TIME NUMBER 6 AND LIQUIDATED DAMAGES:

For Failure to Perform the Switchover of All ITS Devices and Toll Network Communications to proposed Trunkline

Before the commencement of significant earthwork in the vicinity of the existing Trunkline, the Contractor shall construct the proposed Trunkline and splice into existing Trunkline as shown in the plans. The Contractor shall perform all splicing and testing required to re-establish all ITS and toll network communications along the proposed Trunkline, as shown in the Splicing Details.

The Contractor shall perform the switchover within a single forty-eight (48) hour period that starts no earlier than 12:01 a.m. Saturday and ends no later than 11:59 p.m. Sunday.

Prior to beginning the switchover, the Contractor shall coordinate with, and obtain approval from, the Toll System Integrator (TSI) to ensure connection to the routing switches provided by the TSI are ready for switchover. The Contractor shall inform the Engineer at least two weeks in advance of when the work will be performed.

The liquidated damages are **Two Thousand Five Hundred Dollars ($ 2,500.00)** per occurrence, per twenty-four **(24)** hour period or any portion thereof, until corrected.

INTERMEDIATE CONTRACT TIME NUMBER 7 AND LIQUIDATED DAMAGES:

For Failure to Maintain and / or Repair toll / ITS Devices and Restore Communication

The Contractor shall ensure that an IMSA certified, or equivalent, Level II traffic qualified technician is standing by to provide emergency maintenance services whenever any electrical work is performed. Standby status shall be defined as being able to arrive, fully equipped, at the work site within two hours ready to provide maintenance services.

The Contractor shall provide the Engineer with the name, office telephone number, and cellular (mobile) telephone number of the supervisory employee who will be responsible for maintenance and repair of equipment during all hours.

Maintain and repair all ITS devices and toll / ITS communications related equipment within the project construction limits from the beginning of construction until completion of the observation period and receipt of written notification of final acceptance of the project.

For all failures, malfunctions, or damages to equipment, begin necessary repairs within twelve (12) hours of notification. Complete repairs within twenty-four (24) hours of notification. The inability to contact the supervisory employee or prearranged alternate will not extend repair time requirements.

Remove and replace all ITS devices and toll / ITS communications related equipment that fails.

Except for damages and malfunctions caused by the Contractor's work activities, the Contractor will not be held responsible for pre-existing conditions reported to the Engineer before starting any work at the specific location. The Contractor shall assume responsibility for all maintenance and emergency services necessary once work has begun at an existing device location and for all damages and malfunctions caused either directly or indirectly by the Contractor's work activities.

In the event that the Contractor fails to perform maintenance and emergency service in accordance with the details specified herein, the Department reserves the right to perform maintenance and emergency service necessary to ensure continuous operation. All expenses incurred by the Department in implementing this option will be deducted from payment due to the Contractor.

In the event that the Contractor damages the toll facilities infrastructure and / or toll collection equipment, the Contractor shall immediately contact the NCTA Director of Toll Road Operations. All repairs to the toll facilities infrastructure and toll collection equipment will be performed by the Toll System Integrator. All expenses incurred by NCTA to repair the damages will be deducted from payment due to the Contractor.

In the event that the Contractor damages existing toll facilities such that toll revenue cannot be collected, the Contractor shall immediately contact the NCTA Director of Toll Road Operations. Based on representative traffic data from the lane(s) in question, NCTA will calculate the revenue loss resulting from the damage and the damages will be deducted from payment due to the Contractor.

** NOTE ** - In the case of a break in a fiber optic communications cable accessing the Communication Service Center and a toll zone, transaction loss and the associated revenue loss typically does not occur until 90 days after the break.

Maintain system equipment until the completion of the one hundred twenty (120) day observation period and the receipt of written notification from the Engineer of final acceptance of the project.

The liquidated damages are **Two Thousand Five Hundred Dollars ($ 2,500.00)** per occurrence, per toll / ITS device, per twenty-four **(24)** hour period or any portion thereof, until corrected.

INTERMEDIATE CONTRACT TIME NUMBER 8 AND LIQUIDATED DAMAGES:

For Failure to Complete the AET / ITS Infrastructure One Hundred Twenty (120) Days before Substantial Completion

The Contractor shall complete all AET / ITS work in accordance with the plans and any Supplemental Agreements and receive acceptance of the AET / ITS work one hundred twenty (120) days prior to substantial completion of the project. This one hundred twenty (120) day period shall serve as the observation period for the AET / ITS systems. The Contractor shall continue maintenance and emergency repairs throughout the observation period in accordance with Intermediate Contract Time #7 until the receipt of written notification from the Engineer of final acceptance of the project.

In the event that the Contractor fails to perform the work in accordance with the plans within the timeframe specified, the Department reserves the right to perform the work or contract the work to be performed. All expenses incurred by the Department in implementing this option will be deducted from payment due the Contractor.

The liquidated damages are **Two Thousand Five Hundred Dollars ($ 2,500.00)** per calendar day until the AET / ITS work is complete and accepted by the Department.

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 *2012 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 *2012 Standard*

Specifications. No additional compensation will be made for maintenance and removal of temporary erosion control items.

MANDATORY PRE-BID CONFERENCE (Prequalifying To Bid):
(7-18-06) (Rev. 3-25-13) SPI 1-14

In order for all prospective bidders to have an extensive knowledge of the project, all prospective bidders shall attend a mandatory pre-bid conference at 10:00 am on Tuesday, December 5, 2017.

Location: NCDOT Century Center, Building A
Structures Design Conference Room
1000 Birch Ridge Drive
Raleigh, NC 27610
Phone: (919) 707-6400

The pre-bid conference will include a thorough discussion of the plans, contract pay items, special provisions, etc.

Only bidders who have attended and properly registered at the above scheduled pre-bid conference and who have met all other prequalification requirements will be considered prequalified to bid on this project. A bid received from a bidder who has not attended and properly registered at the above scheduled pre-bid conference will not be accepted and considered for award.

Attendance at the pre-bid conference will not meet the requirements of proper registration unless the individual attending has registered at the pre-bid conference in accordance with the following:

(A) The individual has signed his name on the official roster no later than thirty (30) minutes after the above noted time for the beginning of the conference.

(B) The individual has written in the name and address of the company he or she represents.

(C) Only one company has been shown as being represented by the individual attending.

(D) The individual attending is an officer or permanent employee of the company they are representing.

Attendance at any prior pre-bid conference will not meet the requirement of this provision.

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 *2012 Standard Specifications*):

Line #		Description
5	—	Unclassified Excavation
7	—	Borrow Excavation
43	—	13-1/2” Portland Cement Concrete Pavement Through Lanes (With Dowels)

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 *2012 Standard Specifications*).

Line #	Description
84 - 92	Guardrail
93 - 95	Fencing
100 - 133	Signing
150 - 159 & 168 - 170	Long-Life Pavement Markings
160 - 161	Removable Tape
173 - 174	Permanent Pavement Markers
176 - 204	Lighting
205 - 212	Utility Construction
213 - 244 & 246 - 247	Erosion Control
245	Reforestation
248 - 281	Signals/ITS System

FUEL PRICE ADJUSTMENT:
(11-15-05) (Rev. 2-18-14) 109-8 SP1 G43

Revise the *2012 Standard Specifications* as follows:

Page 1-83, Article 109-8, Fuel Price Adjustments, add the following:

The base index price for DIESEL #2 FUEL is **$ 1.8971** 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. 5-16-17) 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)
2018	(7/01/17 - 6/30/18)	**35**% of Total Amount Bid
2019	(7/01/18 - 6/30/19)	**57**% of Total Amount Bid
2020	(7/01/19 - 6/30/20)	**8**% of Total Amount Bid

The Contractor shall also furnish his own progress schedule in accordance with Article 108-2 of the *2012 Standard Specifications*. Any acceleration of the progress as shown by the Contractor's progress schedule over the progress as shown above shall be subject to the approval of the Engineer.

DISADVANTAGED BUSINESS ENTERPRISE:

(10-16-07)(Rev. 1-17-17) 102-15(J) SP1 G61

Description

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

Definitions

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

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

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

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

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

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

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

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

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

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

Forms and Websites Referenced in this Provision

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

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

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

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

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

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

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

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

DBE Goal

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

Disadvantaged Business Enterprises **12.0**%

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

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

Directory of Transportation Firms (Directory)

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

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

Listing of DBE Subcontractors

At the time of bid, bidders shall submit all DBE participation that they anticipate to use during the life of the contract. Only those identified to meet the DBE goal will be considered committed, even though the listing shall include both committed DBE subcontractors and additional DBE subcontractors. Additional DBE subcontractor participation submitted at the time of bid will be

used toward the Department's overall race-neutral goal. Only those firms with current DBE certification at the time of bid opening will be acceptable for listing in the bidder's submittal of DBE participation. The Contractor shall indicate the following required information:

(A) Electronic Bids

Bidders shall submit a listing of DBE participation in the appropriate section of Expedite, the bidding software of Bid Express®.

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

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

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

(B) Paper Bids

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

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

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

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

(2) *If the DBE goal is zero,* entries on the *Listing of DBE Subcontractors* are not required for the zero goal, however any DBE participation that is achieved during

the project shall be reported in accordance with requirements contained elsewhere in the special provision.

DBE Prime Contractor

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

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

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

Written Documentation – Letter of Intent

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

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

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

Submission of Good Faith Effort

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

A hard copy and an electronic copy of this information shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. on the sixth calendar day following opening of bids unless the sixth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day. If the contractor cannot send the information electronically, then one complete set and 9 copies of this information shall be received under the same time constraints above.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Non-Good Faith Appeal

The State Contractual Services 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 Contractual Services Engineer or at DBE@ncdot.gov. The appeal shall be made within 2 business days of notification of the determination of non-good faith.

Counting DBE Participation Toward Meeting DBE Goal

(A) Participation

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

(B) Joint Checks

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

(C) Subcontracts (Non-Trucking)

A DBE may enter into subcontracts. Work that a DBE subcontracts to another DBE firm may be counted toward the contract goal requirement. Work that a DBE subcontracts to a

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

(D) Joint Venture

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

(E) Suppliers

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

(F) Manufacturers and Regular Dealers

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

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

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

Commercially Useful Function

(A) DBE Utilization

The Contractor may count toward its contract goal requirement only expenditures to DBEs that perform a commercially useful function in the work of a contract. A DBE performs a commercially useful function when it is responsible for execution of the work of the

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

(B) DBE Utilization in Trucking

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

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

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

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

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

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

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

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

DBE Replacement

When a Contractor has relied on a commitment to a DBE firm (or an approved substitute DBE firm) to meet all or part of a contract goal requirement, the contractor shall not terminate the DBE for convenience. This includes, but is not limited to, instances in which the Contractor seeks to perform the work of the terminated subcontractor with another DBE subcontractor, a non-DBE subcontractor, or with the Contractor's own forces or those of an affiliate. A DBE may only be terminated after receiving the Engineer's written approval based upon a finding of good cause for the termination. The prime contractor must give the DBE firm five (5) calendar days to respond to the prime contractor's notice of termination and advise the prime contractor and the Department of the reasons, if any, why the firm objects to the proposed termination of its subcontract and why the Department should not approve the action.

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

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

(A) Performance Related Replacement

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

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

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

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

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

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

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

(B) Decertification Replacement

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

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

Changes in the Work

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

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

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

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

Reports and Documentation

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

When using transportation services to meet the contract commitment, the Contractor shall submit a proposed trucking plan in addition to the SAF. The plan shall be submitted prior to beginning construction on the project. The plan shall include the names of all trucking firms proposed for

use, their certification type(s), the number of trucks owned by the firm, as well as the individual truck identification numbers, and the line item(s) being performed.

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

Reporting Disadvantaged Business Enterprise Participation

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

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

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

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

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

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

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

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

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

Failure to Meet Contract Requirements

Failure to meet contract requirements in accordance with Subarticle 102-15(J) of the *2012 Standard Specifications* may be cause to disqualify the Contractor.

CERTIFICATION FOR FEDERAL-AID CONTRACTS:

(3-21-90) SP1 G85

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

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

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

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

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

CONTRACTOR'S LICENSE REQUIREMENTS:

(7-1-95) 102-14 SP1 G88

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

U.S. DEPARTMENT OF TRANSPORTATION HOTLINE:

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

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

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

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

CARGO PREFERENCE ACT:

(2-16-16)

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

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

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

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

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

SUBSURFACE INFORMATION:

(7-1-95) 450 SP1 G112 D

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

LOCATING EXISTING UNDERGROUND UTILITIES:

(3-20-12) 105 SP1 G115

Revise the *2012 Standard Specifications* as follows:

Page 1-43, Article 105-8, line 28, after the first sentence, add the following:

Identify excavation locations by means of pre-marking with white paint, flags, or stakes or provide a specific written description of the location in the locate request.

VALUE ENGINEERING PROPOSAL:

(05-19-15) 104 SP01 G116

Revise the *2012 Standard Specifications* as follows:

Page 1-36, Subarticle 104-12(B) Evaluation of Proposals, lines 42-44, replace the fourth sentence of the second paragraph with the following:

Pending execution of a formal supplemental agreement implementing an approved VEP and

transferal of final plans (hard copy and electronic) sealed by an engineer licensed in the State of North Carolina incorporating an approved VEP to the Resident Engineer and the State Value Management Engineer, the Contractor shall remain obligated to perform the work in accordance with the terms of the existing contract.

Page 1-37, Subarticle 104-12(D) Preliminary Review, lines 9-12, replace the first sentence of the first paragraph with the following:

Should the Contractor desire a preliminary review of a possible VEP, before expending considerable time and expense in full development, a copy of the Preliminary VEP shall be submitted to the Resident Engineer and the State Value Management Engineer at ValueManagementUnit@ncdot.gov.

Page 1-37, Subarticle 104-12(E) Final Proposal, lines 22-23, replace the first sentence of the first paragraph with the following:

A copy of the Final VEP shall be submitted by the Contractor to the Resident Engineer and the State Value Management Engineer at ValueManagementUnit@ncdot.gov.

Page 1-38, Subarticle 104-12(F) Modifications, lines 2-8, replace the first paragraph with the following:

To facilitate the preparation of revisions to contract drawings, the Contractor may purchase reproducible copies of drawings for his use through the Department's Value Management Unit. The preparation of new design drawings by or for the Contractor shall be coordinated with the appropriate Design Branch through the State Value Management Engineer. The Contractor shall provide, at no charge to the Department, one set of reproducible drawings of the approved design needed to implement the VEP. Drawings (hard copy and electronic) which are sealed by an engineer licensed in the State of North Carolina shall be submitted to the State Value Management Engineer no later than ten (10) business days after acceptance of a VEP unless otherwise permitted.

Page 1-38, Subarticle 104-12(F) Modifications, line 17, add the following at the end of the third paragraph:

Supplemental agreements executed for design-bid-build contracts shall reflect any realized savings in the corresponding line items. Supplemental agreements executed for design-build contracts shall add one line item deducting the full savings from the total contract price and one line item crediting the Contractor with 50% of the total VEP savings.

Page 1-38, Subarticle 104-12(F) Modifications, lines 45-47, replace the eighth paragraph with the following:

Unless and until a supplemental agreement is executed and issued by the Department and final plans (hard copy and electronic) sealed by an engineer licensed in the State of North Carolina incorporating an approved VEP have been provided to the Resident Engineer and the State Value Management Engineer, the Contractor shall remain obligated to perform the work in accordance with the terms of the existing contract.

RESOURCE CONSERVATION AND ENV. SUSTAINABLE PRACTICES:

(5-21-13) (Rev. 5-19-15) 104-13 SP1 G118

In accordance with North Carolina Executive Order 156, NCGS 130A-309.14(3), and NCGS 136-28.8, it is the objective of the Department to aid in the reduction of materials that become a part of our solid waste stream, to divert materials from landfills, to find ways to recycle and reuse materials, to consider and minimize, where economically feasible, the environmental impacts associated with agency land use and acquisition, construction, maintenance and facility management for the benefit of the Citizens of North Carolina.

To achieve the mission of reducing environmental impacts across the state, the Department is committed to supporting the efforts to initiate, develop and use products and construction methods that incorporate the use of recycled, solid waste products and environmentally sustainable practices in accordance with Article 104-13 of the *Standard Specifications*.

Report the quantities of reused or recycled materials either incorporated in the project or diverted from landfills and any practice that minimizes the environmental impact on the project annually on the Project Construction Reuse and Recycling Reporting Form. The Project Construction Reuse and Recycling Reporting Form and a location tool for local recycling facilities are available at:
http://connect.ncdot.gov/resources/Environmental/Pages/North-Carolina-Recycling-Locations.aspx.

Submit the Project Construction Reuse and Recycling Reporting Form by August 1 annually to valuemanagementunit@ncdot.gov. For questions regarding the form or reporting, please contact the State Value Management Engineer at 919-707-4810.

DOMESTIC STEEL:

(4-16-13) 106 SP1 G120

Revise the *2012 Standard Specifications* as follows:

P**age 1-49, Subarticle 106-1(B) Domestic Steel, lines 2-7,** replace the first paragraph with the following:

All steel and iron products that are permanently incorporated into this project shall be produced in the United States except minimal amounts of foreign steel and iron products may be used provided the combined material cost of the items involved does not exceed 0.1% of the total amount bid for the entire project or $2,500, whichever is greater. If invoices showing the cost of the material are not provided, the amount of the bid item involving the foreign material will be used for calculations. This minimal amount of foreign produced steel and iron products permitted for use is not applicable to high strength fasteners. Domestically produced high strength fasteners are required.

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 *2012 Standard Specifications* have been furnished to the Engineer.

The provisions of Subarticle 109-5(B) of the *2012 Standard Specifications* will apply to the portable concrete barrier.

REMOVABLE PAVEMENT MARKINGS - (Partial Payments for Materials):

(7-1-95) (Rev. 8-16-11) 1205-10 SP1 G124

When so authorized by the Engineer, partial materials payments will be made up to 95 percent of the delivered cost of pavement marking tape, provided that these materials have been delivered on or in the vicinity of the project, stored in an acceptable manner, not to exceed the shelf life recommended by the manufacturer, and further provided the documents listed in Subarticle 109-5(C) of the *2012 Standard Specifications* have been furnished to the Engineer.

The Contractor shall be responsible for the material and the satisfactory performance of the material when used in the work.

The provisions of Article 109-6 of the *2012 Standard Specifications* will not apply to removable pavement marking materials.

BID DOCUMENTATION:

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

General

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

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

Terms

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

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

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

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

Failure to Provide Bid Documentation

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

Submittal of Bid Documentation

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

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

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

Affidavit

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

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

Verification

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

Confidentiality of Bid Documentation

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

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

Duration and Use

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

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

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

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

Release of Bid Documentation to the Contractor

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

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

Payment

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

TWELVE MONTH GUARANTEE:

(7-15-03) 108 SP1 G145

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

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

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

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

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

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

GIFTS FROM VENDORS AND CONTRACTORS:

(12-15-09) 107-1 SP1 G152

By Executive Order 24, issued by Governor Perdue, and *N.C.G.S.§ 133-32,* it is unlawful for any vendor or contractor (i.e. architect, bidder, contractor, construction manager, design professional, engineer, landlord, offeror, seller, subcontractor, supplier, or vendor), to make gifts or to give favors to any State employee of the Governor's Cabinet Agencies (i.e. Administration, Commerce, Correction, Crime Control and Public Safety, Cultural Resources, Environment and Natural Resources, Health and Human Services, Juvenile Justice and Delinquency Prevention, Revenue, Transportation, and the Office of the Governor). This prohibition covers those vendors and contractors who:

(A) Have a contract with a governmental agency; or
(B) Have performed under such a contract within the past year; or
(C) Anticipate bidding on such a contract in the future.

For additional information regarding the specific requirements and exemptions, vendors and contractors are encouraged to review Executive Order 24 and *N.C.G.S. § 133-32*.

Executive Order 24 also encouraged and invited other State Agencies to implement the requirements and prohibitions of the Executive Order to their agencies. Vendors and contractors should contact other State Agencies to determine if those agencies have adopted Executive Order 24.

LIABILITY INSURANCE:

(5-20-14) SP1 G160

Revise the *2012 Standard Specifications* as follows:

Page 1-60, Article 107-15 LIABILITY INSURANCE, line 16, add the following as the second sentence of the third paragraph:

Prior to beginning services, all contractors shall provide proof of coverage issued by a workers' compensation insurance carrier, or a certificate of compliance issued by the Department of Insurance for self-insured subcontractors, irrespective of whether having regularly in service fewer than three employees.

EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:

(1-16-07) (Rev 11-22-16) 105-16, 225-2, 16 SP1 G180

General

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

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

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

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

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

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

Roles and Responsibilities

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

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

(a) Oversee the work of subcontractors so that appropriate erosion and sediment control/stormwater preventive measures are conformed to at each stage of the work.

(b) Prepare the required National Pollutant Discharge Elimination System (NPDES) Inspection Record and submit to the Engineer.

(c) Attend all weekly or monthly construction meetings to discuss the findings of the NPDES inspection and other related issues.

(d) Implement the erosion and sediment control/stormwater site plans requested.

(e) Provide any needed erosion and sediment control/stormwater practices for the Contractor's temporary work not shown on the plans, such as, but not limited to work platforms, temporary construction, pumping operations, plant and storage yards, and cofferdams.

(f) Acquire applicable permits and comply with requirements for borrow pits, dewatering, and any temporary work conducted by the Contractor in jurisdictional areas.

(g) Conduct all erosion and sediment control/stormwater work in a timely and workmanlike manner.

(h) Fully perform and install erosion and sediment control/stormwater work prior to any suspension of the work.

(i) Coordinate with Department, Federal, State and Local Regulatory agencies on resolution of erosion and sediment control/stormwater issues due to the Contractor's operations.

(j) Ensure that proper cleanup occurs from vehicle tracking on paved surfaces or any location where sediment leaves the Right-of-Way.

(k) Have available a set of erosion and sediment control/stormwater plans that are initialed and include the installation date of Best Management Practices. These practices shall include temporary and permanent groundcover and be properly updated to reflect necessary plan and field changes for use and review by Department personnel as well as regulatory agencies.

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

(a) Control project site waste to prevent contamination of surface or ground waters of the state, i.e. from equipment operation/maintenance, construction materials, concrete washout, chemicals, litter, fuels, lubricants, coolants, hydraulic fluids, any other petroleum products, and sanitary waste.

(b) Inspect erosion and sediment control/stormwater devices and stormwater discharge outfalls at least once every 7 calendar days and within 24 hours after a rainfall event of 0.5 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. 3-19-13) 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 *2012 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 http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/fieldops/downloads/Files/TurbidityReductionOptionSheet.pdf to plan, design, construct, and maintain BMPs to address water quality standards. Tier I Methods include stilling basins which are standard compensatory BMPs. Other Tier I methods are noncompensatory and shall be used when needed to meet the stream turbidity standards. Tier II Methods are also noncompensatory and are options that may be needed for protection of rare or unique resources or where special environmental conditions exist at the site which have led to additional requirements being placed in the DWQ's 401 Certifications and approval letters, Isolated Wetland Permits, Riparian Buffer Authorization or a DOT Reclamation Plan's Environmental Assessment for the specific site. Should the Contractor exhaust all Tier I Methods on a site exclusive of rare or unique resources or special environmental conditions, Tier II Methods may be required by regulators on a case by case basis per supplemental agreement.

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

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

EMPLOYMENT:

(11-15-11) (Rev. 1-17-12) 108, 102 SP1 G184

Revise the *2012 Standard Specifications* as follows:

Page 1-20, Subarticle 102-15(O), delete and replace with the following:

(O) Failure to restrict a former Department employee as prohibited by Article 108-5.

Page 1-65, Article 108-5 Character of Workmen, Methods, and Equipment, line 32, delete all of line 32, the first sentence of the second paragraph and the first word of the second sentence of the second paragraph.

STATE HIGHWAY ADMINISTRATOR TITLE CHANGE:

(9-18-12) SP1 G185

Revise the *2012 Standard Specifications* as follows:

Replace all references to "State Highway Administrator" with "Chief Engineer".

SUBLETTING OF CONTRACT:

(11-18-2014) 108-6 SP1 G186

Revise the *2012 Standard Specifications* as follows:

Page 1-66, Article 108-6 Subletting of Contract, line 37, add the following as the second sentence of the first paragraph:

All requests to sublet work shall be submitted within 30 days of the date of availability or prior to expiration of 20% of the contract time, whichever date is later, unless otherwise approved by the Engineer.

Page 1-67, Article 108-6 Subletting of Contract, line 7, add the following as the second sentence of the fourth paragraph:

Purchasing materials for subcontractors is not included in the percentage of work required to be performed by the Contractor. If the Contractor sublets items of work but elects to purchase material for the subcontractor, the value of the material purchased will be included in the total dollar amount considered to have been sublet.

NOTE TO CONTRACTOR:

The Contractor's attention is directed to the fact that he will be allowed to haul across the existing bridge spanning NC540 with road legal trucks only.

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 *2012 Roadway Standard Drawings*. Conventional clearing methods may be used except where permit drawings or conditions have been included in the proposal which require certain areas to be cleared by hand methods.

BURNING RESTRICTIONS:

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

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

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. Salvage and stockpile the aggregate base course removed from the pavement at locations within the right of way, as directed by the Engineer, for removal by State Forces. Place pavement and earth material removed in embankments or dispose of in waste areas furnished by the Contractor.

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

Such prices and payments will be full compensation for removing, salvaging, and stockpiling aggregate base course; removing pipe culverts; removing asphalt pavement; 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 *2012 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 *2012 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 *2012 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.

BLASTING:

(2-16-16) 220 SP2 R88B

Revise the *2012 Standard Specifications* as follows:

Page 2-8, Article 220-1 DESCRIPTION, line 22, delete “cushion, ”.

Page 2-8, Article 220-1 DESCRIPTION, line 23, add the following after the third sentence:

Unless required otherwise in the contract, design blasts for the vibration and air overpressure limits in this section.

Page 2-9, Subarticle 220-3(A) Vibration and Air Overpressure Limits, line 18, add the following to the end of Subarticle 220-3(A):

Unless required otherwise in the contract or directed, design production and trench blasts in accordance with the following:

(1) Production Blasting

(a) For rock cut slopes steeper than 1.5:1 (H:V) without pre-splitting, do not use production blast holes more than 4" in diameter within 10 ft of finished slope faces or neat lines
(b) Do not drill production holes below bottom of adjacent pre-split blast holes
(c) Use delay blasting to detonate production blast holes towards a free face

(2) Trench Blasting

(a) Do not use trench blast holes more than 3" in diameter
(b) Do not use ANFO or other bulk loaded products
(c) Use cartridge explosives or other explosive types designed for trench blasting
(d) Use charges with a diameter of 1/2" to 3/4" less than the trench blast hole diameter

PIPE INSTALLATION:

(11-20-12) (Rev. 8-18-15) 300 SP3 R01

Revise the *2012 Standard Specifications* as follows:

Page 3-1, Article 300-2, Materials, line 15, in the materials table, replace "Flowable Fill" and "Geotextiles" with the following:

Item	**Section**
Flowable Fill, Excavatable	1000-6
Grout, Type 2	1003
Geotextiles, Type 4	1056

Page 3-1, Article 300-2, Materials, lines 23-24, replace sentence with the following:

Provide foundation conditioning geotextile and geotextile to wrap pipe joints in accordance with Section 1056 for Type 4 geotextile.

Page 3-3, Subarticle 300-6(A), Rigid Pipe, line 2, in the first paragraph, replace "an approved non-shrink grout." with "grout." and line 4, in the second paragraph, replace "filtration geotextile" with "geotextile".

Page 3-3, Article 300-7, Backfilling, lines 37-38, in the first and second sentences of the fifth paragraph, replace "Excavatable flowable fill" with "Flowable fill".

ASPHALT PAVEMENTS - SUPERPAVE:

(6-19-12) (Rev. 8-16-16) 605, 609, 610, 650 SP6 R01

Revise the *2012 Standard Specifications* as follows:

Page 6-3, Article 605-7, APPLICATION RATES AND TEMPERATURES, replace this article, including Table 605-1, with the following:

Apply tack coat uniformly across the existing surface at target application rates shown in Table 605-1.

TABLE 605-1 APPLICATION RATES FOR TACK COAT	
Existing Surface	**Target Rate (gal/sy)**
	Emulsified Asphalt
New Asphalt	0.04 ± 0.01
Oxidized or Milled Asphalt	0.06 ± 0.01
Concrete	0.08 ± 0.01

Apply tack coat at a temperature within the ranges shown in Table 605-2. Tack coat shall not be overheated during storage, transport or at application.

TABLE 605-2 APPLICATION TEMPERATURE FOR TACK COAT	
Asphalt Material	**Temperature Range**
Asphalt Binder, Grade PG 64-22	350 - 400°F
Emulsified Asphalt, Grade RS-1H	130 - 160°F
Emulsified Asphalt, Grade CRS-1	130 - 160°F
Emulsified Asphalt, Grade CRS-1H	130 - 160°F
Emulsified Asphalt, Grade HFMS-1	130 - 160°F
Emulsified Asphalt, Grade CRS-2	130 - 160°F

Page 6-6, Subarticle 607-5(A), Milled Asphalt Pavement, line 25, add the following to the end of the paragraph:

Areas to be paid under these items include mainline, turn lanes, shoulders, and other areas milled in conjunction with the mainline and any additional equipment necessary to remove pavement in the area of manholes, water valves, curb, gutter and other obstructions.

Page 6-6, Subarticle 607-5(C), Incidental Milling, lines 42-48, replace the paragraph with the following:

Incidental Milling to be paid will be the actual number of square yards of surface milled where the Contractor is required to mill butt joints, irregular areas and intersections milled as a separate operation from mainline milling and re-mill areas that are not due to the Contractor's negligence whose length is less than 100 feet. Measurement will be made as provided in Subarticle 607-5(A) for each cut the Contractor is directed to perform. Where the Contractor elects to make multiple cuts to achieve the final depth, no additional measurement will be made. Compensation will be made at the contract unit price per square yard for *Incidental Milling*.

Page 6-7, Article 609-3, FIELD VERIFICATION OF MIXTURE AND JOB MIX FORMULA ADJUSTMENTS, lines 35-37, delete the second sentence of the second paragraph.

Page 6-18, Article 610-1 DESCRIPTION, lines 40-41, delete the last sentence of the last paragraph.

Page 6-19, Subarticle 610-3(A), Mix Design-General, line 5, add the following as the first paragraph:

Warm mix asphalt (WMA) is allowed for use at the Contractor's option in accordance with the NCDOT Approved Products List for WMA Technologies available at:

https://connect.ncdot.gov/resources/Materials/MaterialsResources/Warm%20Mix%20Asphalt%20Approved%20List.pdf

Page 6-20, Subarticle 610-3(C), Job Mix Formula (JMF), lines 47-48, replace the last sentence of the third paragraph with the following:

The JMF mix temperature shall be within the ranges shown in Table 610-1 unless otherwise approved.

Page 6-21, Subarticle 610-3(C) Job Mix Formula (JMF), replace Table 610-1 with the following:

TABLE 610-1 MIXING TEMPERATURE AT THE ASPHALT PLANT	
Binder Grade	**JMF Mix Temperature**
PG 58-28; PG 64-22	250 - 290ºF
PG 70-22	275- 305ºF
PG 76-22	300- 325ºF

Page 6-21, Subarticle 610-3(C) Job Mix Formula (JMF), lines 1-2, in the first sentence of the first paragraph, delete "and compaction". Lines 4-7, delete the second paragraph and replace with the following:

When RAS is used, the JMF mix temperature shall be established at 275ºF or higher.

Page 6-22, Article 610-4, WEATHER, TEMPERATURE AND SEASONAL LIMITATIONS FOR PRODUCING AND PLACING ASPHALT MIXTURES, lines 15-17, replace the second sentence of the first paragraph with the following:

Do not place asphalt material when the air or surface temperatures, measured at the location of the paving operation away from artificial heat, do not meet Table 610-5.

Page 6-23, Article 610-4, WEATHER, TEMPERATURE AND SEASONAL LIMITATIONS FOR PRODUCING AND PLACING ASPHALT MIXTURES, replace Table 610-5 with the following:

TABLE 610-5 PLACEMENT TEMPERATURES FOR ASPHALT	
Asphalt Concrete Mix Type	**Minimum Surface and Air Temperature**
B25.0B, C	35°F
I19.0B, C, D	35°F
SF9.5A, S9.5B	40°F[A]
S9.5C, S12.5C	45°F[A]
S9.5D, S12.5D	50°F

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

Page 6-23, Subarticle 610-5(A), General, lines 33-34, replace the last sentence of the third paragraph with the following:

Produce the mixture at the asphalt plant within ±25 ºF of the JMF mix temperature. The temperature of the mixture, when discharged from the mixer, shall not exceed 350ºF.

Page 6-26, Article 610-7, HAULING OF ASPHALT MIXTURE, lines 22-23, in the fourth sentence of the first paragraph replace "so as to overlap the top of the truck bed and" with "to". Line 28, in the last paragraph, replace "+15 ºF to -25 ºF of the specified JMF temperature." with "±25 ºF of the specified JMF mix temperature."

Page 6-26, Article 610-8, SPREADING AND FINISHING, **line 34**, add the following new

paragraph:

As referenced in Section 9.6.3 of the *HMA/QMS Manual*, use the automatic screed controls on the paver to control the longitudinal profile. Where approved by the Engineer, the Contractor has the option to use either a fixed or mobile string line.

Page 6-29, Article 610-13, FINAL SURFACE TESTING AND ACCEPTANCE, line 39, add the following after the first sentence in the first paragraph:

Smoothness acceptance testing using the inertial profiler is not required on ramps, loops and turn lanes.

Page 6-30, Subarticle 610-13(A), Option 1 – Inertial Profiler, lines 15-16, replace the fourth sentence of the fourth paragraph with the following:

The interval at which relative profile elevations are reported shall be 2".

Page 6-30, Subarticle 610-13(A), Option 1 – Inertial Profiler, lines 25-28, replace the ninth paragraph with the following:

Operate the profiler at any speed as per the manufacturer's recommendations to collect valid data.

Page 6-30, Subarticle 610-13(A), Option 1 – Inertial Profiler, lines 30-31, delete the third sentence of the tenth paragraph.

Page 6-31, Subarticle 610-13(A), Option 1 – Inertial Profiler, lines 11-13, replace the first sentence of the third paragraph with the following:

After testing, transfer the profile data from the profiler portable computer's hard drive to a write once storage media (Flash drive, USB, DVD-R or CD-R) or electronic media approved by the Engineer.

Page 6-31, Subarticle 610-13(A), Option 1 – Inertial Profiler, lines 17-18, replace the first sentence of the fourth paragraph with the following:

Submit a report with the documentation and electronic data of the evaluation for each section to the Engineer within 10 days after completion of the smoothness testing. The report shall be in the tabular format for each 0.10 segment or a portion thereof with a summary of the MRI values and the localized roughness areas including corresponding project station numbers or acceptable reference points. Calculate the pay adjustments for all segments in accordance with the formulas in Sections (1) and (2) shown below. The Engineer shall review and approval all pay adjustments unless corrective action is required.

Page 6-31, Subarticle 610-13(A)(1), Acceptance for New Construction, lines 36-37, replace the third paragraph with the following:

The price adjustment will apply to each 0.10-mile section or prorated for a portion thereof, based on the Mean Roughness Index (MRI), the average IRI values from both wheel paths.

Page 6-32, Subarticle 610-13(A)(2), Localized Roughness, lines 12-16, replace the first paragraph with the following:

Areas of localized roughness shall be identified through the "Smoothness Assurance Module (SAM)" provided in the ProVAL software. Use the SAM report to optimize repair strategies by analyzing the measurements from profiles collected using inertial profilers. The ride quality threshold for localized roughness shall be 165 in/mile for any sections that are 15 ft. to 100 ft. in length at the continuous short interval of 25 ft. Submit a continuous roughness report to identify each section with project station numbers or reference points outside the threshold and identify all localized roughness, with the signature of the Operator included with the submitted IRI trace and electronic files.

Page 6-32, Subarticle 610-13(A)(2), Localized Roughness, line 21, add the following new paragraph:
If the Engineer does not require corrective action, the pay adjustment for each area of localized roughness shall be based on the following formula:

PA = (165 – LR#) 5

Where:

PA = Pay Adjustment (dollars)
LR# = The Localized Roughness number determined from SAM report for the ride quality threshold

Page 6-41, Subarticle 650-3(B), Mix Design Criteria, replace Table 650-1 with the following:

TABLE 650-1
OGAFC GRADATION CRITERIA

Sieve Size (mm)	*Type FC-1*	*Type FC-1 Modified*	*Type FC-2 Modified*
19.0	-	-	100
12.5	100	100	80 - 100
9.50	75 - 100	75 - 100	55 - 80
4.75	25 - 45	25 - 45	15 - 30
2.36	5 - 15	5 - 15	5 - 15
0.075	1.0 - 3.0	1.0 - 3.0	2.0 - 4.0

ASPHALT BINDER CONTENT OF ASPHALT PLANT MIXES:
(11-21-00) (Rev. 7-17-12) 609 SP6 R15

The approximate asphalt binder content of the asphalt concrete plant mixtures used on this project will be as follows:

Asphalt Concrete Base Course	Type B 25.0__	4.4%
Asphalt Concrete Intermediate Course	Type I 19.0__	4.8%
Asphalt Concrete Surface Course	Type S 4.75A	6.8%
Asphalt Concrete Surface Course	Type SA-1	6.8%
Asphalt Concrete Surface Course	Type SF 9.5A	6.7%
Asphalt Concrete Surface Course	Type S 9.5__	6.0%
Asphalt Concrete Surface Course	Type S 12.5__	5.6%

The actual asphalt binder content will be established during construction by the Engineer within the limits established in the *2012 Standard Specifications.*

ASPHALT PLANT MIXTURES:
(7-1-95) 609 SP6 R20

Place asphalt concrete base course material in trench sections with asphalt pavement spreaders made for the purpose or with other equipment approved by the Engineer.

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 *2012 Standard Specifications.*

The base price index for asphalt binder for plant mix is **$ 366.00** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **November 1, 2017**.

FINAL SURFACE TESTING NOT REQUIRED:
(5-18-04) (Rev. 2-16-16) 610 SP6 R45

Final surface testing is not required on this project in accordance with Section 610-13, *Final Surface Testing and Acceptance*.

PORTLAND CEMENT CONCRETE PAVEMENT:
(02-05-15) 700, 710 SP7 R01

Revise the *2012 Standard Specifications* as follows:

Page 7-1, Article 700-1, DESCRIPTION, lines 16-17, replace fifth paragraph with:

Submit for approval a Process Control Plan addressing all operations necessary in the production and placement of concrete pavement a minimum of 30 calendar days prior to placing concrete pavement.

Page 7-2, Subarticle 700-5(A)(1), lines 29-31, replace first paragraph with:

A descending air temperature at the location of the concrete paving operation and away from artificial heat reaches 35°F. Paving may resume when the weather forecast is projected to reach a high of 40°F on that day's operation and the morning ambient temperature is above 32°F.

Page 7-2, Subarticle 700-5(A), General, lines 38 and 40, replace "3500 psi" with "3000 psi."

Page 7-4, Subarticle 700-8(B), Cold Weather, lines 38-42, replace the first paragraph with the following:

When the air temperature is projected to drop below 35°F for more than four hours, insulate the Portland cement concrete pavement to prohibit the concrete surface temperature from dropping below 35°F during the curing period.

Page 7-5, Subarticle 700-9(A), General, line 9, first sentence of the first paragraph, replace "methods herein" with "curing methods herein".

Page 7-5, Subarticle 700-9(A), General, lines 12-15, delete the third paragraph and replace with the following:

Curing is required until the concrete compressive strength has exceeded 3,000 psi using the maturity method in accordance with Article 700-13.

Page 7-6, Subarticle 700-11(A), General, lines 20-29, delete the first and last sentence of the second paragraph. Add the following as the last sentence of the second paragraph on lines 25-26. Move third paragraph (lines 27-29) to between the first and second paragraph before line 20.

To estimate the time of sawing, it is recommended to use the latest version of FHWA's High Performance Paving software entitled HIPERPAV.

Page 7-8, Subarticle 700-11(G), Verification of Dowel Bar Alignment, line 7, in the second sentence of the second paragraph on the page replace "vertical tilt," with "vertical tilt, and total misalignment". Line 25, in the fourth sentence of the seventh paragraph on the page replace "greater misalignment" with "total misalignment". Lines 26-27, delete the last sentence of the seventh paragraph on the page. Line 29, in the first sentence of the sixth paragraph on the page replace "score of 10" with "score of 12".

Page 7-8, Subarticle 700-11(G), TABLE 700-1, TOLERANCE FOR DOWEL BAR ALIGNMENT[A], replace with the following:

TABLE 700-1
TOLERANCE FOR DOWEL BAR ALIGNMENT[A]

Misalignment Category, inches	Weight
$0 \leq \mathbf{d} \leq 0.6$	0
$0.6 < \mathbf{d} \leq 0.8$	2
$0.8 < \mathbf{d} \leq 1.00$	4
$1.00 < \mathbf{d} \leq 1.50$	5
$1.50 \leq \mathbf{d}$	10

A. Where **d** is the individual dowel bar misalignment.

Page 7-9, Subarticle 700-12, (B) Age of Pavement, line 6, delete "14 calendar days old." and replace with "7 calendar days old and concrete is dry based on sealant manufacturer's recommendations."

Page 7-9, Article 700-13, USE OF NEW PAVEMENT OR SHOULDER, line 31, in the first sentence of the first paragraph replace "3,500 psi, unless otherwise permitted." with "3,000 psi." Line 36, add the following as the third sentence of the second paragraph:

Install loggers in slabs after every 2 lots approximately 4 inches from the concrete surface.

Page 7-10, Article 700-13, USE OF NEW PAVEMENT OR SHOULDER, lines 6-11, replace the second paragraph on the page with the following:

Validate the strength-maturity relationship and the correlation between cylinders and beams during the first day's production by casting cylinders and beams and performing strength tests. Use the TTF developed during the mix design process to verify the production strength-maturity relationship. Validate the strength-maturity relationship and the correlation between cylinders and beams by casting cylinders and beams and performing strength tests least every 30 calendar days, or when the TTF varies by more than 10% from the latest approved maturity curve or there is a material change from the approved concrete mix design. If the verification sample's compressive strength when tested at TTF is less than 3,000 psi, immediately suspend early opening of traffic on pavement that has not obtained TTF until a new strength-maturity relationship is developed.

Page 7-13, Article 710-6, FINISHING, lines 5-10, replace the second paragraph on the page with the following:

Produce the final surface finish on all mainline pavement, auxiliary lanes, and ramps by mechanical equipment for longitudinally tined grooves while the concrete is plastic. The tining shall be done with a mechanical device such as a wire comb. The comb shall have a single row of tines. Each shall have a nominal width of 5/64 inch to 1/8 inch. The nominal spacing of the tines shall be 3/4 ± 1/8 inch center-to-center. The nominal depth of tined groove in the plastic concrete shall be 1/8 ± 1/32 inch.

Longitudinal tining shall be accomplished by equipment with automated horizontal and vertical controls to ensure straight, uniform depth tined grooves. The texture geometry shall be the same as imparted throughout the length of the tining comb. A 2-inch to 3-inch wide strip of pavement surface shall be protected from tining for the length of and centered about longitudinal joints.

The tining operation shall be done so that the desired surface texture will be achieved while minimizing displacement of the larger aggregate particles and before the surface permanently sets. Where abutting pavement is to be placed, the tining shall extend as close to the edge as possible without damaging the edge. If abutting pavement is not to be placed, the 6-inch area nearest the edge or one foot from the face of the curb shall not be tined. Hand-operated tining equipment that produces an equivalent texture may be used only on small or irregularly shaped areas. Tines shall be thoroughly cleaned at the end of each day's use and damaged or worn tines replaced.

When surface corrections for pavement smoothness are made in the hardened concrete, no additional texturing is required.

Page 7-13, Article 710-7, FINAL SURFACE TESTING, lines 41-42, replace the third and fourth sentences of the fourth paragraph with the following:

The profile data shall be filtered with a cutoff wavelength of 250 ft. The interval at which relative profile elevations are reported shall be a maximum of 1".

Page 7-14, Article 710-7, FINAL SURFACE TESTING, line 38, in the first sentence of the ninth paragraph on the page, replace "(DVD-R or CD-R)" with "(USB flash drive, external hard drive, or DVD)".

Page 7-15, Subarticle 710-7(B), Localized Roughness, line 33, in the third sentence of the first paragraph, replace "125 in/mile" with "150 in/mile".

Page 7-17, Subarticle 710-10(A), General, lines 18-21, replace the fourth paragraph with the following:

Payment for all work of surface testing will be incidental to the contract unit price for *Portland Cement Concrete Pavement, Through Lanes, (with dowels)* for *Surface Testing Concrete Pavement*.

Page 7-19, Subarticle 710-10(E), Compensation, lines 1-5, delete the second paragraph (the paragraph at the top of the page).

Page 7-19, Subarticle 710-10(F), Pay Items, line 7, delete *Surface Testing Concrete Pavement (Lump Sum)* from the Pay Item table.

MILLED RUMBLE STRIPS (Concrete Shoulder):

(1-24-14) SPI 07-14

Description

Mill rumble strips on Portland cement concrete shoulders in accordance with *Roadway Standard Drawing* No. 720.01, the plans, and as directed by the Engineer.

Equipment

Provide equipment consisting of a rotary type cutting head with an outside diameter of no more than 24" and no less than 16" long. Provide a cutting head that has the cutting tips arranged in such a pattern as to provide a relatively smooth cut as well as a cutting head that is on its own independent suspension from that of the power unit to allow the tool to self align with the slope of the shoulder and/or any irregularities in the shoulder surface. Provide a cutting tool equipped with guides to establish consistent alignment and uniformity of each cut in relation to the roadway.

Construction Methods

Demonstrate the ability to achieve desired surface inside each depression without tearing or snagging the Portland cement concrete prior to beginning the work.

Provide rumble strips that have finished dimensions and pattern in accordance with *Roadway Standard Drawing* No. 720.01.

Material resulting from the operation shall become the property of the Contractor. Remove and dispose of material in accordance with Section 802 of the *Standard Specifications*.

Remove all equipment to a location where it does not present a traffic hazard and clean pavement before reopening work area to traffic.

Measurement and Payment

Milled Rumble Strips (Concrete Shoulder) will be measured and paid as the actual number of linear feet of shoulder, measured longitudinally along the surface of each shoulder, where rumble strips have been constructed and accepted.

Payment will be made under:

Pay Item	Pay Unit
Milled Rumble Strips (Concrete Shoulder)	Linear Foot

MEDIAN HAZARD PROTECTION:

Description

Construct Median Hazard Protection at locations indicated in the plans in accordance with the detail in the plans and as directed by the Engineer.

Measurement and Payment

Median Hazard Protection will be measured and paid for per linear feet that are completed and accepted. Such price and payment will be full compensation for all labor, materials (including, but not limited to, concrete barrier, earth material, #57 stone, concrete cover, galvanized bar and grout) and incidentals necessary construct the Median Hazard Protection.

Payment will be made under:

Pay Item	Pay Unit
Median Hazard Protection	Linear Foot

BRICK PAVERS FOR ISLANDS AND ROUNDABOUTS:

Description

Construct 6” concrete base with traffic bearing brick pavers in accordance with the detail in the plans, the applicable requirements of the *2012 Standard Specifications for Roads and Structures*, this special provision and as directed by the Engineer.

Materials

Refer to Section 1000 of the *2012 Standard Specifications* for concrete specifications.

Brick pavers shall be traffic bearing and shall be 8" x 4" x 2-3/4" pavers. Submit a sample of the proposed pavers (a minimum of 3 paver units but enough to show color variations that will be provided in the full installation) for approval prior to beginning installation.

Pavers will be first class representation of the type specified and meet all applicable standard specifications of the brick paver industry.

Construction Methods

Refer to Section 825 of the *Standard Specifications*, Incidental Concrete Construction.

Remove all construction and vegetative debris and add and compact subgrade material in the area of the island. Construct expansion joints and place grooved construction joints as directed by Article 825-10 of the *Standard Specifications* and as detailed in Standard Drawing No. 848.01 of the *2012 Roadway Standard Drawings*. Drill drainage holes in the concrete base as detailed on the plans and follow paver manufacturer recommendations. Any revisions will be at the direction of the Engineer.

Install pavers within the concrete gutter limits as detailed on the plans and details. Lay pavers on the bonding agent in accordance with manufacturer specifications. Joints shall be flush and tight. Install pavers so that the surface level of the pavers and concrete border create a smooth continuous surface with no raised edges and no changes in level other than the intended surface slope for drainage.

Measurement and Payment

Brick Pavers for Islands and Roundabouts will be measured and paid for as the actual square yards of pavers, measured along the surface of the completed and accepted work. All materials such as bonding agents, concrete slab, wire mesh, weep holes, and work needed to construct brick pavers in the islands are incidental to construction of the Brick Pavers for Islands and Roundabouts.

Payment will be made under:

Pay Item	**Pay Unit**
Brick Pavers for Islands and Roundabouts	Square Yards

TIE PROPOSED PIPE TO EXISTING DRAINAGE STRUCTURE:

Tie proposed drainage pipe to existing masonry drainage structures at locations indicated in the plans or where directed in accordance with the details in the plans and the applicable requirements of Section 840 of the *2012 Standard Specifications*.

Tie Proposed Pipe to Existing Drainage Structure will be measured and paid as each, completed and accepted. Such price and payment is considered full compensation for all equipment, materials, labor, tools, and incidentals necessary to complete each tie satisfactorily.

Payment will be made under:

Pay Item	Pay Unit
Tie Proposed Pipe to Existing Drainage Structure	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 *2012 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 *2012 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 *2012 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 *2012 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 *2012 Standard Specifications*.

Payment will be made under:

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

IMPACT ATTENUATOR UNITS, TYPE 350:

(4-20-04) (Rev. 7-21-15) SP08 R075

Description

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

Materials

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

(A) FHWA acceptance letter for each impact attenuator unit certifying it meets the requirements of NCHRP Report 350, Test Level 3, in accordance with Article 106-2 of the *2012 Standard Specifications*.

(B) Certified working drawings and assembling instructions from the manufacturer for each impact attenuator unit in accordance with Article 105-2 of the *2012 Standard Specifications*.

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

Construction Methods

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

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

Measurement and Payment

Impact Attenuator Unit, Type 350 will be measured and paid at the contract unit price per each. Such prices and payment will be full compensation for all work covered by this provision including, but not limited to, furnishing, installing and all incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Impact Attenuator Units, Type 350	Each

DETECTABLE WARNINGS FOR PROPOSED CURB RAMPS:

(6-15-10) (Rev. 8-16-11) 848 SP8 R126

Description

Construct detectable warnings consisting of integrated raised truncated domes on proposed concrete curb ramps in accordance with the *2012 Standard Specifications,* plan details, the requirements of the *28 CFR Part 36 ADA Standards for Accessible Design* and this provision.

Materials

Detectable warning for proposed curb ramps shall consist of integrated raised truncated domes. The description, size and spacing shall conform to Section 848 of the *2012 Standard Specifications.*

Use material for detectable warning systems as shown herein. Material and coating specifications must be stated in the Manufacturers Type 3 Certification and all Detectable Warning systems must be on the NCDOT Approved Products List.

Install detectable warnings created from one of the following materials: precast concrete blocks or bricks, clay paving brick, gray or ductile iron castings, mild steel, stainless steel, and engineered plastics, rubber or composite tile. Only one material type for detectable warning will be permitted per project, unless otherwise approved by the Engineer.

(A) Detectable Warnings shall consist of a base with integrated raised truncated domes, and when constructed of precast concrete they shall conform to the material requirements of Article 848-2 of the *2012 Standard Specifications.*

(B) Detectable Warnings shall consist of a base with integrated raised truncated domes, and may be comprised of other materials including, but not limited, to clay paving brick, gray iron or ductile iron castings, mild steel, stainless steel, and engineered plastics, rubber or composite tile, which are cast into the concrete of the curb ramps. The material shall have an integral color throughout the thickness of the material. The detectable warning shall include fasteners or anchors for attachment in the concrete and shall be furnished as a system from the manufacturer.

Prior to installation, the Contractor shall submit to the Engineer assembling instructions from the manufacturer for each type of system used in accordance with Article 105-2 of the *2012 Standard Specifications*. The system shall be furnished as a kit containing all consumable materials and consumable tools, required for the application. They shall be capable of being affixed to or anchored in the concrete curb ramp, including green concrete (concrete that has set but not appreciably hardened). The system shall be solvent free and contain no volatile organic compounds (VOC). The static coefficient of friction shall be 0.8 or greater when measured on top of the truncated domes and when measured between the domes in accordance with ASTM C1028 (dry and wet). The system shall be resistant to deterioration due to exposure to sunlight, water, salt or adverse weather conditions and impervious to degradation by motor fuels, lubricants and antifreeze.

(C) When steel or gray iron or ductile iron casting products are provided, only products that meet the requirements of Subarticle 106-1(B) of the *2012 Standard Specifications* may be used. Submit to the Engineer a Type 6 Certification, catalog cuts and installation procedures at least 30 days prior to installation for all.

Construction Methods

(A) Prior to placing detectable warnings in proposed concrete curb ramps, adjust the existing subgrade to the proper grade and in accordance with Article 848-3 of the *2012 Standard Specifications*.

(B) Install all detectable warning in proposed concrete curb ramps in accordance with the manufacturer's recommendations.

Measurement and Payment

Detectable Warnings installed for construction of proposed curb ramps will not be paid for separately. Such payment will be included in the price bid for *Concrete Curb Ramp*.

FOUNDATIONS AND ANCHOR ROD ASSEMBLIES FOR METAL POLES:

(1-17-12) (Rev. 5-19-15) 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 low level 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 materials and anchor rod assemblies for standard foundations for low level light standards. See Section 1405 of the *2012 Standard Specifications* and Standard Drawing No. 1405.01 of the *2012 Roadway Standard Drawings* for materials and anchor rod assemblies for standard foundations. For construction of standard foundations for low level light standards, standard foundations are considered footings in this provision.

This provision does not apply to foundations for signal pedestals; see Section 1743 of the *2012 Standard Specifications* and Standard Drawing No. 1743.01 of the *2012 Roadway Standard Drawings*.

Materials

Refer to the *2012 Standard Specifications*.

Item	Section
Conduit	1091-3
Grout, Type 2	1003
Polymer Slurry	411-2(B)
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 *2012 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 *2012 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 *2012 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 *2012 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 polymer slurry at all times so slurry meets Table 411-3 of the *2012 Standard Specifications* 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 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 *2012 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 *2012 Standard Specifications*. A drilled pier will be considered defective in accordance with Subarticle 411-5(D) of the *2012 Standard Specifications* and drilled pier acceptance is based in part on the criteria in Article 411-6 of the *2012 Standard Specifications* except for the top of pier tolerances in Subarticle 411-6(C) of the *2012 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 *2012 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 *2012 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 *2012 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. Backfill and fill in accordance with Article 410-8 of the *2012 Standard Specifications*. Proper compaction around footings and wings is critical for foundations to resist uplift and torsion forces. Place concrete against undisturbed soil and do not use forms for standard foundations for low level light standards.

(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 *2012 Standard Specifications*. No payment will be made for remediation of unacceptable drilled piers or post repair testing.

MATERIALS:

(2-21-12) (Rev. 11-22-16) 1000, 1002, 1005, 1016, 1018, 1024, 1050, 1074, 1078, 1080, 1081, 1086, 1084, 1087, 1092 SP10 R01

Revise the *2012 Standard Specifications* as follows:

Page 10-1, Article 1000-1, DESCRIPTION, lines 9-10, replace the last sentence of the first paragraph with the following:

Type IL, IP, IS or IT blended cement may be used instead of Portland cement.

Page 10-1, Article 1000-1, DESCRIPTION, line 14, add the following:

If any change is made to the mix design, submit a new mix design (with the exception of an approved pozzolan source change).

If any major change is made to the mix design, also submit new test results showing the mix design conforms to the criteria. Define a major change to the mix design as:

(1) A source change in coarse aggregate, fine aggregate or cement.

(2) A pozzolan class or type change (e.g. Class F fly ash to Class C fly ash).

(3) A quantitative change in coarse aggregate (applies to an increase or decrease greater than 5%), fine aggregate (applies to an increase or decrease greater than 5%), water (applies to an increase only), cement (applies to a decrease only), or pozzolan (applies to an increase or decrease greater than 5%).

Use materials which do not produce a mottled appearance through rusting or other staining of the finished concrete surface.

Page 10-1, Article 1000-2, MATERIALS, line 16; Page 10-8, Subarticle 1000-7(A), Materials, line 8; and Page 10-18, Article 1002-2, MATERIALS, line 9, add the following to the table of item references:

Item	**Section**
Type IL Blended Cement	1024-1

Page 10-1, Subarticle 1000-3(A), Composition and Design, lines 25-27, replace the second paragraph with the following:

Fly ash may be substituted for cement in the mix design up to 30% at a rate of 1.0 lb of fly ash to each pound of cement replaced.

Page 10-2, Subarticle 1000-3(A), Composition and Design, lines 12-21, delete the third paragraph through the sixth paragraph beginning with “If any change is made to the mix design, submit…” through “…(applies to a decrease only).”

Page 10-5, Table 1000-1, REQUIREMENTS FOR CONCRETE, replace with the following:

TABLE 1000-1
REQUIREMENTS FOR CONCRETE

Class of Concrete	Min. Comp. Strength at 28 days	Maximum Water-Cement Ratio				Consistency Max. Slump		Cement Content			
		Air-Entrained Concrete		Non Air-Entrained Concrete		Vibrated	Non-Vibrated	Vibrated		Non-Vibrated	
		Rounded Aggregate	Angular Aggregate	Rounded Aggregate	Angular Aggregate			Min.	Max.	Min.	Max.
Units	*psi*					*inch*	*inch*	*lb/cy*	*lb/cy*	*lb/cy*	*lb/cy*
AA	4,500	0.381	0.426	-	-	3.5	-	639	715	-	-
AA Slip Form	4,500	0.381	0.426	-	-	1.5	-	639	715	-	-
Drilled Pier	4,500	-	-	0.450	0.450	-	5-7 dry 7-9 wet	-	-	640	800
A	3,000	0.488	0.532	0.550	0.594	3.5	4	564	-	602	-
B	2,500	0.488	0.567	0.559	0.630	1.5 machine-placed 2.5 hand-placed	4	508	-	545	-
Sand Light-weight	4,500	-	0.420	-	-	4	-	715	-	-	-
Latex Modified	3,000 7 day	0.400	0.400	-	-	6	-	658	-	-	-
Flowable Fill excavatable	150 max. at 56 days	as needed	as needed	as needed	as needed	-	Flow-able	-	-	40	100
Flowable Fill non-excavatable	125	as needed	as needed	as needed	as needed	-	Flow-able	-	-	100	as needed
Pavement	4,500 design, field 650 flexural, design only	0.559	0.559	-	-	1.5 slip form 3.0 hand place	-	526	-	-	-
Precast	See Table 1077-1	as needed	as needed	-	-	6	as needed	as needed	as needed	as needed	as needed
Prestress	per contract	See Table 1078-1	See Table 1078-1	-	-	8	-	564	as needed	-	-

Page 10-6, Subarticle 1000-4(I), Use of Fly Ash, lines 36-2, replace the first paragraph with the following:

Fly ash may be substituted for cement in the mix design up to 30% at a rate of 1.0 lb of fly ash to each pound of cement replaced. Use Table 1000-1 to determine the maximum allowable water-cementitious material (cement + fly ash) ratio for the classes of concrete listed.

Page 10-7, Table 1000-3, MAXIMUM WATER-CEMENTITIOUS MATERIAL RATIO, delete the table.

Page 10-7, Article 1000-5, HIGH EARLY STRENGTH PORTLAND CEMENT CONCRETE, lines 30-31, delete the second sentence of the third paragraph.

Page 10-19, Article 1002-3, SHOTCRETE FOR TEMPORARY SUPPORT OF EXCAVATIONS, line 30, add the following at the end of Section 1002:

(H) Handling and Storing Test Panels

Notify the Area Materials Engineer when preconstruction or production test panels are made within 24 hours of shooting the panels. Field cure and protect test panels from damage in accordance with ASTM C1140 until the Department transports panels to the Materials and Tests Regional Laboratory for coring.

Page 10-23, Table 1005-1, AGGREGATE GRADATION-COARSE AGGREGATE, replace with the following:

TABLE 1005-1
AGGREGATE GRADATION - COARSE AGGREGATE

	Percentage of Total by Weight Passing											
Std. Size #	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#10	#16	#40	#200	**Remarks**
4	100	90-100	20-55	0-15	-	0-5	-	-	-	-	-	A	Asphalt Plant Mix
467M	100	95-100	-	35-70	-	0-30	0-5	-	-	-	-	A	Asphalt Plant Mix
5	-	100	90-100	20-55	0-10	0-5	-	-	-	-	-	A	AST, Sediment Control Stone
57	-	100	95-100	-	25-60	-	0-10	0-5	-	-	-	A	AST, Structural Concrete, Shoulder Drain Stone, Sediment Control Stone
57M	-	100	95-100	-	25-45	-	0-10	0-5	-	-	-	A	AST, Concrete Pavement
6M	-	-	100	90-100	20-55	0-20	0-8	-	-	-	-	A	AST
67	-	-	100	90-100	-	20-55	0-10	0-5	-	-	-	A	Asphalt Plant Mix, AST, Structural Concrete
78M	-	-	-	100	98-100	75-100	20-45	0-15	-	-	-	A	Asphalt Plant Mix, AST, Structural Concrete, Weep Hole Drains
14M	-	-	-	-	100	98-100	35-70	5-20	-	0-8	-	A	Asphalt Plant Mix, AST, Structural Concrete, Weep Hole Drains
9M	-	-	-	-	100	98-100	85-100	10-40	-	0-10	-	A	AST
ABC	-	100	75-97	-	55-80	-	35-55	-	25-45	-	14-30	4-12[B]	Aggregate Base Course, Aggregate Stabilization
ABC(M)	-	100	75- 100	-	45-79	-	20-40	-	0- 25	-	-	0-12[B]	Maintenance Stabilization
Light-weight[C]	-	-	-	-	100	80-100	5- 40	0-20	-	0-10	-	0-2.5	AST

A. See Subarticle 1005-4(A).
B. See Subarticle 1005-4(B).
C. For Lightweight Aggregate used in Structural Concrete, see Subarticle 1014-2(E)(6).

Page 10-39, Article 1016-3, CLASSIFICATIONS , lines 27-32, replace with the following:

Select material is clean, unweathered durable, blasted rock material obtained from an approved source. While no specific gradation is required, the below criteria will be used to evaluate the materials for visual acceptance by the Engineer:

(A) At least 50% of the rock has a diameter of from 1.5 ft to 3 ft,

(B) 30% of the rock ranges in size from 2" to 1.5 ft in diameter, and

(C) Not more than 20% of the rock is less than 2" in diameter. No rippable rock will be permitted.

Page 10-40, Tables 1018-1 and 1018-2, PIEDMONT, WESTERN AND COASTAL AREA CRITERIA FOR ACCEPTANCE OF BORROW MATERIAL, under second column in both tables, replace second row with the following:

Acceptable, but not to be used in the top 3 ft of embankment or backfill

Page 10-46, Article 1024-1, PORTLAND CEMENT, line 33, add the following as the ninth paragraph:

Use Type IL blended cement that meets AASHTO M 240, except that the limestone content is limited to between 5 and 12% by weight and the constituents shall be interground. Class F fly ash can replace a portion of Type IL blended cement and shall be replaced as outlined in Subarticle 1000-4(I) for Portland cement. For mixes that contain cement with alkali content between 0.6% and 1.0% and for mixes that contain a reactive aggregate documented by the Department, use a pozzolan in the amount shown in Table 1024-1.

Page 10-46, Table 1024-1, POZZOLANS FOR USE IN PORTLAND CEMENT CONCRETE, replace with the following:

TABLE 1024-1
POZZOLANS FOR USE IN PORTLAND CEMENT CONCRETE

Pozzolan	Rate
Class F Fly Ash	20% - 30% by weight of required cement content with 1.0 lb Class F fly ash per lb of cement replaced
Ground Granulated Blast Furnace Slag	35%-50% by weight of required cement content with 1.0 lb slag per lb of cement replaced
Microsilica	4%-8% by weight of required cement content with 1.0 lb microsilica per lb of cement replaced

Page 10-47, Subarticle 1024-3(B), Approved Sources, lines 16-18, replace the second sentence of the second paragraph with the following:

Tests shall be performed by AASHTO's designated National Transportation Product Evaluation Program (NTPEP) laboratory for concrete admixture testing.

Page 10-65, Article 1050-1, GENERAL, line 41, replace the first sentence with the following:

All fencing material and accessories shall meet Section 106.

Page 10-115, Subarticle 1074-7(B), Gray Iron Castings, lines 10-11, replace the first two sentences with the following:

Supply gray iron castings meeting all facets of AASHTO M 306 excluding proof load. Proof load testing will only be required for new casting designs during the design process, and conformance to M306 loading (40,000 lb.) will be required only when noted on the design documents.

Page 10-126, Table 1078-1, REQUIREMENTS FOR CONCRETE, replace with the following:

TABLE 1078-1
REQUIREMENTS FOR CONCRETE

Property	28 Day Design Compressive Strength 6,000 psi or less	28 Day Design Compressive Strength greater than 6,000 psi
Maximum Water/Cementitious Material Ratio	0.45	0.40
Maximum Slump without HRWR	3.5"	3.5"
Maximum Slump with HRWR	8"	8"
Air Content (upon discharge into forms)	5 + 2%	5 + 2%

Page 10-151, Article 1080-4, INSPECTION AND SAMPLING, lines 18-22, replace (B), (C) and (D) with the following:

(B) At least 3 panels prepared as specified in 5.5.10 of AASHTO M 300, Bullet Hole Immersion Test.

(C) At least 3 panels of 4"x6"x1/4" for the Elcometer Adhesion Pull Off Test, ASTM D4541.

(D) A certified test report from an approved independent testing laboratory for the Salt Fog Resistance Test, Cyclic Weathering Resistance Test, and Bullet Hole Immersion Test as specified in AASHTO M 300.

(E) A certified test report from an approved independent testing laboratory that the product has been tested for slip coefficient and meets AASHTO M253, Class B.

Page 10-161, Subarticle 1081-1(A), Classifications, lines 29-33, delete first 3 sentences of the description for Type 2 and replace with the following:

Type 2 - A low-modulus, general-purpose adhesive used in epoxy mortar repairs. It may be used to patch spalled, cracked or broken concrete where vibration, shock or expansion and contraction are expected.

Page 10-162, Subarticle 1081-1(A), Classifications, lines 4-7, delete the second and third sentences of the description for Type 3A. **Lines 16-22,** delete Types 6A, 6B and 6C.

Page 10-162, Subarticle 1081-1(B), Requirements, lines 26-30, replace the second paragraph with the following:

For epoxy resin systems used for embedding dowel bars, threaded rods, rebar, anchor bolts and other fixtures in hardened concrete, the manufacturer shall submit test results showing that the bonding system will obtain 125% of the specified required yield strength of the fixture. Furnish certification that, for the particular bolt grade, diameter and embedment depth required, the anchor system will not fail by adhesive failure and that there is no movement of the anchor bolt. For certification and anchorage, use 3,000 psi as the minimum Portland cement concrete compressive strength used in this test. Use adhesives that meet Section 1081.

List the properties of the adhesive on the container and include density, minimum and maximum temperature application, setting time, shelf life, pot life, shear strength and compressive strength.

Page 10-163, Table 1081-1, PROPERTIES OF MIXED EPOXY RESIN SYSTEMS, replace with the following:

TABLE 1081-1
PROPERTIES OF MIXED EPOXY RESIN SYSTEMS

Property	Type 1	Type 2	Type 3	Type 3A	Type 4A	Type 4B	Type 5
Viscosity-Poises at 77°F ± 2°F	Gel	10-30	25-75	Gel	40-150	40-150	1-6
Spindle No.	-	3	4	--	4	4	2
Speed (RPM)	-	20	20	--	10	10	50
Pot Life (Minutes)	20-50	30-60	20-50	5-50	40-80	40-80	20-60
Minimum Tensile Strength at 7 days (psi)	1,500	2,000	4,000	4,000	1,500	1,500	4,000
Tensile Elongation at 7 days (%)	30 min.	30 min.	2-5	2-5	5-15	5-15	2-5
Min. Compressive Strength of 2". mortar cubes at 24 hours	3,000 (Neat)	4,000-	6,000-	6,000 (Neat)	3,000	3,000	6,000
Min. Compressive Strength of 2" mortar cubes at 7 days	5,000 (Neat)	-	-	-	-	5,000	-
Maximum Water Absorption (%)	1.5	1.0	1.0	1.5	1.0	1.0	1.0
Min. Bond Strength Slant Shear Test at 14 days (psi)	1,500	1,500	2,000	2,000	1,500	1,500	1,500

Page 10-164, Subarticle 1081-1(E), Prequalification, lines 31-33, replace the second sentence of the first paragraph with the following:

Manufacturers choosing to supply material for Department jobs must submit an application through the Value Management Unit with the following information for each type and brand name:

Page 10-164, Subarticle 1081-1(E)(3), line 37, replace with the following:

(3) Type of the material in accordance with Articles 1081-1 and 1081-4,

Page 10-165, Subarticle 1081-1(E)(6), line 1, in the first sentence of the first paragraph replace "AASHTO M 237" with "the specifications".

Page 10-165, Subarticle 1081-1(E), Prequalification, line 9-10, delete the second sentence of the last paragraph.

Page 10-165, Subarticle 1081-1(F), Acceptance, line 14, in the first sentence of the first paragraph replace "Type 1" with "Type 3".

Page 10-169, Subarticle 1081-3(G), Anchor Bolt Adhesives, delete this subarticle.

Page 10-170, Article 1081-3, HOT BITUMEN, line 9, add the following at the end of Section 1081:

1081-4 EPOXY RESIN ADHESIVE FOR BONDING TRAFFIC MARKINGS

(A) General

This section covers epoxy resin adhesive for bonding traffic markers to pavement surfaces.

(B) Classification

The types of epoxies and their uses are as shown below:

Type I – Rapid Setting, High Viscosity, Epoxy Adhesive. This type of adhesive provides rapid adherence to traffic markers to the surface of pavement.

Type II – Standard Setting, High Viscosity, Epoxy Adhesive. This type of adhesive is recommended for adherence of traffic markers to pavement surfaces when rapid set is not required.

Type III – Rapid Setting, Low Viscosity, Water Resistant, Epoxy Adhesive. This type of rapid setting adhesive, due to its low viscosity, is appropriate only for use with embedded traffic markers.

Type IV – Standard Set Epoxy for Blade Deflecting-Type Plowable Markers.

(C) Requirements

Epoxies shall conform to the requirements set forth in AASHTO M 237.

(D) Prequalification

Refer to Subarticle 1081-1(E).

(E) Acceptance

Refer to Subarticle 1081-1(F).

Page 10-173, Article 1084-2, STEEL SHEET PILES, lines 37-38, replace first paragraph with the following:

Steel sheet piles detailed for permanent applications shall be hot rolled and meet ASTM A572 or ASTM A690 unless otherwise required by the plans. Steel sheet piles shall be coated as required by the plans. Galvanized sheet piles shall be coated in accordance with Section 1076. Metallized sheet piles shall be metallized in accordance to the Project Special Provision "Thermal Sprayed Coatings (Metallization)" with an 8 mil, 99.9% aluminum alloy coating and a 0.5 mil seal coating. Any portion of the metallized sheet piling encased in concrete shall receive a barrier coat. The barrier coat shall be an approved waterborne coating with a low-

viscosity which readily absorbs into the pores of the aluminum thermal sprayed coating. The waterborne coating shall be applied at a spreading rate that results in a theoretical 1.5 mil dry film thickness. The manufacturer shall issue a letter of certification that the resin chemistry of the waterborne coating is compatible with the 99.9% aluminum thermal sprayed alloy and suitable for tidal water applications.

Page 10-174, Subarticle 1086-1(B)(1), Epoxy, lines 18-24, replace with the following:

The epoxy shall meet Article 1081-4.

The 2 types of epoxy adhesive which may be used are Type I, Rapid Setting, and Type II, Standard Setting. Use Type II when the pavement temperature is above 60°F or per the manufacturer's recommendations whichever is more stringent. Use Type I when the pavement temperature is between 50°F and 60°F or per the manufacturer's recommendations whichever is more stringent. Epoxy adhesive Type I, Cold Set, may be used to attach temporary pavement markers to the pavement surface when the pavement temperature is between 32°F and 50°F or per the manufacturer's recommendations whichever is more stringent.

Page 10-175, Subarticle 1086-2(E), Epoxy Adhesives, line 27, replace "Section 1081" with "Article 1081-4".

Page 10-177, Subarticle 1086-3(E), Epoxy Adhesives, line 22, replace "Section 1081" with "Article 1081-4".

Page 10-179, Subarticle 1087-4(A), Composition, lines 39-41, replace the third paragraph with the following:

All intermixed and drop-on glass beads shall not contain more than 75 ppm arsenic or 200 ppm lead.

Page 10-180, Subarticle 1087-4(B), Physical Characteristics, line 8, replace the second paragraph with the following:

All intermixed and drop-on glass beads shall comply with NCGS § 136-30.2 and 23 USC § 109(r).

Page 10-181, Subarticle 1087-7(A), Intermixed and Drop-on Glass Beads, line 24, add the following after the first paragraph:

Use X-ray Fluorescence for the normal sampling procedure for intermixed and drop-on beads, without crushing, to check for any levels of arsenic and lead. If any arsenic or lead is detected, the sample shall be crushed and repeat the test using X-ray Fluorescence. If the X-ray Fluorescence test shows more than a LOD of 5 ppm, test the beads using United States Environmental Protection Agency Method 6010B, 6010C or 3052 for no more than 75 ppm arsenic or 200 ppm lead.

SELECT MATERIAL, CLASS III, TYPE 3:

(1-17-12) 1016, 1044 SP10 R05

Revise the *2012 Standard Specifications* as follows:

Page 10-39, Article 1016-3, CLASS III, add the following after line 14:

Type 3 Select Material

Type 3 select material is a natural or manufactured fine aggregate material meeting the following gradation requirements and as described in Sections 1005 and 1006:

Percentage of Total by Weight Passing							
3/8"	#4	#8	#16	#30	#50	#100	#200
100	95-100	65-100	35-95	15-75	5-35	0-25	0-8

Page 10-39, Article 1016-3, CLASS III, line 15, replace "either type" with "Type 1, Type 2 or Type 3".

Page 10-62, Article 1044-1, line 36, delete the sentence and replace with the following:

Subdrain fine aggregate shall meet Class III select material, Type 1 or Type 3.

Page 10-63, Article 1044-2, line 2, delete the sentence and replace with the following:

Subdrain coarse aggregate shall meet Class V select material.

SHOULDER AND SLOPE BORROW:
(3-19-13) 1019 SP10 R10

Use soil in accordance with Section 1019 of the *2012 Standard Specifications*. Use soil consisting of loose, friable, sandy material with a PI greater than 6 and less than 25 and a pH ranging from 5.5 to 7.0.

Soil with a pH ranging from 4.0 to 5.5 will be accepted without further testing if additional limestone is provided in accordance with the application rates shown in Table 1019-1A. Soil type is identified during the soil analysis. Soils with a pH above 7.0 require acidic amendments to be added. Submit proposed acidic amendments to the Engineer for review and approval. Soils with a pH below 4.0 or that do not meet the PI requirements shall not be used.

pH TEST RESULT	**Sandy Soils Additional Rate (lbs. / Acre)**	**Silt Loam Soils Additional Rate (lbs. / Acre)**	**Clay Loam Soils Additional Rate (lbs. / Acre)**
4.0 - 4.4	1,000	4,000	6,000
4.5 - 4.9	500	3,000	5,000
5.0 - 5.4	NA	2,000	4,000

Note: Limestone application rates shown in this table are in addition to the standard rate of 4000 lbs. / acre required for seeding and mulching.

No direct payment will be made for providing additional lime or acidic amendments for Ph adjustment.

GROUT PRODUCTION AND DELIVERY:
(3-17-15) 1003 SP10 R20

Revise the *2012 Standard Specifications* as follows:

Replace Section 1003 with the following:

SECTION 1003
GROUT PRODUCTION AND DELIVERY

1003-1 DESCRIPTION

This section addresses cement grout to be used for structures, foundations, retaining walls, concrete barriers, embankments, pavements and other applications in accordance with the contract. Produce non-metallic grout composed of Portland cement and water and at the Contractor's option or as required, aggregate and pozzolans. Include chemical admixtures as required or needed. Provide sand cement or neat cement grout as required. Define "sand cement grout" as grout with only fine aggregate and "neat cement grout" as grout without aggregate.

The types of grout with their typical uses are as shown below:

Type 1 – A cement grout with only a 3-day strength requirement and a fluid consistency that is typically used for filling subsurface voids.

Type 2 – A nonshrink grout with strength, height change and flow conforming to ASTM C1107 that is typically used for foundations, ground anchors and soil nails.

Type 3 – A nonshrink grout with high early strength and freeze-thaw durability requirements that is typically used in pile blockouts, grout pockets, shear keys, dowel holes and recesses for concrete barriers and structures.

Type 4 – A neat cement grout with low strength, a fluid consistency and high fly ash content that is typically used for slab jacking.

Type 5 – A low slump, low mobility sand cement grout with minimal strength that is typically used for compaction grouting.

1003-2 MATERIALS

Refer to Division 10.

Item	Section
Chemical Admixtures	1024-3
Fine Aggregate	1014-1
Fly Ash	1024-5
Ground Granulated Blast Furnace Slag	1024-6
Portland Cement	1024-1
Silica Fume	1024-7
Water	1024-4

Do not use grout that contains soluble chlorides or more than 1% soluble sulfate. At the Contractor's option, use an approved packaged grout instead of the materials above except for water. Use packaged grouts that are on the NCDOT Approved Products List.

Use admixtures for grout that are on the NCDOT Approved Products List or other admixtures in accordance with Subarticle 1024-3(E) except do not use concrete additives or unclassified or other admixtures in Type 4 or 5 grout. Use Class F fly ash for Type 4 grout and Type II Portland cement for Type 5 grout.

Use well graded rounded aggregate with a gradation, liquid limit (LL) and plasticity index (PI) that meet Table 1003-1 for Type 5 grout. Fly ash may be substituted for a portion of the fines in the aggregate. Do not use any other pozzolans in Type 5 grout.

TABLE 1003-1
AGGREGATE REQUIREMENTS FOR TYPE 5 GROUT

Gradation		Maximum Liquid Limit	Maximum Plasticity Index
Sieve Designation per AASHTO M 92	**Percentage Passing (% by weight)**		
3/8"	100	N/A	N/A
No. 4	70 – 95		
No. 8	50 – 90		
No. 16	30 – 80		
No. 30	25 – 70		
No. 50	20 – 50		
No. 100	15 – 40		
No. 200	10 – 30	25	10

1003-3 COMPOSITION AND DESIGN

When using an approved packaged grout, a grout mix design submittal is not required. Otherwise, submit proposed grout mix designs for each grout mix to be used in the work. Mixes for all grout shall be designed by a Certified Concrete Mix Design Technician or an Engineer licensed by the State of North Carolina. Mix proportions shall be determined by a testing laboratory approved by the Department. Base grout mix designs on laboratory trial batches that meet Table 1003-2 and this section. With permission, the Contractor may use a quantity of chemical admixture within the range shown on the current list of approved admixtures maintained by the Materials and Tests Unit.

Submit grout mix designs in terms of saturated surface dry weights on Materials and Tests Form 312U at least 35 days before proposed use. Adjust batch proportions to compensate for surface moisture contained in the aggregates at the time of batching. Changes in the saturated surface dry mix proportions will not be permitted unless revised grout mix designs have been submitted to the Engineer and approved.

Accompany Materials and Tests Form 312U with a listing of laboratory test results of compressive strength, density and flow or slump and if applicable, aggregate gradation,

durability and height change. List the compressive strength of at least three 2" cubes at the age of 3 and 28 days.

The Engineer will review the grout mix design for compliance with the contract and notify the Contractor as to its acceptability. Do not use a grout mix until written notice has been received. Acceptance of the grout mix design or use of approved packaged grouts does not relieve the Contractor of his responsibility to furnish a product that meets the contract. Upon written request from the Contractor, a grout mix design accepted and used satisfactorily on any Department project may be accepted for use on other projects.

Perform laboratory tests in accordance with the following test procedures:

Property	**Test Method**
Aggregate Gradation[A]	AASHTO T 27
Compressive Strength	AASHTO T 106
Density (Unit Weight)	AASHTO T 121, AASHTO T 133[B], ANSI/API RP[C] 13B-1[B] (Section 4, Mud Balance)
Durability	AASHTO T 161[D]
Flow	ASTM C939 (Flow Cone)
Height Change	ASTM C1090[E]
Slump	AASHTO T 119

A. Applicable to grout with aggregate.
B. Applicable to Neat Cement Grout.
C. American National Standards Institute/American Petroleum Institute Recommended Practice.
D. Procedure A (Rapid Freezing and Thawing in Water) required.
E. Moist room storage required.

1003-4 GROUT REQUIREMENTS

Provide grout types in accordance with the contract. Use grouts with properties that meet Table 1003-2. The compressive strength of the grout will be considered the average compressive strength test results of three 2" cubes at each age. Make cubes that meet AASHTO T 106 from the grout delivered for the work or mixed on-site. Make cubes at such frequencies as the Engineer may determine and cure them in accordance with AASHTO T 106.

TABLE 1003-2 GROUT REQUIREMENTS					
Type of Grout	**Minimum Compressive Strength at**		**Height Change at 28 days**	**Flow[A]/Slump[B]**	**Minimum Durability Factor**
	3 days	**28 days**			
1	3,000 psi	–	–	10 – 30 sec	–
2	Table 1[C]			Fluid Consistency[C]	–
3	5,000 psi	–	0 – 0.2%	Per Accepted Grout Mix Design/ Approved Packaged Grout	80
4[D]	600 psi	1,500 psi	–	10 – 26 sec	–
5	–	500 psi	–	1 – 3"	–

A. Applicable to Type 1 through 4 grouts.
B. Applicable to Type 5 grout.
C. ASTM C1107.
D. Use Type 4 grout with proportions by volume of 1 part cement and 3 parts fly ash.

1003-5 TEMPERATURE REQUIREMENTS

When using an approved packaged grout, follow the manufacturer's instructions for grout and air temperature at the time of placement. Otherwise, the grout temperature at the time of placement shall be not less than 50°F nor more than 90°F. Do not place grout when the air temperature measured at the location of the grouting operation in the shade away from artificial heat is below 40°F.

1003-6 ELAPSED TIME FOR PLACING GROUT

Agitate grout continuously before placement. Regulate the delivery so the maximum interval between the placing of batches at the work site does not exceed 20 minutes. Place grout before exceeding the times in Table 1003-3. Measure the elapsed time as the time between adding the mixing water to the grout mix and placing the grout.

TABLE 1003-3 ELAPSED TIME FOR PLACING GROUT (with continuous agitation)		
Air or Grout Temperature, Whichever is Higher	**Maximum Elapsed Time**	
	No Retarding Admixture Used	**Retarding Admixture Used**
90°F or above	30 minutes	1 hr. 15 minutes
80°F through 89°F	45 minutes	1 hr. 30 minutes
79°F or below	60 minutes	1 hr. 45 minutes

1003-7 MIXING AND DELIVERY

Use grout free of any lumps and undispersed cement. When using an approved packaged grout, mix grout in accordance with the manufacturer's instructions. Otherwise, comply with Articles 1000-8 through 1000-12 to the extent applicable for grout instead of concrete.

GEOSYNTHETICS:

(2-16-16) 1056 SP10 R25

Revise the *2012 Standard Specifications* as follows:

Replace Section 1056 with the following:

SECTION 1056
GEOSYNTHETICS

1056-1 DESCRIPTION

Provide geosynthetics for subsurface drainage, separation, stabilization, reinforcement, erosion control, filtration and other applications in accordance with the contract. Use geotextiles, geocomposite drains and geocells that are on the NCDOT Approved Products List. Prefabricated geocomposite drains include sheet, strip and vertical drains (PVDs), i.e., "wick drains" consisting of a geotextile attached to and/or encapsulating a plastic drainage core. Geocells are comprised of ultrasonically welded polymer strips that when expanded form a 3D honeycomb grid that is typically filled with material to support vegetation.

If necessary or required, hold geotextiles and sheet drains in place with new wire staples, i.e., "sod staples" that meet Subarticle 1060-8(D) or new anchor pins. Use steel anchor pins with a diameter of at least 3/16" and a length of at least 18" and with a point at one end and a head at the other end that will retain a steel washer with an outside diameter of at least 1.5".

1056-2 HANDLING AND STORING

Load, transport, unload and store geosynthetics so geosynthetics are kept clean and free of damage. Label, ship and store geosynthetics in accordance with Section 7 of AASHTO M 288. Geosynthetics with defects, flaws, deterioration or damage will be rejected. Do not unwrap geosynthetics until just before installation. Do not leave geosynthetics exposed for more than 7 days before covering except for geosynthetics for temporary wall faces and erosion control.

1056-3 CERTIFICATIONS

Provide Type 1, Type 2 or Type 4 material certifications in accordance with Article 106-3 for geosynthetics. Define "minimum average roll value" (MARV) in accordance with ASTM D4439. Provide certifications with MARV for geosynthetic properties as required. Test geosynthetics using laboratories accredited by the Geosynthetic Accreditation Institute (GAI) to perform the required test methods. Sample geosynthetics in accordance with ASTM D4354.

1056-4 GEOTEXTILES

When required, sew geotextiles together in accordance with Article X1.1.4 of AASHTO M 288. Provide sewn seams with seam strengths meeting the required strengths for the geotextile type and class specified.

Provide geotextile types and classes in accordance with the contract. Geotextiles will be identified by the product name printed directly on the geotextile. When geotextiles are not marked with a product name or marked with only a manufacturing plant identification code, geotextiles will be identified by product labels attached to the geotextile wrapping. When identification is based on labels instead of markings, unwrap geotextiles just before use in the presence of the Engineer to confirm that the product labels on both ends of the outside of the geotextile outer wrapping match the labels affixed to both ends of the inside of the geotextile roll core. Partial geotextile rolls without the product name printed on the geotextile or product labels affixed to the geotextile roll core may not be used.

Use woven or nonwoven geotextiles with properties that meet Table 1056-1. Define “machine direction” (MD) and “cross-machine direction” (CD) in accordance with ASTM D4439.

TABLE 1056-1
GEOTEXTILE REQUIREMENTS

Property	**Requirement**					**Test Method**
	Type 1	**Type 2**	**Type 3[A]**	**Type 4**	**Type 5[B]**	
Typical Application	*Shoulder Drains*	*Under Rip Rap*	*Silt Fence Fabric*	*Soil Stabilization*	*Temporary Walls*	
Elongation (MD & CD)	≥ 50%	≥ 50%	≤ 25%	< 50%	< 50%	ASTM D4632
Grab Strength (MD & CD)	Table 1[D], Class 3	Table 1[D], Class 1	100 lb[C]	Table 1[D], Class 3	–	ASTM D4632
Tear Strength (MD & CD)			–			ASTM D4533
Puncture Strength			–			ASTM D6241
Ultimate Tensile Strength (MD & CD)	–	–	–	–	2,400 lb/ft[C] (unless required otherwise in the contract)	ASTM D4595
Permittivity	Table 2[D], 15% to 50% *in Situ* Soil Passing 0.075 mm	Table 6[D], 15% to 50% *in Situ* Soil Passing 0.075mm	Table 7[D]	Table 5[D]	0.20 sec^{-1}[C]	ASTM D4491
Apparent Opening Size					0.60 mm[E]	ASTM D4751
UV Stability (Retained Strength)					70%[C] (after 500 hr of exposure)	ASTM D4355

A. Minimum roll width of 36" required.
B. Minimum roll width of 13 ft required.
C. MARV per Article 1056-3.
D. AASHTO M 288.
E. Maximum average roll value.

1056-5 GEOCOMPOSITE DRAINS

Provide geocomposite drain types in accordance with the contract and with properties that meet Table 1056-2.

TABLE 1056-2 GEOCOMPOSITE DRAIN REQUIREMENTS				
Property	**Requirement**			**Test Method**
	Sheet Drain	**Strip Drain**	**Wick Drain**	
Width	≥ 12" (unless required otherwise in the contract)	12" ±1/4"	4" ±1/4"	N/A
In-Plane Flow Rate[A] (with gradient of 1.0 and 24-hour seating period)	6 gpm/ft @ applied normal compressive stress of 10 psi	15 gpm/ft @ applied normal compressive stress of 7.26 psi	1.5 gpm[B] @ applied normal compressive stress of 40 psi	ASTM D4716

A. MARV per Article 1056-3.
B. Per 4" drain width.

For sheet and strip drains, use accessories (e.g., pipe outlets, connectors, fittings, etc.) recommended by the Drain Manufacturer. Provide sheet and strip drains with Type 1 geotextiles heat bonded or glued to HDPE, polypropylene or high impact polystyrene drainage cores that meet Table 1056-3.

TABLE 1056-3 DRAINAGE CORE REQUIREMENTS			
Property	**Requirement (MARV)**		**Test Method**
	Sheet Drain	**Strip Drain**	
Thickness	1/4"	1"	ASTM D1777 or D5199
Compressive Strength	40 psi	30 psi	ASTM D6364

For wick drains with a geotextile wrapped around a corrugated drainage core and seamed to itself, use drainage cores with an ultimate tensile strength of at least 225 lb per 4" width in accordance with ASTM D4595 and geotextiles with properties that meet Table 1056-4.

TABLE 1056-4 WICK DRAIN GEOTEXTILE REQUIREMENTS		
Property	**Requirement**	**Test Method**
Elongation	≥ 50%	ASTM D4632
Grab Strength	Table 1[A], Class 3	ASTM D4632
Tear Strength		ASTM D4533
Puncture Strength		ASTM D6241
Permittivity	0.7 sec^{-1}[B]	ASTM D4491
Apparent Opening Size (AOS)	Table 2[A], > 50% *in Situ* Soil Passing 0.075 mm	ASTM D4751
UV Stability (Retained Strength)		ASTM D4355

A. AASHTO M 288.
B. MARV per Article 1056-3.

For wick drains with a geotextile fused to both faces of a corrugated drainage core along the peaks of the corrugations, use wick drains with an ultimate tensile strength of at least 1,650 lb/ft

in accordance with ASTM D4595 and geotextiles with a permittivity, AOS and UV stability that meet Table 1056-4.

1056-6 GEOCELLS

Geocells will be identified by product labels attached to the geocell wrapping. Unwrap geocells just before use in the presence of the Engineer. Previously opened geocell products will be rejected.

Manufacture geocells from virgin polyethylene resin with no more than 10% rework, also called "regrind", materials. Use geocells made from textured and perforated HDPE strips with an open area of 10% to 20% and properties that meet Table 1056-5.

TABLE 1056-5
GEOCELL REQUIREMENTS

Property	Minimum Requirement	Test Method
Cell Depth	4"	N/A
Sheet Thickness	50 mil -5%, +10%	ASTM D5199
Density	58.4 lb/cf	ASTM D1505
Carbon Black Content	1.5%	ASTM D1603 or D4218
ESCR[A]	5000 hr	ASTM D1693
Coefficient of Direct Sliding (with material that meets AASHTO M 145 for soil classification A-2)	0.85	ASTM D5321
Short-Term Seam (Peel) Strength (for 4" seam)	320 lb	USACE[C] Technical Report GL-86-19, Appendix A
Long-Term Seam (Hang) Strength[B] (for 4" seam)	160 lb	

A. Environmental Stress Crack Resistance.
B. Minimum test period of 168 hr with a temperature change from 74°F to 130°F in 1-hour cycles.
C. US Army Corps of Engineers.

Provide geocell accessories (e.g., stakes, pins, clips, staples, rings, tendons, anchors, deadmen, etc.) recommended by the Geocell Manufacturer.

TRUCK MOUNTED CHANGEABLE MESSAGE SIGNS:
(8-21-12) 1101.02 SP11 R10

Revise the *2012 Roadway Standard Drawings* as follows:

Drawing No. 1101.02, Sheet 12, TEMPORARY LANE CLOSURES, replace General Note #11 with the following:

11- TRUCK MOUNTED CHANGEABLE MESSAGE SIGNS (TMCMS) USED ON SHADOW VEHICLES FOR "IN LANE" ACTIVITIES SHALL BE A MINIMUM OF 43" X 73". THE DISPLAY PANEL SHALL HAVE FULL MATRIX CAPABILITY WITH THE CAPABILITY TO PROVIDE 2 MESSAGE LINES WITH 7 CHARACTERS PER LINE WITH A MINIMUM

CHARACTER HEIGHT OF 18". FOR ADDITIONAL MESSAGING, CONTACT THE WORK ZONE TRAFFIC CONTROL SECTION.

12- TMCMS USED FOR ADVANCED WARNING ON VEHICLES LOCATED ON THE SHOULDER MAY BE SMALLER THAN 43" X 73". THE DISPLAY PANEL SHALL HAVE THE CAPABILITY TO PROVIDE 2 MESSAGE LINES WITH 7 CHARACTERS PER LINE WITH A MINIMUM CHARACTER HEIGHT OF 18". FOR ADDITIONAL MESSAGING, CONTACT THE WORK ZONE TRAFFIC CONTROL SECTION.

Drawing No. 1101.02, Sheet 13, TEMPORARY LANE CLOSURES, replace General Note #12 with the following:

12- TRUCK MOUNTED CHANGEABLE MESSAGE SIGNS (TMCMS) USED ON SHADOW VEHICLES FOR "IN LANE" ACTIVITIES SHALL BE A MINIMUM OF 43" X 73". THE DISPLAY PANEL SHALL HAVE FULL MATRIX CAPABILITY WITH THE CAPABILITY TO PROVIDE 2 MESSAGE LINES WITH 7 CHARACTERS PER LINE WITH A MINIMUM CHARACTER HEIGHT OF 18". FOR ADDITIONAL MESSAGING, CONTACT THE WORK ZONE TRAFFIC CONTROL SECTION.

13- TMCMS USED FOR ADVANCED WARNING ON VEHICLES LOCATED ON THE SHOULDER MAY BE SMALLER THAN 43" X 73". THE DISPLAY PANEL SHALL HAVE THE CAPABILITY TO PROVIDE 2 MESSAGE LINES WITH 7 CHARACTERS PER LINE WITH A MINIMUM CHARACTER HEIGHT OF 18". FOR ADDITIONAL MESSAGING, CONTACT THE WORK ZONE TRAFFIC CONTROL SECTION.

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 *2012 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.

DIAMOND GRINDING CONCRETE PAVEMENT:

(4-15-08) (Rev 08-16-16) SPI 7-9A

Description

Perform the work covered by this provision including but not limited to diamond grinding and regrinding concrete pavement to meet final surface acceptable smoothness requirements detailed in Article 710-7, selecting diamond tipped saw blades and configuration of cutting head; continual removal of residual slurry from pavement and disposal; furnishing all labor, materials, supplies, tools, equipment and incidentals as necessary. Perform this work on all new concrete pavement or as directed by the Engineer.

Prior to beginning any diamond grinding operations, schedule a pre-grind meeting with grinding subcontractor, Division Construction Engineer, Project Engineer, Area Roadway Engineer, State Pavement Construction Engineer, representatives from the Roadside Environmental Unit and the Materials and Tests Unit.

Equipment

Use equipment with diamond tipped saw blades gang mounted on a power driven self-propelled machine with a minimum wheel base length of 15 feet that is specifically designed to smooth and texture Portland Cement Concrete pavement. Utilize equipment that does not cause ravels; aggregate fracture; spalls or disturbance to the longitudinal or transverse joints; or damage and/or strain to the underlying surface of the pavement. Should any of the above problems occur immediately suspend operations.

Provide a minimum 3 feet wide grinding head with 50 to 60 evenly spaced grooves per foot. Prior to designing the grinding head, evaluate the aggregate hardness of the concrete pavement and select the appropriate diamond size, diamond concentration and bond hardness for the individual saw blades.

Provide vacuuming equipment to continuously remove slurry residue and excess water from the pavement as part of the grinding operation. Transport slurry material off-site and dispose of this material appropriately. Do not allow the slurry material to flow into a travel lane occupied by traffic or into any drainage facility.

Method of Construction

Grind the pavement surface to a uniform appearance with a high skid resistant longitudinal corduroy type texture. Provide grooves between 0.09 and 0.15 inches wide with the land area between the grooves between 0.06 and 0.13 inches wide. Ensure a ridge peak of approximately 0.0625 inches higher than the bottom of the grooves.

Begin and end diamond grinding at lines normal to the pavement centerline. Grind only in the longitudinal direction. All grooves and adjacent passes shall be parallel to each other with no variation. Completely lap adjacent passes with no unground surface remaining between passes and no overlap of more than 1½ inches. Adjacent passes shall be within 1/8 inch of the same height as measured with a 3 foot straightedge. Maintain positive cross-slope drainage for the duration of the grinding operation.

Grind all travel lanes to include auxiliary lanes, ramps and loops with not less than 98 percent of the specified surface being textured by grinding. Grinding of the bridge decks and concrete shoulders will not be required. Remove a minimum 0.0625 inches at all locations except dips. Extra grinding to eliminate minor depressions is not required. It is anticipated that extra grinding will be required on the high side of existing faults in the pavement. There shall be no ridge between lanes. In a separate operation, transition the grinding of any remaining ridges greater than 1/8 inch in height on the outside edge next to the shoulder or at a tie to an existing facility to the satisfaction of the Engineer.

Final surface testing is required on this project in accordance with Article 710-7 of the *2012 Standard Specifications.*

Disposal of Residual Slurry

Diamond grinding slurry disposal shall be in accordance with the Statewide Permit for Land Application of Diamond Grinding Slurry (DGS), Permit No. WQ0035749 dated June 3, 2014. Submit a slurry disposal plan to the Engineer detailing method of handling and disposing of slurry from the diamond grinding operation a minimum of 60 days prior to beginning the diamond grinding operation. Engineer shall review the slurry disposal plan. Plan must be accepted prior to beginning the diamond grinding operation. DGS shall be transported beyond the project limits to an approved permitted site. No additional payment will be made for transporting this slurry material for disposal.

Disposal options are:

(A) Concrete grinding residues (CGR) that are not liquid and otherwise not hazardous may be disposed of in a municipal solid waste landfill or utilized as an alternate daily cover (ADC). The sanitary landfill operator that requests the use of this material as ADC shall contact the N.C. Department of Environmental Quality (DEQ) inspector for approval. The definition of a solid, for solid waste disposal purposes, is a material that passes a Paint Filter test. CGR's may be eligible for disposal or use as ADC in an unlined sanitary landfill or a construction and demolition debris landfill. If CGR is disposed in an unlined-landfill, the Contractor shall submit samples of the material to a certified laboratory to verify that the CGR does not exceed Resource Conservation and Recovery Act (RCRA) regulatory limits for the following metals: Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium and Silver.

(B) Upon the Engineer's approval, dewatered CGR's may be beneficially reused within the DOT project boundary or areas under DOT control at agronomic rates suitable for the establishment of vegetation. Dewatered CGR's that meet the solid waste definition for inert debris, North Carolina General Statute 130A-290(a)(14), may also be used within the roadbed at rates approved by the Engineer for soil modification purposes. If CGR is disposed as beneficial reuse within DOT project boundaries, the Contractor shall submit samples of the material to a certified laboratory to verify that the CGR does not exceed RCRA regulatory limits for the following metals: Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium and Silver.

To prevent the migration of any direct discharge from the diamond grinding machine DGS from entering a drainage inlet or structure, the contractor shall install coir fiber wattles and silt fence at the direction of the Engineer. Silt Fence shall be installed in accordance with Section 1605 of the NCDOT *2012 Standard Specifications*

Measurement and Payment

The quantity of *Diamond Grinding PCC Pavement* to be paid for will be the actual number of square yards of pavement which has been satisfactorily diamond ground, measured along the final top surface of the pavement. No separate payment will be made for any overlapping, regrinding, or for extra grinding on the high side of existing faults.

Payment will be full compensation for the work, including but is not limited to grinding, disposal of slurry, final surface testing, furnishing all materials, equipment, labor and all incidentals necessary to satisfactorily complete the work.

Payment will be made under:

Pay Item	**Pay Unit**
Diamond Grinding PCC Pavement	Square Yard

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(E) of the *2012 Standard Specifications*.

STANDARD SPECIAL PROVISION
NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY

(5-17-11) Z-3

Seed shall be sampled and tested by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory. When said samples are collected, the vendor shall supply an independent laboratory report for each lot to be tested. Results from seed so sampled shall be final. Seed not meeting the specifications shall be rejected by the Department of Transportation and shall not be delivered to North Carolina Department of Transportation warehouses. If seed has been delivered it shall be available for pickup and replacement at the supplier's expense.

Any re-labeling required by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory, that would cause the label to reflect as otherwise specified herein shall be rejected by the North Carolina Department of Transportation.

Seed shall be free from seeds of the noxious weeds Johnsongrass, Balloonvine, Jimsonweed, Witchweed, Itchgrass, Serrated Tussock, Showy Crotalaria, Smooth Crotalaria, Sicklepod, Sandbur, Wild Onion, and Wild Garlic. Seed shall not be labeled with the above weed species on the seed analysis label. Tolerances as applied by the Association of Official Seed Analysts will NOT be allowed for the above noxious weeds except for Wild Onion and Wild Garlic.

Tolerances established by the Association of Official Seed Analysts will generally be recognized. However, for the purpose of figuring pure live seed, the found pure seed and found germination percentages as reported by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory will be used. Allowances, as established by the NCDOT, will be recognized for minimum pure live seed as listed on the following pages.

The specifications for restricted noxious weed seed refers to the number per pound as follows:

Restricted Noxious **Weed**	Limitations per Lb. Of Seed	Restricted Noxious **Weed**	Limitations per Lb. of Seed
Blessed Thistle	4 seeds	Cornflower (Ragged Robin)	27 seeds
Cocklebur	4 seeds	Texas Panicum	27 seeds
Spurred Anoda	4 seeds	Bracted Plantain	54 seeds
Velvetleaf	4 seeds	Buckhorn Plantain	54 seeds
Morning-glory	8 seeds	Broadleaf Dock	54 seeds
Corn Cockle	10 seeds	Curly Dock	54 seeds
Wild Radish	12 seeds	Dodder	54 seeds
Purple Nutsedge	27 seeds	Giant Foxtail	54 seeds
Yellow Nutsedge	27 seeds	Horsenettle	54 seeds
Canada Thistle	27 seeds	Quackgrass	54 seeds
Field Bindweed	27 seeds	Wild Mustard	54 seeds
Hedge Bindweed	27 seeds		

Seed of Pensacola Bahiagrass shall not contain more than 7% inert matter, Kentucky Bluegrass, Centipede and Fine or Hard Fescue shall not contain more than 5% inert matter whereas a maximum of 2% inert matter will be allowed on all other kinds of seed. In addition, all seed shall

not contain more than 2% other crop seed nor more than 1% total weed seed. The germination rate as tested by the North Carolina Department of Agriculture shall not fall below 70%, which includes both dormant and hard seed. Seed shall be labeled with not more than 7%, 5% or 2% inert matter (according to above specifications), 2% other crop seed and 1% total weed seed.

Exceptions may be made for minimum pure live seed allowances when cases of seed variety shortages are verified. Pure live seed percentages will be applied in a verified shortage situation. Those purchase orders of deficient seed lots will be credited with the percentage that the seed is deficient.

FURTHER SPECIFICATIONS FOR EACH SEED GROUP ARE GIVEN BELOW:

Minimum 85% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 83% pure live seed will not be approved.

Sericea Lespedeza
Oats (seeds)

Minimum 80% pure live seed; maximum 1% total weed seed; maximum 2% total other crop; maximum 144 restricted noxious weed seed per pound. Seed less than 78% pure live seed will not be approved.

Tall Fescue (all approved varieties)
Kobe Lespedeza
Korean Lespedeza
Weeping Lovegrass
Carpetgrass
Bermudagrass
Browntop Millet
German Millet – Strain R
Clover – Red/White/Crimson

Minimum 78% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 76% pure live seed will not be approved.

Common or Sweet Sundangrass

Minimum 76% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 74% pure live seed will not be approved.

Rye (grain; all varieties)
Kentucky Bluegrass (all approved varieties)
Hard Fescue (all approved varieties)
Shrub (bicolor) Lespedeza

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 noxious weed seed per pound. Seed less than 70% pure live seed will not be approved.

Centipedegrass
Crownvetch
Pensacola Bahiagrass
Creeping Red Fescue
Japanese Millet
Reed Canary Grass
Zoysia

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 5% inert matter; maximum 144 restricted noxious weed seed per pound.

Barnyard Grass
Big Bluestem
Little Bluestem
Bristly Locust
Birdsfoot Trefoil
Indiangrass
Orchardgrass
Switchgrass
Yellow Blossom Sweet Clover

STANDARD SPECIAL PROVISION

ERRATA

(1-17-12) (Rev. 04-21-15) Z-4

Revise the *2012 Standard Specifications* as follows:

Division 2

Page 2-7, line 31, Article 215-2 Construction Methods, replace "Article 107-26" with "Article 107-25".

Page 2-17, Article 226-3, Measurement and Payment, line 2, delete "pipe culverts,".

Page 2-20, Subarticle 230-4(B), Contractor Furnished Sources, change references as follows: **Line 1,** replace "(4) Buffer Zone" with "(c) Buffer Zone"; **Line 12,** replace "(5) Evaluation for Potential Wetlands and Endangered Species" with "(d) Evaluation for Potential Wetlands and Endangered Species"; and **Line 33,** replace "(6) Approval" with "(4) Approval".

Division 3

Page 3-1, after line 15, Article 300-2 Materials, replace "1032-9(F)" with "1032-6(F)".

Division 4

Page 4-77, line 27, Subarticle 452-3(C) Concrete Coping, replace "sheet pile" with "reinforcement".

Division 6

Page 6-7, line 31, Article 609-3 Field Verification of Mixture and Job Mix Formula Adjustments, replace "30" with "45".

Page 6-10, line 42, Subarticle 609-6(C)(2), replace "Subarticle 609-6(E)" with "Subarticle 609-6(D)".

Page 6-11, Table 609-1 Control Limits, replace "Max. Spec. Limit" for the Target Source of $P_{0.075}/P_{be}$ Ratio with "1.0".

Page 6-40, Article 650-2 Materials, replace "Subarticle 1012-1(F)" with "Subarticle 1012-1(E)"

Division 7

Page 7-1, Article 700-3, CONCRETE HAULING EQUIPMENT, line 33, replace "competion" with "completion".

Division 8

Page 8-23, line 10, Article 838-2 Materials, replace "Portland Cement Concrete, Class B" with "Portland Cement Concrete, Class A".

Division 10

Page 10-166, Article 1081-3 Hot Bitumen, replace "Table 1081-16" with "Table 1081-2", replace "Table 1081-17" with "Table 1081-3", and replace "Table 1081-18" with "Table 1081-4".

Division 12

Page 12-7, Table 1205-3, add "FOR THERMOPLASTIC" to the end of the title.
Page 12-8, Subarticle 1205-5(B), line 13, replace "Table 1205-2" with "Table 1205-4".
Page 12-8, Table 1205-4 and 1205-5, replace "THERMOPLASTIC" in the title of these tables with "POLYUREA".
Page 12-9, Subarticle 1205-6(B), line 21, replace "Table 1205-4" with "Table 1205-6".
Page 12-11, Subarticle 1205-8(C), line 25, replace "Table 1205-5" with "Table 1205-7".

Division 15

Page 15-4, Subarticle 1505-3(F) Backfilling, line 26, replace "Subarticle 235-4(C)" with "Subarticle 235-3(C)".
Page 15-6, Subarticle 1510-3(B), after line 21, replace the allowable leakage formula with the following: $\mathbf{W=LD\sqrt{P} \div 148{,}000}$
Page 15-6, Subarticle 1510-3(B), line 32, delete "may be performed concurrently or" and replace with "shall be performed".
Page 15-17, Subarticle 1540-3(E), line 27, delete "Type 1".

Division 17

Page 17-26, line 42, Subarticle 1731-3(D) Termination and Splicing within Interconnect Center, delete this subarticle.

Revise the *2012 Roadway Standard Drawings* as follows:

1633.01 Sheet 1 of 1, English Standard Drawing for Matting Installation, replace "1633.01" with "1631.01".

STANDARD SPECIAL PROVISION

PLANT AND PEST QUARANTINES
(Imported Fire Ant, Gypsy Moth, Witchweed, Emerald Ash Borer, And Other Noxious Weeds)

(3-18-03) (Rev. 12-20-16) 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 *http://www.ncagr.gov/plantindustry/* 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, or other noxious weeds.

STANDARD SPECIAL PROVISION

AWARD OF CONTRACT

(6-28-77)(Rev 2/16/2016) Z-6

"The North Carolina Department of Transportation, in accordance with the provisions of *Title VI of the Civil Rights Act of 1964* (78 Stat. 252) and the Regulations of the Department of Transportation (*49 C.F.R., Part 21*), issued pursuant to such act, hereby notifies all bidders that it will affirmatively insure that the contract entered into pursuant to this advertisement will be awarded to the lowest responsible bidder without discrimination on the ground of race, color, or national origin".

TITLE VI AND NONDISCRIMINATION

I. Title VI Assurance

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:

(1) Compliance with Regulations: The contractor shall comply with the Regulation relative to nondiscrimination in Federally-assisted programs of the Department of Transportation (hereinafter, "DOT") Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.

(2) 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 either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

(3) 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 Regulations relative to nondiscrimination on the grounds of race, color, or national origin.

(4) Information and Reports: The contractor shall provide all information and reports required by the Regulations or 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 North Carolina Department of Transportation (NCDOT) or the Federal Highway Administration (FHWA) to be pertinent to ascertain compliance with such Regulations, orders and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information the contractor shall so certify to the NCDOT, or the FHWA as appropriate, and shall set forth what efforts it has made to obtain the information.

(5) Sanctions for Noncompliance: In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the NCDOT shall impose such contract sanctions as it or the FHWA may determine to be appropriate, including, but not limited to:

(a) Withholding of payments to the contractor under the contract until the contractor complies, and/or

(b) Cancellation, termination or suspension of the contract, in whole or in part.

(6) Incorporation of Provisions: The contractor shall include the provisions of paragraphs (1) through (6) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto.

The contractor shall take such action with respect to any subcontractor procurement as the NCDOT or the FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance: provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the NCDOT to enter into such litigation to protect the interests of the NCDOT, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

II. Title VI Nondiscrimination Program

Title VI of the 1964 Civil Rights Act, 42 U.S.C. 2000d, provides that: "No person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." The broader application of nondiscrimination law is found in other statutes, executive orders, and regulations (see Section III, Pertinent Nondiscrimination Authorities), which provide additional protections based on age, sex, disability and religion. In addition, the 1987 Civil Rights Restoration Act extends nondiscrimination coverage to all programs and activities of federal-aid recipients and contractors, including those that are not federally-funded.

Nondiscrimination Assurance

The North Carolina Department of Transportation (NCDOT) hereby gives assurance that no person shall on the ground of race, color, national origin, sex, age, and disability, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity conducted by the recipient, as provided by Title VI of the Civil Rights Act of 1964, the Civil Rights Restoration Act of 1987, and any other related Civil Rights authorities, whether those programs and activities are federally funded or not.

Obligation

During the performance of this contract, the Contractor and its subcontractors are responsible for complying with NCDOT's Title VI Program. The Contractor must ensure that NCDOT's Notice of Nondiscrimination is posted in conspicuous locations accessible to all employees and subcontractors on the jobsite, along with the Contractor's own Equal Employment Opportunity (EEO) Policy Statement. The Contractor shall physically incorporate this "**TITLE VI AND NONDISCRIMINATION**" language, in its entirety, into all its subcontracts on federally-assisted and state-funded NCDOT-owned projects, and ensure its inclusion by subcontractors into all subsequent lower tier subcontracts. The Contractor and its subcontractors shall also physically incorporate the **FHWA-1273**, in its entirety, into all subcontracts and subsequent lower tier subcontracts on **Federal-aid highway** construction contracts only. The Contractor is also responsible for making its subcontractors aware of NCDOT's Discrimination Complaints Process, as follows:

FILING OF COMPLAINTS

1. **Applicability** – These complaint procedures apply to the beneficiaries of the NCDOT's programs, activities, and services, including, but not limited to, members of the public, contractors, subcontractors, consultants, and other sub-recipients of federal and state funds.
2. **Eligibility** – Any person or class of persons who believes he/she has been subjected to discrimination or retaliation prohibited by any of the Civil Rights authorities, based upon race, color, sex, age, national origin, or disability, may file a written complaint with NCDOT's Civil Rights office. The law prohibits intimidation or retaliation of any sort. The complaint may be filed by the affected individual or a representative, and must be in writing.
3. **Time Limits and Filing Options** – A complaint must be filed no later than 180 calendar days after the following:
   - The date of the alleged act of discrimination; or
   - The date when the person(s) became aware of the alleged discrimination; or
   - 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 other discrimination complaints may be submitted to the following entities:
   - **North Carolina Department of Transportation**, Office of Equal Opportunity & Workforce Services (EOWS), External Civil Rights Section, 1511 Mail Service Center, Raleigh, NC 27699-1511; 919-508-1808 or toll free 800-522-0453
   - **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

     Federal Highway Administration, North Carolina Division Office, 310 New Bern Avenue, Suite 410, Raleigh, NC 27601, 919-747-7010

     Federal Highway Administration, Office of Civil Rights, 1200 New Jersey Avenue, SE, 8th Floor, E81-314, Washington, DC 20590, 202-366-0693 / 366-0752

     Federal Transit Administration, Office of Civil Rights, ATTN: Title VI Program Coordinator, East Bldg. 5th Floor – TCR, 1200 New Jersey Avenue, SE, Washington, DC 20590

     Federal Aviation Administration, Office of Civil Rights, 800 Independence Avenue, SW, Washington, DC 20591, 202-267-3258
   - **US Department of Justice**, Special Litigation Section, Civil Rights Division, 950 Pennsylvania Avenue, NW, Washington, DC 20530, 202-514-6255 or toll free 877-218-5228
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 EOWS at the phone number above 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, sex, age, or disability. The term "basis" refers to the complainant's membership in a protected group category. Contact this office to receive a Discrimination Complaint Form.

Protected Categories	Definition	Examples	Applicable Statutes and Regulations	
			FHWA	FTA
Race	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	Title VI of the Civil Rights Act of 1964; 49 CFR Part 21; Circular 4702.1B
Color	Color of skin, including shade of skin within a racial group	Black, White, brown, yellow, etc.		
National Origin	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	Women and Men	1973 Federal-Aid Highway Act	Title IX of the Education Amendments of 1972
Age	Persons of any age	21 year old person	Age Discrimination Act of 1975	
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	

III. 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:

- 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.
- 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);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 *et seq*.), (prohibits discrimination on the basis of sex);
- 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;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq*.), (prohibits discrimination on the basis of age);
- 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);
- 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);

- 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;
- The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures discrimination 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;
- 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);
- 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).
- 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);
- 49 CFR Part 26, regulation to ensure nondiscrimination in the award and administration of DOT-assisted contracts in the Department's highway, transit, and airport financial assistance programs, as regards the use of Disadvantaged Business Enterprises (DBEs);
- Form FHWA-1273, "Required Contract Provisions," a collection of contract provisions and proposal notices that are generally applicable to *all Federal-aid construction projects* and must be made a part of, and physically incorporated into, *all federally-assisted contracts*, as well as appropriate subcontracts and purchase orders, particularly Sections II (Nondiscrimination) and III (Nonsegregated Facilities).

STANDARD SPECIAL PROVISION

MINORITY AND FEMALE EMPLOYMENT REQUIREMENTS

Z-7

NOTICE OF REQUIREMENTS FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (*EXECUTIVE NUMBER 11246*)

1. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, see as shown on the attached sheet entitled "Employment Goals for Minority and Female participation".

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with the Executive Order and the regulations in *41 CFR Part 60-4* shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in *41 CFR 60-4.3(a)*, and its effort to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the executive Order and the regulations *in 41 CFR Part 60-4*. Compliance with the goals will be measured against the total work hours performed.

2. As used in this Notice and in the contract resulting from this solicitation, the "covered area" is the county or counties shown on the cover sheet of the proposal form and contract.

EMPLOYMENT GOALS FOR MINORITY AND FEMALE PARTICIPATION

Economic Areas

Area 023 29.7%
Bertie County
Camden County
Chowan County
Gates County
Hertford County
Pasquotank County
Perquimans County

Area 024 31.7%
Beaufort County
Carteret County
Craven County
Dare County
Edgecombe County
Green County
Halifax County
Hyde County
Jones County
Lenoir County
Martin County
Nash County
Northampton County
Pamlico County
Pitt County
Tyrrell County
Washington County
Wayne County
Wilson County

Area 025 23.5%
Columbus County
Duplin County
Onslow County
Pender County

Area 026 33.5%
Bladen County
Hoke County
Richmond County
Robeson County
Sampson County
Scotland County

Area 027 24.7%
Chatham County
Franklin County
Granville County
Harnett County
Johnston County
Lee County
Person County
Vance County
Warren County

Area 028 15.5%
Alleghany County
Ashe County
Caswell County
Davie County
Montgomery County
Moore County
Rockingham County
Surry County
Watauga County
Wilkes County

Area 029 15.7%
Alexander County
Anson County
Burke County
Cabarrus County
Caldwell County
Catawba County
Cleveland County
Iredell County
Lincoln County
Polk County
Rowan County
Rutherford County
Stanly County

Area 0480 8.5%
Buncombe County
Madison County

Area 030 6.3%
Avery County
Cherokee County
Clay County
Graham County
Haywood County
Henderson County
Jackson County
McDowell County
Macon County
Mitchell County
Swain County
Transylvania County
Yancey County

SMSA Areas

Area 5720 26.6%
Currituck County

Area 9200 20.7%
Brunswick County
New Hanover County

Area 2560 24.2%
Cumberland County

Area 6640 22.8%
Durham County
Orange County
Wake County

Area 1300 16.2%
Alamance County

Area 3120 16.4%
Davidson County
Forsyth County
Guilford County
Randolph County
Stokes County
Yadkin County

Area 1520 18.3%
Gaston County
Mecklenburg County
Union County

Goals for Female

Participation in Each Trade

(Statewide) 6.9%

STANDARD SPECIAL PROVISION

REQUIRED CONTRACT PROVISIONS FEDERAL - AID CONSTRUCTION CONTRACTS

FHWA - 1273 Electronic Version - May 1, 2012 Z-8

I. General
II. Nondiscrimination
III. Nonsegregated Facilities
IV. Davis-Bacon and Related Act Provisions
V. Contract Work Hours and Safety Standards Act Provisions
VI. Subletting or Assigning the Contract
VII. Safety: Accident Prevention
VIII. False Statements Concerning Highway Projects
IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
X. Compliance with Governmentwide Suspension and Debarment Requirements
XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

   The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

   Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

   Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).
2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.
3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.
4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding $10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. **Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:
   a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.
   b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. **EEO Officer:** The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.
3. **Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:
   a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.
   b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.
   c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.
   d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.
   e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.
4. **Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.
   a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.
   b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.
   c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.
5. **Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:
   a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.
   b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.
   c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.
   d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.
6. **Training and Promotion:**
   a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.
   b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).
   c The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.
   d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.
7. **Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:
   a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.
   b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.
   c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. **Reasonable Accommodation for Applicants / Employees with Disabilities:** The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.
9. **Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.
   a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.
   b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.
10. **Assurance Required by 49 CFR 26.13(b):**
   a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.
   b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.
11. **Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.
   a. The records kept by the contractor shall document the following:
      (1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;
      (2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and
      (3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;
   b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding $2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. **Minimum wages**
   a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

      Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:
(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
(ii) The classification is utilized in the area by the construction industry; and
(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. **Withholding.** The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. **Payrolls and basic records**

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/ wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency.

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;
(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;
(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. **Apprentices and trainees**

a. Apprentices (programs of the USDOL). Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL). Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT). Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. **Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. **Subcontracts.** The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. **Contract termination:** debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. **Compliance with Davis-Bacon and Related Act requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. **Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. **Certification of eligibility.**

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. **Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
2. **Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.
3. **Withholding for unpaid wages and liquidated damages.** The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.
4. **Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).
   a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:
      (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
      (2) the prime contractor remains responsible for the quality of the work of the leased employees;
      (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
      (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.
   b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.
2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.
3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.
4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.
5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.
2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions

which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost $25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. **Instructions for Certification – First Tier Participants:**
   a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.
   b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.
   c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.
   d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
   e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).
   f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.
   g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.
   h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered

transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

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2. **Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:**
   a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:
      (1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;
      (2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
      (3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and
      (4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
   b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.
2. **Instructions for Certification - Lower Tier Participants:**
   (Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost $25,000 or more - 2 CFR Parts 180 and 1200)
   a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.
   b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
   c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.
   d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).
   e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
   f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.
   g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.
   h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
   i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.
2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:
   a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
   b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.
3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

STANDARD SPECIAL PROVISION

ON-THE-JOB TRAINING

(10-16-07) (Rev. 4-21-15) Z-10

Description

The North Carolina Department of Transportation will administer a custom version of the Federal On-the-Job Training (OJT) Program, commonly referred to as the Alternate OJT Program. All contractors (existing and newcomers) will be automatically placed in the Alternate Program. Standard OJT requirements typically associated with individual projects will no longer be applied at the project level. Instead, these requirements will be applicable on an annual basis for each contractor administered by the OJT Program Manager.

On the Job Training shall meet the requirements of 23 CFR 230.107 (b), 23 USC – Section 140, this provision and the On-the-Job Training Program Manual.

The Alternate OJT Program will allow a contractor to train employees on Federal, State and privately funded projects located in North Carolina. However, priority shall be given to training employees on NCDOT Federal-Aid funded projects.

Minorities and Women

Developing, training and upgrading of minorities and women toward journeyman level status is a primary objective of this special training provision. Accordingly, the Contractor shall make every effort to enroll minority and women as trainees to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

Assigning Training Goals

The Department, through the OJT Program Manager, will assign training goals for a calendar year based on the contractors' past three years' activity and the contractors' anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from 1 to 15 per contractor per calendar year. The Contractor shall sign an agreement to fulfill their annual goal for the year.\

Training Classifications

The Contractor shall provide on-the-job training aimed at developing full journeyman level workers in the construction craft/operator positions. Preference shall be given to providing training in the following skilled work classifications:

Equipment Operators	Office Engineers
Truck Drivers	Estimators
Carpenters	Iron / Reinforcing Steel Workers
Concrete Finishers	Mechanics
Pipe Layers	Welders

The Department has established common training classifications and their respective training requirements that may be used by the contractors. However, the classifications established are not all-inclusive. Where the training is oriented toward construction applications, training will be allowed in lower-level management positions such as office engineers and estimators. Contractors shall submit new classifications for specific job functions that their employees are performing. The Department will review and recommend for acceptance to FHWA the new classifications proposed by contractors, if applicable. New classifications shall meet the following requirements:

Proposed training classifications are reasonable and realistic based on the job skill classification needs, and

The number of training hours specified in the training classification is consistent with common practices and provides enough time for the trainee to obtain journeyman level status.

The Contractor may allow trainees to be trained by a subcontractor provided that the Contractor retains primary responsibility for meeting the training and this provision is made applicable to the subcontract. However, only the Contractor will receive credit towards the annual goal for the trainee.

Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman level status or in which they have been employed as a journeyman.

Records and Reports

The Contractor shall maintain enrollment, monthly and completion reports documenting company compliance under these contract documents. These documents and any other information as requested shall be submitted to the OJT Program Manager.

Upon completion and graduation of the program, the Contractor shall provide each trainee with a certification Certificate showing the type and length of training satisfactorily completed.

Trainee Interviews

All trainees enrolled in the program will receive an initial and Trainee/Post graduate interview conducted by the OJT program staff.

Trainee Wages

Contractors shall compensate trainees on a graduating pay scale based upon a percentage of the prevailing minimum journeyman wages (Davis-Bacon Act). Minimum pay shall be as follows:

60 percent	of the journeyman wage for the first half of the training period
75 percent	of the journeyman wage for the third quarter of the training period
90 percent	of the journeyman wage for the last quarter of the training period

In no instance shall a trainee be paid less than the local minimum wage. The Contractor shall adhere to the minimum hourly wage rate that will satisfy both the NC Department of Labor (NCDOL) and the Department.

Achieving or Failing to Meet Training Goals

The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and who receives training for at least 50 percent of the specific program requirement. Trainees will be allowed to be transferred between projects if required by the Contractor's scheduled workload to meet training goals.

If a contractor fails to attain their training assignments for the calendar year, they may be taken off the NCDOT's Bidders List.

Measurement and Payment

No compensation will be made for providing required training in accordance with these contract documents.

STANDARD SPECIAL PROVISION

NAME CHANGE FOR NCDENR

(1-19-16) Z-11

Description

Wherever in the 2012 Standard Specifications, Project Special Provisions, Standard Special Provisions, Permits or Plans that reference is made to “NCDENR” or “North Carolina Department of Environment and Natural Resources”, replace with “NCDEQ” or “North Carolina Department of Environmental Quality” respectively, as the case may be.

STANDARD SPECIAL PROVISION
MINIMUM WAGES
GENERAL DECISION NC170103 01/06/2017 NC103

Z-103

Date: January 6, 2017

General Decision Number: NC170103 01/06/2017 NC103

Superseded General Decision Numbers: NC20160103

State: North Carolina

Construction Type: HIGHWAY

COUNTIES:

Brunswick	Greene	Onslow
Cumberland	Hoke	Pender
Currituck	Johnston	Pitt
Edgecombe	Nash	Wake
Franklin	New Hanover	Wayne

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.20 for calendar year 2017 that applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract for calendar year 2017. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/06/2017

SUNC2014-005 11/17/2014

	Rates	Fringes
BLASTER	21.04	
CARPENTER	13.72	
CEMENT MASON/CONCRETE FINISHER	14.48	
ELECTRICIAN		
Electrician	17.97	
Telecommunications Technician	16.79	.63
IRONWORKER	16.02	
LABORER		
Asphalt Raker and Spreader	12.46	
Asphalt Screed/Jackman	14.33	
Carpenter Tender	12.88	
Cement Mason/Concrete Finisher Tender	12.54	
Common or General	10.20	
Guardrail/Fence Installer	12.87	

	Rates	Fringes
Pipelayer	12.17	
Traffic Signal/Lighting Installer	14.89	
PAINTER		
Bridge	24.57	
POWER EQUIPMENT OPERATORS		
Asphalt Broom Tractor	11.85	
Bulldozer Fine	17.04	
Bulldozer Rough	14.34	
Concrete Grinder/Groover	20.34	2.30
Crane Boom Trucks	20.54	
Crane Other	20.08	
Crane Rough/All-Terrain	20.67	
Drill Operator Rock	14.38	
Drill Operator Structure	21.14	
Excavator Fine	16.60	
Excavator Rough	14.00	
Grader/Blade Fine	18.47	
Grader/Blade Rough	14.62	
Loader 2 Cubic Yards or Less	13.76	
Loader Greater Than 2 Cubic Yards	14.14	
Material Transfer Vehicle (Shuttle Buggy)	15.18	
Mechanic	17.55	
Milling Machine	15.36	
Off-Road Hauler/Water Tanker	11.36	
Oiler/Greaser	13.55	
Pavement Marking Equipment	12.11	
Paver Asphalt	15.59	
Paver Concrete	18.20	
Roller Asphalt Breakdown	12.45	
Roller Asphalt Finish	13.85	
Roller Other	11.36	
Scraper Finish	12.71	
Scraper Rough	11.35	
Slip Form Machine	16.50	
Tack Truck/Distributor Operator	14.52	
TRUCK DRIVER		
GVWR of 26,000 Lbs or Less	11.12	
GVWR of 26,000 Lbs or Greater	12.37	

Welders – Receive rate prescribed for craft performing operation to which welding is incidental.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence,

sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier. Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

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GEOTEXTILE FOR PAVEMENT STABILIZATION: (1-21-14)

Description

Furnish and place geotextile for pavement stabilization in accordance with the contract. Geotextile for pavement stabilization may be required to prevent pavement cracking and provide separation between the subgrade and pavement section at locations shown in the plans and as directed.

Materials

Refer to Division 10 of the *Standard Specifications*.

Item	Section
Geotextiles	1056

Provide Type 5 geotextile for geotextile for pavement stabilization that meets the following requirements:

GEOTEXTILE FOR PAVEMENT STABILIZATION REQUIREMENTS		
Property	**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
Melting Point	300° F	ASTM D276

A. Define "minimum average roll value" (MARV), "machine direction" (MD) and "cross-machine direction" (CD) in accordance with ASTM D4439.

Construction Methods

Notify the Engineer when the roadbed is completed within 2" of subgrade elevation. The Engineer will sample and test subgrade soils for quality to determine if geotextile for pavement stabilization is required at locations shown in the plans and other locations as directed. For subgrades without stabilization, allow 24 days to determine if geotextile for pavement stabilization is required. For stabilized subgrades with geotextile for pavement stabilization, stabilize subgrade soils to 12" beyond the base course as shown in the plans.

Place geotextile for pavement stabilization on subgrades immediately below pavement sections as shown in the plans and in slight tension free of kinks, folds, wrinkles or creases. Install geotextiles with the MD perpendicular to the roadway centerline. The MD is the direction of the length or long dimension of the geotextile roll. Do not splice or overlap geotextiles in the MD so splices or overlaps are parallel to the roadway centerline. Extend geotextile for pavement stabilization 12" beyond the base course as shown in the plans.

Completely cover subgrades with geotextile for pavement stabilization so geotextiles are adjacent to each other in the CD, i.e., perpendicular to the MD. The CD is the direction of the width or short dimension of the geotextile roll. Overlapping geotextiles in the CD is permitted but not required. Overlap geotextiles in the direction that base course will be placed to prevent lifting the edge of the top geotextile.

For asphalt base courses, asphalt mixture temperatures in the truck may not exceed 315° F at the time of placement. Do not damage geotextile for pavement stabilization when constructing base

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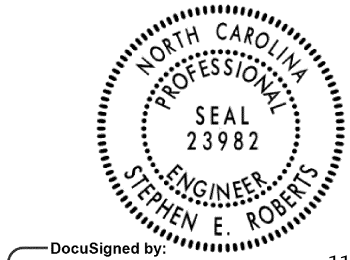
courses. Place and compact base courses in accordance with the *Standard Specifications*. Do not operate heavy equipment on geotextiles any more than necessary to construct pavement sections. Replace any damaged geotextiles to the satisfaction of the Engineer.

Measurement and Payment

Geotextile for Pavement Stabilization will be measured and paid in square yards. Geotextiles will be measured along subgrades as the square yards of exposed geotextiles before placing base courses. 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 placing geotextiles.

Payment will be made under:

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



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NORTH CAROLINA PROFESSIONAL SEAL 036073 ENGINEER BARRY L. BRANDT

DocuSigned by:
Barry Brandt
[illegible]

10/31/2017

OVERHEAD AND DYNAMIC MESSAGE SIGN FOUNDATIONS

Description

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

Materials

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

Assumed Subsurface Conditions

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

(A) Unit weight (γ) = 120 lb/cf,

(B) Friction angle (ϕ) = 30°,

(C) Cohesion (c) = 0 lb/sf and

(D) Groundwater 7 ft below finished grade.

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

Subsurface Investigations

Use a prequalified geotechnical consultant to perform one standard penetration test (SPT) boring in accordance with ASTM D1586 at each sign location requiring a subsurface investigation. Rough grade sign locations to within 2 ft of finished grade before beginning drilling. Drill borings to 2 drilled pier diameters below anticipated pier tip elevations or refusal, whichever is higher.

Use the computer software gINT version V8i or later manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs. Provide boring logs sealed by a geologist or engineer licensed in the state of North Carolina.

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Sign Foundation Designs

Design sign foundations for the wind zone and clearances shown in the plans and the slope of finished grade at each sign location. Use the assumed soil parameters and groundwater elevation above for sign foundation designs unless a subsurface investigation is required. For sign locations requiring a subsurface investigation, design sign foundations for the subsurface conditions at each sign location. Design footings, pedestals, drilled piers, grade beams and wings in accordance with the 6th Edition of the *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*. In some instances, conflicts with drainage structures may dictate sign foundation types.

Design footings in accordance with Section 4.4 of the *AASHTO Standard Specifications for Highway Bridges*. Do not use an allowable bearing pressure of more than 3,000 lb/sf for footings.

Design drilled piers for side resistance only in accordance with Section 4.6 of the *AASHTO Standard Specifications for Highway Bridges* except reduce ultimate side resistance by 25% for uplift. Use the computer software LPILE version 6.0 or later manufactured by Ensoft, Inc. to analyze drilled piers. Provide drilled pier designs with a horizontal deflection of less than 1" at top of piers. For cantilever signs with single drilled pier foundations supporting metal poles, use wings to resist torsion forces. Provide drilled pier designs with a factor of safety of at least 2.0 for torsion.

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

Submit boring logs, if any, working drawings and design calculations for acceptance in accordance with Article 105-2 of the *2012 Standard Specifications*. Submit working drawings showing plan views, required foundation dimensions and elevations and typical sections with reinforcement, conduit and anchor rod assembly details. Include all boring logs, design calculations and LPILE output for sign foundation design submittals. Have sign foundations designed, detailed and sealed by an engineer licensed in the state of North Carolina.

Construction Methods

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

Measurement and Payment

Overhead Footings will be measured and paid in cubic yards. Sign foundations will be measured as the cubic yards of foundation concrete for footings, pedestals, drilled piers, grade beams and wings shown on the accepted submittals. The contract unit price for *Overhead Footings* will be full compensation for providing labor, tools, equipment and foundation materials, stabilizing or shoring excavations and supplying concrete, reinforcing steel, conduit, anchor rod assemblies and any incidentals necessary to construct sign foundations. Subsurface investigations required by the Engineer will be paid as extra work in accordance with Article 104-7 of the *2012 Standard Specifications*.

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Payment will be made under:

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

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OVERHEAD SIGN AND GANTRY SUPPORTS

DESCRIPTION

Design, fabricate, furnish and erect various types of overhead sign assemblies. Fabricate supporting structures using tubular members of either aluminum or steel. The types of overhead sign assemblies included in this specification are span structures, cantilever structures and sign structures attached to bridges.

Materials

Refer to Division 10

Item	Section
Structural Steel	1072
Overhead Sign Structures	1096
Signing Materials	1092
Organic Zinc Repair Paint	1080-9
Reinforcing Steel	1070
Direct Tension Indicators	440 and 1072

Construction Methods

A. General

Fabricate overhead sign assemblies in accordance with the details shown in the approved working drawings and the requirements of these specifications.

No welding, cutting or drilling will be permitted in the field, unless approved by the Engineer.

Drill bolt holes and slots to finished size. Holes may also be punched to finish size, provided the diameter of the punched holes is at least twice the thickness of the metal being punched. Flame cutting of bolt holes and slots is not permitted.

Erect sign panels in accordance with the requirement for Type A or B signs as indicated in the plans or Roadway Standard Drawings. Field drill two holes per connection in the Z bars for attaching signs to overhead structures. Provide two U-bolts at each U-bolt

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connection such as each truss chord to sign hanger and each truss chord to walkway support or light support. Provide two U-bolts at each U-bolt connection where ends of truss chords are supported. The minimum diameter of all U-bolts is ½ inch.

For all U-bolt connections of hanger beams to overhead assembly truss chords, provide all U-bolts with a flat washer and double nuts at each end of the U-bolts. All double nuts that are on any U-bolt shall be the same thickness and weight. When assembled, the double nuts shall be brought tight against each other by the use of two wrenches.

Use two coats of a zinc-rich paint to touch up minor scars on all galvanized materials

For high strength bolted connections, use direct tension indicators. Galvanize bolts, nuts and washers in accordance with the Standard Specifications.

B. Shop Drawings

Design the overhead sign supports, including foundations, prior to fabrication. Submit design calculations and working drawings of the designs to the Engineer for review and acceptance.

Have a professional engineer registered in the State of North Carolina perform the computations and render a set of sealed, signed and dated drawings detailing the construction of each structure.

Submit to the Engineer for review and acceptance complete design and fabrication details for each overhead sign assembly, including foundations and brackets for supporting the signs and maintenance walkways, if applicable, electrical control boxes, and lighting luminaires. Base design upon the revised structure line drawings, wind load area and the winds speed shown in the plans, and in accordance with the AASHTO *Standard Specifications for Structural Structures for Highway Signs, Luminaires and Traffic Signals, 6th Edition, 2013 and 2015 Interim Revisions*.

Submit electronic (.pdf) copies of completely detailed working drawings and the design calculations including all design assumptions for each overhead sign assembly to the Engineer for approval prior to fabrication. Working drawings shall include complete design and fabrication details (including foundations), provisions for attaching signs, maintenance walkways (when applicable), lighting luminaires to supporting structures, applicable material specifications, and any other information necessary for procuring and replacing any part of the complete overhead sign assembly.

Allow 40 days for initial working drawing review after the Engineer receives them. If revisions to working drawings are required, an additional 40 days shall be required for review and approval of the final working drawings.

Approval of working drawings by the Engineer shall not relieve the Contractor of responsibility for the correctness of the drawings, or for the fit of all shop and field connections and anchors.

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C. Design and Fabrication

The following criteria govern the design of overhead sign assemblies:

Design shall be in accordance with the AASHTO *Standard Specifications for Structural Structures for Highway Signs, Luminaires and Traffic Signals, 6th Edition, 2013 and 2015 Interim Revisions.*

Within this Specification, there are several design criteria that are owner specified. They include:

- Overhead cantilever sign structures shall include galloping loads (exclude four-chord horizontal trusses)

- The Yearly Mean Wind Velocity, V_{mean}, in North Carolina shall be assumed to be 11.6 mph.
- The Fatigue Importance Category used in the design, for each type of structure, shall be for:

    - Cantilevered structures with span greater than 50 feet – Fatigue Importance Category I.
    - Cantilevered structures with span less than or equal to 50 feet – Fatigue Importance Category II.
    - Non-Cantilevered structures – Fatigue Importance Category II.

The following Specification interpretations or criteria shall be used in the design of overhead sign assemblies:

- For design of supporting upright posts or columns, the effective length factor for columns "K", as provided for in Appendix B, Section B.5, shall be taken as the following, unless otherwise approved by the Engineer:

    Case 1 For a single upright post of cantilever or span type overhead sign structure, the effective column length factor, "K", shall be taken as 2.0.

    Case 2 For twin post truss-type upright post with the post connected to one chord of a horizontal truss, the effective column length factor for that column shall be taken as 2.0.

    Case 3 For twin post truss-type upright post with the post connected to two truss chords of a horizontal tri-chord or box truss, the effective column length factor for that column shall be taken as 1.65.

- For twin post truss-type uprights, the unbraced length of the post shall be from the chord to post connection to the top of base plate.

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- For twin post truss-type uprights, when the post is subject to axial compression, bending moment, shear, and torsion, the post shall satisfy the AASHTO *Standard Specifications for Structural Structures for Highway Signs, Luminaires and Traffic Signals, 6th Edition, 2013 and 2015 Interim Revisions* Equations 5.12.2.1-1, 5.12.2.1-2 and 5.12.2.1-5. To reduce the effects of secondary bending, in lieu of Equation 5.12.2.1-2, the following equation may be used:

$$\frac{f_a}{F_a} + \frac{f_b}{\left(1 - \frac{0.6 f_a}{F_{é}}\right) F_b} + \left(\frac{f_v}{F_v}\right)^2 \leq 1.0$$

Where f_a = Computed axial compression stress at base of post

- The base plate thickness for all uprights and poles shall be a minimum of 2" but not less than that determined by the following criteria and design.

Case 1 Circular or rectangular solid base plates with the upright pole welded to the top surface of the base plate with full penetration butt weld, and where no stiffeners are provided. A base plate with a small center hole, which is less than 1/5 of the upright diameter, and located concentrically with the upright pole, may be considered as a solid base plate.

The magnitude of bending moment in the base plate, induced by the anchoring force of each anchor bolt shall be calculated as $M = (P \times D_1)/2$.

Case 2 Circular or rectangular base plate with the upright pole socketed into and attached to the base plate with two lines of fillet weld, and where no stiffeners are provided, or any base plate with a center hole that is larger in diameter than 1/5 of the upright diameter. The magnitude of bending moment induced by the anchoring force of each anchor bolt shall be calculated as $M = P \times D_2$.

Where:

M = bending moment at the critical section of the base plate induced by one anchor bolt

P = anchoring force of each bolt

D_1 = horizontal distance between the center of the anchor bolt and the outer face of the upright, or the difference between the radius of the bolt circle and the radius of the upright

D_2 = horizontal distance between the face of the upright and the face of the anchor bolt nut

- The critical section shall be located at the face of the anchor bolt and perpendicular to the radius of the bolt circle. The overlapped part of two adjacent critical sections shall be considered ineffective.

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- The thickness of Case 1 base plate shall not be less than the calculated based on formula for Case 2.

- Uprights, foundations, and trusses that support overhead signs shall be designed in accordance with the Overhead and Dynamic Message Sign Foundations Project Special Provision for the effects of torsion. Torsion shall be considered from dead load eccentricity of these attachments, as well as for the attachments such as supporting brackets, lights, etc., that add to the torsion in the assembly. Truss vertical and horizontal truss diagonals in particular and any other assembly members shall be appropriately sized for these loads

- Uprights, foundations, and trusses that support overhead mounted signs shall be designed for the proposed sign wind area as noted in the contract drawings. Truss vertical and horizontal truss diagonals in particular and any other assembly members shall be appropriately sized for these loads.

For non-cantilevered monotube sign support structures, the following table and figures are considered as a required addition to the AASHTO *Standard Specifications for Structural Structures for Highway Signs, Luminaires and Traffic Signals, 6th Edition, 2013 and 2015 Interim Revisions:*

Construction	Detail	Stress Category	Application	Example
Mechanically Fastened Connections	25. Bolts in tension	D	Beam column connection for monotube structures	16
Fillet-Welded Connections	26. Fillet weld with one side normal to the applied stress	E'	Beam column connection for monotube structures	16
Mechanically Fastened Connections	27. High-Strength bolts in tension	D	Monotube or truss-chord splice	17
Fillet-Welded Connections	28. Fillet weld with one side normal to the applied stress	E'	Monotube or truss-chord splice	17
Mechanically Fastened Connections	29. U-bolts tied to the transverse truss column to keep the chords in place	D	Horizonal truss connection with the vertical truss	18
Mechanically Fastened Connections	30. Net section of full-tightened, high-tension bolts in shear	B	Truss-bolted joint	18

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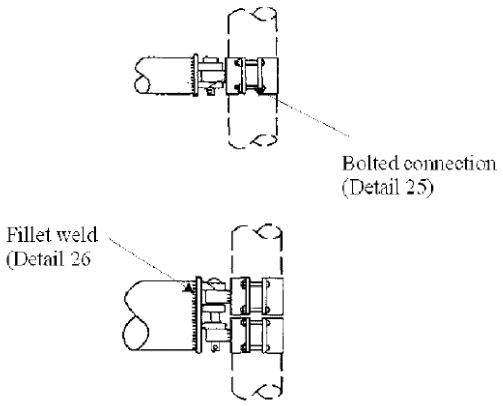
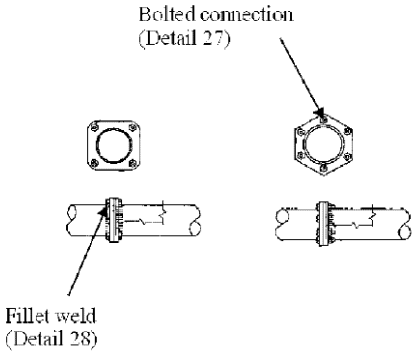
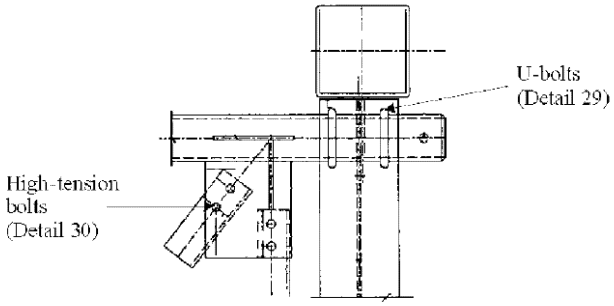


Beam-Column Connection for monotube structure
Example 16



Monotube beam splice
Example 17



Beam-Column Connection for Truss Structure
Example 18

* From NCHRP Report 494 dated 2003

Fabricate all overhead sign assemblies, including but not limited to foundations, in accordance with the details shown on the approved shop drawings and with the requirements of these Specifications.

Fabricate the span and cantilever supporting structures using tubular members of either aluminum or steel, using only one type of material throughout the project. Sign support structures that are to be attached to bridges shall be fabricated using other structural shapes.

Horizontal components of the supporting structures for overhead signs may be of a truss design or a design using singular (monotube) horizontal members to support the sign panels.

Truss or singular member centerline must coincide with the centerline of sign design area shown on the structure line drawing.

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Provide permanent camber in addition to dead load camber in accordance with the AASHTO *Standard Specifications for Structural Structures for Highway Signs, Luminaires and Traffic Signals, 6th Edition, 2013 and 2015 Interim Revisions*. Indicate on the shop drawings the amount of camber provided and the method employed in the fabrication of the support to obtain the camber.

Use cantilever sign structures that meet the following design criteria:

a. Do not exceed an L/150 vertical dead load deflection at the end of the arm due to distortions in the arm and vertical support, where L is the length of the arm from the center of the vertical support to the outer edge of the sign.

b. Do not exceed an L/40 horizontal deflection at the end of the arm due to distortions in the arm and vertical support, as a result of design wind load.

Fabricate attachment assemblies for mounting signs in a manner that allows easy removal of sign panels for repair.

D. Compensation

The work covered by this section will be paid for at the contract lump sum for each *Supports, Overhead Sign Structure @ _____*. Such price will be full compensation for all work covered by this specification includes all design, fabrication, construction, transportation, and erection of the complete overhead sign or gantry structure, supporting structure, hardware, lighting support brackets, preparing and furnishing shop drawings, and attaching the signs to the overhead assembly.

Payment will be made under:

Supports, Overhead Sign Structure @ _____	Lump Sum

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TOLL ROUTE ASSEMBLIES

1.00 DESCRIPTION

Fabricate and furnish signs, including sign face, supporting frames, hardware and package the signs for shipment. Erect proposed ground mounted signs to proposed supports and furnish mounting hardware. Comply with the requirements of Sections 901 and 904 of the *2012 Standard Specifications.*

2.00 MATERIALS

Comply with the requirements of Sections 901 and 904 of the *2012 Standard Specifications* for Type B signs.

3.00 CONSTRUCTION METHODS

Comply with the requirements of Section 901 and 904 of the *2012 Standard Specifications* for Type B signs, except as follows:

- Silk Screening – Follow the requirements for Type E and F signs.
- Mounting – Do not drill holes in sign panels. Mount sign panels to Z-Bars using VHB tape. Refer to Contract Plans for mounting details.

4.00 MEASUREMENT AND PAYMENT

Sign fabrication will be measured and paid as the actual number of square feet of sign face areas acceptably fabricated. In measuring this quantity, the sign face areas will be calculated to the nearest 1/100 of a square foot, using the dimensions shown in the contract.

Repair or otherwise correct any damage to the signs or refabricate them at no cost to the Department. When requested by the Contractor, the Department may have the necessary repairs made or the signs refabricated, and deduct the associated costs thereof from monies due the Contractor.

Sign Erections (Toll Route Assembly) will be measured and paid as the actual number of ground mounted signs erected and accepted. Each Toll Route Marker sign assembly will be measured as one sign.

Payment will be made under:

Pay Item	**Pay Unit**
Contractor Furnished, Toll Route Assembly	Square Foot
Sign Erection, Toll Route Assembly	Each

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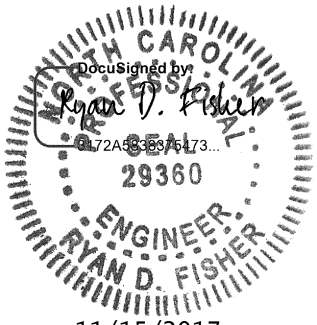

11/15/2017

REINFORCING STEEL (AESTHETIC COLUMNS ONLY)

This special provision shall follow section 425 FABRICATING AND PLACING REINFORCEMENT of the *2012 Standard Specifications* with the following exceptions:

Page 4-51, Article 425-6, Measurement and Payment, line 16, replace "*Reinforcing Steel*" at beginning of sentence with "*Reinforcing Steel (Aesthetic Columns Only)*".

Page 4-52, Article 425-6, Measurement and Payment, line 10, replace "*Reinforcing Steel*" for the first pay item with "*Reinforcing Steel (Aesthetic Columns Only)*".

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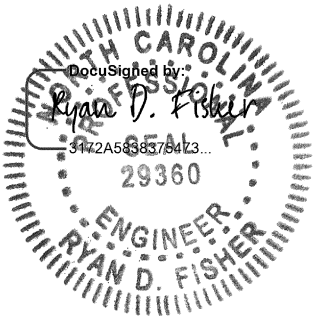

11/15/2017

CLASS A CONCRETE (AESTHETIC COLUMNS ONLY)

This special provision shall follow section 420 CONCRETE STRUCTURES of the *2012 Standard Specifications* with the following exceptions:

Page 4-46, Article 420-21, Measurement and Payment, line 44, replace "*Class___Concrete*" with "*Class A Concrete (Aesthetic Columns Only)*".

Page 4-47, Article 420-21, Measurement and Payment, line 43, replace "*Class___Concrete*" for the first pay item with "*Class A Concrete (Aesthetic Columns Only)*".

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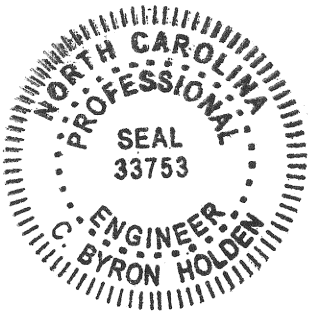

10/30/2017

DocuSigned by:
C. Byron Holden
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REMOVE AND REPLACE SNOWPLOWABLE PAVEMENT MARKER REFLECTOR:

(02/06/2013)

Page 12-16, Article 1253-3(B) Reflector Replacement, add the following after the first paragraph:

Remove existing Snowplowable Pavement Marker Reflective Lenses as specified in the plans by the method recommended by the manufacturer of the marker and approved by the Engineer.

Install new Reflective Lenses in existing Snowplowable Pavement Marker Castings as specified in the plans by using adhesives and methods recommended by the manufacturer of the markers and approved by the Engineer.

Missing castings shall be replaced. Broken castings shall be removed and replaced. In both cases, the slot for the castings shall be properly prepared by the method recommended by the manufacturer of the marker prior to installing the new casting. Removal of broken castings and preparation of slots will be considered incidental to the work of replacing castings.

Page 12-16, Article 1253-5 Measurement and Payment, add the following as the second paragraph:

Remove and Replace Snowplowable Pavement Marker Reflector will be measured and paid for in units of each that have been satisfactorily removed, replaced and accepted.

Add the following pay item:

Pay Item	Pay Unit
Remove and Replace Snowplowable Pavement Marker Reflector	Each

LAW ENFORCEMENT:

(05/14/2013)

Description

Furnish Law Enforcement Officers and marked Law Enforcement vehicles to direct traffic in accordance with the contract.

Construction Methods

Use uniformed Law Enforcement Officers and marked Law Enforcement vehicles equipped with blue lights mounted on top of the vehicle, and Law Enforcement vehicle emblems to direct or control traffic as required by the plans or by the Engineer.

Measurement and Payment

Law Enforcement will be measured and paid for in the actual number of hours that each Law Enforcement Officer is provided during the life of the project as approved by the Engineer. There will be no direct payment for marked Law Enforcement vehicles as they are considered incidental to the pay item.

Payment will be made under:

Pay Item	Pay Unit
Law Enforcement	Hour

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PROJECT SPECIAL PROVISIONS
LIGHTING

1.00 DESCRIPTION

The work covered by this Section consists of furnishing, installing, connecting, and placing into satisfactory operating condition roadway lighting at locations shown on the plans. Perform all work in accordance with these Special Provisions, the Plans, the National Electrical Code, and North Carolina Department of Transportation "Standard Specifications for Roads and Structures" (*2012 Standard Specifications*).

Perform all work in conformance with Division 14 of the *2012 Standard Specifications* except as modified or added to by these Special Provisions. Install all bore pits outside the clear zone, as defined in the AASHTO Roadside Design Guide or as directed by the Engineer.

In addition to the requirements of Division 1400, other specific Sections of the *2012 Standard Specifications* applicable to the work on this project are listed below.

Section 1401	High Mount Standard and Portable Drive Unit
Section 1404	Light Standards
Section 1405	Standard Foundation
Section 1407	Electric Service Pole and Lateral
Section 1408	Light Control System
Section 1409	Electrical Duct
Section 1410	Feeder Circuits
Section 1411	Electrical Junction Boxes

2.00 CONSTRUCTION METHODS

Modify the fourth paragraph of Standard Specification 1400-4(F) to read as follows:

Install manufactured set screw type connectors, suitable for connecting multiple wires, and which are UL Listed (UL486D) for all phase conductor splices. These precise fit connectors are insulated with high–strength dielectric material and have removable access plugs over the set screws. Direct buried and/or submersible versions of these connectors, equipped with factory made waterproof insulating boots, are required for splicing inside junction boxes. Non-direct buried and/or non-submersible connectors may be used for phase conductor splicing in normally dry areas such as inside poles and transformer bases. After tightening set screw, tape down the access plugs to keep them securely in place. Split-bolt connectors may be used for ground wire splicing. Wire nut and compression type connectors will not be allowed.

Add the following to the end of Standard Specification 1400-4:

(K) Foundations
Form foundations with prefabricated cardboard forms down to 12" min. below top of ground.

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Do not erect standards before test cylinders representing the foundation concrete have attained the minimum compressive strength detailed in Section 1000 of the *2012 Standard Specifications.* Test cylinders shall be provided for each truckload of concrete used for light pole foundations. Tests shall be conducted as described in Section 1000 of the *2012 Standard Specifications.*

To avoid vehicle undercarriage snagging of any substantial remains of a breakaway support (when it is broken away), the edge of the foundation or top of anchor bolt should not extend more than four inches (4") above a sixty inch (60") chord aligned radially to the centerline of the highway, and connecting any point within the length of the chord on the ground surface on one side of the foundation to a point on the ground surface on the other side.

3.00 BURN IN TEST

Add the following to the end of Standard Specification 1400-6:

The Contractor is responsible for all maintenance of the lighting system(s) installed or renovated as part of this contract until contract completion. The Department will assume maintenance responsibility for the completed lighting systems after the entire project is accepted and there is no chance of construction related damage.

4.00 HIGH MOUNT FOUNDATIONS

4.10 DESCRIPTION

High mount foundations for high mount standards consist of drilled piers or footings with pedestals, conduit and anchor rod assemblies. Construct high mount foundations in accordance with the contract and either *2012 Roadway Standard Drawings* No. 1402.01 or the accepted submittals. Define “high mount standard foundation” as a drilled pier including the conduit and anchor rod assembly that meets Standard Drawing No. 1402.01.

4.20 MATERIALS

Use high mount foundation materials that meet the *Foundations and Anchor Rod Assemblies for Metal Poles* provision found in the Roadway Project Special Provisions.

Provide and install a polymer concrete (PC) electrical junction box measuring 18” (l) x 12” (w) x 18” (h) (PC18) and meeting the specifications found in the Special Provisions.

4.30 HIGH MOUNT STANDARD FOUNDATIONS

Construct high mount standard foundations for the wind zone and high mount heights shown in the plans unless the following assumed site conditions are not applicable to high mount locations:

A. Soil with unit weight (γ) $\geq$ 120 lb/cf and friction angle (ϕ) $\geq$ 30°,
B. Groundwater at least 7 ft below finished grade and
C. Slope of finished grade 6:1 (H:V) or flatter.

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

4.40 SUBSURFACE INVESTIGATIONS

Use a prequalified geotechnical consultant to perform one standard penetration test (SPT) boring in accordance with ASTM D1586 at each high mount location requiring a subsurface investigation. Rough grade high mount locations to within 2 ft of finished grade before beginning drilling. Drill borings to 2 drilled pier diameters below anticipated pier tip elevations or refusal, whichever is higher.

Use the computer software gINT version V8i or later manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs. Provide boring logs sealed by a geologist or engineer licensed in the state of North Carolina.

4.50 HIGH MOUNT FOUNDATION DESIGNS

Design high mount foundations for the wind zone and high mount heights shown in the plans and the slope of finished grade and subsurface conditions at each high mount location. Design drilled piers, footings and pedestals in accordance with the 6th Edition of the *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*.

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. Provide drilled pier designs with a horizontal deflection of less than 0.5" at top of piers.

Design footings in accordance with Section 4.4 of the *AASHTO Standard Specifications for Highway Bridges.* Do not use an allowable bearing pressure of more than 3,000 lb/sf for footings.

Submit boring logs, working drawings and design calculations for acceptance in accordance with Article 105-2 of the *2012 Standard Specifications*. Submit working drawings showing plan views, required foundation dimensions and elevations and typical sections with reinforcement, conduit and anchor rod assembly details. Include all boring logs, design calculations and LPILE output for high mount foundation design submittals. Have high mount foundations designed, detailed and sealed by an engineer licensed in the state of North Carolina.

4.60 CONSTRUCTION METHODS

Grade a 3 ft diameter level work area around high mount locations with cut and fill slopes as shown on Standard Drawing No. 1402.01. Construct drilled piers, footings and pedestals and

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install anchor rod assemblies for high mount foundations in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

Install PC18 junction box within 10' of pole foundation. Junction box shall be used as a tee point for feeder circuitry and conductors, and as housing for the pole ground rod.

4.70 MEASUREMENT AND PAYMENT

High Mount Foundations will be measured and paid in cubic yards. High mount standard foundations will be measured as the cubic yards of concrete shown on Standard Drawing No. 1402.01 for the high mount height and wind zone shown in the plans. All other high mount foundations will be measured as the cubic yards of foundation concrete for drilled piers, footings and pedestals shown on the accepted submittals. The contract unit price for *High Mount Foundations* will be full compensation for providing labor, tools, equipment and foundation materials, stabilizing or shoring excavations and supplying concrete, reinforcing steel, conduit, anchor rod assemblies and any incidentals necessary to construct high mount foundations. Subsurface investigations and high mount foundation designs required by the Engineer will be paid as extra work in accordance with Article 104-7 of the *2012 Standard Specifications*.

Payment will be made under:

High Mount Foundations……..Cubic Yard

5.00 ELECTRICAL JUNCTION BOXES

5.10 DESCRIPTION

Same as Article 1411-1.

5.20 MATERIALS

Same as Article 1411-2, except modify referenced Article 1091-5 as follows:

- Page 10-202, revise paragraph starting on line 9 to read "Provide polymer concrete (PC) boxes which have bolted covers and open bottoms. Provide vertical extensions of 6" to 12" as required by project special provisions. Provide an 18" reinforced concrete collar, minimum 4" thick, on all junction boxes, unless boxes are on slopes of 3:1 or steeper. Avoid placing junction boxes on such slopes wherever possible."
- Page 10-202, revise sentence beginning on line 14 to read "Other thermoplastic materials may be used for components which are not normally exposed to sunlight."

5.30 CONSTRUCTION METHODS

Same as Article 1411-3, except add the following:

Install a High Mast Junction Box (HMJB) meeting the requirements of this section and sized as shown in the plans within ten feet (10') of each high mast foundation. Position the junction box

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for best routing of underground circuitry. The junction box is used as a tee point for circuitry to the high mast standard.

For single arm or twin arm light standards installed in grassy areas, provide a light standard junction box (LSJB) meeting the requirements of this section and sized as shown in the plans. Install the LSJB within five feet (5') of the standard foundation. The LSJB shall be placed parallel to, or behind the light standard foundation, as viewed from the roadway. The LSJB is used as a tee point for circuitry.

Install a ground rod in the HMJB and the LSJB. Permanently attach grounding conductor from light standard to ground rod in junction box via exothermic weld.

5.40 MEASUREMENT AND PAYMENT

Electrical Junction Boxes ____ will be measured and paid as the actual number of the appropriate type and size junction boxes installed and accepted. Payment for the conduit, duct and wiring will be paid under other contract items. Items used for splicing are incidental to the junction boxes. The 18" reinforced concrete collar is incidental to each junction box.

Payment will be made under:

Electrical Junction Boxes _____..... Each

6.00 LIGHT STANDARDS

6.10 DESCRIPTION

Furnish and install light standards less than 55 ft. high complete with bracket arm(s), when required, and an AASHTO approved impact attenuation device (slip base, frangible base adapter, breakaway base) as shown on the plans.

6.20 MATERIALS

Same as Article 1404-2, except modified as follows:

- Remove the words 'ellipsoidal shaped' from paragraph two.
- Replace paragraph 12 to read "Luminaires may be either direct pole mounted or mounted to a bracket arm. Where bracket arms are required, use bracket arms for each standard which are the length shown in the plans and of the same material as the standard. For direct pole mounted luminaires, minimum setback distances shown in the *2012 Roadway Standard Drawings* must be maintained."

6.30 CONSTRUCTION METHODS

Same as Article 1404-3.

6.40 MEASUREMENT AND PAYMENT

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Same as Article 1404-4.

7.00 LIGHT STANDARD LIGHT EMITTING DIODE (LED) LUMINAIRES

7.10 DESCRIPTION

Furnish, install and place into satisfactory operation luminaire, either on a bracket arm or directly mounted to the standard, complete with all light sources, drivers, wiring inside standard from circuit conductors to luminaire, in-line breakaway fuseholders and fuses and ground wiring at the pole on light standards less than 55 ft. in height.

Type	HPS Replacement Equivalent	Color Temp	Min. % of initial output at 70k hours	Min. Maintained Delivered Lumens
208W LED	250W	4000K ±500K	83%	19,000
285W LED	400W	4000K ±500K	83%	21,000

Third party certified photometric files in IES format are required to be submitted with the catalog cuts for the proposed LED roadway luminaire. Photometric files must show that proposed luminaire will meet or exceed the design shown in the plans.

The manufacturer shall state the Light Loss Factor (LLF) used in the photometric calculations for the proposed luminaire. LLF shall be calculated as follows:

LLF = Lamp Lumen Depreciation (LLD) x Luminaire Dirt Depreciation (LDD)

- Lamp Lumen Depreciation (LLD) shall be the value calculated and reported by the manufacturer based on the LM-80 and TM-21 reports for the proposed fixture for 70,000 hours at 25° C.
- Luminaire Dirt Depreciation (LDD) = 0.90

7.20 MATERIALS

7.21 LUMINAIRE REQUIREMENTS

A. General Requirements

- LM-79 photometric test reports shall be provided for all LED luminaires. LM-79 luminaire photometric reports shall be produced by an independent test laboratory and include the following:
  - Name of test laboratory. The test laboratory must hold National Voluntary Laboratory Accreditation Program (NVLAP) accreditation for the IES LM-79 test procedure or must be qualified, verified, and recognized through the U.S. Department of Energy's CALiPER program.
  - Report number
  - Date

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- Complete luminaire catalog number. Catalog number tested must match the catalog number of the luminaire submitted, except for variations which do not affect performance.
- Description of luminaire, LED light source(s), and LED driver(s)
- Goniophotometry
- Colorimetry

- LM-80 lumen maintenance test report shall be provided for each respective LED light source.
- Luminaire shall be constructed of a single piece die cast aluminum housing. Each luminaire shall be finished gray in color unless otherwise noted.
- The luminaire shall have a 7 pin ANSI C136.41 compliant photocontrol receptacle for future expansion capabilities. Provide shorting caps to cover photocontrol receptacle for all luminaires.
- Provide a summary of reliability testing performed for LED driver.
- Luminaires maximum total power consumption shall not exceed the values shown in the table above. Nominal luminaire input wattage shall account for nominal applied voltage and any reduction in driver efficiency due to sub-optimal driver loading.
- Luminaire shall have a maximum Backlight, Uplight & Glare (BUG) rating of 3-0-3 and an IESNA distribution of Type II or Type III as required to meet the spacing, the average maintained footcandle level and the average to minimum uniformity ratio requirements shown on the plans. The same BUG rating and distribution type shall be used throughout the project.
- Luminaire electrical components (driver and surge protection) shall meet the dust and moisture requirements of ingress protection (IP) rating of IP65 and IP66 for the optical compartments as specified in ANSI C136.25, minimum.
- Luminaire shall have external and internal labels per ANSI C136.15 and ANSI C136.22, respectively. Internal label shall identify the manufacturer, year and month of manufacture and the manufacturer's part number.
- Luminaire shall have an internal bubble level.
- Luminaires shall start and operate in -20°C to +40°C ambient.
- Luminaires shall be rated for continuous service at an ambient temperature of 40°C (104°F)
- Electrically test fully assembled luminaires before shipment from factory.
- Effective Projected Area (EPA) and weight of the luminaires shall not exceed 1.4 square feet and 46 lbs.
- Luminaires shall be designed for ease of electrical component replacement.
- Luminaires shall be rated for minimum 2G vibration, minimum, per ANSI C136.31.
- LED light sources and drivers shall be RoHS compliant.
- The luminaire manufacturer shall have no less than five (5) years of experience in manufacturing LED-based lighting products and the manufacturing facility must be ISO 9001 certified.

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- Luminaire shall have a 1.25" to 2.0" adjustable tenon mount for connection to luminaire bracket arm assembly.
- Pole hardware, nuts, bolts, and washers, etc. shall be made from 18-8 stainless steel, or steel conforming to ASTM A307 galvanized in accordance with ASTM A153.
- Grommets shall be installed in cable entry holes. Cable entry holes shall be free from sharp edges which might cut conductors or an ungloved hand.
- All conductors inside the luminaire shall be neatly secured with tie-wraps as needed to prevent pinch points and assist in trouble shooting.

B. Driver
- Shall be 0V-10V dimmable.
- Rated case temperature shall be suitable for operation in the luminaire operating in the ambient temperature range of -20°C to +40°C.
- Shall be rated for 480VAC at 50/60 Hz, and shall operate normally for input voltage fluctuations of ± 10%.
- Shall have a minimum Power Factor (PF) of 0.90 at full input power and across specified voltage range.
- Shall provide UL Class II output.

C. Surge Suppression
- Integral surge protection shall meet ANSI/IEEE C62.45 procedures based on ANSI/IEEE C62.41.2 definitions for standard and optional waveforms for location category C-High 10kV/10kA test, IEC 61000-4-2 (Electrostatic Discharge) 8kV Air/4kV Contact test and IEC 61000-4-4 (Fast Transients).

D. Electromagnetic interference
- Luminaires shall have a maximum Total Harmonic Distortion (THD) of 20% at full input power and across specified voltage range.
- Luminaires shall comply with FCC 47 CFR part 15 non-consumer RFI/EMI standards.

E. Electrical safety testing
- Luminaires shall be listed for wet locations.
- Luminaires shall be UL listed and labeled.

F. Finish
- Luminaires shall be painted with a corrosion resistant polyester powdered paint with a minimum 2.0 mil thickness.
- Luminaires shall exceed a rating of six per ASTM D1654 after 1000 hours of salt spray fog testing per ASTM B117.
- The coating shall exhibit no greater than 30% reduction of gloss per ASTM D523, after 500 hours of QUV testing at ASTM G154 Cycle 6.
- Exterior surfaces shall be smooth and free of burrs.

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G. Thermal management
- Mechanical design of protruding external surfaces (heat sink fins) on roadway luminaries shall facilitate hose-down cleaning and discourage debris accumulation.
- Liquids or moving parts will not be allowed for thermal management.

H. Color Quality
- Minimum Color Rendering Index (CRI) of 70 with a Correlated Color Temperature (CCT) of 3500K to 4500K

I. Optics
- Transmissive optical components shall be applied in accordance with OEM design guidelines to ensure suitability for the thermal/mechanical/chemical environment.

J. The following shall be in accordance with corresponding sections of ANSI C136.37
- All internal components shall be assembled and pre-wired using modular electrical connections.
- Terminal blocks shall be used for incoming AC lines. Terminal blocks shall be easily accessible to installers or repair personnel. Wire nuts are prohibited inside the luminaire housing.

K. Latching and hinging
- Refractor and housing door holders and hinges shall be designed to maintain positive control of door to the luminaire body so as not to allow the accidental disengagement of either door.
- Drivers shall be mounted to a housing door designed to be opened from the bottom of the luminaire. Housing door shall allow easy removal for troubleshooting/repair on the ground.

L. Manufacturer or local sales representative shall provide installation and troubleshooting support via telephone and/or email.

7.30 WARRANTY

Provide a minimum ten-year warranty covering maintained integrity and functionality of the luminaire housing, wiring, and connections, LED light source(s) and LED driver. Negligible light output from more than 10 percent of the LED packages constitutes luminaire failure.

Warranty period shall begin after project acceptance by the Department. Supplier shall furnish documentation of warranty procedures to the Contractor stating that warranty is for NCDOT.

7.40 CONSTRUCTION METHODS

Level and secure each luminaire in all directions. Adjust any luminaires, as directed by the Engineer, to provide optimal illumination distribution.

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All LED packages on all luminaires must be operating normally at contract completion. Any luminaire displaying improper operating characteristics prior to contract completion will be replaced by the Contractor at no additional cost to the Department.

7.50 MEASUREMENT AND PAYMENT

The roadway luminaries measured as provided above will be paid for at the contract unit price per each "Roadway Light Standard Luminaires – LED". Such price and payment will be considered full compensation for providing and installing the LED roadway luminaire on the bracket arm, wiring inside the standard from the circuit conductors to the LED roadway luminaire, in-line breakaway fuseholders with fuses and ground wiring at the pole on the light standard.

Payment will be made under:

Roadway Light Standard Luminaire – ____LED……. Each

8.00 HIGH MAST LIGHT EMITTING DIODE (LED) LUMINAIRES

8.10 DESCRIPTION

Furnish, install and place into satisfactory operation, LED luminaires on high mount standards as detailed in these Special Provisions.

The Contractor shall supply Holophane or Cooper LED high mount luminaires as specified below or approved equal.

Mounting Height	# of Fixtures	Holophane Part Number	Cooper Part Number
120'	8	HMLED2-12-4K-AH-G-AW-P7	GAN-AF-10-LED-8-5WQ-AP-MA-4N7
100'	6	HMLED2-12-4K-AH-G-AW-P7	GAN-AF-10-LED-8-5WQ-AP-MA-4N7
80'	8	HMLED2-06-4K-AH-G-AWP7	GAN-AF-06-LED-8-5WQ-AP-MA-4N7
60'	4	HMLED2-06-4K-AH-G-AWP7	GAN-AF-06-LED-8-5WQ-AP-MA-4N7

Any alternate luminaire submitted for approval must meet the minimum requirements in the table and sections below.

Mounting Height	Max. LED Fixture Wattage	Number & HPS Replacement Equivalent	Color Temp	Min. % of initial output at 70k hours	Min. Maintained Delivered Lumens (per fixture)
120'	550W	8 x 750W	4000K ±500K	87%	44,250
100'	550W	6 x 750W	4000K ±500K	87%	44,250
80'	320W	8 x 400W	4000K ±500K	87%	23,300
60'	320W	4 x 400W	4000K ±500K	87%	23,300

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The Contractor shall supply the Department with current catalog cuts and 3rd party certified photometric data files in Illuminating Engineering Society (IES) format for any alternate high mount luminaire submitted for approval. The Department will thoroughly evaluate alternate luminaires to determine if proposed alternate high mount luminaire meets or exceeds design criteria.

The manufacturer shall state the Light Loss Factor (LLF) used in the photometric calculations for the proposed luminaire. LLF shall be calculated as follows:

LLF = Lamp Lumen Depreciation (LLD) x Luminaire Dirt Depreciation (LDD)

- Lamp Lumen Depreciation (LLD) shall be the value calculated and reported by the manufacturer based on the LM-80 and TM-21 reports for the proposed fixture for 70,000 hours at 25° C.
- Luminaire Dirt Depreciation (LDD) = 0.90

High mount luminaire retrofit LED kits are not an acceptable alternative.

8.20 MATERIALS

8.21 LUMINAIRE REQUIREMENTS

A. General Requirements

- LM-79 photometric test reports shall be provided for all LED luminaires. LM-79 luminaire photometric reports shall be produced by an independent test laboratory and include the following:
  - Name of test laboratory. The test laboratory must hold National Voluntary Laboratory Accreditation Program (NVLAP) accreditation for the IES LM-79 test procedure or must be qualified, verified, and recognized through the U.S. Department of Energy's CALiPER program.
  - Report number
  - Date
  - Complete luminaire catalog number. Catalog number tested must match the catalog number of the luminaire submitted, except for variations which do not affect performance.
  - Description of luminaire, LED light source(s), and LED driver(s)
  - Goniophotometry
  - Colorimetry

- LM-80 lumen maintenance test report shall be provided for each respective LED light source.
- Luminaire shall be constructed of aluminum. Each luminaire shall be finished gray in color unless otherwise noted.
- The luminaire shall have a 7 pin ANSI C136.41 compliant photocontrol receptacle for future expansion capabilities. Provide shorting caps to cover photocontrol receptacle for all luminaires.
- Provide a summary of reliability testing performed for LED driver.

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- Luminaires maximum total power consumption shall not exceed the values shown in the table above. Nominal luminaire input wattage shall account for nominal applied voltage and any reduction in driver efficiency due to sub-optimal driver loading.
- Luminaire shall have a maximum Backlight, Uplight & Glare (BUG) rating of 5-0-5 and an IESNA distribution of Type V as required to meet the spacing, the average maintained footcandle level and the average to minimum uniformity ratio requirements shown on the plans. The same BUG rating and distribution type shall be used throughout the project.
- Luminaire LED modules shall meet dust and moisture rating of IP-66, minimum.
- Luminaire shall have an external label per ANSI C136.15.
- Luminaires shall have an internal label per ANSI C136.22.
- Luminaires shall start and operate in -20°C to +40°C ambient.
- Electrically test fully assembled luminaires before shipment from factory.
- Effective Projected Area (EPA) and weight of the luminaires shall not exceed 1.3 square feet and 65 lbs.
- Luminaires shall be designed for ease of electrical component replacement.
- Luminaires shall be rated for minimum 2G vibration, minimum, per ANSI C136.31-2010
- LED light sources and drivers shall be RoHS compliant.
- The luminaire manufacturer shall have no less than five (5) years of experience in manufacturing LED-based lighting products and the manufacturing facility must be ISO 9001 certified.
- Pole hardware, nuts, bolts, and washers, etc. shall be made from 18-8 stainless steel, or steel conforming to ASTM A307 galvanized in accordance with ASTM A153.

B. Driver
- Shall be 0V-10V dimmable.
- Rated case temperature shall be suitable for operation in the luminaire operating in the ambient temperature range of -20°C to +40°C.
- Shall be rated for 480VAC at 50/60 Hz, and shall operate normally for input voltage fluctuations of ± 10%.
- Shall have a minimum Power Factor (PF) of 0.90 at full input power and across specified voltage range.

C. Surge Suppression
- Integral surge protection shall meet ANSI/IEEE C62.45 procedures based on ANSI/IEEE C62.41.2 definitions for standard and optional waveforms for location category C-High 10kV/10kA test, IEC 61000-4-2 (Electrostatic Discharge) 8kV Air/4kV Contact test and IEC 61000-4-4 (Fast Transients).

D. Electromagnetic interference
- Luminaires shall have a maximum Total Harmonic Distortion (THD) of 20% at full input power and across specified voltage range.

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- Luminaires shall comply with FCC 47 CFR part 15 non-consumer RFI/EMI standards.

E. Electrical safety testing
- Luminaires shall be listed for wet locations.
- Luminaires shall be UL listed and labeled.

F. Finish
- Luminaires shall be painted with a corrosion resistant polyester powdered paint with a minimum 2.0 mil thickness.
- Luminaires shall exceed a rating of six per ASTM D1654 after 1000 hours of salt spray fog testing per ASTM B117.
- The coating shall exhibit no greater than 30% reduction of gloss per ASTM D523, after 500 hours of QUV testing at ASTM G154 Cycle 6.

G. Thermal management
- Mechanical design of protruding external surfaces (heat sink fins) shall facilitate hose-down cleaning and discourage debris accumulation.

H. Color Quality
- Minimum Color Rendering Index (CRI) of 70 with a Correlated Color Temperature (CCT) of 3500K to 4500K

I. Optics
- Transmissive optical components shall be applied in accordance with OEM design guidelines to ensure suitability for the thermal/mechanical/chemical environment.

J. The following shall be in accordance with corresponding sections of ANSI C136.37
- All internal components shall be assembled and pre-wired using modular electrical connections.
- Terminal blocks shall be used for incoming AC lines
- Latching and hinging

K. Manufacturer or local sales representative shall provide installation and troubleshooting support via telephone and/or email.

8.30 WARRANTY

Provide a minimum five-year warranty covering maintained integrity and functionality of the luminaire housing, wiring, and connections, LED light source(s) and LED driver. Negligible light output from more than 10 percent of the LED packages constitutes luminaire failure.

Warranty period shall begin after project acceptance by the Department.

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8.40 CONSTRUCTION METHODS

Level and secure each luminaire in all directions. Securely terminate the wiring for each high mount luminaire and include an equipment grounding conductor to bond the housing to the supply cord grounding conductor.

Adjust any luminaires, as directed by the Engineer, to provide optimal illumination distribution.

All LED packages on all luminaires must be operating normally at contract completion. Any luminaire displaying improper operating characteristics prior to contract completion will be replaced by the Contractor at no additional cost to the Department.

8.50 MEASUREMENT AND PAYMENT

The high mount luminaires measured as provided above will be paid for at the contract unit price per each "(height) High Mount Luminaires – LED". Such price and payment will be considered full compensation for providing and installing the LED high mount luminaire on the carrier ring tenon arm and connecting the LED high mount luminaire to the supply cord on the carrier ring.

Payment will be made under:

(height) High Mount Luminaire – LED ……. Each

9.00 LIGHT CONTROL SYSTEM

9.10 DESCRIPTION

Same as Article 1408-1.

9.20 MATERIALS

Same as Article 1408-2, except modified as follows:

- Modify the 3rd item on line 2 of page 14-19 to read "Portland Cement Concrete, Class A" and the Section to read "1000-4"
- Modify the first sentence of paragraph 2 on page 14-20 to read "Use a delayed response photo-control…"

9.30 CONSTRUCTION METHODS

Same as Article 1408-3.

9.40 MEASUREMENT AND PAYMENT

Same as Article 1408-4.

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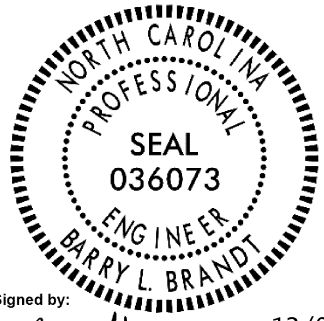
U-5315 A&B **LT-15** Wake County



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Barry Brandt
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12/9/2017

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UNLESS ALL SIGNATURES COMPLETED

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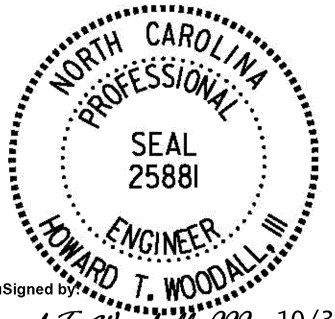
Project: U-5315A&B **UC-1** County: Wake

PROJECT SPECIAL PROVISIONS
Utility Construction
Town of Cary Water Distribution
October 31, 2017

Rummel, Klepper & Kahl, LLP
900 Ridgefield Drive, Ste. 350
Raleigh, NC 27609



DocuSigned by:
Howard T. Woodall, III 10/31/2017
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Revise the NCDOT 2012 Standard Specifications as follows:

Page 10-58, Sub-article 1036-1 General
add the following sentence:

All materials in contact with potable water shall be in conformance with Section 1417 of the Safe Drinking Water Act.

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

The utility owner is the Town of Cary. The contact person is Kyle Hubert, PE and he can be reached by phone at 919.462.3938.

The contractor shall coordinate with the Town to provide the required notice to customers prior to any shut down of the waterline.

Page 15-2, Sub-article 1500-9 Placing Pipelines into Service
add the following sentence:

Obtain approval from the Town of Cary prior to placing a new water line into service. Use backflow prevention assemblies for temporary connections to isolate new water lines from existing water line.

Page 15-6, Sub-article 1510-3 (B), Testing and Sterilization
change the allowable leakage formula to:

$$W = LD\sqrt{P} \div 148,000$$

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Page 15-6, Sub-article 1510-3 (B), Testing and Sterilization, sixth paragraph:
Replace the paragraph with the following:

Sterilize water lines in accordance with Section 1003 of The Rules Governing Public Water supply and AWWA C651 Section 4.4.3, the Continuous Feed Method. Provide a chlorine solution with between 50 parts per million and 100 parts per million in the initial feed. If the chlorine level drops below 10 parts per million during a 24 hour period, then flush, refill with fresh chlorine solution, and repeat for 24 hours. Provide certified bacteriological and contaminant test results from a state-approved or state-certified laboratory. Operate all valves and controls to assure thorough sterilization.

Page 15-6, Sub-article 1510-3 (B), Testing and Sterilization, seventh paragraph:
delete the words "may be performed concurrently or consecutively."
and replace with "shall be performed consecutively."

Page 15-7, sub-article 1515-2 Materials,
replace paragraph beginning "Double check valves…" with the following:

Double Check valves (DCV) and Reduced Pressure Zone principal (RPZ) backflow prevention assemblies shall be listed on the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research list of approved backflow devices.

Page 15-7, Article 1510-4 MEASUREMENT AND PAYMENT, add the following paragraph after line 7:

The quantity of *Ductile Iron Water Pipe Fittings* will be measured and paid per pound based on the published weights for ductile iron fittings, exclusive of the weights of any accessories, as listed in the "DI Fittings Weight Chart" located at the NCDOT Utilities web site. If the Contractor elects to use compact ductile iron water pipe fittings, measurement will be based on the weight of standard size ductile iron water pipe fittings. Any fitting not listed will be measured based on the published weights for ductile iron fittings listed in ANSI/AWWA C-110/A21.10. This is limited to pressure pipe 4 inches or larger.

Page 15-7, Article 1510-4 MEASUREMENT AND PAYMENT, add the following pay item:

Pay Item	**Pay Unit**
Ductile Iron Water Pipe Fittings	Pound

Page 15-9, Article 1515-4 MEASUREMENT AND PAYMENT, line 28, delete "fittings".

Page 15-18, Article 1550-1 DESCRIPTION, add the following after line 7:
Contractor shall adhere to installation requirements of Section 1550 when removing existing water lines and connecting the new waterlines to the existing carrier pipe.

Revise the NCDOT 2012 Standard Specifications per Owner's Specifications as follows:

Page 10-58, Article 1036-5 DUCTILE IRON PIPE AND FITTINGS, replace line 43 with:

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Ductile iron pipe shall be designed and manufactured in accordance with AWWA C150 and C151 and provided in nominal 18-ft or 20-ft lengths. The minimum required pressure ratings for ductile iron pipe and required laying conditions below:

Pipe Diameter	AWWA C-150, Laying Condition	Pressure Class	Maximum Depth of Cover
4-8 -inch	Type 4	350 psi	16-34 feet
14-20 -inch	Type 4	250 psi	3-22 feet

Page 10-59, Article 1036-5 DUCTILE IRON PIPE AND FITTINGS, add the following sentence after line 2:

All fittings shall be pressure rated for a minimum 350-psi through 24-inches in diameter.

Page 10-59, Article 1036-5 DUCTILE IRON PIPE AND FITTINGS, replace line 5 with:

All DI fittings shall be provided with mechanical joint end connections and restrained with standard blocking and rodding or wedge action retainer glands, unless otherwise specified with more stringent restrained connections approved by the Town. Gaskets shall be provided in conformance with AWWA C111 with EPDM rubber gaskets preferred over SBR.

Page 10-59, Article 1036-6 FIRE HYDRANTS, line 12, delete 36” and replace with 48”

Page 10-59, Sub-Article 1036-7 (A) Gate Valves,

line 24, delete 200psi and replace 250psi

add the following paragraph after line 24:

As additional requirement, gate valves 16-inches through 24-inches if installed vertically, shall be provided with a minimum of 2-ft of overhead clearance between the top of the operator nut and the finished subgrade. Vertical gate valve installations sized from 16 through 24 inches in diameter shall be provided with a spur gear operator at a 4:1 ratio.

Page 15-4, Sub-article 1505-3 (E), Thrust Restraint, add the following paragraph after line 23:

All water distribution mains in the Town of Cary water system shall be restrained. The standard joint restraint shall consist of stainless steel rodding and blocking as specified herein. All valves shall be restrained in a manner consistent with operation as a dead end, which includes restraining the valve to the pipe and restraining a sufficient number of pipe joints on both sides of the valve to accommodate dead end valve restraint. The specifications allow for several options to achieve required pipeline restraint, such as wedge action retainer glands, rods, blocking, manufacturer

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provided restrained joint pipe, concentric ring fittings, etc. All joint restraint products that include the means of restraint within the joint gasket shall be prohibited in the Town of Cary water system.

All plans submitted shall include the pipe restraining plan including the number of joints restrained at fittings, valves, etc. The pipe restraint plan shall be included under the design responsibility of the NC Professional Engineer sealing the shop drawings by the contractor. Restraining systems not included within this specification shall require approval from the Town of Cary prior to utilization.

Page 15-6, Sub-article 1510-3 (A), General, line 7, delete 36" to 42" and replace with 48"

Page 15-5, Article 1510-4 MATERIALS, add the following paragraph after line 18:

All water main distribution pipe shall be ductile iron. The Engineering Department will maintain a list of approved manufacturers for all water distribution products. New manufacturers must submit requests for approval to the Engineering Department in accordance with Standard Procedure 120, Manufacturer Approval Guidelines.

Page 15-8, Sub-article 1515-3 (A) Valves, add the following paragraphs after line 5:

Valve Boxes shall be cast iron, screw or telescopic type, with a 5-inch opening and "water" stamped on the cover. All valve box assemblies and covers shall be cast from Class 35 gray iron and domestically made and manufactured in the USA.

Valve box ring adjustments will not be allowed. The valve box shall be centered over the wrench nut and seated on compacted backfill without touching the valve assembly. All valve boxes shall be encased in a trowel finished 2' x 2' x 6" pad of 3000-psi concrete beneath the asphalt with the cover flush with the top of the pavement or flush with the finished grade.

add the following sentence after line 9:

All valves shall be restrained to the main line or other fittings or appurtenances within close proximity. Valves shall be properly located, operable and at the correct elevation. All valves and reducers shall be rodded to the tee or cross if one is located within 10 feet as shown in the Details. If valves or reducers are located more than 10 feet from a fitting and cannot be rodded, wedge action retainer glands or concentric ring restrained valves will be required. All valve installations utilizing wedge action retainer glands or concentric ring restrained connections shall be restrained on both sides of the valve and include sufficient pipe restraint to allow the valve to operate under dead end pressures without movement. The maximum depth of the valve nut shall be 8 feet without an extension kit. When valve extension kits are used, they must be manufactured by the same company which manufactured the valve.

Page 15-8, Sub-article 1515-3 (D) Fire Hydrants, add the following sentence after line 28:

A break away ground line flange and break away rod coupling is required on all fire hydrants.

Page 15-8, Sub-article 1515-3 (F) Air Release Valves, add the following paragraphs after line 43:

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All combination air valves shall be provided in conformance with AWWA C512. Combination air valves shall be of the single housing style with Type 304 or 316 stainless steel body that combines the operation of both an air/vacuum and air release valve.

The valve shall have a minimum two (2) inch NPT inlet and the inlet body shall be rated for minimum 230 PSI working pressure. Combination air valves sized from 2-inches to 4-inches shall be provided with NPT inlets and outlets unless otherwise submitted for approval with flanged connections. The combination air valve shall be provided with cylindrical shaped floats and anti-shock orifice made of high density polyethylene. Combination air valves with spherical floats shall not be accepted. All combination air valves shall be installed in accordance with the Details.

The combination air valve shall be installed in standard eccentric manhole as shown in the detail drawings. All combination air valve assemblies shall be provided with a saddle tap in the same sizing as the combination air valve assembly and isolated with a gate valve of the same size. The isolation gate valve shall be provided with NPT threads and connected with "no lead" brass (meeting UNSC89833 as per ASTM B584) or bronze piping. "No lead" brass or bronze. The isolation valve shall be rated for 200-psi service or greater.

Page 15-8, Sub-article 1515-3 (G) Miscellaneous Controls, add the following paragraphs after line 6:

Blowoffs: a) Blowoffs shall be a minimum of 2 inches and installed at the end of all dead-end water lines. Where there is not sufficient pressure or fire hydrants to thoroughly flush the system, a larger blowoff shall be required. b) Blowoff Assemblies shall be constructed as shown in the Details. The valves shall be gate type with a non-rising stem and a 2 inch operating nut, O-ring seals and screwed ends. A full size gate valve is required on water mains that are planned to be extended. c) Blowoff Assemblies installed in cul-de-sacs with 4-inch water mains not planned for roadway extension may be constructed with a self-contained blowoff assembly as shown in the detail drawings.

PROJECT SPECIAL PROVISIONS
Utilities by Others

RK&K
900 Ridgefield Drive, Suite 350 | Raleigh, NC 27609 | P 919.878.9560 | T 888.521.4455 | F 919.790.8382 | www.rkk.com

General:

The following utility companies have facilities that will be in conflict with the construction of this project:

A) Duke Energy (Transmission)
B) Duke Energy (Distribution)
C) AT&T Telecommunications
D) Spectrum CATV

The conflicting facilities of these concerns will be adjusted prior to the date of availability, unless otherwise noted and are therefore listed in these special provisions for the benefit of the Contractor. All utility work listed herein will be done by the utility owners. All utilities are shown on the plans from the best available information.

The Contractor's attention is directed to Article 105-8 of the 2012 Standard Specifications.

Utilities Requiring Adjustment:

Utility relocations are shown on the Utilities by Others Plans.

A) Duke Energy Transmission

1) Duke Energy (Transmission) is not in conflict. However, Duke Energy will need to be contacted whenever earthwork of any kind will be performed within their easement. Please refer to the UBO plans for easement information.
2) Contact person for Duke Transmission (Asset Protection) is; Mr. Bruce Pait at 919-219-9567 (Cell)

B) Duke Energy (Distribution)

1) Duke Energy (Distribution) will install new poles, aerial lines and underground cables within the project limits by the date of availability. Duke Energy (Distribution) will start their relocation work on the week of October 2, 2017. Duke Energy (Distribution) will be completed November 22, 2017.
2) Contact person for Duke Energy (Distribution) is; Mr. Mark Blackman at (919) 717-4723 (Cell)

PROJECT SPECIAL PROVISIONS
Utilities by Others

C) AT&T Telecommunications

1) AT&T Telecommunications will install aerial cables on Duke Energy's (Distribution) new utility poles as well as installing underground cable drops for services. AT&T Telecommunications will relocated by January 15, 2018.
2) Contact person for AT&T Telecommunications is; Mr. Billy Griner at 919-612-9856 (Cell)

D) Spectrum CATV

1) Spectrum CATV will install aerial cables on Duke Energy's (Distribution) new utility poles as well as installing underground cable drops for services. Spectrum CATV will be the first attachment on Duke Energy's new utility poles. Spectrum CATV will be relocated by February 15, 2018.
2) Contact person for Spectrum CATV is; Mr. Lance Hoffman at (919) 573-7283 (Cell)

Project Special Provisions
Erosion Control

STABILIZATION REQUIREMENTS:

(3-11-2016)

Stabilization for this project shall comply with the time frame guidelines as specified by the NCG-010000 general construction permit effective August 1, 2016 issued by the North Carolina Department of Environment and Natural Resources Division of Water Quality. Temporary or permanent ground cover stabilization shall occur within 7 calendar days from the last land-disturbing activity, with the following exceptions in which temporary or permanent ground cover shall be provided in 14 calendar days from the last land-disturbing activity:

- Slopes between 2:1 and 3:1, with a slope length of 10 ft. or less
- Slopes 3:1 or flatter, with a slope of length of 50 ft. or less
- Slopes 4:1 or flatter

The stabilization timeframe for High Quality Water (HQW) Zones shall be 7 calendar days with no exceptions for slope grades or lengths. High Quality Water Zones (HQW) Zones are defined by North Carolina Administrative Code 15A NCAC 04A.0105 (25). Temporary and permanent ground cover stabilization shall be achieved in accordance with the provisions in this contract and as directed.

SEEDING AND MULCHING: (East)

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

All Roadway Areas

March 1 - August 31		**September 1 - February 28**	
50#	Tall Fescue	50#	Tall Fescue
10#	Centipede	10#	Centipede
25#	Bermudagrass (hulled)	35#	Bermudagrass (unhulled)
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Waste and Borrow Locations

March 1 – August 31		**September 1 - February 28**	
75#	Tall Fescue	75#	Tall Fescue
25#	Bermudagrass (hulled)	35#	Bermudagrass (unhulled)
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Note: 50# of Bahiagrass may be substituted for either Centipede or Bermudagrass only upon Engineer's request.

Approved Tall Fescue Cultivars

06 Dust	Escalade	Justice	Serengeti
2nd Millennium	Essential	Kalahari	Shelby
3rd Millennium	Evergreen 2	Kitty Hawk 2000	Sheridan
Apache III	Falcon IV	Legitimate	Signia
Avenger	Falcon NG	Lexington	Silver Hawk
Barlexas	Falcon V	LSD	Sliverstar
Barlexas II	Faith	Magellan	Shenandoah Elite
Bar Fa	Fat Cat	Matador	Sidewinder
Barrera	Festnova	Millennium SRP	Skyline
Barrington	Fidelity	Monet	Solara
Barrobusto	Finelawn Elite	Mustang 4	Southern Choice II
Barvado	Finelawn Xpress	Ninja 2	Speedway
Biltmore	Finesse II	Ol' Glory	Spyder LS
Bingo	Firebird	Olympic Gold	Sunset Gold
Bizem	Firecracker LS	Padre	Taccoa
Blackwatch	Firenza	Patagonia	Tanzania
Blade Runner II	Five Point	Pedigree	Trio
Bonsai	Focus	Picasso	Tahoe II
Braveheart	Forte	Piedmont	Talladega
Bravo	Garrison	Plantation	Tarheel
Bullseye	Gazelle II	Proseeds 5301	Terrano
Cannavaro	Gold Medallion	Prospect	Titan ltd
Catalyst	Grande 3	Pure Gold	Titanium LS
Cayenne	Greenbrooks	Quest	Tracer
Cessane Rz	Greenkeeper	Raptor II	Traverse SRP
Chipper	Gremlin	Rebel Exeda	Tulsa Time
Cochise IV	Greystone	Rebel Sentry	Turbo
Constitution	Guardian 21	Rebel IV	Turbo RZ
Corgi	Guardian 41	Regiment II	Tuxedo RZ
Corona	Hemi	Regenerate	Ultimate
Coyote	Honky Tonk	Rendition	Venture
Darlington	Hot Rod	Rhambler 2 SRP	Umbrella
Davinci	Hunter	Rembrandt	Van Gogh
Desire	Inferno	Reunion	Watchdog
Dominion	Innovator	Riverside	Wolfpack II
Dynamic	Integrity	RNP	Xtremegreen
Dynasty	Jaguar 3	Rocket	
Endeavor	Jamboree	Scorpion	

On cut and fill slopes 2:1 or steeper Centipede shall be applied at the rate of 5 pounds per acre and add 20# of Sericea Lespedeza from January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

NUTRIENT MANAGEMENT TRAINING REQUIREMENTS:

The person(s) responsible for applying fertilizer or person(s) conducting the application of fertilizer on this project within the Jordan Lake or Falls Lake Watershed shall complete the following web-based training prior to performing this work:

http://www.jordanlake.org/web/jordanlake/fertilizer-management

A certificate of completion must be presented by the person(s) responsible for fertilizer application or person(s) conducting the application of fertilizer prior to performing fertilizer application on the project within the limits of the Jordan Lake or Fall Lake Watershed.

Native Grass Seeding and Mulching **(East)**

Native Grass Seeding and Mulching shall be performed on the disturbed areas of wetlands and riparian areas, and adjacent to Stream Relocation construction within a 50 foot zone on both sides of the stream or depression, measured from top of stream bank or center of depression. The stream bank of the stream relocation shall be seeded by a method that does not alter the typical cross section of the stream bank. Native Grass Seeding and Mulching shall also be performed in the permanent soil reinforcement mat section of preformed scour holes, and in other areas as directed.

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

March 1 - August 31		**September 1 - February 28**	
18#	Creeping Red Fescue	18#	Creeping Red Fescue
6#	Indiangrass	6#	Indiangrass
8#	Little Bluestem	8#	Little Bluestem
4#	Switchgrass	4#	Switchgrass
25#	Browntop Millet	35#	Rye Grain
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Approved Creeping Red Fescue Cultivars:

Aberdeen	Boreal	Epic	Cindy Lou

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Native Grass Seeding and Mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

Measurement and Payment

Native Grass *Seeding and Mulching* will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.

TEMPORARY SEEDING:

Fertilizer shall be the same analysis as specified for *Seeding and Mulching* and applied at the rate of 400 pounds and seeded at the rate of 50 pounds per acre. Sweet Sudan Grass, German Millet or Browntop Millet shall be used in summer months and Rye Grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

FERTILIZER TOPDRESSING:

Fertilizer used for topdressing on all roadway areas except slopes 2:1 and steeper shall be 10-20-20 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 10-20-20 analysis and as directed.

Fertilizer used for topdressing on slopes 2:1 and steeper and waste and borrow areas shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis and as directed.

SUPPLEMENTAL SEEDING:

The kinds of seed and proportions shall be the same as specified for *Seeding and Mulching*, with the exception that no centipede seed will be used in the seed mix for supplemental seeding. The rate of application for supplemental seeding may vary from 25# to 75# per acre. The actual rate per acre will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre, total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a sod seeder shall be used for incorporating seed into the soil as to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

MOWING:

The minimum mowing height on this project shall be 4 inches.

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 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.

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:

http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/fieldops/downloads/Files/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*.

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

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

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 Environment and Natural Resources (NCDENR) Division of Water Quality (DWQ) 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

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 Environment and Natural Resources (NCDENR) Division of Water Quality (DWQ) 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

CULVERT DIVERSION CHANNEL:

Description

This work consists of providing a *Culvert Diversion Channel* to detour the existing stream around the culvert construction site at locations shown on the plans. Work includes constructing the diversion channel, disposing of excess materials, providing and placing geotextile liner, maintaining the diversion area in an acceptable condition, removing geotextile liner, backfilling diversion channel area with suitable material, and providing proper drainage when diversion channel area is abandoned.

Materials

Refer to Division 10

Item	Section
Geotextile for Soil Stabilization, Type 4	1056

Construction Methods

Grade channel according to the plans with channel surface free of obstructions, debris, and pockets of low-density material. Utilize suitable material and provide disposal area for unsuitable material.

Line channel with geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury top of slope geotextile edge in a trench at least 5" deep and tamp securely. Make vertical overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile.

Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 6" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically.

Measurement and Payment

Culvert Diversion Channel will be measured and paid for as the actual number of cubic yards excavated, as calculated from the typical section throughout the length of the diversion channel as shown on the final approved plans.

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

Such price and payment shall be considered full compensation for all work covered by this section including all materials, construction, maintenance, and removal of *Culvert Diversion Channel*.

Payment will be made under:

Pay Item	Pay Unit
Culvert Diversion Channel	Cubic Yard

IMPERVIOUS DIKE:

Description

This work consists of furnishing, installing, maintaining, and removing an *Impervious Dike* for the purpose of diverting normal stream flow around the construction site. The Contractor shall construct an impervious dike in such a manner approved by the Engineer. The impervious dike shall not permit seepage of water into the construction site or contribute to siltation of the stream. The impervious dike shall be constructed of an acceptable material in the locations noted on the plans or as directed.

Materials

Acceptable materials shall include but not be limited to sheet piles, sandbags, and/or the placement of an acceptable size stone lined with polypropylene or other impervious geotextile.

Earth material shall not be used to construct an impervious dike when it is in direct contact with the stream unless vegetation can be established before contact with the stream takes place.

Measurement and Payment

Impervious Dike will be measured and paid as the actual number of linear feet of impervious dike(s) constructed, measured in place from end to end of each separate installation that has been completed and accepted. Such price and payment will be full compensation for all work including but not limited to furnishing materials, construction, maintenance, and removal of the impervious dike.

Payment will be made under:

Pay Item	Pay Unit
Impervious Dike	Linear Foot

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

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

CONCRETE WASHOUT STRUCTURE:
(12-01-15)

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 waste 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.

The construction details for the above grade and below grade concrete washout structures can be found on the following web page link:

http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/soil_water/details/

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

COMPOST BLANKET:
(8-23-17)

Description

This work shall consist of furnishing, installing, maintaining, and seeding a water permeable *Compost Blanket* to reduce soil erosion and sediment by promoting the establishment of vegetation on sandy soils where vegetation is difficult to establish.

Materials

Compost:

Compost used for Compost Blankets shall be weed free and derived from a well-decomposed source of organic matter. The compost shall be produced using an aerobic composting process meeting CFR 503 regulations, including time and temperature data indicating effective weed seed, pathogen, and insect larvae kill. The compost shall be free of any refuse, contaminants or other materials toxic to plant growth. Non-composted products will not be accepted. Test methods for the items below should follow USCC TMECC guidelines for laboratory procedures:

1. pH between 5.0-8.0 in accordance with TMECC 04.11-A, "Electrometric pH Determinations for Compost".
2. For seeded Compost Blankets, seed should be incorporated at the time of application in the entire depth of the compost blanket, at rates per foot, per square yard, or per acre, as acceptable to the engineer. The following particle sizes shall also be followed: 100% passing a 2" sieve; 99% passing a 1" sieve; minimum of 60% passing a ½" sieve. All other testing parameters remain the same. The seeding rates are generally similar or slightly higher than those used when considering application of seed via hydroseeding or other seeding methods.
3. Moisture content of less than 60% in accordance with standardized test methods for moisture determination.
4. Material shall be relatively free (<1% by dry weight) of inert or foreign man made materials.
5. A sample shall be submitted to the engineer for approval prior to being used and must comply with all local, state and federal regulations.

Construction Methods

1. Compost Blankets will be placed as directed. Unless otherwise specified, Compost Blankets should be installed at a minimum depth of 1".
2. The Compost Blanket shall be seeded at time of installation for establishment of permanent vegetation. The Engineer will specify seeding requirements.
3. Compost Blankets are not to be used in direct flow situations or in runoff channels.
4. The type and rate of seed, fertilizer and lime shall be in accordance with the Seeding and Mulching provisions of this contract and as directed.

Maintenance

1. The Contractor shall perform routine inspections and maintain the Compost Blanket in a functional condition at all times.
2. Where the Compost Blanket fails, it will be routinely repaired.
3. The Compost Blanket will be seeded on site, at rates and seed types as determined by the Engineer. Once vegetation is established, final seeding is not required.

Performance

1. The Contractor is responsible for establishing a working erosion control system and may, with approval of the Engineer, work outside the minimum construction requirements as needed.
2. Where the Compost Blanket deteriorates or fails, it will be repaired or replaced with a more effective approved alternative.

Measurement and Payment

The Contractor shall provide the Engineer with proof that a minimum 1" thick Compost Blanket has been applied after settling. This rate equals approximately 270 cubic yards of compost material per acre of application area. The Contractor shall supply satisfactory evidence that the specified amount of material has been effectively placed (i.e., truck load tickets).

Compost Blanket will be measured and paid for as the actual number of acres measured along the surface of the ground over which the Compost Blanket is installed and accepted.

Payment will be made under:

Pay Item	Pay Unit
Compost Blanket	Acre

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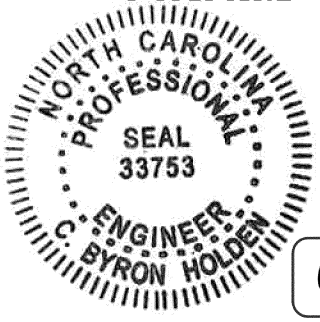

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Intelligent Transportation Systems
Project Special Provisions

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NOTE: ALL REFERENCES IN NCTA ITS STANDARD DETAIL DRAWINGS TO SEE THE RFP SHALL BE ADDRESSED IN THESE SPECIAL PROVISIONS.

1. 2012 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES

The 2012 Standard Specifications are revised as follows:

1.1 Polymer Concrete (PC) Junction Boxes (1091-5(B))

Page 10-202, revise paragraph starting on line 9 to read "Provide polymer concrete (PC) boxes which have bolted covers and open bottoms. Provide vertical extensions of 6" to 12" as required by project special provisions."

Page 10-202, revise sentence beginning on line 14 to read "Other thermoplastic materials may be used for components which are not normally exposed to sunlight."

1.2 Submittal Requirements (1098-1(B))

Page 10-208, replace paragraph on line 34 with the following:

Submit for approval catalog cuts and/or shop drawings for materials proposed for use on the project. Allow 40 days for review of each submittal. Do not fabricate or order material until receipt of Engineer's approval.

Submit 4 copies of each catalog cut and/or drawing and show for each component the material description, brand name, stock-number, size, rating, manufacturing specification and the intended use (identified by labeling all components with the corresponding contract line item number). Present the submittals neatly arranged in the same order as the contract bid items. Electronic submittals of catalog cuts and drawings may be accepted in lieu of hard copies.

One hard copy and an electronic (PDF) copy of reviewed submittals will be returned to the Engineer from the ITS and Signals Unit.

1.3 Junction Boxes (1098-5)

Page 10-212, sub-Section 1098-5(C) Oversized Junction Boxes

Revise sentence to read, "Provide oversized junction boxes and covers with minimum inside dimensions of 28"(l) x 15"(w) x 22"(h)."

2. UNDERGROUND CONDUIT

2.1.DESCRIPTION

Furnish and install conduit for underground installation with tracer wire, miscellaneous fittings, all necessary hardware, marker tape, conduit plugs, sealing putty, pull lines, backfill, graded stone, paving materials, and seeding and mulching.

Provide conduit as needed to interconnect the ITS devices and toll facilities as shown on the plans.

2.2.MATERIALS

A. General

Material, equipment, and hardware furnished under this section shall be pre-approved on the Department's QPL, however, for HDPE and accessories, adhere to "Submittal 'Requirements" found elsewhere in the Contract Documents.

Comply with Article 1091-3 of the 2012 *Standard Specifications for Roads and Structures,* with additional requirements detailed below.

Use moldable sealing putty in occupied conduit and conduit risers.

B. Mechanical Couplings for HDPE Conduit

Provide mechanical couplings that are both watertight and airtight for joining two segments of HDPE conduit of like diameter in trenched locations. Do not use mechanical couplings for directionally drilled installations. Provide couplings designed to accommodate pneumatic methods of cable installation. Provide couplings suitable for burial underground and that meet the following requirements:

- The coupling shall not fail by leakage when subjected to sustained internal pressure testing as noted in ASTM F 2176
- The coupling shall not fail by leakage when subjected to sustained external pressure testing as noted in ASTM F 2176
- The coupling assemblies tested shall be able to comply with the tensile loading requirements as specified in ASTM F 2176
- As specified in ASTM F 2176, the coupling shall not fail when conditioned at low temperature conditions of 10 degrees F and tested by an impact with a force of 20 ft-lb using Type "B" as described in Test Method ASTM D 2444

2.3.CONSTRUCTION METHODS

A. General

Comply with Article 1715-3 of the 2012 *Standard Specifications for Roads and Structures*.

Install a minimum of two 2" conduits for all underground routes that are designated to convey a pair of 24-fiber communications cables. Install four 2" conduits **(blue, white, black and orange)** for all underground routes that are designated to convey a pair of 72-fiber communications cables. This includes the "Primary Trunkline". Install a minimum of two 2" conduits for underground routes that are designated to convey 12-fiber communications cable. Install a minimum of one 2" conduit for underground routes that are designated to convey RS-485 cable.

Install a minimum of two 2" conduits for conveying communication cables, exclusive of conduit needed for power service, for all directional drill installations beneath roadways, or streams.

Do not exceed **1,500** feet between junction boxes in any underground conduit route that conveys communications cable without the prior approval by the Department.

Conduit installation and modifications to existing conduit systems shall be closely coordinated with the grading operations and Traffic Management Plans to ensure no disruption to the existing Toll/ITS communication. All proposed trunkline conduit (and fiber) will need to installed, tested and ready for incorporation as construction begins in Phase II, Step 6 of Transportation Management Plans, as the modification to existing conduit system just south of Panther Creek and subsequent splicing of the proposed fiber to the existing trunkline fiber will need to be completed during this phase. The existing/proposed conduit at this location will need to relocated and/or placed at a distance deemed safe from construction activities that would damage the existing Toll/ITS communication.

B. Maximum Length of Directional Drill

The length of a directional drill shall not exceed **1,000** feet measured horizontally along the route of the directionally drilled conduit(s), unless otherwise approved by the Engineer. On or before the **1,000**-foot mark, transition from directional drill to trenching to continue the route up to the maximum spacing of **1,500** feet between junction boxes. Alternatively, continue the route by beginning a successive directional drill and installing an over-sized heavy-duty junction box where the two directionally drilled conduit runs meet.

C. Splicing and Coupling of HDPE Conduit

Install a continuous HDPE conduit free from splices or couplings between junction boxes whenever possible. However, splicing or coupling of HDPE conduit may be permitted, subject to the prior approval by the Department, in the following situations:

- To complete an underground HDPE conduit run when the end of an HDPE reel is reached
- When transitioning from directional drill to trenching or from trenching to directional drill in an underground run while maintaining the same quantity and size of conduits in the run
- To complete modification to existing conduit system

Join the HDPE conduit ends by installing mechanical couplings in accordance with the manufacturer's instructions or by splicing the conduits using either a butt-fusion welder or an electro-fusion welder. Submit the proposed method of coupling or splicing the conduits to the Engineer for review and approval prior to joining any HDPE conduits.

Otherwise, install an oversized, heavy-duty junction box where the ends of the HDPE conduits meet in lieu of joining the ends through splicing and coupling. Install an oversized, heavy-duty junction box where the number of conduits in the underground run changes. For example, install an oversized, heavy-duty junction box where two directionally drilled conduits meet a single run of trenched conduit.

D. Bore and Jack

Comply with Article 1715-3 of the 2012 *Standard Specifications for Roads and Structures*.

2.4.MEASUREMENT AND PAYMENT

Comply with Subarticle 1715-4 of the 2012 *Standard Specifications for Roads and Structures.*

3. JUNCTION BOXES

3.1. DESCRIPTION

Furnish and install junction boxes (pull boxes) with covers, concrete collars, graded stone, grounding systems, and all necessary hardware.

3.2. MATERIALS

A. General

Comply with Article 1411-2 of the 2012 *Standard Specifications for Roads and Structures*, except as follows:

- Provide junction box covers with standard NCTA logos, pull slots and stainless steel pins. For standard size junction boxes, provide covers with *NCTA Electrical* logo. Provide covers with NCTA *Fiber Optic logo* on all oversized and special-sized, heavy-duty junction boxes that house fiber-optic communications cable along the project.
- Do not provide sealant compound between junction boxes and covers.
- Material, equipment, and hardware furnished under this section must be pre-approved on the Department's QPL by the date of equipment installation; however, for special-sized heavy-duty junction boxes, loop and custom splice boxes, adhere to "Submittal Requirements" found elsewhere in the Contract Documents.
- Provide an 18" reinforced concrete collar, minimum 4" thick, on all junction boxes, unless boxes are on slopes of 3:1 or steeper. Avoid placing junction boxes on such slopes wherever possible.
- Provide box drains as shown in the NCTA AET Standard Drawings.

B. Standard Sized Junction Boxes

Provide standard sized junction boxes with minimum inside dimensions of 16"(l) x 10"(w) x 10"(d) that meet or exceed the Tier 15 requirements of ANSI/SCTE 77. Provide certification that testing methods are compliant with ANSI/SCTE 77. Vertical extensions of 6" to 12" shall be available from the junction box manufacturer.

C. Oversized Heavy-Duty Junction Boxes

Provide oversized heavy-duty junction boxes and covers with minimum inside dimensions of 30"(l) x 15"(w) x 24"(d) that meet or exceed the Tier 15 requirements of ANSI/SCTE 77. Provide certification that testing methods are compliant with ANSI/SCTE 77.

D. Special-sized, Heavy-Duty Junction Boxes

Provide special-sized heavy-duty junction boxes and covers with minimum inside dimensions of 36"(l) x 24"(w) x 24"(d) that meet or exceed the Tier 15 requirements of ANSI/SCTE 77. Provide certification that testing methods are compliant with ANSI/SCTE 77.

E. Loop Splice Boxes

Provide loop splice boxes and covers with minimum inside dimensions of 36"(l) x 17"(w) x 30"(d) that meet or exceed the Tier 15 requirements of ANSI/SCTE 77. Provide certification that testing methods are compliant with ANSI/SCTE 77.

F. Custom Splice Boxes

Provide larger boxes for specialized use near AET Toll Zones that meet or exceed the Tier 15 requirements of ANSI/SCTE 77. Provide certification that testing methods are compliant with ANSI/SCTE 77.

3.3.CONSTRUCTION METHODS

Comply with Article 1411-3 of the 2012 *Standard Specifications for Roads and Structures*, except as follows:

- Install junction boxes flush with finished grade. Do not install sealant compound between junction boxes and covers.
- Install junction boxes where underground splicing of electrical cable is necessary and where transitioning from below ground to above ground installation or vice-versa.
- Install oversized heavy-duty junction boxes in underground fiber-optic communications cable runs at maximum intervals of 1500 feet for boxes containing fiber-optic cable except those with splice enclosures.
- Install special-sized, heavy-duty junction boxes at all underground fiber-optic splice enclosure locations.
- Install loop splice boxes in AET Toll Zones as shown in the NCTA AET Standard Drawings.
- Route the black and orange conduits into the ITS junction box. Route the white and blue conduit into the Tolls junction box.
- Mark the “Tolls” junction box with a blue plastic disc similarly in size and material to those used at other such boxes on the Triangle Expressway (Toll NC 540).
- Install 18” reinforced concrete collars a minimum of 4” thick around all AET and ITS junction boxes.

3.4.MEASUREMENT AND PAYMENT

Comply with Subarticle 1716-4 of the 2012 *Standard Specifications for Roads and Structures* except for the following changes:

No measurement will be made of reinforced concrete collar, reinforcing steel, or any other materials or labor associated with the construction of reinforced concrete collars around junction boxes as this will be incidental to furnishing and installing junction boxes.

4. FIBER-OPTIC CABLE

4.1. DESCRIPTION

Furnish and install single-mode fiber-optic (SMFO) communications cable and drop cable assemblies with grounding systems, communications cable identification markers, and all necessary hardware.

Provide two 72-strand single-mode fiber-optic cables in separate conduits, one for ITS and one for toll operations for the replacement Primary Trunkline cable.

Provide one 24-strand single-mode fiber-optic drop cable for connection to AET T16.

Provide 6 or 12-strand single-mode fiber-optic drop cables for ITS devices.

Route the ITS and toll operations fiber-optic cables throughout the project as indicated on the plans and Splicing Details. The toll operations cable shall route only thru the AET Toll Zone Vault T16. The toll network connection between the AET Toll Zone Vault T16 and the AET Toll Zone Site T15 will be installed by the Toll System Integrator. All fiber strands of the AET Toll Zone Vault T16 drop cable shall terminate on a patch panel provided by the Contractor.

Conduct OTDR tests on both the ITS and toll operations fiber-optic cable and correct any defects revealed by the testing. Conform to Section 1730, and specifically, Subarticles 1731-3(A) and (G), of the 2012 *Standard Specifications for Roads and Structures*.

The Toll System Integrator will energize the Tolls designated cable and connect equipment to it after acceptance.

4.2. MATERIALS

A. SMFO Communications Cable

Furnish single-mode fiber-optic communications cable that is pre-approved on the Department's QPL.

Comply with Article 1098-10 of the 2012 *Standard Specifications for Roads and Structures*.

B. Drop Cable Assembly

Furnish drop cable assemblies that provide communications links between splice enclosures and Ethernet edge switches mounted in cabinets. Provide an assembly that is factory pre-assembled and factory pre-tested with the necessary drop cable length. Contractor may elect to furnish a drop a cable assembly comprised of the designated length of fiber-optic cable that has been factory pre-terminated on a factory pre-connectorized patch panel with six or twelve connectors matching the Ethernet edge and routing switches to form an integral pre-assembled unit. Drop-cable assembly that would require no field assembly, connectorization, or termination other than splicing the free end of the drop cable into the fiber-optic trunk cable in a splice enclosure external to the cabinet.

Provide a drop cable assembly with a patch panel in a compact, modular housing or a patch panel housed in low profile, rack-mountable interconnect center. The compact modular patch panel shall have a rugged, durable, non-metallic housing that can be surface-mounted vertically to the face of the 19-inch equipment rack rail inside a cabinet or mounted horizontally within the

equipment rack occupying no more than one standard rack unit (1 RU) of space. The dimensions of the patch panel shall not exceed 1.75" (h) x 16.5"(w) x 13.5" (d). The low-profile interconnect center that houses the patch panel shall be a powder-coated aluminum enclosure designed for mounting horizontally in the 19-inch equipment rack inside a device cabinet and shall occupy no more than one standard rack unit (1 RU) of space.

Provide outdoor-rated, non-armored, riser-rated cable. Provide UV rated cable.

Use single-mode fiber-optic cable that does not exceed attenuation of 0.30 dB/km at 1550 nm and 0.40 dB/km at 1310 nm. Ensure attenuation loss for complete drop cable assembly does not exceed a mean value of 1.5 dB.

Provide metal connector housing, ceramic ferrules and coupler inserts. Provide a connector attenuation of 0.20 dB and a reflectance of /<-55 dB UPC. Use heat-cured epoxy material.

Provide length markings in sequential feet and within one percent of actual cable length. Ensure character height of markings is approximately 0.10".

Furnish SMFO jumpers that are a minimum of 3 feet in length with factory-assembled connectors matching the Ethernet edge and routing switches on each end for connecting Ethernet edge and routing switches to the fiber-optic patch panels on the drop cable assemblies. The Contractor shall provide SMFO jumpers of sufficient length to not strain the fibers within when installed in the final position. The minimum length for all jumpers shall be 3 feet in field cabinets and 6 feet in the AET Toll Zone Vaults. Ensure SMFO jumpers meet the operating characteristics of the SMFO cable with which they are to be coupled.

C. Communications Cable Identification Markers

Comply with Subarticle 1098-10(C) of the 2012 *Standard Specifications for Roads and Structures*, with the exception of replacing “NCDOT” on the cable marker with “NCTA".

4.3.CONSTRUCTION METHODS

A. General

Comply with Subarticle 1730-3(A) of the 2012 *Standard Specifications for Roads and Structures*.

B. Underground Installation

Comply with Subarticle 1730-3(C) of the 2012 *Standard Specifications for Roads and Structures*.

Use a breakaway swivel so as not to exceed 80% of the maximum allowable pulling tension specified by the cable’s manufacturer if cable is pulled by mechanical means.

Store 50 feet of each fiber-optic cable in oversized heavy-duty junction boxes on all cable runs that are continuous without splices. Obtain approval for spare cable storage locations.

C. Installation of Drop Cable Assembly

Determine length of drop cable needed, including slack, to reach from termination point to termination point.

At below ground splice enclosures, coil at least 50 feet of slack cable for each cable entering and exiting the splice enclosure in the junction box where enclosure is located. Coil and store any drop cable in excess of what is needed for storage in the manhole or junction box in the base of the equipment cabinet, however store no more than 100 feet of extra cable.

Mount the patch panel of the drop cable assembly vertically to the surface the rack frame or horizontally within 19-inch equipment rack using the screws, mounting brackets and hardware provided with the drop cable assembly. Mount the patch panel in a location convenient to the Ethernet switch and / or video encoder to facilitate installation of SMFO jumpers between them. Secure drop cable in cabinet using cable ties and cable management hardware.

Install SMFO jumpers between the appropriate connectors on the patch panel of the drop cable assembly and the Ethernet edge switch.

Label all connectors, pigtails and the connector panel.

Using an OTDR, test the end-to-end connectivity of the drop cable assembly from patch panel installed inside the ITS cabinet to its respective communications hub. Comply with the OTDR testing and reporting requirements of the "Testing and Acceptance" section of the Special Provisions when testing drop cable.

4.4.MEASUREMENT AND PAYMENT

Comply with Subarticle 1730-4 of the 2012 *Standard Specifications for Roads and Structures.*

5. RS-485 CABLE

5.1.DESCRIPTION

Furnish and install RS-485 cable with all necessary hardware to be used in conjunction with, but not limited to, MVD devices.

5.2.MATERIALS

A. RS-485 Communications Cable

Submit manufacturer's specifications and certifications to the Department for review and approval prior to installation of cable.

Comply with Article 1098 of the 2012 *Standard Specifications for Roads and Structures*.

5.3.CONSTRUCTION METHODS

A. General

Install RS-485 cable and all necessary hardware

Comply with manufacturer's recommendations. Install cable in metal poles, junction boxes, and in conduits as per the plans, standard detail drawings, and these special provisions.

Take all precautions necessary to ensure cable is not damaged during storage, handling, and installation. Do not violate minimum bending radius of manufacturer's recommendation. Do not step on cable nor run over cable with vehicles or equipment. Do not pull cable over or around obstructions or along the ground.

Determine lengths of cable necessary to reach from termination-point to termination-point. Install cable in continuous lengths between approved splicing facilities. Additionally, provide a sufficient amount of slack cable to allow for an additional 20 ft of cable to be present after removal of outer sheath for termination. Measure slack cable by extending cable straight out of cabinet door.

Keep cable ends sealed at all times during installation to effectively prevent the ingress of moisture. Used approved heat shrink cable end cap. Do not use tape to seal cable ends.

Before installing cable, provide 3 copies of cable manufacturer's recommended and maximum pulling tension. Do not exceed 80% of the manufacturer's recommended pulling tension. Use pulling grips containing a rotating swivel. Coil cable in a fiture-8 configuration whenever cable is unreeled for subsequent pulling.

Install cable in poles and cabinets in accordance with the NCTA Standard Detail Drawings.

B. Underground Installation

Comply with Subarticle 1730-3(C) of the 2012 *Standard Specifications for Roads and Structures*.

Use a breakaway swivel so as not to exceed 80% of the maximum allowable pulling tension specified by the cable's manufacturer if cable is pulled by mechanical means.

5.4.MEASUREMENT AND PAYMENT

RS-485 Cable will be measured and paid as the actual linear feet of RS-485 cable furnished, installed, and accepted. Measurement will be made by calculating the difference in length markings located on outer jacket from start of run to end of run for each run. Terminate all cables before determining length of run.

No measurement will be made for terminating, splicing, and testing RS-485 cable as this will be incidental to the installation of RS-485 cable.

Pay Item

RS-485 CABLE ..... Linear Foot

6. FIBER-OPTIC SPLICE CENTERS

6.1. DESCRIPTION

Furnish and install fiber-optic interconnect centers, fiber-optic splice enclosures, and all necessary hardware.

6.2. MATERIALS

Material, equipment, and hardware furnished under this section shall be pre-approved on the Department's QPL. Ensure patch panel connectors match connectors for associated switches.

A. Interconnect Center

Furnish compact, modular interconnect centers designed for rack mounting in AET Toll Zone Vaults. Design and size interconnect centers to accommodate all fibers (used and unused) entering the AET Toll Zone Vault.

Comply with Subarticle 1098-11 (A) of the 2012 *Standard Specifications for Roads and Structures*.

B. Splice Enclosure

Comply with Subarticle 1098-11 (C) of the 2012 *Standard Specifications for Roads and Structures*.

6.3. CONSTRUCTION METHODS

A. General

Comply with Article 1731-3 of the 2012 *Standard Specifications for Roads and Structures*.

B. Termination and Splicing within Interconnect Center

Install one rack-mounted interconnect center for the cable entering AET Toll Zone Vault T16 in a 19-inch communications rack provided by the Toll System Integrator. Coordinate with the Toll System Integrator on the placement of the interconnect center.

Fiber strands shall be either expressed through an interconnect center or terminated on patch panels. For all fibers designated to pass through an interconnect center, neatly coil and express the fibers without cutting. Neatly coil excess tubing inside interconnect center.

Install SMFO jumpers between the appropriate connectors on the interconnect center and the routing switch.

C. Splice Enclosure

Comply with Subarticle 1731-3(E) of the 2012 *Standard Specifications for Roads and Structures*.

Develop a cable-splicing plan to maximize cable performance and minimize the quantity of cable.

Install underground enclosures with 50 feet of slack cable from each trunk cable entering the enclosure to allow enclosure to be taken out of the special sized heavy-duty junction boxes and extended into a splicing vehicle.

For underground, special-sized heavy duty and junction box facility installations, place the enclosure along with required spare cables in the facility in a neat and workmanship like manner. Neatly coil the spare cable in the special-sized heavy-duty junction boxes. In the AET Toll Zone Vaults, neatly coil the spare cable and secure with tie wraps to the communications rack or cable trays.

6.4. MEASUREMENT AND PAYMENT

Comply with Subarticle 1731-4 of the 2012 *Standard Specifications for Roads and Structures.*

7. ELECTRICAL SERVICE

7.1. DESCRIPTION

Install new electrical service to new ITS cabinets and devices as indicated in the plans for CCTV-8A and MVD-76. MVD-73 and MVD-74 will be powered by the new electrical service at CCVT-8A. MVD-76 will be powered by the new electrical service at MVD-76. Relocate the existing electrical service to the new CCTV-8 site. All new electrical services within the NCDOT or NCTA rights of way shall be underground with pedestal-mounted assemblies, as shown in the ITS Standard Details.

7.2. MATERIALS

Material, equipment, and hardware furnished under this section shall be pre-approved on the Department's QPL by the date of equipment installation.

Provide UL-listed 1-inch Schedule 80 conduit for underground runs. If electrical conduit shares a trench with fiber-optic conduit, use conduit color other than black, orange, blue or white.

Provide all materials necessary to form a complete electrical service assembly as shown in 2012 *Roadway Standard Drawing* No. 1700.01, "Electrical Service Options".

Provide an external electrical service disconnect at each new ITS device cabinet location. Furnish external electrical service disconnects with a minimum of a double pole 50 ampere circuit breaker with a minimum of 10,000 RMS symmetrical amperes short circuit current rating in a lockable NEMA 3R enclosure. Ensure service disconnects are listed as meeting UL Standard UL-489 and marked as being suitable for use as service equipment. Fabricate enclosure from galvanized steel and electrostatically apply dry powder paint finish, light gray in color, to yield a minimum

thickness of 2.4 mils. Provide ground bus and neutral bus with a minimum of four terminals with minimum wire capacity range of number 14 AWG through number 4 AWG.

Furnish NEMA Type 3R meter base rated 200-ampere minimum that meets the requirements of the local utility. Provide meter base with socket's ampere rating based on sockets being wired with minimum of 167 degrees F insulated wire. Furnish four-terminal, 600 volt, single-phase, three-wire meter bases that comply with the following:

- Line, load, and neutral terminals accept #8 to 2/0 AWG copper / aluminum wire
- With or without horn bypass
- Made of galvanized steel
- Listed as meeting UL Standard UL-414
- Underground service entrance

Ensure meter bases have electrostatically applied dry powder paint finish, light gray in color, with minimum thickness of 2.4 mils. Furnish 1" watertight hub for threaded rigid conduit with meter base. For all new ground-mounted electrical service assemblies for underground electrical service, provide a combination panel with pedestal extension. Ensure combination meter and disconnect mounted in a pedestal for underground service is listed as meeting UL Standard UL-231. Do not provide wood posts, steel U-channel posts, square tube sign posts (i.e., Telespar, etc.), Unistrut metal framing, or any method other than an underground service pedestal to mount meter bases and disconnects for new underground electrical service.

7.3.CONSTRUCTION METHODS

A. General

All work involving electrical service shall be coordinated with the appropriate electric utility company. Coordinate with the utility company to ascertain the feasibility of installing electrical service at each location before performing any work. Obtain all required local permits before beginning work.

Run service conductors separately from all other conductors in a 1-inch rigid galvanized conduit above ground and Schedule 80 conduit underground. Do not allow service conductors to share conduits or junction boxes with any other conductors or cables, without permission from the Engineer. Do not route unfused electrical service conductors inside of metal poles.

B. New Electrical Service for ITS Devices

Install new electrical service for a device cabinet in accordance with the ITS Standard Details. Install a new electrical service comprised of an external service disconnect and a meter base housed in a combination panel. If more than one cabinet is fed from the same utility company service point, a common meter may be utilized with individual disconnects at each device cabinet. The cost of running electrical service to all cabinets shall include any transformers required.

Locate all secondary power service points outside the controlled access right of way. Locate combination panels as shown on the ITS Standard Details. After installation of the meter base, the local power company will install a new meter and make any necessary connections to the power lines.

Have the power company route the service drop underground to the service entrance equipment, even where source power lines are overhead; wood poles on NCTA / NDOT right of way for power service are generally not permissible with the exception of bringing power just inside the right of way.

Place durable vinyl identification number sticker (with 2" letters) on meter base. Utilize stickers that match the appearance of those used elsewhere on the Triangle Expressway (Toll NC 540). Submit proposed sticker to the Department for approval prior to incorporation.

7.4.MEASUREMENT AND PAYMENT

New Electrical Service will be measured and paid for as the actual number of electrical services furnished, installed and accepted. No separate measurement or payment will be made for electrical service meters, disconnects, and associated wiring, service conductors, feeder conductors, grounding, grounding electrodes, ground wire, connectors, acquisition of service fees or permits and any remaining hardware or fittings as this will be considered incidental to the New Electrical Service.

No measurement will be made for relocation of existing electrical services for ITS devices. This work is considered incidental to relocation of ITS devices.

Payment will be made under:

New Electrical Service ..... Each

8. DEVICE CABINETS

8.1.GENERAL

Furnish and install ITS device cabinets to house communications hardware, fiber-optic patch panels, power supplies, cable terminations, and other equipment to support the installation of CCTV cameras, and MVDS. Maintenance pads are required to be installed for ITS cabinets per the ITS Standard Details.

8.2.MATERIALS

A. General

Provide device cabinets as follows to house equipment specific to the site where it is installed.

Cabinet Type Designation	Purpose
A	MVDS sites requiring fiber-optic communications, CCTV sites

B	"Slave" MVDS sites

Type A cabinets shall be a minimum size of a Type 336 cabinet. Should such locations be on steep slopes (3:1 or steeper), mount cabinet on downstream side of pedestal structure. For Type A cabinets, provide reinforced concrete maintenance pad as per the ITS Standard Details.

Provide cabinets with a serial number unique to the manufacturer. Engrave the entire identification code on a metallic plate that shall be epoxied to the cabinet on the upper right hand sidewall.

- Lighting

Provide two 15-watt fluorescent light strips with shields, one in the top of the cabinet and the other under the bottom shelf. Design both lights to automatically turn on when the cabinet door is opened and turn off when the door closes.

- Convenience Lighting

Provide a 120V (+/-10%) GFCI duplex receptacle of the 3-wire grounding type in the cabinet in a location that presents no electrical hazard when used by service personnel for the operation of power tools and work lights. Provide at least one surge protected 120V (+/-10%) GFCI duplex receptacle of the 3-wire grounding type in the cabinet.

- Circuit Protection

Protect the ITS device controller, accessories, and cabinet utilities with thermal magnetic circuit breakers. Provide the controller cabinet with a main circuit breaker sized according to the NEC. Use appropriately sized branch circuit breakers to protect and service ITS device equipment and cabinet utilities.

B. Type A

Furnish and install pole-mounted cabinets to house MVDS and CCTV-related equipment described herein. Provide the cabinets with 19-inch communications rack for all equipment. The Contractor shall appropriately size the cabinet to fit all the equipment installed within the cabinet at the particular location.

Furnish, at a minimum, Type 336 cabinets meeting the following minimum requirements as applicable to the specific installation:

- Pole mounting brackets
- Grounding bus bar
- 120 VAC power supply
- 120 VAC GFCI-protected duplex outlets for tools
- 120 VAC SPD-protected duplex outlets for equipment
- Lightning and surge protection on incoming and outgoing electrical lines (power and data)
- 19-inch rack system for mounting of all devices in the cabinet
- Pull-out shelf for laptop and maintenance use
- Fluorescent lighting
- Two ventilation fans with independent thermostat controls
- Power strip along vertical rail

- Termination of the composite cable to the camera
- Maintenance access points for data and video connections to observe camera images and program/monitor camera status

Provide cabinets complete with a prefabricated cabinet shell, and all internal components and equipment, back and side panels, front and back doors, terminal strips, cabling and harnesses, surge protection for power and communication circuits, power distribution blocks or assemblies, shelves, connectors and all mounting hardware necessary for installation of equipment.

Cabinets shall be constructed using unpainted sheet aluminum with a minimum thickness of 0.125 inch.

Provide the rack assembly with a removable, standard 19-inch EIA compliant rack. Equip each cabinet with an aluminum storage compartment mounted in the rack assembly with the following dimensions (±0.5 inch): 16 inches wide, 14 inches long, and 1.75 inches deep. Provide the compartment with a ball bearing telescoping drawer guides to allow full extension from the rack assembly. The storage compartment shall open to provide a full-depth storage space for cabinet documentation and other miscellaneous items. The storage compartment shall be of adequate construction to support a weight of 20 pounds when extended without sagging. The top of the storage compartment shall be hinged aluminum. Provide at least one removable metal full-depth shelf with each cabinet.

Doorstops shall be included at 90 and 180-degree positions. Provide both the door and the doorstop mechanism of sufficient strength to withstand a simulated wind load of five pounds per square foot of door area applied to the both inside and outside surfaces without failure, permanent deformation, or compromising of door position and normal operation. Provide the cabinets without auxiliary police doors.

Ensure that cabinet doors include a gasket to provide a dust and weather-resistant seal when closed. Provide the gasket material with closed-cell neoprene and shall maintain its resiliency after exposure to the outdoor environment. The gasket shall show no sign of rolling or sagging, and shall ensure a uniform dust and weather-resistant seal around the entire door facing.

Ventilation: Provide all cabinets with a 100 CFM, minimum, cooling fan capacity. Provide dual fans with thermostats incorporated into the ventilation system.

Provide the cabinets with vent openings in the doors to allow convection cooling of electronic components. Locate the vent opening on the lower portion of the cabinet doors and shall be covered fully on the inside with a commercially available disposable three-layer graded type filter.

1. **Electrical**

Provide AC isolation within the cabinet. Configure all cabinets to accept 120 VAC from the utility company.

Provide UL listed circuit breakers with an interrupt capacity of 10,000 amperes and insulation resistance of 100 MΩ at 500 VDC. Provide power distributions blocks for use as power feed

and junction points for two and three wire circuits. The line side of each shall be capable of handling up to 2/0 AWG conductors. Isolate the AC neutral and equipment ground wiring and terminal blocks from the line wiring by an insulation resistance of at least 10 MΩ when measured at the AC neutral.

C. Type B

Furnish and install pole-mounted Type 5052-H32 aluminum NEMA 3S cabinets to house MVDS related equipment described herein. Type B cabinets may be used when the MVDS unit does not (or will not) contain a 120 VAC power service drop and fiber-optic drop cable. The Contractor shall appropriately size the cabinet to fit all the equipment installed within the cabinet at the particular location.

8.3.CONSTRUCTION METHODS

A. General

Ground all cabinets in accordance with the requirements of the Special Provisions. Keep the ground wire from the cabinet ground bus bar to the ground rod assembly or array as short as possible. Ensure the ground wire is not in contact with any other part of the cabinet.

Tag and identify all cabinet wiring by the use of insulated pre-printed sleeves. The wire markers shall identify in plain words with sufficient details without abbreviations or codes.

Neatly arrange all wiring, firmly lace or bundle it, and mechanically secure the wiring without the use of adhesive fasteners. Route and secure all wiring and cabling to avoid sharp edges and to avoid conflicts with other equipment or cabling. Terminate all wiring on a terminal block, strip, bus bar, device clamp, lug; or connector, do not splice any wiring. Label all wiring, cables, terminal strips, and distribution blocks. Provide strain relief for all cabling with connectors, all cabling entering knockouts or ports at the equipment, and where appropriate.

Fasten all components of the cabinet assembly to be mounted on cabinet side panels with hex-head or Phillips-head machine screws. Install the screws into tapped and threaded holes in the panels. The components include, but are not limited to, terminal blocks; bus bars, panel, and socket mounted SPD, circuit breakers, accessory and equipment outlets, and DC power supply chassis.

Fasten all other cabinet components with hex-head or Phillips-head machine screws installed with nuts (with locking washer or insert) or into tapped and threaded holes. Fasten stud-mounted components to a mounting bracket providing complete access to the studs and mounting nuts. All fastener heads and nuts (when used) shall be fully accessible within a complete cabinet assembly, and any component shall be removable without requiring removal of other components, panels or mounting rails. Do not use self-tapping or self-threading fasteners.

Provide cabinets with all mounting plates, anchor bolts, and any other necessary mounting hardware in accordance with the Special Provisions and the project plans.

Seal all unused conduit installed in cabinets at both ends to prevent water and dirt from entering the conduit and cabinet with approved sealing material.

Install a ground bushing attached inside the cabinet on all metal conduits entering the cabinet. Connect these ground bushings to the cabinet ground bus.

Ground the cabinet per Sections 1098 and 1700 of the 2012 *Standard Specifications for Roads and Structures*, the ITS Standard Details and the Special Provisions. Provide grounding circuits that are permanent and electrically continuous with a current carrying capacity high enough and an impedance low enough to limit the potential above ground to a safe level.

Run the power company neutral, conduit grounds, and all equipment grounds directly and independently off the ground bus. Use ground clamps, grounding and bonding bushings, lock nuts, and grounding electrodes that comply with UL Standard Electric Grounding and Bonding Equipment. Use ground rods of 5/8 inch minimum diameter, 10 feet long, and made of copper clad steel.

Make connections between ground electrodes and the ground wire using an exothermic welding process, cadweld or equivalent.

Ensure completed cabinet grounds have a resistance to ground of not more than 20 Ohms.

Each cabinet shall be ISO 9001 certified at the time of bid letting.

Equip the cabinets with SPD lightning and surge protection described separately in the Special Provisions.

Place durable vinyl identification number sticker (with 4" letters) on cabinets. Utilize stickers that match the appearance of those used elsewhere on the Triangle Expressway (Toll NC 540). Submit proposed sticker to the Department for approval prior to incorporation.

B. Type A

Mount the CCTV / MVDS cabinets on the metal pole using stainless steel bands as shown in the ITS Standard Details. Attach all risers to the base of pole-mounted cabinet as shown in the ITS Standard Details.

The CCTV camera cabinet shall be interconnected to CCTV camera assembly using a composite cable carrying the video, serial data and power. Terminal strips shall be provided to support 4-wire EIA 422 communications and the 24 VAC power as shall be required for power and data. The terminal strips shall be accessible such that it shall not be necessary to remove any other components to gain access. The terminal shall secure conductors by means of nickel or cadmium plated brass binder head screws.

Configure the cabinets with an interface panel to allow maintenance access for both video and data channels. This access shall provide a means to connect analog video and control data channels to a laptop computer. The connection of the laptop computer to video and data feeds shall not require disassembly or removal of any of the equipment or other components located inside the cabinet with the exception of patch cords for the data and video feeds.

Provide a video splitter to provide to the video encoder and the video monitor port simultaneously. The video cables shall interface with the CCTV camera cabinet test point connection and be fitted for interconnection to a BNC receptacle.

Provide a switch for selecting local camera PTZ control. Provide a communication cable for connection to a typical laptop and video monitor for future maintenance activities. The data cable shall consist of an integral USB to RS-232/422 converter as required to support the CCTV camera protocol and shall be compatible with the CCTV camera assembly. The data cable shall plug into the test point connector as provided in the cabinet and into a typical laptop USB data port. Two sets of cables shall be provided; two for data and two for video.

Mount the digital video encoder in the 19" equipment rack inside the cabinet in accordance with the "Central Video Equipment" section of the Special Provisions.

8.4.MEASUREMENT AND PAYMENT

Cabinet (___, Pole Mounted) will be measured and paid as the actual number of each type of cabinets of each type that are furnished, installed, and accepted, subject to the following conditions: 90% of the payment will be made upon acceptance of the unit; 10% of the payment will be made following final acceptance of the integrated system (including completion of the observation period).

No measurement will be made for grounding systems or any hardware and fasteners required for mounting cabinets to poles as these items will be considered incidental to the cabinet.

No measurement will be made of sealing conduits with duct plugs, mechanical sealing devices and duct and conduit sealer as such work will be considered incidental to furnishing and installing cabinets.

No measurement will be made of collecting and recording GPS coordinates for cabinets and junction boxes and compiling this data in the prescribed Microsoft Excel® spreadsheet as such work will be considered incidental to installing cabinets.

Payment will be made under:

CABINET (TYPE 5052-H32 ALUM. NEMA 3S, POLE MOUNTED) ..... Each

CABINET (TYPE 336, POLE MOUNTED) ..... Each

9. METAL CCTV CAMERA AND MVDS POLES

9.1.GENERAL

Furnish and install new MVDS poles, CCTV poles with lowering devices, grounding systems, and all necessary hardware. Relocate existing CCTV-8 pole with lowering device. The work covered by the Special Provision includes requirements for the design, fabrication, and installation of custom / site specifically designed CCTV and MVDS poles and associated foundations. The minimum CCTV camera mounting height shall be 45' above the adjacent roadway whether it is

the mainline, ramp or crossing roadway, whichever is higher. The minimum mounting height and resultant pole length of the MVDS above the roadway edge of pavement shall be established by the manufacturer's recommended guidelines. For cases where the pole location is well above the grade of the roadway, a shorter pole will be allowed if the Contractor documents there will be no loss of functionality or intended field of view.

Remove the existing CCTV-8 pole foundations, and cut the existing conduits below final grade.

The Contractor may use NCDOT's standard strain poles and foundations for the CCTV camera and MVDS poles or they may custom design the poles and foundations using the design procedures described in this Special Provision. Screw, auger or helix pole foundations shall not be used for CCTV camera poles.

Provide MVDS poles that contain no guy assemblies, struts, or stay braces. Provide designs of completed assemblies with hardware that equals or exceeds the requirements of the 6th Edition of the 2013 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals", including the latest interim specifications. Provide assemblies with a round cross-sectional design.

Ensure that materials and construction are in accordance with Section 12 of the "Project Special Provisions for Signals and Intelligent Transportation Systems". Ignore references to mast-arm poles and traffic signal related equipment. Replace references to "signal poles" with "CCTV camera and MVDS poles".

9.2.MATERIALS

A. General

Furnish poles and foundations that meet or exceed the following functional requirements with all CCTV camera and / or MVDS units, power meter, service disconnect, and all equipment cabinets attached and all risers, condulets, and weather head accessories in place:

- Maximum deflection at top of pole in 30 mph, non-gusting wind: one inch
- Ultimate load: 100 mph wind with a 30% gust factor

Furnish poles and foundations that sustain the dead load of all equipment attached to the pole with a safety factor of 1.65.

Furnish MVDS poles that when erected in foundation and completely installed are at a minimum height as recommended by the MVDS manufacturer.

B. Metal Pole

Design poles according to the ITS Standard Details.

Furnish hot-dipped galvanized steel poles to mount CCTV cameras / MVDS units and equipment cabinets that meet or exceed the requirements of the 2012 *Standard Specifications for Roads and Structures,* unless otherwise noted in the ITS Standard Details or the Special Provisions.

Furnish CCTV camera poles with ½-inch diameter air terminal, with #4 AWG wire, routed down pole and cadwelded to a one of the ground rods installed for the cabinet equipment grounding system. Furnish an air terminal that extends high enough to provide a 45-degree cone of protection of the camera, as shown in the ITS Standard Details.

Provide materials in accordance with Section 12 of the "Project Special Provisions for Signals and Intelligent Transportation Systems".

C. Foundation

Prepare a design for the pole's concrete foundation and submit to the Engineer for review. The top of the drilled shaft foundation shall be flush with finished grade. Unstable soil may require a deeper foundation. Concrete for the foundation shall be 3000 psi minimum. Foundation design shall meet all NCDOT requirements and be prepared and sealed by a North Carolina registered professional engineer. Prepare design, optional custom design and perform soil tests for each CCTV camera and MVDS metal pole foundation location in accordance with Section 12.4.B of the "Project Special Provisions for Signals and Intelligent Transportation Systems".

Conduit elbows in foundation shall have a minimum radius of 15 inches.

9.3.CONSTRUCTION METHODS

A. General

Obtain approval from the Engineer for final field locations of the CCTV camera / MVDS metal poles before developing shop drawings or installing the poles. In order not to obstruct proper storm drainage, do not install poles in the center of ditch lines. Obtain shop drawings, signed and sealed by a North Carolina registered engineer, for each pole location (each combination of pole height and equipment mix) and submit to Engineer for approval. When approved, submit to pole manufacturer. Determine and provide to pole manufacturer the effective projected area of all items to be attached to each pole at each pole location. Construct drilled pier foundations, drilled pier wing-wall foundations, and erect pole in accordance with Section 12.4 of the "Project Special Provisions for Signals and Intelligent Transportation Systems".

9.4.METAL POLE REMOVALS

A. Description:

Remove and dispose of existing metal poles including mast arms, and remove and dispose of existing foundations, associated anchor bolts, electrical wires and connections.

B. Construction Methods:

1. Foundations:

Remove and promptly dispose of the metal pole foundations including reinforcing steel, electrical wires, and anchor bolts to a minimum depth of two feet below the finished ground elevation. At the Contractor's option, remove the complete foundation.

2. Metal Poles:

Assume ownership of the metal poles, remove the metal poles, and promptly transport the metal signal poles from the project. Use methods to remove the metal signal poles and attached traffic signal equipment that will not result in damage to other portions of the project or facility. Repair damages that are a result of the Contractor's actions at no additional cost to the Department.

Transport and properly dispose of the materials.

Backfill and compact disturbed areas to match the finished ground elevation. Seed unpaved areas.

Use methods to remove the foundations that will not result in damage to other portions of the project or facility. Repair damages that are a result of the Contractor's actions at no cost to the Department.

9.5.MEASUREMENT AND PAYMENT

Actual number of metal 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.

Actual number of designs for metal poles furnished and accepted.

Actual number of metal pole foundations removed and disposed.

Actual number of metal poles removed and disposed.

No measurement will be made for foundation designs prepared with metal pole designs, as these will be considered incidental to designing support structures.

Payment will be made under:

Metal Pole for ITS Device ..... Each

Soil Test ..... Each

Drilled Pier Foundation ..... Cubic Yard

Metal ITS Pole Design ..... Each

Metal Pole Foundation Removal ..... Each

Metal Pole Removal ..... Each

10. CCTV FIELD EQUIPMENT

10.1. Description

Furnish and install CCTV field equipment described in these Project Special Provisions. Furnish equipment that is compatible, interoperable, and completely interchangeable with existing high-performance dome equipment currently in use by NCTA in this Region. Ensure that the equipment is fully compatible with all features of the existing video management software currently in use by NCTA in this Region.

10.2. Material

A. General

Furnish and install new CCTV camera assemblies at the locations shown on the Plans. CCTV cameras shall be high definition resolution with integrated encoders for video-over-IP transmission.

Each CCTV camera assembly shall consist of the following:

- NEMA environmental dome enclosure
- CCTV day/night color digital signal processing camera unit with zoom lens, filter,
- control circuit, and accessories
- Control receiver/driver that complies with the NTCIP specifications listed below,
- Motorized pan, tilt, and zoom
- Power supplies
- Pole-mount camera lowering device attachment hardware at locations shown on the ITS Plans
- All necessary cable, connectors and incidental hardware to make a complete and operable system
- Furnish a NEMA Type 4, IP 66 enclosure constructed of aluminum with a clear acrylic dome or approved equal camera unit housing
- Cat5e cable PoE connection
- Surge suppression devices (SPDs)

B. Standards

- ANSI
- ASTM
- CE, Class B
- FCC Rules Part 15, Sub-part J
- FCC Rules Part 15, Sub-part B Class A
- FCC Class A
- FCC, Class B
- IEEE
- ICEA

- IMSA
- ISO 9001
- NEC
- NEMA 4X, IP 66
- NEMA Type 1
- NFPA
- NTSC
- UL Listed

Provide UL listed SPD devices according to the *UL 1449, 4th edition* standard and shall comply with the NEMA requirements as detailed in the *NEMA LS 1 (1992)* standard.

Provide UL listed air terminal according to the *UL 96A* standard and be suitable for use in a UL master label lightning protection system.

C. Camera and Lens

1. Cameras

Furnish new CCTV cameras with high definition resolution and integrated encoders for video-over-IP transmission. The CCTV camera shall meet the following minimum requirements:

- Image Sensor: Progressive Scan CCD with 1/3" image size
- Power over Ethernet (PoE) IEEE 802.3at
- Image Sensor Resolution: Scalable; NTSC-compatible 320x176 to 1280x720 (HDTV 720p, 4:3 Aspect Ratio)
- Network Interface: Ethernet 10/100Base-T (RJ-45 connector)
- Protocols: IPv4, IPv6, HTTP, HTTPS, QoS, FTP, UPnP, SNMP v2c/v3, DNS, NTP, RTSP, RTP, UDP, IGMP, DHCP, TCP/IP, UDP/IP (unicast, multicast IGMP), DNS, DHCP, SNMP v2c/v3, QoS, SMTP, ONVIF Profile S
- Security: SSL, SSH, 802.1x, HTTPS encryption with password controlled browser interface
- Video Streams: Two simultaneous streams, user configurable
- Compression: H.264 (MPEG-4 Part 10/AVC)
- Resolution: Scalable; NTSC-compatible 320x176 to 1280x720 (HDTV 720p, 4:3 Aspect Ratio)
- Frame Rate: 1-30 FPS programmable (full motion)
- Bandwidth: 30 kbps – 6 Mbps, configurable depending on resolution
- Edge Storage: SD/SDHC/SDXC slot supporting up to 64GB memory card

2. Zoom Lens

Furnish each camera with a motorized zoom lens with automatic iris control with manual override and neutral density spot filter. Furnish lenses that meet the following optical specifications:

- Automatic focus: Automatic with manual override
- Lens Aperture: f/1.4 to f/4.6
- Optical Zoom: 30X
- Digital Zoom: 12X
- Sensitivity at 35 IRE: .025 lux at ½ second color, .1 lux at 1/60 second black and white, .004 lux at ½ sec. black and white

The lens must be capable of both automatic and remote manual control iris and focus override operation. The lens must be equipped for remote control of zoom and focus, including automatic movement to any of the preset zoom and focus positions. The operating voltages of the lens must be compatible with the outputs of the camera control.

D. Camera Housing

Furnish new dome style enclosure for assemblies with a high performance integrated dome system or approved equal. Equip each housing with a mounting assembly for attachment to the CCTV camera-lowering device, or to the pole if lowering devices are not used. The enclosures must be equipped with a strip heater and a sunshield and be fabricated from corrosion resistant aluminum and finished in a neutral color of weather resistant enamel. The viewing area of the enclosure must be high impact acrylic plastic.

A dome-type environmental housing shall have a sustained ambient operating temperature of -50°C to 50°C (-58°F to 122°F), with 10 to 100 percent relative humidity (condensing).

The enclosure shall have a NEMA 4X/IP-66 rating.

E. Pan and Tilt Unit

Each new dome style assembly must be equipped with a pan and tilt unit. The pan and tilt unit must be integral to dome system. The pan and tilt unit must be rated for outdoor operation, provide instantaneous stopping, prevent drift, and have minimum backlash. The dome must have an auto flip dome rotation to rotate and reposition camera for viewing objects passing below camera. Equip the drive unit with electronic image stabilization and image enhancement. The pan and tilt units must meet or exceed the following specifications:

- Pan: Continuous 360 degrees,
- Tilt: 220 degrees unobstructed minimum,
- Presets: Minimum of 256 presets,
- Pan speed: 0.05 degrees/second to 450 degrees/second,

- Tilt speed: 0.05 degrees/second to 450 degrees/second,
- Input voltage: 24 VAC 60 Hz or 24 VDC, and
- Motors: Variable speed, continuous duty, instantaneous reversing.

F. Power Supplies

Provide all power supplies necessary for the camera and its pan tilt unit. Mount power supplies in the camera cabinet and utilize composite cable to supply power the camera and pan tilt unit.

G. Control Receiver/Driver

Each new camera unit must contain control receiver/driver that is integral to the CCTV dome assembly. The control receiver/driver must receive data via Ethernet communications initiated from a camera control unit, decode the command data, perform error checking, and drive the pan/tilt unit, camera controls, and motorized lens. As a minimum, the control receiver/drivers must provide the following functions:

- Zoom in/out,
- Automatic focus with manual override,
- Tilt up/down,
- Automatic iris with manual override,
- Pan right/left, and
- Minimum of 256 preset positions for pan, tilt, and zoom.

In addition, each control receiver/driver must accept status information from pan/tilt unit and motorized lens for preset positioning of those components. The control receiver/driver must relay pan, tilt, zoom, and focus positions from the field to remote camera control units. The control receiver/driver must accept "goto" preset commands from the camera control unit, decode the command data, perform error checking, and drive the pan/tilt and motorized zoom lens to the correct preset position. The preset commands from the camera control unit will consist of unique values for the desired pan, tilt, zoom, and focus positions.

H. Software

Furnish vendor-supplied software to program and configure the cameras in the field.

I. CCTV Camera Attachment to Pole

At locations shown in the Plans where new CCTV cameras are to be installed on new CCTV poles, furnish an attachment assembly for the CCTV camera unit. Use stainless steel banding approved by the Engineer. Submit shop drawings for review and approval by the Engineer prior to installation.

Furnish CCTV attachments that allow for the removal and replacement of the CCTV enclosure as well as providing a weatherproof, weather tight, seal that does not allow moisture to enter the enclosure.

Furnish a CCTV Camera Attachment Assembly that is able to withstand wind loading at the maximum wind speed and gust factor called for in these Special Provisions and can support a minimum camera unit dead load of 45 pounds (20.4 kg).

J. Surge Suppression

Provide a maximum 20 ohm ground impedance measurement, and the placement of transient voltage protection both ahead of and behind the ITS device electronics for CCTV installations. All SPD devices shall have an ambient operating temperature of -29 degrees F to 165 degrees F with 95 percent non-condensing relative humidity.

1. **Grounding**

Furnish a grounding system as shown in the ITS Concept Plans. Provide all connections to the grounding electrode with an exothermic weld. Bond (i.e., connect) all metal components of the camera and cabinets to the grounding system with a grounding cable that uses a mechanical connection on the equipment side and an exothermic welded connection at the down cable.

2. **Load Side CCTV Power**

Load side protection is designed to restrict surge current transients from entering the power source from the CCTV device and/or site. The SPD for the CCTV power source shall have an operating voltage of 120 volts single phase and a maximum continuous operating voltage of 150 volts single phase.

The device's SPD shall be rated at a minimum of 90,000 amps per phase and have maximum clamping voltage ratings of 330 volts at 500 amps, 395 volts at 3,000 amps, and 533 volts at 10,000 amps. The SPD shall also be UL listed for a minimum suppressed voltage of 330 volts per line to the neutral/ground. The suppression device shall be of the metal oxide varistor (MOV) type.

3. Line Side CCTV Power

The SPD for the CCTV power source shall have an operating voltage of 120 volts single phase and a maximum continuous operating voltage of 150 volts single phase. The SPD shall be rated at a minimum of 150,000 amps per phase, and have minimum clamping voltage ratings of 293 volts at 500 amps, 350 volts at 3,000 amps, and 446 volts at 10,000 amps. The SPD for the power source shall also be UL listed for a minimum suppressed voltage of 400 volts per line to the neutral/ground. The suppression device shall be an MOV type.

4. **CCTV Data/Video Supply and Load Side**

The SPD shall have an operating voltage to match the characteristics of the CCTV, such as 24 volts of direct current (VDC) and less than five VDC for data and video functions. These specialized SPD units shall be UL listed according to the *UL 497A* standard. The minimum surge current rating for the SPD shall be 2,000 amps for data and telecommunications, and 4,000 amps for binary network connectors (BNC).

10.3. Construction Methods

A. General

Mount CCTV camera units at a height sufficient to adequately see traffic in all directions and as approved by the Engineer. The maximum attachment height is 45 feet above ground level.

Obtain approval of the camera locations and orientation from the Engineer prior to installing the CCTV camera assemblies.

Mount CCTV cameras on the side of poles nearest intended field of view. Avoid occluding the view with the pole.

Use the vendor-supplied software to configure the cameras.

B. Electrical and Mechanical Requirements

Ground all equipment as called for in the 2012 *Standard Specifications for Roads and Structures*, the Special Provisions and the ITS Standard Details.

Install surge protectors on all ungrounded conductors entering the CCTV camera enclosure as described below. House the protectors in the CCTV camera cabinet on the pole in a manner approved by the Engineer. The air terminal down conductor shall not pass through this cabinet.

C. Power Service

Provide 120 Volt power service. Comply with the "Electrical Service" section of the Special Provisions.

D. Surge Suppression

(a) Grounding

Connect all grounding points related to CCTV camera pole and its subsystems to a single point main grounding electrode, sometimes referred to as the ground window, which shall be driven a minimum of 12 inches from the CCTV camera pole. Each grounding electrode shall require an interfacing hemisphere, an imaginary cylinder with a diameter and depth equal to the length of the electrode. Therefore, a grounding electrode that is a minimum of 10 feet long shall be installed 10-20 feet away from any additional grounding electrodes and / or ground-mounted devices.

Install a minimum of one grounding radiant, plus additional radiants as required to achieve a resistance to ground of 20 Ω or less, at each CCTV camera pole. This grounding radiant shall consist of one main grounding rod that is a minimum of 10 feet long located at the structural base of the CCTV camera pole and attached to one additional 20-foot radiant grounding rod placed a minimum of 20 feet away from the main grounding rod. Attach the main grounding rod to the CCTV camera pole by a solid #4 ground cable that shall be exothermically welded. Attach the radiant grounding rod to the main grounding rod with a minimum #4 solid bare copper wire that is exothermically welded at both the main grounding rod and the radiant grounding rod.

(b) Load Side CCTV Camera Power

Install a transient voltage suppressor (SPD) at the CCTV camera power source on the load side. This device shall provide protection between line-to-neutral, line- to-ground, line-to-line, and neutral-to-ground.

(c) Line Side CCTV Camera Power

Install a SPD in the power line side ahead of all CCTV camera electronic equipment. This installation technique is designed to restrict earth current transients induced within the ground, or directly from the power source, from entering the ITS device through the incoming 120-volt power circuit. This device shall provide protection between line to neutral, line to ground, line-to-line and neutral to ground.

(d) Device Data/Video Line and Load Side

Install specialized SPDs at the line and line sides of all low voltage connections to the CCTV camera and its operating subsystems. These connections include, but are not limited to, Category 6 data cables, coaxial video cables, twisted pair video cables, and low voltage control cables that comply with EIA requirements as detailed in the EIA-232/422/485 standards.

10.4. MEASUREMENT AND PAYMENT

CCTV camera assembly will be measured and paid as the actual number of CCTV camera assemblies furnished, installed, and accepted according to the following conditions: 90% of the payment will be made upon acceptance of the installed CCTV camera assembly and the remaining 10% of the payment will be made following final acceptance (including completion of the observation period.)

No separate measurement will be made for composite cabling, connectors, CCTV camera attachment assemblies (including luminaire mast arms), software, grounding equipment, surge protector devices, composite cable, other cabling, and conduit, or any other equipment or labor required to install the CCTV assembly and integrate it with the fiber-optic communications equipment as they are considered incidental to furnishing and installing the CCTV camera assembly and the CCTV cabinet.

Payment will be made under:

CCTV Camera Assembly ..... Each

10. MICROWAVE VEHICLE DETECTION SYSTEM

11.1. GENERAL

Furnish and install a microwave vehicle detection system (MVDS) as shown in the plans and as directed by the Engineer that is capable of traffic data collection meeting this section's requirements. Conform to the placement guidelines found in the Detector Location sheet of the ITS Standard Details. Ensure that the MVDS can be mounted on new MVDS poles, or CCTV camera poles for a side-fire configuration. The final locations and quantity to provide the minimum coverage shown in the plans shall be the responsibility of the Contractor. All interchange ramps shall be covered with a dedicated detector and not by derivation or calculation of other detectors.

The detection units shall use Ethernet communications for monitoring and control from the NCDOT Statewide Transportation Operations Center (STOC).

11.2. MATERIALS

A. General

Provide an MVDS assembly for the project site that consists of microwave radar sensor(s) in enclosed housing(s) (i.e., the detectors), as shown in the ITS Standard Details and as directed by the Engineer. Provide an installation kit with mounting brackets; home run cable for the transmission and receipt of data and communications between the field detector and the communication system hardware; and all required power and data cables, as detailed in the ITS Standard Details.

B. Detector

Provide a (MVDS) that uses a Federal Communications Commission (FCC)-certified, low-power microwave radar beam to detect vehicle passage and generate volume, occupancy, length-based classification, and speed data. Ensure that the MVDS is a true-presence microwave radar that uses the frequency modulated continuous wave (FMCW) principle. Ensure that any non-background targets reflect the signal back to the microwave radar detector, where the targets are detected and their range measured.

Ensure that the MVDS provides speed-trap emulation and has the ability to detect automatically sensor settings, baud rates, loop spacing, and communication port settings to select an operational mode.

Ensure that the detector has the ability to self-tune and allow manual calibration via supplied vendor software. Ensure that the MVDS is capable of auto-calibration and auto-configuration, and that it does not transmit any signals outside its FCC-approved frequency. Provide a setup program that allows the operator to define detection zones within the detector's field of view. Ensure that the detector automatically configures zones, requiring minimal external tuning. Verify that the unit is not adversely affected by varied weather conditions, such as rain, fog, heat, or wind.

Ensure that the MVDS can compute, store, and provide all required traffic parameter measurements per detection zone in user-selected time intervals from 0 to 60 minutes, including, but not limited to, 10 seconds, 20 seconds, 30 seconds, 60 seconds, 5 minutes, 10 minutes, 15 minutes, 30 minutes, and 60 minutes. The MVDS shall log and store vehicle volume, occupancy,

length-based classification and speed data for a minimum of seven days regardless of collection interval. Data storage within the MVDS shall utilize a first in / first out architecture such that the oldest stored data record is overwritten with the newest data record when the storage device is at full capacity.

1. Communications

Ensure that the MVDS generates and transmits traffic data in serial format using an Electronic Industries Alliance (EIA) standard EIA-232 communication port and an Internet Protocol (IP) interface. Ensure that the MVDS can generate contact closures emulating the output of a pair of 6-foot by 6-foot loops with leading edges placed 16 feet apart.

Verify that the MVDS is IP addressable. Ensure that all device communication addresses are user programmable.

Ensure that the MVDS supports Ethernet protocols. Ensure that the setup program assigns an IP address to the detection unit. Ensure that the MVDS responds to a polling request from the TMC for traffic data. Verify that the detection unit responds with the accumulated traffic parameter measurements from the period since the last request was issued.

Verify that the MVDS stores all system configuration and traffic parameter data within internal nonvolatile memory. Verify that traffic data can be locally and remotely transferred by issuing requests from a personal computer (PC) across the communication network connecting the detector and the NCTA operator workstation or other PC.

2. Configuration and Management

Ensure that the MVDS software application provides a display of the detection zones and control of any vehicle detector connected to the network. Ensure that the MVDS setup program enables the operator to select whether data is output as contact closures emulating standard loop detector outputs, and / or as accumulated statistical data using detector serial ports.

Verify that the sensor holds a vehicle's presence in the specified detection zone until the vehicle is clear of the zone. Ensure that the sensor does not tune out stationary vehicles within a detection zone and thereby give a false clear status to the lane, even if a vehicle has stopped for a period exceeding 30 minutes. Provide a detector that is capable of resolving closely spaced vehicles.

Provide an assembly manufactured in such a way as to prevent reversed or improper installation. Ensure that the MVDS design provides high-voltage exposure protection to personnel during equipment operation, adjustments and maintenance.

Ensure that an operator using a locally connected laptop computer can conduct system setup, calibration, diagnosis, and data retrieval operations. Ensure that the MVDS is capable of having its configuration data saved to a laptop computer or TMC server, which can later transfer the data back to the MVDS for reloading.

Ensure that the MVDS operator can use a laptop computer or TMC server to edit previously defined detection configurations to permit adjustments to the detection zone's size, placement, and sensitivity, and to reprogram the detector's parameters.

Ensure that the laptop computer and the MVDS can communicate when connected directly by an EIA-232 cable. Provide preinstalled USB to RS-232 converter to facilitate laptop communications. Ensure that the laptop computer and MVDS can communicate across the ITS system's communication network using the NTCIP standards described in the Special Provisions. Ensure that the software allows communication between multiple users and multiple field devices concurrently across the same communication network.

Once programmed, ensure that no periodic adjustments are required to the detection zones unless physical roadway conditions change, such as lane shifts or closures.

3. Electrical Requirements

Ensure that the MVDS field hardware meets the requirements in the FCC's 2005 Code of Federal Regulation (CFR), Title 47, Part 15. The detector shall not interfere with any known equipment.

Ensure the MVDS operates using a nominal input voltage at the field cabinet of 120 volts of alternating current (V_{AC}). Ensure that the system's power supply will operate with an input voltage ranging from 89 to 135 V_{AC}. For any device requiring a source input other than the standard 120 V_{AC}, supply the appropriate means of conversion.

Provide an assembly manufactured in such a way as to prevent reversed or improper installation. Ensure that the MVDS design provides high-voltage exposure protection to personnel during equipment operation, adjustments, and maintenance.

Furnish all equipment with the appropriate power and communication cables. Install the power cable and the communication cables according to the manufacturer's recommendation. Ensure that the cables comply with NEC sizing requirements as presented in NEC Article 210-19(a), Fine Print Note (FPN) No. 4, and meet all other applicable standards, specifications and local code requirements.

Ensure that the power cable running between the MVDS and its electrical service is in a separate conduit. Do not install communication cables in the same conduit as power cables carrying voltage greater than 24 V_{DC}/V_{AC} or current in excess of 1.5 amps. Do not install the power and communication cables in the same pull boxes.

Cut all wires to their proper length before assembly. Do not double back any wire to take up slack. Neatly lace wires into cables with nylon lacing or plastic straps. Secure cables with clamps and provide service loops at all connections.

In the event that power to the MVDS or a subcomponent thereof is interrupted, ensure that the equipment automatically recovers after power is restored. Ensure that all programmable system settings return to their previous configurations and the system resumes proper operation.

Ensure that the MVDS operator is able to select and use 12 to 24 volts of direct current (V_{DC}) and 115 V_{AC} at 60 Hz.

Ensure that the detector is FCC certified and that the FCC's identification number is displayed on an external label. Ensure that the detector transmits within a frequency band of 10.525 gigahertz, ±25 megahertz, or another FCC approved spectral band.

4. Environmental Requirements

Provide MVDS that meet all specifications during and after being subjected to an ambient operating temperature range of -29 degrees F to 165 degrees F with a maximum non-condensing relative humidity as defined in the environmental requirements section of the NEMA TS 2 standard.

Verify that the MVDS manufacturer certifies that its device has successfully completed environmental testing as defined in the NEMA TS 2 standard. Verify that vibration and shock resistance meet the requirements of Sections 2.1.9 and 2.1.10, respectively, of NEMA TS 2.

Ensure that no item, component, or subassembly emits a noise level exceeding the peak level of 55 decibels adjusted (dBa) when measured at a distance of 3.3 feet away from its surface.

Ensure that MVDS components comply with the environmental requirements detailed in the NEMA TS 2 standard.

5. Detector Housing

Furnish and install an environmentally resistant and tamper-proof sensor enclosure for any detector assembly exposed to the elements. Ensure that the enclosure is environmentally sealed upon installation and that it is light in color.

6. Wind Loads

Design MVDS poles in accordance with the 6th Edition 2009 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, including all of the latest interim revisions.

7. Performance

Provide a MVDS capable of meeting the minimum total roadway segment accuracy levels of 95% for volume, 90% for occupancy, 90% for length based classification and 90% for speed for all lanes. This evaluation (by necessity) shall take place during the Observation Period. Provide detection for up to 12 traffic lanes. Provide a detection range of 0 to 250 feet.

To verify conformance with the accuracy requirements in this section, perform evaluations by comparing sample data collected from the vehicle detection system with ground truth data collected during the same time by human observation or by another method approved by the Engineer. Base the vehicle detection system's performance evaluation on sample data taken over several periods under a variety of traffic conditions. Develop and adhere to a methodology to collect data and calibrate and evaluate the performance of each device using speed, volume, and occupancy data.

C. Software

Ensure the MVD software can perform the following tasks:

- Device configuration and setup
- Diagnostic testing
- Device management
- Data retrieval, analysis, reporting and storage
- Data importing from NCDOT's MVDS database
- Data exporting to other systems, including but not limited to:
    - Toll collection system for congestion pricing
    - NCTA's Protronix "Metrics" data aggregation software
    - Protronix "Traffic Melder" software
    - NCDOT for posting on a speed map

Ensure software can collect data from each sensor as frequently as 20-second intervals.

The report function shall include user-definable queries in graphical, text and tabular formats.

Ensure software can perform database translations, data types and file formats to accomplish the above data exporting. The software shall utilize the following minimum file formats: XML, HTML, SQL, Excel, and PDF. Ensure software includes "on-demand" and scheduled data translation.

The Contractor shall update the NCTA Protronix "Metrics" internal speed map by depicting / providing:

- Location of each MVD,
- Background map suitable in detail and for use on Internet website

The maps shall be expanded to display all of the interchange and the crossing route. Depict on the map local names, route numbers, and major landmarks. The Contractor shall develop a verification plan, to be approved by the Engineer, to verify that speeds displayed on the map are accurate. This verification shall take place during the Observation Period.

Provide device drivers for detectors provided in the Special Provisions.

10.3 CONSTRUCTION METHODS

Install, configure, and demonstrate a fully functional vehicle side-fire detection system. Connect all field hardware to the communication network, and provide all materials specified in the Special Provisions. Install all equipment according to the manufacturer's recommendations or as directed by the Engineer.

A. Electrical and Mechanical Requirements

Ground all equipment as called for in the 2012 *Standard Specifications for Roads and Structures*, the Special Provisions, and the ITS Standard Details.

Install surge protectors on all ungrounded conductors entering the MVDS enclosure as described below. House the surge protectors in the MVDS cabinet on the pole in a manner approved by the Engineer. The air terminal down conductor must not pass through this cabinet.

B. MVDS

Ensure that the MVDS can be mounted on new MVDS poles or CCTV camera poles, in a side-fire configuration. Mount each MVDS at height and setback corresponding to the manufacturer's recommendations for the number of lanes and the detection zone. For CCTV camera poles with lowering devices, provide a detector-mounting bracket to mount the detector on the side of the pole 90 degrees to traffic so the camera and lowering device do not strike the detector. For locations where the minimum setback cannot be met when mounting on front face of pole, provide a mounting bracket to mount on the side of the pole 90 degrees to traffic so the camera and lowering device do not strike the detector. Use this method only if that provides the minimum setback.

Mount the MVDS detector as detailed in the ITS Standard Details. In either configuration, mount the detector level with respect to the centerline of the roadway. Tilt the unit downward toward the roadway to ensure detection of all lanes.

Ensure that the MVDS sensor has a 250-foot range, and that the viewing angle is a minimum of 40 degrees vertical and a maximum of 15 degrees horizontal. Verify that all detection zones are contained within the specified elevation angle according to the manufacturer's recommendations and that the MVDS is capable of fully detecting all vehicles in a minimum of eight lanes or zones. Ensure that the configuration also provides accurate collection of all data types as detailed in this specification.

Provide a detector housing that can be pole-mounted, as indicated in the ITS Standard Details. Supply a universal mounting bracket that is adjustable on two axes for optimum alignment.

Attach the mounting bracket with approved stainless steel bands that are 0.75 inch wide and 0.025 inch thick, or mount to a concrete structure using two stainless steel expansion bolts of sufficient length and diameter to support 100 pounds.

When installing a detector near metal structures, such as buildings, bridges, or sign supports, mount the sensor and aim it so that the detection zone is not under and does not pass through any structure to avoid distortion and reflection.

Ensure that the detector is factory calibrated to comply with all applicable standards, specifications, and requirements.

Provide an interface to external equipment with a single connector. Ensure that the connector provides power to the unit and allows generation of contact closure output pairs. Ensure that the connector includes serial communication lines for programming, testing, and interfacing with the modem / switch at 9,600 to 115,000 bps baud rate and that it has at least 26 pins. Ensure that the serial port's data format is standard binary non-return to zero (NRZ) modulation with 8-bit data, 1-stop bit, and no parity.

Ensure that the homerun cable is a polyurethane-jacketed cable approved by the Engineer, with polyvinyl chloride (PVC) insulated conductors. The homerun cable shall have a 300-volt rating and a temperature rating of 200° F. Ensure that the cable is equipped with #20 or #22 American Wire Gauge (AWG) conductors.

Crimp or solder the detector connector pins to the cable conductors. Assemble and test the cable prior to onsite installation and pulling. Cut all wires to their proper length before installation. Do not double back wire to take up slack. Neatly lace wires into cable with nylon lacing or plastic straps, and secure cables with l a m p s . Provide service loops at all connections.

Perform continuity tests on the detector's stranded conductors using a meter having a minimum input resistance of 20,000 Ω per volt and resistance of not more than 16 Ω per 984.25 feet of conductor.

Measure the insulation resistance between isolated conductors and between each conductor, ground, and shield using a meter designed for measuring insulation resistance. The resistance shall be infinity. Perform all resistance testing after final termination and cable installation, but prior to the connection of any electronic or field devices.

C. Power Service

Provide 120VAC power service. Comply with the "Electrical Service" section of the Special Provisions.

D. Surge Suppression

1. Grounding

Connect all grounding points related to the MVDS to a single point main grounding electrode as shown in the ITS Standard Details. A 10-foot grounding electrode shall be installed a minimum of 20 feet away from any additional grounding electrodes and / or ground mounted devices.

This grounding radiant shall consist of one main 10-foot grounding rod located at the structural base of the MVDS pole and attached to three additional 10-foot radiant grounding rod placed a minimum of 20 feet away from the main grounding rod. Attach the radiant grounding rod to the main grounding rod with a minimum #4 solid bare copper wire that shall be exothermically welded at both the main grounding rod and the radiant grounding rod.

2. Load Side Detector Power

Install a transient voltage suppressor (SPD) at the MVDS power source on the supply side. This device shall provide protection between line-to-neutral, line-to- ground, line-to-line, and neutral-to-ground.

3. Line Side Detector Power

Install a SPD in the power line side ahead of all MVDS electronic equipment. This installation technique is designed to restrict earth current transients induced within the ground, or directly

from the power source, from entering the ITS device through the incoming 120/240-volt power circuit. This device shall provide protection between line-to-neutral, line-to-ground, line-to-line and neutral-to-ground.

4. Load Side Detector Data

Install specialized SPD devices at the supply and line sides of all low voltage connections to the MVDS and its operating subsystems. These connections include, but are not limited to, Category 6 data cables, and low voltage control cables that comply with EIA requirements as detailed in the EIA-232/422/485 standards.

5. Software

If software is required, install the software application(s) on the NCDOT Statewide Transportation Operations Center (STOC) virtual servers for access by all NCDOT Statewide Transportation Operations Center (STOC) operators. Configure data translation applications for those services described above.

11.3. MEASUREMENT AND PAYMENT

Actual number of microwave vehicle detection systems furnished, installed, and accepted.

No measurement will be made of cables or hardware, as these will be considered incidental to furnishing and installing microwave vehicle detection systems.

Payment will be made under:

Microwave Vehicle Detector..... Each

12. COMMUNICATIONS HARDWARE

12.1. DESCRIPTION

A. General

All communications between ITS devices and the local hub shall use Ethernet communications. The communications network along the corridor shall consist of local Ethernet edge switches at ITS devices.

Provide a minimum of a Fast Ethernet (100 Mbps) optical communications network between all proposed ITS field devices and Gigabit Ethernet routing switches located in the AET Toll Zone Vaults located at the toll zones.

B. Ethernet Edge Switches

Furnish and install a hardened, device-level managed field Ethernet edge switch in each ITS field cabinet location. Ensure that the Ethernet edge switches provide fast Ethernet connectivity at minimum transmission rate of 100 Mbps from each ITS cabinet location to its respective Gigabit Ethernet routing switch. Provide Ethernet Switches capable of being managed with the existing Castle Rock network management software.

12.2. MATERIALS

A. General

Ensure that the Ethernet switches are fully compatible and interoperable with the trunk Ethernet network interface and that the Ethernet switches support half and full duplex Ethernet communications.

Furnish Ethernet switches that provide 99.999% error-free operation and that comply with the Electronic Industries Alliance (EIA) Ethernet data communication requirements using single-mode fiber-optic transmission medium and copper transmission medium. Ensure that the Ethernet switches have a minimum mean time between failures (MTBF) of 10 years, or 87,600 hours, as calculated using the Bellcore / Telcordia SR-332 standard for reliability prediction.

B. Ethernet Edge Switches

The Contractor shall configure each Layer 2 edge switch with industry standard, non-proprietary protocols identified in the Contractor-provided network documentation as outlined below. The protocols to be configured by the Contractor shall include at a minimum:

- RSTP / MSTP
- SNMPv3 (Simple Network Management Protocol version 3)
- IGMP Snooping (Internet Group Management Protocol)
- SNTP (Simple Network Time Protocol)
- LLDP (Link Layer Discovery Protocol)

12.3. CONSTRUCTION METHODS

A. General

Ensure that all Ethernet switches are UL listed.

Verify that network / field / data patch cords meet all ANSI/EIA/TIA requirements for Category 6 4-pair unshielded twisted pair cabling with stranded conductors and RJ45 connectors.

Ensure that all project IP addresses are assigned as static addresses. Ensure As-Constructed Drawings include the identification of all IP addresses, subnets, gateways, VLANs, and associated hardware devices and device locations. Configure the Ethernet network so the CCTV cameras shall be in separate VLAN(s) from other devices. All CCTV camera VLANs shall have IGMP snooping enabled.

After consulting with vendors of communication hardware, submit the following for review and approval by the Engineer prior to incorporation:

- Drawings and supporting documentation of the physical network topology as established and installed including physical connectivity at the device and port level
- Drawings and supporting documentation for a coherent and complete overall logical layers 2-3 network architecture and detailed design to include the following:

    - VLAN
    - STP domains (if applicable)
    - STP mode / role
    - STP ports
    - IP addressing / subnets / gateways
    - IP routing / trunking
    - Routing and routed protocols
    - Multicast addressing

- Drawings and supporting documentation identifying SNMP and RMON strategy and configurations including, probe information as applicable, management IP addressing, community strings, MIBS, traps, and respective active / passive alert thresholds.

B. Ethernet Edge Switches

Ensure that the ITS network administrator will be able to manage each Ethernet edge switch individually or as a group / cluster for switch configuration, performance monitoring, and troubleshooting. Note that these requirements stipulate additional minimum management intelligence (i.e., Layer 2+) typical of most current industrial Ethernet deployments. Ensure that the Ethernet edge switches include Layer 2+ capability providing architecture standardization, open connectivity (i.e., interoperability), bandwidth management, rate limiting, security filtering, and general integration management of an advanced Ethernet switching architecture.

Ensure that all project IP addresses and VLAN IDs are statically assigned. Ensure As-Constructed Drawings include the identification of all IP addresses, VLANs, and associated hardware devices and device locations.

Mount the Ethernet edge switches securely inside each ITS device cabinet in the communications rack or on a vertical rail. Ensure that the Ethernet edge switches are resistant to all electromagnetic interference (EMI). Ensure that the Ethernet edge switches are is fully accessible by field technicians without blocking access to other equipment. Verify that fiber-optic jumpers consist of a length of cable that is connectorized on both ends, primarily used for interconnecting termination or patching facilities and/or equipment. Use fiber-optic jumpers that are factory assembled and connectorized and are certified by the fiber-optic jumpers' manufacturer to meet the relevant performance standards required below. Verify that network / field / data jumper cables meet all ANSI/EIA/TIA requirements for Category 6 4-pair unshielded twisted pair cabling with stranded conductors and RJ45 connectors.

12.4. MEASUREMENT AND PAYMENT

The switches include all appropriate ports, cabling, grounding, redundancies, labeling, and any integration between the switches and the communications network as necessary to make a fully working installation. For furnish and install and for furnish only materials, all power supplies, power cords, adapters, mounting hardware, DIN rail mounting brackets, DIN rails, connectors, serial cables, signs, decals, disconnect switches, installation materials, and configuration software necessary to complete this work, will be included and will be incidental.

MVD Terminal Server Assembly will be measured and paid as the actual number of MVD Terminal Server Assemblies furnished, installed, and accepted. No separate measurement will be made for fiber-optic ports modules. No separate measurement will be made of Ethernet patch panels as they will be considered incidental to furnishing and installing the server assembly.

Ethernet edge switch will be measured and paid as the actual number of Ethernet edge switches furnished, installed, and accepted.

Payment will be made under:

MVD TERMINAL SERVER ASSEMBLY..... Each

ETHERNET EDGE SWITCH..... Each

13. SUBMITTAL DATA AND DOCUMENTATION

13.1. DESCRIPTION

Provide project submittal data and documentation as described below:

13.2. SUBMITTALS

A. General

Comply with the Department's Submittal Guidelines. All written documentation shall be either 11" x 17" or 8½" x 11" format. No documentation may be smaller or larger than these formats. Except for standard bound manuals, bind all 8½" x 11" documentation, including 11" x 17" drawings folded to 8½" x 11", in logical groupings in either 3-ring or plastic slide-ring loose-leaf binders. Permanently label each grouping of documentation.

All materials and equipment used on the project shall be submitted for review and approval prior to use on the project. Items on the Department's QPL will be approved by manufacturer and part number reference. Items not on the Department's QPL shall have catalog cut sheets submitted and approved that verify compliance with the 2012 *Standard Specifications for Roads and Structures*, *Standard Roadway Drawings*, ITS Standard Details and the Special Provisions. All submittals shall be reviewed and approved by the Department. Absence of comment will not grant approval.

B. Qualified Products

The Qualified Products List (QPL) is available on the Department's Website. Certain signal and communications equipment, material, and hardware shall be pre-approved on the QPL by the date of installation. Equipment, material, and hardware not pre- approved when required will not be allowed for use on the project. Consult the QPL Website to obtain pre-approval procedures.

C. Submittal Requirements

Provide certification to the Department that all Contractor-furnished material is in accordance with the Special Provisions. When requested by the Department, provide additional certifications from independent testing laboratories and sufficient data to verify item meets applicable specifications. Ensure additional certification states that the testing laboratory is independent of the material manufacturer and neither the laboratory nor the manufacturer has a vested interest in the other.

The intent of submittals is to show completely the materials meet the requirements of the plans and Special Provisions and how the Contractor intends to construct or configure the materials. The Contractor shall clearly demonstrate in the submittals that the desired materials shall meet or exceed the requirements of the plans and Special Provisions. Each submittal shall be sufficiently complete and detailed for the Department to review and accept. For submittals with surge protection devices (SPDs), the submittal shall include a block diagram that clearly indicates the purpose of each SPD (data, power, comms, etc.) and the placement of the SPD in the path of data / power flow. If the Department deems that the submittal is insufficient in detail or completeness for review or acceptance, the submittal will be returned for corrections. Additional time and / or compensation shall not be granted for re-submittals.

Before material submittal data begins, provide to the Department for review and approval a list of all submittals with approximate dates of submission that the Contractor intends to make. It is incumbent upon the Contractor to schedule reviews in a timely manner that will not delay their schedule.

Certain groups of materials are related in function and operate as a subsystem together. To ensure individual and subsystem compliance with the project requirements materials shall be submitted as packages as follows:

Submittal Package	Description
Testing Plans	Detailed test plans, procedures and testing schedule
Electrical	UPS, meter bases, disconnects
Field Equipment Cabinets	Cabinet layout and wiring diagrams
Communications Hardware	Ethernet edge switches
Metal Poles	MVD pole shop drawings and foundation design, CCTV pole shop drawings and foundation design
Field Infrastructure	Fiber optic cable, conduit, risers, junction boxes, heavy-duty junction boxes/cabinets, misc. hardware
MVDS	Detector unit, vendor software, cabling
CCTV	CCTV camera, cabling

Submit cabinet layout and wiring diagrams for all cabinets.

Identify all proprietary parts in furnished material. The Department reserves the right to reject material that uses proprietary components not commercially available through electronic supply houses.

For furnished material listed on the QPL, furnish submittals in the format defined by the QPL.

For furnished material not on the QPL, furnish the equipment list including catalog cuts. Identify proposed material on catalog cuts by a reproducible means. Ensure material lists contain material description, brand name, manufacturer's address and telephone number, stock number, size, identifying trademark or symbol, and other appropriate ratings. For submittals showing a variety of models and parts available from the manufacturer, clearly identify by circles, marking or other means the specific materials for which approval is requested.

Submittal acceptance will be granted only to specific materials; do not deviate from what is accepted without approval by the Department. Do not fabricate or order material until receipt of the Department's acceptance. All submittals will be returned as either "Accepted (AC)" (as submitted), "Accepted as Noted (AN)" or "Returned for Correction (RC)". The Contractor may proceed with fabrication or ordering for items marked "Accepted". If an item is marked "Accepted as Noted" without any stipulation for re-submittal, then the Contractor may proceed with fabrication or ordering. For any other notations, the Contractor shall revise the submittal, address comments and resubmit for acceptance.

D. Documentation

In addition to the requirements in Section 109 of the 2012 *Standard Specifications for Roads and Structures*, furnish to the Department two copies of the following materials prior to acceptance: warranty materials, and serial and model numbers of all equipment furnished. All equipment and appurtenances shall be furnished and identified by name, model number, serial number, technical support, and warranty telephone numbers, and any other pertinent information required to facilitate equipment maintenance. Provide all configuration data for each device in electronic and printed form.

E. As-Built Plans

Provide coordinately correct electronic As-Built Plans, in MicroStation format, for all conduit system infrastructures, including but not limited to junction boxes. Provide a tabular list of all GPS coordinate data, in Microsoft Excel® format, including but not limited to point data for each junction box and conduit run location points at a maximum ten-foot spacing.

13.3. MEASUREMENT AND PAYMENT

There will be no direct payment for work covered in this section. Payment at the contract unit prices for the various items in the contract will be full compensation for all work covered by this section.

14. TRAINING

14.1. DESCRIPTION

Provide training for the installation, operation, and maintenance of:

a. MVDS
b. Communications hardware
c. CCTVs

The Department will consider waiving certain sections of training if the equipment provided as a part of the project is identical or similar to equipment provided as a part of the Triangle Expressway (Toll NC 540) project.

14.2. MATERIALS

A. General

Provide training in the installation, operation, maintenance, troubleshooting and repair of all equipment and software. Prepare training outline, agenda, training manuals, training exercises, instructor resumes and any other teaching aids for approval by the Department. For exercises requiring computers, furnish enough computers to have one computer per two students.

Provide draft training material to the Department for review and approval at least 60 days prior to the scheduled training. Provide adequate time for review and revision of the draft training materials. Furnish audio-visual equipment, demonstration equipment, and "hands-on" equipment in support of the envisioned training. Each training participant shall receive a copy of course materials including both comprehensive and presentation manuals. Assume there will be 12-15 students in the class. Provide two additional copies of these documents to the Department.
Utilize training personnel well versed in the subject matter and with extensive field experience dealing with real world problems. Utilize training personnel that have been certified by the respective manufacturers.
Video record the entire training on digital video disc (DVD) and provide the DVD(s) to the Department for later use.
The training shall be conducted locally after the completion of all system integration tests. The Department shall provide the training facility. Provide the Department with a 30-day notification to carry out the training so that arrangements can be made for attendance. Coordinate a mutually agreeable date, time, and location with the Department. The Engineer shall approve the training schedule time and location.
Develop the course content specifically for the products supplied for this project. The course shall include the following topics:
• Introductory-level briefing to familiarize attendees
• Terminology
• Theory of operation
• Installation
• Hardware and software configuration
• Operating procedures and capabilities
• Testing, diagnostics and troubleshooting
• Software applications
• Use of the system documentation to operate, diagnose, maintain, and expand the system
• “Hands-on” use of the system, laptop computer and software, system test equipment, and any other system equipment supplied
Provide course lengths and specific training described below:

B. MVDS

Provide two sessions in the basic theory and operation of the MVDS detectors, cabinets, and other related equipment. Include in this training lecture and hands-on exercise in the use of the MVDS software.

The training shall include the following sessions specific to the MVDS detectors:

Course	Type of Training	Length (Days)
Operations	Lecture	1
System overview / theory of operation	Lecture, Demonstration	
System software	Lecture, Demonstration	

Maintenance	Lecture	1
Routine maintenance, troubleshooting, testing and calibrating	Lecture, Demonstration and Hands-on	

C. CCTV

Provide training for the CCTV field equipment & local CCTV camera software as described below:

Course	Type of Training	Length (Days)
Operations	Lecture	1
Theory of operation	Lecture, Demonstration	
Local camera programming	Lecture, Demonstration and Hand-on	
Camera addresses, presets, privacy zones, tours, other features		
Maintenance	Lecture	
Routine maintenance, troubleshooting, testing and calibrating	Lecture, Demonstration and Hands-on	

D. Communications Hardware

Provide training for the Ethernet communications hardware as described below:

Course	Type of Training	Length (Days)
Ethernet Switches		1
Introduction	Lecture	
Configuration and programming	Lecture	
Review of Maintenance Manual	Lecture and Hands-on	
Review of Operations Manual	Lecture and Hands-on	
Maintenance	Lecture, Demonstration and Hands-on	
Routine, troubleshooting procedures, testing, system restart and recovery		
Question and answer session		

14.3. MEASUREMENT AND PAYMENT

Lump sum for training with training packages completed and accepted.

Payment will be made under:

Generic Signal Item (Training).....Lump Sum

15. RELOCATION OF EXISTING ITS DEVICES

15.1. DESCRIPTION

Relocate CCTV-8 as shown on the plans. If cables and connectors are damaged during dismantling and relocating CCTV-8, the contractor must replace damaged equipment with new equipment at no additional cost to the Department.

CCTV-8

Dismantle and relocate one existing CCTV camera in accordance with these Project Special Provisions and as indicated in the Plans. Use the existing metal pole, pole mounted equipment cabinet and all existing equipment contained inside the equipment cabinet.

15.2. MATERIALS

GENERAL

Install all necessary cable, connectors and incidental hardware to make a complete and operable system. Reuse all existing hardware for attaching ITS devices to their pole/structure. All equipment on the pole/structure must be protected by grounded metal oxide varistors connecting each power and control conductor to ground as outlined elsewhere in these Special Provisions.

15.3. CONSTRUCTION METHODS

CCTV-8

Before significant construction starts in proximity to the existing CCTV-8, the Contractor shall relocate the CCTV-8 camera, pole, cabinet, and ancillary equipment to a new foundation at the location indicated in the Plans. After all junction boxes, conduits, and fiber-optic cable has been installed, the Contractor shall perform the switchover of the CCTV assembly with a 48-hour period that starts no earlier than midnight Friday and ends no later than midnight Sunday. The Contractor shall coordinate the switchover with the Department and provide a minimum of 2 weeks' notice for performing the switchover work.

Ground all equipment as called for in the Standard Specifications, these Special Provisions, and NCTA grounding details. Install surge protectors on all ungrounded conductors entering the CCTV enclosure. House the protectors in the CCTV equipment cabinet in a manner approved by the Engineer. The air terminal ground wire must not pass through this cabinet.

15.4. MEASUREMENT AND PAYMENT

Relocate CCTV assembly will be measured and paid in actual number of CCTV assemblies relocated, installed, integrated, and accepted. No separate measurement will be made for cabling, connectors, CCTV camera attachment assemblies, relocation of the existing field equipment cabinet, conduit, condulets, grounding equipment, surge protectors, or any other equipment or labor required to relocate and install the CCTV assembly and integrate it with the existing CCTV camera system as these will be considered incidental to relocating the CCTB assembly.

Payment will be made under:

Relocate CCTV Assembly ..... Each

16. REMOVAL OF EXISTING ITS DEVICES

16.1. DESCRIPTION

Remove RWIS as shown on the plans.

RWIS

Disconnect and remove one existing RWIS assembly in accordance with these Project Special Provisions and as indicated in the Plans.

16.2. MATERIALS

GENERAL

Disconnect, remove, and dispose of RWIS assembly and all associated equipment including hardware, pole, cable, connectors, incidental hardware, and electrical service.

16.3. CONSTRUCTION METHODS

RWIS

Before significant construction starts in proximity to the existing RWIS, the Contractor shall disconnect, remove, and dispose of the RWIS equipment, pole, cabinet, ancillary equipment, and electrical service as indicated in the Plans.

16.4. MEASUREMENT AND PAYMENT

Remove RWIS assembly will be measured and paid in actual number of RWIS assemblies disconnected, removed, and disposed. No separate measurement will be made for removal of associated cabling, connectors, cabinets, conduit, condulets, electrical service, grounding equipment,

surge protectors, or any other equipment or labor required to remove and dispose of the RWIS assembly as this will be considered incidental to removing the RWIS assembly.

Payment will be made under:

Remove RWIS Assembly ..... Each

17. TESTING AND ACCEPTANCE

17.1. GENERAL

Identify the test organization including the roles and responsibilities of the quality assurance organization. For each piece of equipment that requires testing, a test plan shall delineate the following:

- Test procedures with test values and desired outcomes
- Submittal schedule of test procedures
- Start time of each level of testing
- Test duration including any re-tests that are required or anticipated
- Submittal of the completed and signed off test report
- Revisions to the test plan shall be provided to the Department monthly

All testing shall be performed by the Contractor and will be observed by the Engineer. The Engineer may perform additional testing at any time during the project.

Conduct and successfully complete the following progressive series of tests before acceptance: factory acceptance testing, field demonstration test prior to installation, installed standalone device tests, system test of the network hardware, management software and an observation period. Develop a comprehensive series of test plans for each device to determine the equipment was correctly installed and meets the requirements of materials, workmanship, performance, and functionality required in the plans and these Special Provisions. The test plans shall describe the functions to be tested, purpose of test, setup requirements, procedures to be followed, any inputs and expected outputs for each test, criteria for pass / fail and any required tools or test equipment. Any software testers shall be pre-approved by the Department.

Develop as part of the test plan a traceability matrix of all the individual subsystem functional requirements to be used to cross-reference each planned test to a specific contract requirement to be verified. This Test Evaluation / Traceability Matrix shall be used by the Engineer to crosscheck the functional requirements and the results.

A key element of test plans, where appropriate, shall be the introduction of forced errors into the functional test. The test plan shall check the actual result of the forced error against the

anticipated result. Tests shall be performed by the Contractor and witnessed by the Department. No deviation from the approved test procedure shall be permitted without approval from the Engineer. Any changes to the approved test procedure to accommodate unforeseen events during the time of testing shall be documented in the master test procedure. Immediately following the conclusion of each test, the Department and the Contractor shall meet to agree on the results observed and recorded during the testing. This shall form the basis for the conclusions reported in the test plan. All test results, notes, and observations shall be maintained in electronic form. Maintain complete records of all test results during all stages of testing.

17.2. FACTORY ACCEPTANCE TESTING (FAT)

Conduct a factory acceptance test in the presence of the Engineer to verify to the Department that all design, materials, and performance requirements for this project are satisfactorily met. Perform the factory acceptance tests at the equipment manufacturer's facility or at an independent testing laboratory.

17.3. PRE-INSTALLATION FIELD DEMONSTRATION TESTING (FDT)

A. General

Conduct pre-installation tests on all devices at a Contractor-provided facility within Wake County. Perform the tests on all components supplied to verify that no damage was done to any unit during the shipment and delivery process. Notify the Engineer a minimum of 15 calendar days before the start of any tests. Conduct all tests according to the approved test procedures detailed in this section. Each device shall pass the individual tests detailed below prior to installation. Existing equipment that is being relocated shall be subject to pre-testing; after acceptance of the existing condition by the Engineer, the Contractor shall maintain the equipment until the project is accepted.

1. Product Examination Test

Examine each device carefully to verify that the materials, design, construction, markings and workmanship comply with all applicable standards, specifications and requirements. Perform the following tests as a minimum:

- Verify that all surfaces are free of dents, scratches, weld burns, or abrasions
- Round sharp edges and corners
- Verify bend radius of cables is not excessive or could potentially cause damage
- Verify all modules, lamps and components are properly secured
- Verify that there are no exposed live terminals

2. Continuity Test Specifications

Check the wiring to determine conformance with the applicable standards, specifications and requirements.

3. Operational Test Specifications

Operate each device long enough to permit equipment temperature stabilization, and to check and record an adequate number of performance characteristics to ensure compliance with applicable standards, specifications and requirements.

4. Preinstallation Test Failure Consequence

If any unit fails to pass a FDT, the unit shall be corrected or another unit substituted in its place, and the test successfully repeated.

If a unit has been modified because of an FDT failure, prepare a report and deliver that report to the Engineer prior to the unit's shipment. The report shall describe the nature of the failure and the corrective action taken.

If a failure pattern develops (more than two failures), the Engineer will make a determination of the disposition of the failed equipment without additional cost to the Department or an extension of the contract period.

B. Microwave Vehicle Detectors

Subject the MVDS to field demonstration tests as follows:

- Use a laptop computer provided as part of the support equipment to configure the installation
- Install the MVDS sensor at the site for test setup
- Verify that configuration data is stored in nonvolatile memory
- Download previously stored configuration data
- Verify that vehicles traveling at the test site can be detected across multiple travel lanes to the accuracy specified herein
- Drive a test car of known length and speed through the detection zone. Compare the output from the vehicle detector to this known value to verify the accuracy of detection. Repeat this measurement at least 10 times
- Verify the volume counts and speed measurements for each MVDS using the test software running on the laptop computer connected locally to the detector's EIA-232/485 communication port. Verify the accuracy of traffic parameters specified herein by using permanent or temporary traffic detection devices of known accuracy

17.4. INSTALLED SITE TESTS

A. General

Conduct an approved, installed standalone device installation test at the field site. Test all standalone functions of the field devices using equipment installed as detailed in the plans developed by the Contractor, or as directed by the Engineer.

Complete approved test plan forms and turn them over to the Engineer for review as a basis for rejection or acceptance. Provide a minimum notice of 30 calendar days prior to all tests to permit the Engineer or his representative to observe each test.

If any unit fails to pass its stand-alone test, correct the unit or substitute another unit in its place, then repeat the test.

If a unit has been modified because of a standalone test failure, prepare a report describing the nature of the failure and the corrective action taken and deliver it to the Engineer prior to re-testing the unit. If a failure pattern develops, the Engineer may direct that design and construction modifications be made to all units without additional cost to the Department or an extension of the contract period.

Utilize vendor supplied device software to perform diagnostic tests of each device. The vendor supplied diagnostic software shall be provided to the Department before final acceptance. Test the following features of each competent as described below.

B. Conduit

Prepare and submit written test procedures for conduit system tests to be performed. Provide test procedures for review and approval by the Engineer before any tests are conducted. The test procedures shall follow industry standards. The testing shall demonstrate the following:

- All conduit runs are open
- Run a mandrel through each conduit to demonstrate a fully functional and clear conduit
- Junction boxes and splice boxes are installed correctly with working lids and are free of debris

The conduit system shall be tested in accordance with the testing plan and procedures developed by the Contractor and approved by the Engineer. Notify the Engineer of the proposed date, time and location of all testing a minimum of 10 calendar days in advance of the test being performed. All testing shall be performed by the Contractor and shall be observed by the Engineer. The Engineer or assignee may perform additional testing at any time during the project.

C. CCTV Camera Field Equipment

Develop an operational test plan that demonstrates all requirements of the equipment and software. Submit for approval before conducting tests.

Notify the Department at least 14 calendar days prior to the proposed date for the tests. The Department shall have the right to witness such tests, or to designate an individual or entity to witness such tests.

Perform the following installed site tests at the camera assembly field site in accordance with the test plans. A laptop computer shall provide camera control and positioning. After completing the

installation of the camera assembly, including the camera hardware, power supply, and connecting cables:

- Furnish all equipment, appliances, and labor necessary to test the installed cable and to perform the following tests before any connections are made
- Verify that physical construction has been completed
- Inspect the quality and tightness of ground and surge protector connections
- Check the power supply voltages and outputs
- Connect devices to the power sources
- Verify installation of specified cables and connections between the camera, PTZ, camera control receiver and control cabinet
- Perform the CCTV camera assembly manufacturer's initial power-on test in accordance with the manufacturer's recommendation
- Set the camera control address
- Verify the presence and quality of the video image with a portable NTSC-approved monitor
- Exercise the pan, tilt, zoom, focus, iris opening, and manual iris control selections, and the operation, preset positioning, and power on / off functions
- Demonstrate the pan and tilt speeds and extent of movement to meet all applicable standards, specifications, and requirements
- Verify proper voltage of all power supplies

Repair or replace defective or failed equipment and retest.

D. MVDS Detectors

Inspect the MVDS field components to ensure proper installation and cable termination.

Adjust and verify the detector settings by comparing each sensor's recorded traffic volumes and speed with those actually observed. Remotely repeat this test from the TMC. Verify the accuracy of traffic parameters using permanent or temporary traffic detection methods or devices of known accuracy.

Conduct the installed field tests detailed below. The Contractor shall furnish all equipment, appliances and labor necessary to test the installed MVDS and the network communication device, and to perform the following tests before any connections are made:

- Perform a continuity test on the detector cables to ensure that anomalies, such as openings, shorts, crimps or defects, are not present
- Perform continuity tests on the detector's stranded conductors using a meter having a minimum input resistance of 20,000 Ω per volt and show that each conductor has a resistance of not more than that specified by the wire/cable manufacturer
- Measure the insulation resistance between isolated conductors and between each conductor, ground, and shield using a meter designed for measuring insulation resistance. The resistance shall be greater than 100 MΩ. Perform all resistance testing after final termination and cable installation, but prior to the connection of any electronic or field devices

- Replace any cable that fails to meet these parameters, or if any testing reveals defects in the cable, and retest new cable as specified in this section.

Furnish and calibrate all test equipment. Demonstrate the following after installation of the MVDS, other hardware, power supplies and connecting cables:

- Verify that physical construction has been completed as specified in the plans developed by the Contractor
- Inspect the quality and tightness of ground and surge protector connections
- Check power supply voltages and outputs
- Verify that device connections to power sources are as specified in the plans
- Verify that the installation of specified cables and connections between all detectors and the field cabinet are as specified in the plans
- Demonstrate that the remote system is fully operational and performing all specified types of detection, including data storage functions, with a laptop computer
- Verify detector accuracy by conducting sample ground counts using test intervals of 10 minutes and 100 vehicles as described in the field demonstration test

17.5. OBSERVATION PERIOD

A. General

The Department shall observe all equipment and software operation according to the requirements of the Special Provisions for a single 60-day system observation period for all subsystems simultaneously. The observation period shall not begin until all subsystems are ready.

The observation period shall begin at project final acceptance. A successful 60-day observation period shall consist of continuous operation with no more than a total of two calendar days of non-operation due to mechanical, electrical, or other malfunctions of the CCTV camera and / or MVDS subsystems.

During the observation period, respond to failures of the Contractor's equipment within two hours and make repairs within eight hours. For items that pose a traffic safety hazard, complete repairs within four hours. If any failures affect major components for more than 48 hours, the Department shall suspend the observation period beginning when the failure occurred. Resume the observation period with the approval of the Engineer after successful repair or replacement. If three or more major component failures of a like nature occur, the Department shall terminate the observation period. Begin a new 60-day observation period with the approval of the Engineer after the faulty equipment has been repaired or replaced.

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PROJECT SPECIAL PROVISIONS
CULVERT

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Bruce D Klappenbach
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10/30/2017

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PROJECT SPECIAL PROVISIONS
CULVERT

OPTIONAL PRECAST REINFORCED CONCRETE BOX CULVERT AT STATION 83+04.00 -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

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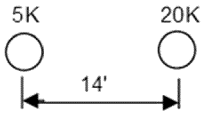
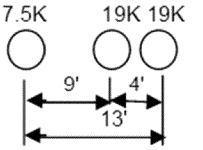
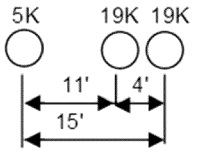
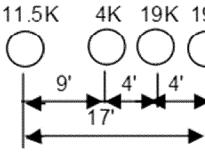
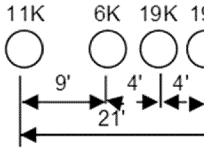
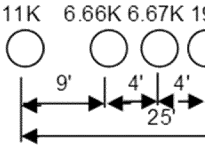
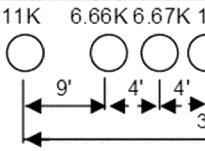
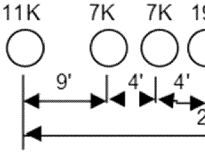
SH		25K 12.5 TON
S3A		45.5K 22.75 TON
S3C		43K 21.5 TON
S4A		53.5K 26.75 TON
S5A		61K 30.5 TON
S6A		69K 34.5 TON
S7A		80K 40 TON
S7B		77K 38.5 TON

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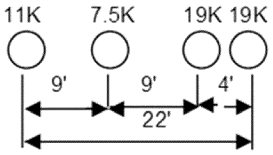
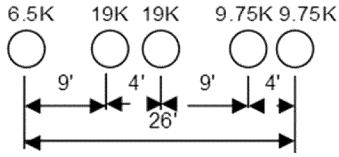
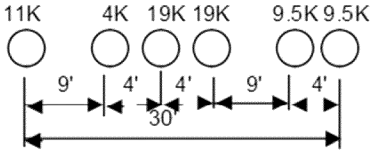
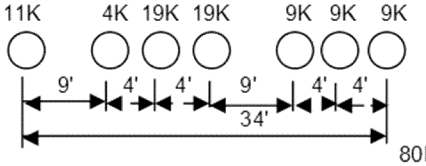
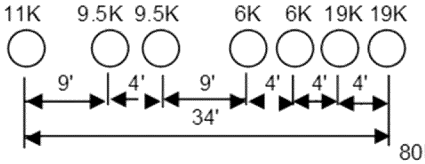
T4A		56.5K 28.25 TON
T5B		64K 32 TON
T6A		72K 36 TON
T7A		80K 40 TON
T7B		80K 40 TON

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

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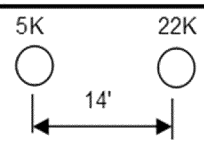
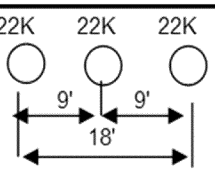
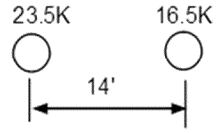
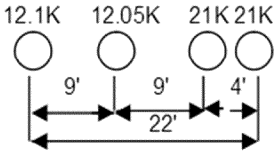
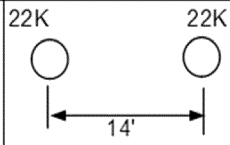
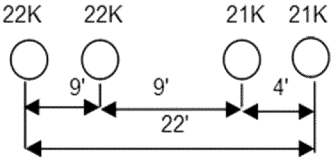
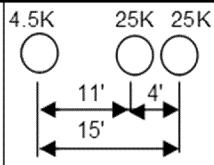
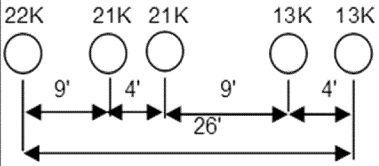
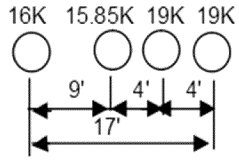
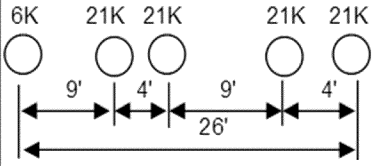
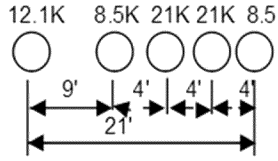
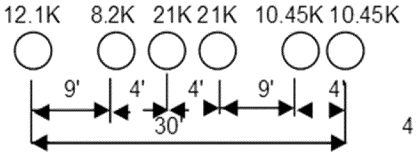
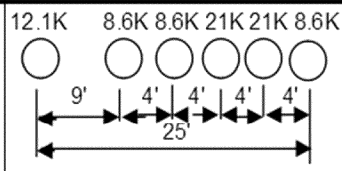
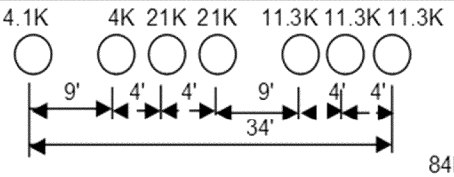
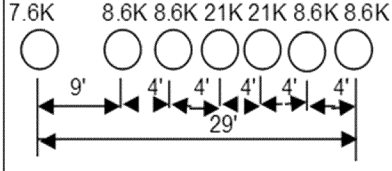
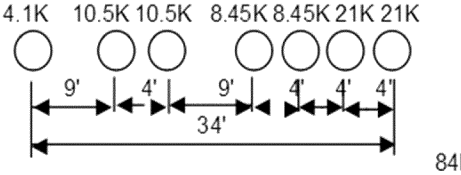
SNSH		27K 13.5 TON	TNAGRIT3		66K 33 Ton
SNGARBS2		40K 20 TON	TNT4A		66.15K 33.075 TON
SNAGRIS2		44K 22 Ton	TNAGRIT4		86K 43 TON
SNCOTTS3		54.5K 27.25 TON	TNAGT5A		90K 45 TON
SNAGGRS4		69.85K 34.925 TON	TNAGT5B		90K 45 TON
SNS5A		71.1K 35.55 TON	TNT6A		83.2K 41.6 TON
SNS6A		79.9K 39.95 TON	TNT7A		84K 42 TON
SNS7B		84K 42 TON	TNT7B		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

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shop drawings submitted for review. The external joint wrap shall be installed in pieces, as indicated on Figure 1 below:

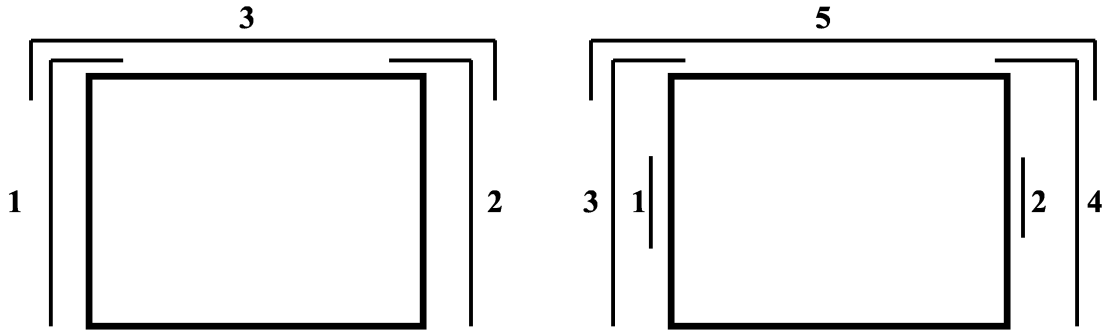

Figure 1

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).

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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 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.

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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.

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

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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.

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.

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.

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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.

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

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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.

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.

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Design falsework and formwork requiring submittals in accordance with the 1995 AASHTO *Guide Design Specifications for Bridge Temporary Works* except as noted herein.

1. Wind Loads

   Table 2.2 of Article 2.2.5.1 is modified to include wind velocities up to 110 mph. In addition, Table 2.2A is included to provide the maximum wind speeds by county in North Carolina.

Table 2.2 - Wind Pressure Values

Height Zone feet above ground	Pressure, lb/ft^2 for Indicated Wind Velocity, mph				
	70	80	90	100	110
0 to 30	15	20	25	30	35
30 to 50	20	25	30	35	40
50 to 100	25	30	35	40	45
over 100	30	35	40	45	50

2. Time of Removal

   The following requirements replace those of Article 3.4.8.2.

   Do not remove forms until the concrete has attained strengths required in Article 420-16 of the Standard Specifications and these Special Provisions.

   Do not remove forms until the concrete has sufficient strength to prevent damage to the surface.

Table 2.2A - Steady State Maximum Wind Speeds by Counties in North Carolina

COUNTY	25 YR (mph)	COUNTY	25 YR (mph)	COUNTY	25 YR (mph)
Alamance	70	Franklin	70	Pamlico	100
Alexander	70	Gaston	70	Pasquotank	100
Alleghany	70	Gates	90	Pender	100
Anson	70	Graham	80	Perquimans	100
Ashe	70	Granville	70	Person	70
Avery	70	Greene	80	Pitt	90
Beaufort	100	Guilford	70	Polk	80
Bertie	90	Halifax	80	Randolph	70

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Bladen	90	Harnett	70	Richmond	70
Brunswick	100	Haywood	80	Robeson	80
Buncombe	80	Henderson	80	Rockingham	70
Burke	70	Hertford	90	Rowan	70
Cabarrus	70	Hoke	70	Rutherford	70
Caldwell	70	Hyde	110	Sampson	90
Camden	100	Iredell	70	Scotland	70
Carteret	110	Jackson	80	Stanley	70
Caswell	70	Johnston	80	Stokes	70
Catawba	70	Jones	100	Surry	70
Cherokee	80	Lee	70	Swain	80
Chatham	70	Lenoir	90	Transylvania	80
Chowan	90	Lincoln	70	Tyrell	100
Clay	80	Macon	80	Union	70
Cleveland	70	Madison	80	Vance	70
Columbus	90	Martin	90	Wake	70
Craven	100	McDowell	70	Warren	70
Cumberland	80	Mecklenburg	70	Washington	100
Currituck	100	Mitchell	70	Watauga	70
Dare	110	Montgomery	70	Wayne	80
Davidson	70	Moore	70	Wilkes	70
Davie	70	Nash	80	Wilson	80
Duplin	90	New Hanover	100	Yadkin	70
Durham	70	Northampton	80	Yancey	70
Edgecombe	80	Onslow	100		
Forsyth	70	Orange	70		

B. Review and Approval

The Engineer is responsible for the review and approval of temporary works' drawings.

Submit the working drawings sufficiently in advance of proposed use to allow for their review, revision (if needed), and approval without delay to the work.

The time period for review of the working drawings does not begin until complete drawings and design calculations, when required, are received by the Engineer.

Do not start construction of any temporary work for which working drawings are required until the drawings have been approved. Such approval does not relieve the Contractor of the responsibility for the accuracy and adequacy of the working drawings.

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4.0 CONSTRUCTION REQUIREMENTS

All requirements of Section 420 of the Standard Specifications apply.

Construct temporary works in conformance with the approved working drawings. Ensure that the quality of materials and workmanship employed is consistent with that assumed in the design of the temporary works. Do not weld falsework members to any portion of the permanent structure unless approved. Show any welding to the permanent structure on the approved construction drawings.

Provide tell-tales attached to the forms and extending to the ground, or other means, for accurate measurement of falsework settlement. Make sure that the anticipated compressive settlement and/or deflection of falsework does not exceed 1 inch. For cast-in-place concrete structures, make sure that the calculated deflection of falsework flexural members does not exceed 1/240 of their span regardless of whether or not the deflection is compensated by camber strips.

A. Maintenance and Inspection

Inspect and maintain the temporary work in an acceptable condition throughout the period of its use. Certify that the manufactured devices have been maintained in a condition to allow them to safely carry their rated loads. Clearly mark each piece so that its capacity can be readily determined at the job site.

Perform an in-depth inspection of an applicable portion(s) of the temporary works, in the presence of the Engineer, not more than 24 hours prior to the beginning of each concrete placement. Inspect other temporary works at least once a month to ensure that they are functioning properly. Have a North Carolina Registered Professional Engineer inspect the cofferdams, shoring, sheathing, support of excavation structures, and support systems for load tests prior to loading.

B. Foundations

Determine the safe bearing capacity of the foundation material on which the supports for temporary works rest. If required by the Engineer, conduct load tests to verify proposed bearing capacity values that are marginal or in other high-risk situations.

The use of the foundation support values shown on the contract plans of the permanent structure is permitted if the foundations are on the same level and on the same soil as those of the permanent structure.

Allow for adequate site drainage or soil protection to prevent soil saturation and washout of the soil supporting the temporary works supports.

If piles are used, the estimation of capacities and later confirmation during construction using standard procedures based on the driving characteristics of the pile is permitted. If preferred, use load tests to confirm the estimated capacities; or, if required by the

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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.

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SUBMITTAL OF WORKING DRAWINGS (6-28-17)

5.0 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.

6.0 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:

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eomile@ncdot.gov (Emmanuel Omile)

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:

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Primary Structures Contact:	James Bolden	(919) 707 – 6408 (919) 250 –4082 facsimile 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

7.0 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 &

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			"Falsework and Formwork"
Box Culvert Falsework [7]	5	0	Plan Note, SN Sheet & "Falsework and Formwork"
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	7	0	Article 420-20

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Structures (cranes, etc.)			
Precast Concrete Box Culverts	2, then 1 reproducible	0	"Optional Precast Reinforced Concrete Box Culvert at Station ___"
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.

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3. Submittals for these items may not be required. A list of pre-approved sequences is available from the producer or the Materials & Tests Unit.
4. The fabricator may submit these items directly to the Structures Management Unit.
5. The two sets of preliminary submittals required by Article 1072-8 of the *Standard Specifications* are not required for these items.
6. Submittals for Fabrication Drawings are not required. Submittals for Catalogue Cuts of Proposed Material are required. See Section 5.A of the referenced provision.
7. Submittals are necessary only when the top slab thickness is 18" or greater.

GEOTECHNICAL SUBMITTALS

Submittal	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.

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4. Electronic copy of submittal is required. See referenced provision.

CRANE SAFETY (8-15-05)

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 regulations (OSHA).

Submit all items listed below to the Engineer prior to beginning crane operations involving critical lifts. A critical lift is defined as any lift that exceeds 75 percent of the manufacturer's crane chart capacity for the radius at which the load will be lifted or requires the use of more than one crane. 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:** **By July 1, 2006**, crane operators performing critical lifts shall be certified by NC CCO (National Commission for the Certification of Crane Operators), or satisfactorily complete the Carolinas AGC's Professional Crane Operator's Proficiency Program. Other approved nationally accredited programs will be considered upon request. All crane operators shall also have a current CDL medical card. Submit a list of anticipated critical lifts and corresponding crane operator(s). Include current certification for the 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 (9-30-11)

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, or decks. 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

Use a Department approved pre-packaged, non-shrink, non-metallic grout. Contact the Materials and Tests Unit for a list of approved pre-packaged grouts and consult the manufacturer to determine if the pre-packaged grout selected is suitable for the required application.

When using an approved pre-packaged grout, a grout mix design submittal is not required.

The grout shall be free of soluble chlorides and contain less than one percent soluble sulfate. Supply water in compliance with Article 1024-4 of the Standard Specifications.

Aggregate may be added to the mix only where recommended or permitted by the manufacturer and Engineer. The quantity and gradation of the aggregate shall be in accordance with the manufacturer's recommendations.

Admixtures, if approved by the Department, shall be used in accordance with the manufacturer's recommendations. The manufacture date shall be clearly stamped on each container. Admixtures with an expired shelf life shall not be used.

The Engineer reserves the right to reject material based on unsatisfactory performance.

Initial setting time shall not be less than 10 minutes when tested in accordance with ASTM C266.

Test the expansion and shrinkage of the grout in accordance with ASTM C1090. The grout shall expand no more than 0.2% and shall exhibit no shrinkage. Furnish a Type 4 material certification showing results of tests conducted to determine the properties listed in the Standard Specifications and to assure the material is non-shrink.

Unless required elsewhere in the contract the compressive strength at 3 days shall be at least 5000 psi. Compressive strength in the laboratory shall be determined in accordance with ASTM C109 except the test mix shall contain only water and the dry manufactured material. Compressive strength in the field will be determined by molding and testing 4" x 8" cylinders in accordance with AASHTO T22. Construction loading and traffic loading shall not be allowed until the 3 day compressive strength is achieved.

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When tested in accordance with ASTM C666, Procedure A, the durability factor of the grout shall not be less than 80.

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.

Do not place grout if the grout temperature is less than 50°F or more than 90°F or if the air temperature measured at the location of the grouting operation in the shade away from artificial heat is below 45°F.

Provide grout at a rate that permits proper handling, placing and finishing in accordance with the manufacturer's recommendations unless directed otherwise by the Engineer. Use grout free of any lumps and undispersed cement. Agitate grout continuously before placement.

Control grout delivery so the interval between placing batches in the same component does not exceed 20 minutes.

The Engineer will determine the locations to sample grout and the number and type of samples collected for field and laboratory testing. The compressive strength of the grout will be considered the average compressive strength test results of 3 cube or 2 cylinder specimens at 28 days.

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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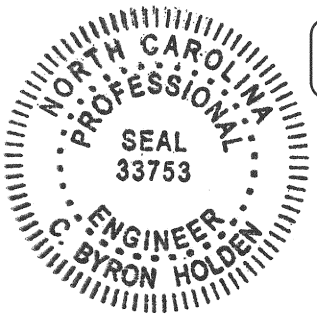

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Aesthetic Design Project Special Provisions

General

The project shall include aesthetic treatments consistent with the existing details of R-2635A/B/C. The original details are outlined in the NCTA Aesthetic Design Guidelines dated September 28, 2007.

The Contractor shall utilize details which aesthetically match the existing details for R-2635A/B/C. The Contractor shall utilize the aforementioned NCTA Aesthetic Design Guidelines provided by the Department to incorporate the details necessary for aesthetic treatments of roadways and other elements as outlined herein.

The Contractor shall consistently apply the design motif and replications of existing R-2635A/B/C aesthetic details throughout all of the proposed tolling areas, sign structures, ITS components and other roadway elements. At a minimum, the Contractor shall adhere to the following:

1. **Columns:** Columns for sign structures and toll gantries shall be detailed with the same reveal patterns as the existing structures within the R-2635A/B/C corridor. The grooves and indentations in the proposed columns shall match the existing columns.

2. **Dogwood Emblems:** The proposed dogwood emblems at overhead signs and toll gantries shall match the existing emblems. The Contractor shall replicate the emblem by reverse mold casting or other means to accurately create the new emblems.

3. **Screen Walls:** Decorative screen walls at toll system utility buildings shall be consistent with the existing facilities on the R-2635A/B/C corridor and the noise wall aesthetics illustrated in the NCTA Aesthetic Design Guidelines.

Submittals

The Contractor shall submit an Aesthetic Design Submittal to NCTA for review and approval. For each element (roadway, sign structure, gantry, etc.), the Contractor shall develop and submit any specifications, material requirements and / or construction processes needed to accomplish the aesthetic work outlined above. The submittal shall include three test panels for each type of colored concrete element on the project. At the Contractor's own risk, they may elect to use production elements as the test panels. All coloring shall be supplied by a single commercial facility to avoid potential differences in tinting machines.

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Measurement and Payment

There will be no direct payment for work covered in this section. Payment at the contract unit prices for the various items in the contract will be full compensation for all work covered by this section.

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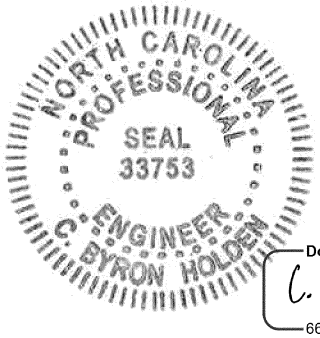

All Electronic Tolling (AET) Toll Zone Facilities Infrastructure Project Special Provisions

12/10/2017

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C. Byron Holden
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NOTE: ALL REFERENCES IN NCTA AET DETAIL DRAWINGS TO SEE THE RFP SHALL BE ADDRESSED IN THESE SPECIAL PROVISIONS.

1. 2012 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES

The 2012 Standard Specifications are revised as follows:

1.1. Polymer Concrete (PC) Junction Boxes (1091-5(B))

Page 10-202, revise paragraph starting on line 9 to read "Provide polymer concrete (PC) boxes which have bolted covers and open bottoms. Provide vertical extensions of 6" to 12" as required by project special provisions."

Page 10-202, revise sentence beginning on line 14 to read "Other thermoplastic materials may be used for components which are not normally exposed to sunlight."

1.2. Submittal Requirements (1098-1(B))

Page 10-208, replace paragraph on line 34 with the following:

Submit for approval catalog cuts and/or shop drawings for materials proposed for use on the project. Allow 40 days for review of each submittal. Do not fabricate or order material until receipt of Engineer's approval.

Submit 4 copies of each catalog cut and/or drawing and show for each component the material description, brand name, stock-number, size, rating, manufacturing specification and the intended use (identified by labeling all components with the corresponding contract line item number). Present the submittals neatly arranged in the same order as the contract bid items. Electronic submittals of catalog cuts and drawings may be accepted in lieu of hard copies.

One hard copy and an electronic (PDF) copy of reviewed submittals will be returned to the Engineer from the ITS and Signals Unit.

1.3. Junction Boxes (1098-5)

Page 10-212, sub-Section 1098-5(C) Oversized Junction Boxes

Revise sentence to read, "Provide oversized junction boxes and covers with minimum inside dimensions of 28"(l) x 15"(w) x 22"(h)."

2. ALL-ELECTRONIC TOLLING (AET) TOLL ZONE FACILITIES INFRASTRUCTURE

2.1.General

This AET Toll Zone Facilities Infrastructure Scope of Work includes fabrication, delivery and erection of gantries, AET Toll Zone Vaults, pavement, concrete pads, sidewalks, electrical work, heat, ventilation, air conditioning (HVAC) work, conduit duct banks and associated junction boxes necessary for the infrastructure of the AET tolling system.

The AET Toll Zones shall be constructed in conformance with the NCTA AET Standard Drawings and NCTA aesthetic guidelines.

The Department will enter into an agreement with a Toll Systems Integrator (TSI), to design, develop, install, test and operate the roadside toll AET equipment for the project.

The Contractor shall coordinate with the Department during construction of the AET Toll Zones to readily accommodate the TSI's components without the need for modifications and to achieve the NCTA tolling performance requirements. Some information contained within these AET Toll Zone Facilities Infrastructure Special Provisions and the NCTA AET Standard Drawings is typical and may not be applicable for the specific tolling system provided by the TSI. Any reduction, deletion, or addition of items indicated within the plan and these Special Provisions shall result in compensation adjustments in accordance with the 2012 *Standard Specifications for Roads and Structures.*

Accurate As-Built Plans shall be provided to the Department at the completion of work indicating all AET Toll Zone facilities infrastructure elements installed with accurate locations indicated.

The Contractor shall provide NCTA four (4) sets of keys to all doors and cabinets.

The Contractor shall provide NCTA a binder containing equipment installation / maintenance manuals, warranty information, etc. for all installed equipment. Provide electronic copies of this material on CD or DVD with the aforementioned binder.

Construction drawings, As-Builts Plans, details, and specifications described within these Special Provisions shall be the responsibility of the Contractor, unless noted otherwise. Provide all details and plans consistent with industry standards and professional requirements.

2.2.AET Toll Zone Locations

Locate each AET Toll Zone at the locations indicated in the plans.

Construction shall ensure that surface stormwater shall be directed away from all in-ground junction boxes and equipment pads.

2.3.AET Toll Zone Vault

A. Location

Locate the AET Toll Zone Vault at the location indicated in the plans.

Do not install equipment and utilities not specifically required for the AET Toll Zone Vaults, including utility pipes, wiring, cabling, ductwork or other electrical equipment within, through, or under the AET Toll Zone Vault.

B. General Configuration

Design, engineer, fabricate and erect an AET Toll Zone Vault for each AET Toll Zone as shown in the NCTA AET Standard Drawings. The AET Toll Zone Vault shall house ITS equipment and roadside toll collection equipment (provided by the TSI).

Provide AET Toll Zone Vaults of pre-cast concrete construction that is aesthetically consistent with the existing vaults on the Triangle Expressway (Toll NC 540). Steel, masonry and / or wood construction will not be allowed. Provide solid reinforced concrete walls/ceiling for the structure. Provide durable, watertight, secure, AET Toll Zone Vaults requiring minimal maintenance. Provide a roofing system with a minimum 20-year warranty. Residential type shingles will not be allowed. Paint the exterior of the vault with a color consistent with existing nearby vaults on the Triangle Expressway. Submit the choice of paint type and color to NCTA for approval.

Size of the AET Toll Zone Vault to meet constraints shown in the NCTA AET Standard Drawings. Design Ceiling height to be not less than 9 feet as measured from the finished floor elevation. The vaults shall have a minimum R-24 insulation.

AET Toll Zone Vault shall have a minimum two-hour fire rating, unless superseded by the North Carolina Fire Code standards. Provide a 10 pound Class ABC fire extinguisher rated for the size of the AET Toll Zone Vault mounted at the entrance wall.

The AET Toll Zone Vault shall be watertight and not allow water intrusion in extreme weather conditions. All conduit and utility penetrations shall be sealed watertight. The Contractor shall test the AET Toll Zone Vault upon completion to verify the entire assembly is watertight.

C. Architectural Plans

Prepare an architectural plans package for the AET Toll Zone Vaults, to include the Architectural, Structural, Electrical, HVAC and Mechanical Plans, finish schedule and other documents necessary for a complete turnkey construction of the AET Toll Zone Vaults. Submit design calculations including structural, foundations, HVAC and electrical calculations for all components of the AET Toll Zone Vault with plans. A professional engineer registered in the state of North Carolina shall seal all designs, plans and calculations. Design AET Toll Zone Vaults to meet all zoning code requirements. Prepare the AET Toll Zone Vault plans and designs in accordance with the North Carolina Building Code, latest edition. Provide facility plans that are accurate, legible, and complete in design, drawn to appropriate scales and furnished in reproducible form. Obtain all required permits to construct and occupy the AET Toll Zone Vaults.

D. HVAC

Furnish AET Toll Zone Vaults with one HVAC unit. The Contractor shall design the HVAC system in coordination with the TSI. Current heat load requirements provided by the TSI require a minimum of a 1½ ton HVAC unit. These load requirements are based upon anticipated toll collection and ITS equipment. Actual heat loads to be used in design of the HVAC system shall be confirmed with the TSI.

Provide a dual set point (heat and cool) thermostat and install heating and cooling ducts to minimize interference with wall surface area and conflicts with electrical and communication conduits, cable trays, and cabling.

Provide method of routing condensate away from base of building.

E. Doors

Provide exterior access doors that swing outward following the NCTA AET Standard Drawings. Provide exterior doors constructed of steel with steel frames. Design and install exterior door, including hollow door jamb, to accommodate future access-control keypads and proximity card readers, which will be installed by the TSI. Provide keyed door locks for interim / back-up security. Provide a universal key that accesses all locks. Provide door construction to suitably protect, seal, and prevent the ingress of water, moisture, dust, gases and wind-driven rain into the AET Toll Zone Vaults.

Doors, frames and hardware shall be extra heavy duty, full flush as defined in SDI A250.8 and shall have a minimum two-hour fire rating in accordance with ANSI/UL 10C, "Positive Pressure Fire Tests of Door Assemblies", unless superseded by the North Carolina Fire Code Standards.

Additionally, the doors to the AET Toll Zone Vault shall be unobstructed such that a vehicle or portable lift could access the AET Toll Zone Vault.

F. Interior Finishes

Provide interior walls and ceiling fully sealed and painted with a durable high quality paint. The interior finish color shall be high, bright white semi-gloss. Provide industrial anti-static non-slip tile or an epoxy flooring material.

G. Lighting

Provide interior lighting consisting of T8 industrial fluorescent lighting fixtures with wall mounted occupancy sensor and manual on / off. Provide a minimum 50 foot-candles of illumination at a 30-inch work plane. Provide battery operated backup emergency packs with integral halogen heads at entrance / exit. Provide lighting point-by-point calculations for interior lighting as part of Architectural Plan submittal.

Provide motion sensor control, exterior lighting that provides an average maintained lighting level of 1.0 foot-candle with a uniformity ratio of 3:1 to 4:1 for the access to the AET Toll Zone Vault and the maintenance parking area. Provide full cut-off exterior lighting fixtures as defined by IESNA and that are International Dark-Sky Association (IDA) compliant. Provide lighting point-by-point calculations for exterior lighting as part of Architectural Plan submittal. Exterior lighting shall not illuminate the roadway in such a way that it would distract drivers. Exposed conduit on the exterior of the vault will not be allowed for the exterior lighting system

2.4.AET Toll Zone Gantry Requirements

Fabricate, transport and erect watertight gantry structures to which the TSI will attach the tolling equipment. Gantries shall be in compliance with the AASHTO 2013 *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 6th Edition, *including the latest interim specifications.*

Construct gantry structure including scale, materials, color and finish aesthetically consistent with the applicable Aesthetic Guidelines. The front façade or paneling of the gantry shall conceal all AET Toll Zone tolling equipment (to the extent possible without impairing the tolling accuracy) and cabling from on-coming traffic and shall present a straight and clean visual appearance, which shall not be detracted from by tolling equipment.

Construct an equipment-mounting frame and cantilevered overhead scanner (also known as an AVC [Automatic Vehicle Classifier] or as a profiler) frame as shown in the plans and NCTA AET Standard Drawings to be used for the installation of the toll collection equipment.

A 12" (H) x 12" (W) divided enclosed NEMA 3R, 4, or 4X weather-tight cable tray shall be located on the top of the truss, concealed by the cladding face. A 24" x 24" x 12" enclosed NEMA 3R, 4, or 4X junction box shall be installed on the end of the cable tray to accommodate connection of the conduits extending up through the column. The extent of the cable tray is shown in the NCTA AET Standard Drawings. The cable tray shall accommodate connections where needed to facilitate the running of cables to equipment located at the lane / shoulder centers and lane / shoulder lines. Cable trays and boxes shall be grounded and bonded per NEC. The equipment mounting bar shall extend to cover all current and future lanes and paved shoulders.

All conduit, risers and cabling requirements shall be coordinated with the TSI and the Department.

Provide conduits terminating above the top of the gantry column and at the at-grade control / junction boxes at the base of the gantry as shown in the NCTA AET Standard Drawings.

Construct communications conduit connections between the conduit at the top of the column and the cable tray junction box to accommodate a minimum 18" cable bend radius. Construct

power conduit connections between the conduit at the top of the column and the cable tray junction box to accommodate a minimum 6" cable bend radius.

Aesthetic end cap treatment shall be designed for the column-top conduit / cables to be accessible for preventive or emergency maintenance.

The aesthetic treatment shall conceal all conduit and cable trays from view of approaching traffic in a manner consistent with nearby Triangle Expressway toll sites.

Locate hand-holes, stub-outs, junction boxes, or control boxes, for access to equipment cabling and electrical wiring out of view of approaching traffic.

2.5.AET Toll Zone Driveway

Provide an asphalt driveway / parking area as shown in the plans.

2.6.Foundation / Sidewalk / Concrete Maintenance Pad

As shown in the NCTA AET Standard Drawings, construct concrete pads that serve as the AET Toll Zone Vault foundation (will serve as maintenance pad, sidewalk, etc.) and equipment cabinet foundations. The AET Toll Zone Vaults and equipment cabinet foundations shall be 8-inches thick minimum. Grade site so water flows away from the AET Toll Zone Vault slab and equipment pads.

The sidewalk and pad areas shall have a brushed finish.

Locate the generator on the AET Toll Zone Vault foundation concrete pad as detailed in the NCTA AET Standard Drawings.

The AET Toll Zone Vault shall include a 6-inch high curb that separates the foundation from the adjacent parking surface. (Reference the NCTA AET Standard Drawings for additional requirements) Provide a ramp from the adjacent driveway centered on the door for loading / unloading.

2.7.Screen Wall

Design decorative screening / wall to visually shield the motorist from viewing the AET Toll Zone Vault and maintenance pad. Provide decorative screening / wall around two sides of the AET Toll Zone Vault, as shown in the NCTA AET Standard Drawings and plans. Between the wall and the AET Toll Zone Vault, provide a washed stone (or similar) surface to facilitate drainage and maintenance of conduit entering the AET Toll Zone Vault.

2.8.AET Toll Zone Conduit and Junction Boxes

Construct required conduits and cabling infrastructure necessary to establish the communications path between fiber-optic trunk line, AET Toll Zone Vaults, gantries, cabinets, and junction boxes. Install the number and size of conduits, boxes and related equipment specified in the AET plans and the NCTA AET Standard Drawings.

Ensure junction boxes are provided such that the last set of junction boxes before a conduit route enters a vault are not placed higher in elevation than the vault slab itself. This will prevent water-filled boxes from draining into the vault.

Provide an 18" reinforced concrete collar, minimum 4" thick, on all junction boxes, unless boxes are on slopes of 3:1 or steeper. Avoid placing junction boxes on such slopes wherever possible.

Install 1" conduit stubouts from loop box to paved shoulder in accordance with the Plans.

Coordinate with the Department throughout the conduit and junction box installation.

Provide separation between power and communications conduit as specified in the NCTA AET Standard Drawings.

Provide underground concrete-encased conduit duct bank when crossing new roadways. Install conduit duct banks such that there is a minimum of 18 inches of cover from pavement subgrade to the top of the duct bank. For duct bank crossings of existing roads, bore or open-cut as site conditions dictate. Trenched conduit, directional bores or jack and bore shall be in accordance with the 2012 *Standard Specifications for Roads and Structures*.

Terminate conduit through the floor slab of AET Toll Zone Vaults above finished floor elevation.

Furnish conduits stubbed out at all concrete pads with plastic bushings (or comparable material) to prevent cables from being damaged when being pulled through conduits or shifting during use. Clearly label each end of the conduits and include conduit plugs, pull line in each conduit, and tracer wire (if needed) per Article 1091-3 of the 2012 *Standard Specifications for Roads and Structures*.

Provide galvanized metallic conduit in above ground installations.

2.9.Electrical

Provide electrical service to the AET Toll Zone Vault.

- Electrical service to the AET Toll Zone Vault shall be 120/240V single-phase service.

- Provide an operating voltage of 120/240V, at a minimum, 200 amps, unless otherwise approved.
- Provide electrical power panel in a conventional NEMA 1 surface mount panel board enclosure, which supplies power to the electronic toll equipment.
- Provide, at a minimum, a 200 amp Main Breaker with a minimum of 24 circuits.
- Provide, at a minimum, one (1) two-pole breaker for UPS, coordinated with the TSI and 20% installed spare breakers at 20 amps rated, at a minimum, 18K AIC.
- Provide a main ground bus bar connected to the building grounding system
- Provide a Main Distribution Panel at the AET Toll Zone T16 (Vault) to power AET Toll Zone T15.

Provide electrical subpanels at AET Toll Zone T15 site as shown in the AET Standard Drawings. Run UPS and raw power electrical conductors from AET Toll Zone T16 to AET Toll Zone T15 as shown in the ITS Plans. One 350 MCM sized 4-Wire Conductor shall be installed for raw power and shall be terminated in the subpanel. One 350 MCM sized 4-Wire Conductor shall be installed for UPS power, coiled at both ends and not terminated in the subpanel.

Coordinate with the TSI and the Department in the design of the electrical loading, ampere capacity rating, circuit poles, etc. for the final power panel design.

Coordinate with the TSI and the Department to establish electrical power and communication / data service requirements for each toll gantry.

Provide building electrical power to lights, switches, receptacles, HVAC system and other infrastructure items for operating and managing the AET Toll Zone Vault.

Provide the AET Toll Zone Vaults with 125 volt rated duplex receptacles at approximately 10-foot centers at 18 inches above finished floor, as shown on the NCTA AET Standard Drawings. (Field-adjust, as needed, to accommodate the conduit risers)

Coordinate with the local utility company(ies), make application(s) in the name of NC Turnpike Authority, and pay all deposit fees to provide necessary electrical and communication services for the AET Toll Zones. The Contractor shall be responsible for all application and connection fees. The Contractor shall be responsible for any utility service installation from the power meter to the AET Toll Zone Vaults' power panels. The Contractor will not be responsible for paying the monthly power bills.

Install concrete equipment pads as shown in the AET Plans.

2.10. Grounding

Provide a master grounding system at all new and revised AET Toll Zone Vault electrical service points, unless otherwise specified. In addition to National Electrical Code (latest edition) requirements, test grounding electrode resistance at connection point to electrical service ground

bus for a maximum of 20 ohms. Furnish and install additional ground rods to grounding electrode system as necessary to meet test requirements. Submit a completed Grounding Test Results form. Provide a length of marker tape 12-inches below finished grade directly over grounding electrodes and conductors.

2.11. Lightning Protection

Design and install Lightning Protection System for the AET Toll Zone Vault and Gantries in conformance with, and certified by, the Lightning Protection Institute (L.P.I.) Installation Code LPI-175. Products shall comply with Underwriters Laboratories, Inc. Master Label Code 96A and NFPA 780. The lightning protection system installer shall submit a UL Master Label or L.P.I. system certification upon completion of the work. Design Lightning Protection System taking into account all tolling equipment to be installed on gantry. Consider equipment installed on the Triangle Expressway's Salem Street interchange ramp toll sites as indicative of equipment to be installed at these sites. Coordinate with the TSI on actual equipment to be installed.

2.12. Standby Generator

Provide standby generator to power each complete AET Toll Zone to include AET Toll Zone Vault, toll and communications equipment, video tolling cameras and lights, sensors, lighting, electrical system, security system, monitoring and HVAC systems. Supply and install a 45kW standby generator. Provide a generator disconnect as per the NCTA AET Standard Drawings.

Where toll zone configurations differ from those shown in the NCTA AET Standard Drawings, alternate sizing shall be necessary and shall be coordinated with the Department.

Provide standby generator with an automatic transfer switch designed to run after 5 seconds of power outage. Evaluate and include a method for reducing the noise impact caused by the standby generator to residences near proposed AET Toll Zone Vault location.

The standby generator shall be provided with an outdoor-rated housing and mounted on the concrete pad adjacent to the AET Toll Zone Vault with clearances as shown on the NCTA AET Standard Drawings, unless additional clearance is required by code or manufacturer's recommendation. Include a muffled exhaust system for the generator.

Provide a protective screen against rodents at the base of the generator.

2.13. Propane Tank

Provide a single propane fuel tank with a dry level sensing device (hard-wired, 4-20mA, 0-5 VCD or 0-10 VDC typical Hall Effect Transmitter) that will interface with future AET Toll Zone Vault automation system provided by others. Supply a 500 gallon propane fuel tank. Install a transfer switch to interact and directly communicate via contact closures with building automation system for critical status indications. Provide TSI with Interface Control Documents

(ICDs) as a part of construction submittals for generator, transfer switch, and propane tank to facilitate communications. Design propane fuel tank system compliant with all local, State, and Federal requirements and comply with NFPA 54, National Fuel Gas Code. The Contractor shall take measures to ensure standing water does not accumulate in access hatch.

All wiring from the building interior to the generator and the propane shall be continuous and free of splices.

After the propane tank has been delivered, installed, and connections completed, the Contractor shall fill the tank with 500 gallons of propane fuel.

2.14. Measurement and Payment

Lump Sum payment will be made for both AET Toll Zone Sites with all materials and work completed and accepted.

Work considered to be incidental to AET Toll Zone Sites are submittals, materials and installation of Toll Zone Vault (including but not limited to Architectural Plans, HVAC, Doors, Interior Finishes and Lighting), Foundation / Sidewalk / Concrete Maintenance Pad, Screen Wall (including geotextile and #57 stone for the ditch between the screen wall and vault pad), AET Toll Zone Conduit & Junction Boxes, reinforced concrete collar, Loop Stubout Conduit, Electrical service to Toll Zone Vault, Grounding system, Lightning Protection, Standby Generator and Propane Tank.

All conduit and Junction Boxes shown in the ITS plans shall be paid under separate contract line items in accordance with Divisions 17 of the 2012 *Standard Specifications for Roads and Structures*, the Plans, Contract, and Special Provisions.

Asphalt and paving materials for the AET Toll Zone Driveway shall be paid under separate contract line items in accordance with Divisions 5 and 6 of the 2012 *Standard Specifications for Roads and Structures*, the Plans, Contract, and Special Provisions.

Gantry truss shall be paid under separate contract line items in accordance with the Overhead Sign and Gantry Supports Special Provision

Concrete, drilled pier, transition footing, aesthetic column, and reinforcing steel for the Toll Zone Gantries shall be quantified and paid under separate contract line items in accordance with Division 4 of the 2012 *Standard Specifications for Roads and Structures*, the Plans, Special Provisions and Contract. Remaining AET Toll Zone Gantry work including but not limited to conduit, risers, weather-tight cable tray, cladding, and junction boxes shall be considered incidental to the AET Toll Zone Sites.

Payment will be made under:
AET Toll Zone Sites .....Lump Sum

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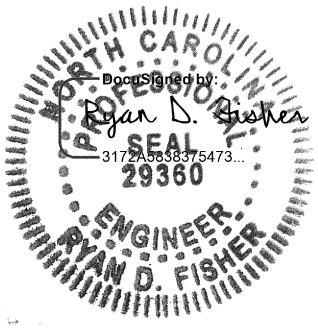

12/11/2017

THERMAL SPRAYED COATINGS (METALLIZATION) (9-30-11)

1.0 DESCRIPTION

Apply a thermal sprayed coating (TSC) and sealer to metal surfaces as specified herein when called for on the plans or by other Special Provisions, or when otherwise approved by the Engineer in accordance with the SSPC-CS 23.00/AWS C2.23/NACE No. 12 Specification. Only Arc Sprayed application methods are used to apply TSC coatings, the Engineer must approve other methods of application.

2.0 QUALIFICATIONS

Only use NCDOT approved TSC Contractors meeting the following requirements:

1. The capability of blast cleaning steel surfaces to SSPC SP-5 and SP-10 Finishes.

2. Employ Spray Operator(s) qualified in accordance with AWS C.16/C2.16M2002 and Quality Control Inspector(s) who have documented training in the applicable test procedures of ASTM D-3276 and SSPC-CS 23.00.

A summary of the contractor's related work experience and the documents verifying each Spray Operator's and Quality Control Inspector's qualifications are submitted to the Engineer before any work is performed.

3.0 MATERIALS

Provide wire in accordance with the metallizing equipment manufacturer's recommendations. Use the wire alloy specified on the plans which meets the requirements in Annex **C** of the SSPC-CS 23.00 Specification. Have the contractor provide a certified analysis (NCDOT Type 2 Certification) for each lot of wire material.

Apply an approved sealer to all metallized surfaces in accordance with Section 9 of SSPC-CS 23. The sealer must either meet SSPC Paint 27 or is an alternate approved by the Engineer.

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4.0 SURFACE PREPARATION AND TSC APPLICATION

Grind flame cut edges to remove the carbonized surface prior to blasting. Bevel all flame cut edges in accordance with Article 442-10(D) regardless of included angle. Blast clean surfaces to be metallized with grit or mineral abrasive in accordance with Steel Structures Painting Council SSPC SP-5/10(as specified) to impart an angular surface profile of 2.5 - 4.0 mils. Surface preparation hold times are in accordance with Section 7.32 of SSPC-CS 23. If flash rusting occurs prior to metallizing, blast clean the metal surface again. Apply the thermal sprayed coating only when the surface temperature of the steel is at least 5°F above the dew point.

At the beginning of each work period or shift, conduct bend tests in accordance with Section 6.5 of SSPC-CS 23.00. Any disbonding or delamination of the coating that exposes the substrate requires corrective action, additional testing, and the Engineer's approval before resuming the metallizing process.

Apply TSC with the alloy to the thickness specified on the plans or as provided in the table below. All spot results (the average of 3 to 5 readings) must meet the minimum requirement. No additional tolerance (as allowed by SSPC PA-2) is permitted. (For Steel Beams: For pieces with less than 200 ft^2 measure 2 spots/surface per piece and for pieces greater than 200 ft^2 add 1 additional spots/surface for each 500 ft^2).

Application	Thickness	Alloy	Seal Coat
Pot Bearings	8 mil	85/15 Zinc (W-Zn-Al-2)	0.5 mil
Armored Joint Angles	8 mil	85/15 Zinc (W-Zn-Al-2)	0.5 mil
Modular Joints	8 mil	99.99% Zn (W-Zn-1)	0.5 mil
Expansion Joint Seals	8 mil	99.99% Zn (W-Zn-1)	0.5 mil
Optional Disc Bearings	8 mil	85/15 Zinc (W-Zn-Al-2)	0.5 mil

When noted on the plans or as specified in the above chart, apply the sealer to all metallized surfaces in accordance with the manufacturer's recommendations and these provisions. Apply the seal coat only when the air temperature is above 40°F and the surface temperature of the steel is at least 5°F above the dew point. If the sealer is not applied within eight hours after the final application of TSC, the applicator verifies acceptable TSC surfaces and obtains approval from the Engineer before applying the sealer.

5.0 INSPECTION FREQUENCY

The TSC Contractor must conduct the following tests at the specified frequency and the results documented in a format approved by the Engineer.

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Test/Standard	Location	Frequency	Specification
Ambient Conditions	Site	Each Process	5°F above the dew point
Abrasive Properties	Site	Each Day	Size, angularity, cleanliness
Surface Cleanliness SSPC Vis 1	All Surfaces	Visual All Surfaces	SSPC-SP-10 Atmospheric Service SSPC-SP - 5 Immersion Service
Surface Profile ASTM D-4417 Method C	Random Surfaces	3 per 500 ft^2	2.5 - 4.0 mils
Bend Test SSPC-CS 23.00	Site	5 per shift	Pass Visual
Thickness SSPC PA-2R SSPC-CS 23.00	Each Surface	Use the method in PA-2 Appendix 3 for Girders and Appendix 4 for frames and miscellaneous steel. See Note 1.	Zn - 8 mils minimum Al - 8 mils minimum Zn Al - 8 mils minimum Areas with more than twice the minimum thickness are inspected for compliance to the adhesion and cut testing requirements of this specification.
Adhesion ASTM 4541	Random Surfaces Splice Areas	1 set of 3 per 500 ft^2	Zn > 500 psi Al > 1000 psi Zn Al > 750 psi
Cut Test - SSPC-CS 23.00	Random Surfaces	3 sets of 3 per 500 ft^2	No peeling or delamination
Job Reference Std. SSPC-CS 23.00	Site	1 per job	Meets all the above requirements

6.0 REPAIRS

All Repairs are to be performed in accordance with the procedures below, depending on whether the repair surface is hidden or exposed. As an exception to the following, field welded splices on joint angles and field welding bearing plates to girders may be repaired in accordance with the procedures for hidden surfaces.

For hidden surfaces (including but not limited to interior girders, interior faces of exterior girders, and below-grade sections of piles):

1. Welding of metallized surfaces may be performed only if specifically permitted by the Engineer. Remove metallizing at the location of field welds by blast cleaning (SSPC SP-6 finish), or hand (SSPC SP-2 finish) or power tool cleaning (SSPC SP-3 finish) just prior to welding. Clean sufficiently to prevent contamination of the weld. All repairs to welded connections are metallized in accordance with SSPC CS 23.00.

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2. Minor areas less than or equal to 0.1 ft^2 exposing the substrate are metallized in accordance with SSPC CS 23.00 or painted in accordance with ASTM A780, "Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings."

3. Large areas greater than 0.1 ft^2 exposing the substrate are metallized in accordance with SSPC CS 23.00.

4. Damaged (burnished) areas not exposing the substrate with less than the specified coating thickness are metallized in accordance with SSPC CS 23.00 or painted in accordance with ASTM A780, "Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings."

5. Damaged (burnished) areas not exposing the substrate with more than the specified coating thickness are not repaired.

6. Defective coating is repaired by either method 2 or 3 depending on the area of the defect.

For Exposed Surfaces (including but not limited to exterior faces of exterior girders and above-grade sections of piles):

1. Welding of metallized surfaces may be performed only if specifically permitted by the Engineer. Remove metallization at the location of field welds by blast cleaning (SSPC SP-6 finish), or hand (SSPC SP-2 finish) or power tool cleaning (SSPC SP-3 finish) just prior to welding. Clean sufficiently to prevent contamination of the weld. All repairs to welded connections are metallized in accordance with SSPC CS 23.00.

2. All areas exposing the substrate are metallized in accordance with SSPC CS 23.00

3. Defective coating is repaired by either method 2 or 3 depending on the area of the defect.

7.0 TWELVE MONTH OBSERVATION PERIOD

The contractor maintains responsibility for the coating system for a twelve (12) month observation period beginning upon the satisfactory completion of all the work required in the plans or as directed by the engineer. The contractor must guarantee the coating system under the payment and performance bond (refer to Article 109-10). To successfully complete the observation period, the coating system must meet the following requirements after twelve(12) months service:

- No visible rust, contamination or application defect is observed in any coated area.
- Painted surfaces have a uniform color and gloss.
- Surfaces have an adhesion of no less than 500 psi when tested in accordance with ASTM D-4541.

8.0 BASIS OF PAYMENT

The contract price bid for the bridge component to which the coating is applied will be full compensation for the thermal sprayed coating.

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FOAM JOINT SEALS (9-27-12)

1.0 SEALS

Use preformed seals compatible with concrete and resistant to abrasion, oxidation, oils, gasoline, salt and other materials that are spilled on or applied to the surface. Use a resilient, UV stable, preformed, impermeable, flexible, expansion joint seal. The joint seal shall consist of low-density, closed cell, cross-linked polyethylene non-extrudable, foam. The joint seal shall contain no EVA (Ethylene Vinyl Acetate). Cell generation shall be achieved by being physically blown using nitrogen. No chemical blowing agents shall be used in the cell generation process.

Use seals manufactured with grooves 1/8"± wide by 1/8"± deep and spaced between 1/4" and 1/2" apart along the bond surface running the length of the joint. Use seals with a depth that meets the manufacturer's recommendation, but is not less than 70% of the uncompressed width. Provide a seal designed so that, when compressed, the center portion of the top does not extend upward above the original height of the seal by more than 1/4". Provide a seal that has a working range of 30% tension and 60% compression and meets the requirements given below.

TEST	TEST METHOD	REQUIREMENT
Tensile strength	ASTM D3575-08, Suffix T	110 – 130 psi
Compression Set	ASTM D1056 Suffix B, 2 hr recovery	10% - 16%
Water Absorption	ASTM D3575	< 0.03 lb/ft^2
Elongation at Break	ASTM D3575	180% - 210%
Tear Strength	ASTM D624 (D3575-08, Suffix G)	14 – 20 pli
Density	ASTM D3575-08, Suffix W, Method A	1.8 – 2.2 lb/ft^3
Toxicity	ISO-10993.5	Pass (not cytotoxic)

Have the top of the joint seal clearly shop marked. Inspect the joint seals upon receipt to ensure that the marks are clearly visible before installation.

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2.0 BONDING ADHESIVE

Use a two component, 100% solid, modified epoxy adhesive supplied by the joint seal manufacturer that meets the requirements given below.

TEST	TEST METHOD	REQUIREMENT
Tensile strength	ASTM D638	3000 psi (min.)
Compressive strength	ASTM D695	7000 psi (min.)
Hardness	Shore D Scale	75-85 psi
Water Absorption	ASTM D570	0.25% by weight max.
Elongation to Break	ASTM D638	5% (max.)
Bond Strength	ASTM C882	2000 psi (min.)

Use an adhesive that is workable to 40°F. When installing in ambient air or surface temperatures below 40°F or for application on moist, difficult to dry concrete surfaces, use an adhesive specified by the manufacturer of the joint seal.

3.0 SAWING THE JOINT

The joint opening shall be initially formed to the width shown on the plans including the blockout for the elastomeric concrete.

The elastomeric concrete shall have sufficient time to cure such that no damage can occur to the elastomeric concrete prior to sawing to the final width and depth as specified in the plans.

When sawing the joint to receive the foam seal, always use a rigid guide to control the saw in the desired direction. To control the saw and to produce a straight line as indicated on the plans, anchor and positively connect a template or a track to the bridge deck. Do not saw the joint by visual means such as a chalk line. Fill the holes used for holding the template or track to the deck with an approved, flowable non-shrink, non-metallic grout.

Saw cut to the desired width and depth in one or two passes of the saw by placing and spacing two metal blades on the saw shaft to the desired width for the joint opening.

The desired depth is the depth of the seal plus 1/4" above the top of the seal plus approximately 1" below the bottom of the seal. An irregular bottom of sawed joint is permitted as indicated on the plans. Grind exposed corners on saw cut edges to a 1/4" chamfer.

Saw cut a straight joint, centered over the formed opening and to the desired width specified in the plans. Prevent any chipping or damage to the sawed edges of the joint.

Remove any staining or deposited material resulting from sawing with a wet blade to the satisfaction of the Engineer.

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4.0 PREPARATION OF SAWED JOINT FOR SEAL INSTALLATION

The elastomeric concrete shall cure a minimum of 24 hours prior to seal installation.

After sawing the joint, the Engineer will thoroughly inspect the sawed joint opening for spalls, popouts, cracks, etc. All necessary repairs will be made by the Contractor prior to blast cleaning and installing the seal.

Clean the joints by sandblasting with clean dry sand immediately before placing the bonding agent. Sandblast the joint opening to provide a firm, clean joint surface free of curing compound, loose material and any foreign matter. Sandblast the joint opening without causing pitting or uneven surfaces. The aggregate in the elastomeric concrete may be exposed after sandblasting.

After blasting, either brush the surface with clean brushes made of hair, bristle or fiber, blow the surface with compressed air, or vacuum the surface until all traces of blast products and abrasives are removed from the surface, pockets, and corners.

If nozzle blasting is used to clean the joint opening, use compressed air that does not contain detrimental amounts of water or oil.

Examine the blast cleaned surface and remove any traces of oil, grease or smudge deposited in the cleaning operations.

Bond the seal to the blast cleaned surface on the same day the surface is blast cleaned.

5.0 SEAL INSTALLATION

Install the joint seal according to the manufacturer's procedures and recommendations and as recommended below. Do not install the joint seal if the ambient air or surface temperature is below 45°F. Have a manufacturer's certified trained factory representative present during the installation of the first seal of the project.

Before installing the joint seal, check the uninstalled seal length to insure the seal is the same length as the deck opening. When the joint seal requires splicing, use the heat welding method by placing the joint material ends against a teflon heating iron of 425-475°F for 7 - 10 seconds, then pressing the ends together tightly. Do not test the welding until the material has completely cooled.

Begin installation by protecting the top edges of the concrete deck adjacent to the vertical walls of the joint as a means to minimize clean up. After opening both cans of the bonding agent, stir each can using separate stirring rods for each component to prevent premature curing of the bonding agent. Pour the two components, at the specified mixing ratio, into a clean mixing bucket. Mix the components with a low speed drill (400 rpm max.) until a uniform gray color is achieved without visible marbling. Apply bonding agent to both sides of the elastomeric concrete as well as both sides of the joint seal, making certain to completely fill the grooves with epoxy. With gloved hands, compress the joint seal and

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with the help of a blunt probe, push the seal into the joint opening until the seal is recessed approximately 1/4" below the surface. When pushing down on the joint seal, apply pressure only in a downward direction. Do not push the joint seal into the joint opening at an angle that would stretch the material. Seals that are stretched during installation shall be removed and rejected. Once work on placing a seal begins, do not stop until it is completed. Clean the excess epoxy from the top of the joint seal immediately with a trowel. Do not use solvents or any cleaners to remove the excess epoxy from the top of the seal. Remove the protective cover at the joint edges and check for any excess epoxy on the surface. Remove excess epoxy with a trowel, the use of solvents or any cleaners will not be allowed.

The installed system shall be watertight and will be monitored until final inspection and approval. Do not place pavement markings on top of foam joint seals.

6.0 BASIS OF PAYMENT

Payment for all foam joint seals will be at the lump sum contract price bid for "Foam Joint Seals". Prices and payment will be full compensation for furnishing all material, including elastomeric concrete, labor, tools and equipment necessary for installing these units in place and accepted.

PROJECT SPECIAL PROVISION

(10-18-95) (Rev. 3-21-17) Z-1

PERMITS

The Contractor's attention is directed to the following permits, which have been issued to the Department of Transportation by the authority granting the permit.

PERMIT	AUTHORITY GRANTING THE PERMIT
Dredge and Fill and/or Work in Navigable Waters (404)	U. S. Army Corps of Engineers
Water Quality (401)	Division of Environmental Management, DEQ State of North Carolina

The Contractor shall comply with all applicable permit conditions during construction of this project. Those conditions marked by * are the responsibility of the Department and the Contractor has no responsibility in accomplishing those conditions.

Agents of the permitting authority will periodically inspect the project for adherence to the permits.

The Contractor's attention is also directed to Articles 107-10 and 107-13 of the *2012 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.

DocuSigned by:
Contract Standards and Development
68A7405FFA5F48E...

9/28/2017 | 9:07 AM EDT

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

REPLY TO
ATTENTION OF

January 30, 2009

Regulatory Division

Action ID SAW-2008-00373

RECEIVED
FEB 04 2009
TOWN OF CARY
ENGINEERING DEPT.

Town of Cary, Engineering Department
ATTN: Mr. Eric Simpson
Post Office Box 8005
Cary, North Carolina 27512-8005

Dear Mr. Simpson:

Enclosed is a Department of the Army permit to fill material into 0.72 acres of jurisdictional forested wetlands, and 3,412 linear feet of perennial stream channel exhibiting important aquatic functions associated with the construction of Morrisville Parkway, Phase III. The project location is between North Carolina Highway 55 (NC 55) westward for a distance of approximately 3 miles to a terminus with SR 1625, Green Level to Durham Road at SR 1600, Green Level Church Road near Cary, Wake County, North Carolina.

Any deviation in the authorized work will likely require modification of this permit. If a change in the authorized work is necessary, you should promptly submit revised plans to the Corps showing the proposed changes. You may not undertake the proposed changes until the Corps notifies you that your permit has been modified.

Carefully read your permit. The general and special conditions are important. Your failure to comply with these conditions could result in a violation of Federal law. Certain significant conditions require that:

a. You must complete construction before December 31, 2029.

b. You must allow representatives from this office to make periodic visits to your worksite as deemed necessary to assure compliance with permit plans and conditions.

You must notify this office in advance as to when you intend to commence and complete work.

You should address all questions regarding this authorization to Monte Matthews in the Raleigh Regulatory Field Office at (919) 554-4884, extension 30.

Sincerely,

Jefferson M. Ryscavage
Colonel, U.S. Army
District Commander

Enclosures

Copy Furnished (with enclosures):

Chief, Source Data Unit
NOAA/National Ocean Service
ATTN: Sharon Tear N/CS261
1315 East-West Hwy., Rm 7316
Silver Spring, Maryland 20910-3282

Copy Furnished (with special conditions and plans):

Mr. Ronald J. Mikulak, Chief
Wetlands Regulatory Section
61 Forsyth Street
Atlanta, Georgia 30303

Mr. Pete Benjamin
U.S. Fish and Wildlife Service
Fish and Wildlife Enhancement
Post Office Box 33726
Raleigh, North Carolina 27636-3726

Mr. Ron Sechler
National Marine Fisheries Service
Pivers Island
Beaufort, North Carolina 28516

Mr. Doug Huggett
Division of Coastal Management
N.C. Department of Environment
and Natural Resources
400 Commerce Avenue
Morehead City, North Carolina 28557

Mr. David Rackley
National Marine Fisheries Service
219 Fort Johnson Road
Charleston, South Carolina 29412-9110

DEPARTMENT OF THE ARMY PERMIT

RECEIVED
JAN 2 8 2009
REGULATORY
WILM.FLD.OFC.

Permittee: TOWN OF CARY

Permit No: SAW-200800373

Issuing Office: USAED, WILMINGTON

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of the office acting under the authority of the commanding officer.

You are authorized to perform work in the accordance with the terms and conditions specified below.

Project Description: Portions of Morrisville Parkway have previously been constructed. This project is to extend the existing portion of roadway, currently terminating at NC 55, to Green Level to Durham Road at Green Level Church Road. The ultimate design would be similar to the existing sections of Morrisville Parkway which includes a 105-foot wide, 4-lane median divided roadway, including 5-foot wide sidewalks and 5-foot wide utility strips to be situated on both sides of the roadway. Included is an interchange with the future Western Wake Freeway (I-540). Total permanent impacts from this project are 0.72-acres of jurisdictional forested wetlands, and 3,412 linear feet of perennial stream channel exhibiting important aquatic functions. The Town of Cary is utilizing this long-range planning approach for a fair evaluation on the corridor and expected impacts of this roadway, rather than waiting and allowing future development to limit the overall flexibility required for impact minimization and/or avoidance. Stage 1A would be constructed using the final designs depicted within this permit. The other 2 phases would be permitted on the impacts stated above, realizing that these are worse-case scenarios. Final designs for each stage would be provided to the Corps for a permit modification prior to construction. At the time of permit modification, additional minimization or avoidance would be evaluated for items such as bridging, fill slopes, etc. It is expected that impact amounts would go down during the time of permit modification. To mitigate for all unavoidable impacts to jurisdictional features for stage 1A, the applicant has proposed payment into the North Carolina Ecosystem Enhancement Program (NCEEP) in the amount to restore 0.17 acres of riparian wetlands in the Cape Fear River Basin, Cataloging Unit 03030002 and 731 linear feet of warm water stream in the Cape Fear River Basin, Cataloging Unit 03030004. In addition, the applicant will preserve 3,565 linear feet of on-site stream channel and 1.2 acres of on-site wetlands via the Corps' standard Declaration of Restrictions language. As the plans for phases 1B and 2 are finalized, permit modifications showing the finalized plans must be submitted to the Corps for review and evaluation. Compensatory mitigation for impacts under phases 1B and 2 will be addressed at the time of each respective permit modification and completed prior to impacts to jurisdictional features.

Project Location: The project location is between North Carolina Highway 55 (NC 55) westward for a distance of approximately 3 miles to a terminus with SR 1625, Green Level to Durham Road at SR 1600, Green Level Church Road near Cary, Wake County, North Carolina. Coordinates, in decimal degrees, for the end points of the construction areas are 35.813720° N, 78.872747° W, and 35.802659 ° N, 78.909490 ° W. The project site contains several wetlands and unnamed streams channels which drain to Panther Creek in the Haw watershed of the Cape Fear River Basin (8-Digit Cataloging Unit of 03030002).

Permit Conditions:

General Conditions:

1. The time Limit for completing the work authorized ends on December 31, 2029 If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Conditions 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

*SEE ATTACHED SPECIAL CONDITIONS

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S. C. 403).

(X) Section 404 of the clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United states in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was mad in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measure by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

 *U.S. GOVERNMENT PRINTING OFFICE: 1986 – 717-425

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

_____ 1/26/09

(PERMITTEE) **TOWN OF CARY** *(DATE)*

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

_____ 1/30/09

(DISTRICT Engineer) **JEFFERSON M. RYSCAVAGE, COLONEL** *(DATE)*

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

_____ _____

(Transferee) (Date)

Special Conditions - Action ID 200800373, Town of Cary

Work Limits

1. All work authorized by this permit must be performed in strict compliance with the attached plans, which are a part of this permit. Any modification to these plans must be approved by the US Army Corps of Engineers (USACE) prior to implementation.

2. Except as authorized by this permit or any USACE approved modification to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands. This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area. This prohibition applies to all borrow and fill activities connected with this project.

3. Except as specified in the plans attached to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within waters or wetlands or to reduce the reach of waters or wetlands.

4. The North Carolina Division of Water Quality (DWQ) permit/certification number 3737 was issued for this project on April 9, 2008. Special conditions were issued associated with this water quality permit/certification and a copy of these conditions is attached as Exhibit A. These referenced conditions are hereby incorporated as special conditions of this permit.

5. The permittee shall make payment to the North Carolina Ecosystem Enhancement Program (NC EEP) in the amount determined by the NC EEP, sufficient to perform the amount necessary to restore 0.17 acre of riparian wetlands in the Cape Fear River Basin, Cataloging Unit 03030002 and 731 linear feet of warm water stream in the Cape Fear River Basin, Cataloging Unit 03030004.

Construction within jurisdictional areas on the property for Stage 1A shall begin only after the permittee has made full payment to the NC EEP and provided a copy of the payment documentation to the Corps, and the NC EEP has provided written confirmation to the Corps that it agrees to accept responsibility for the mitigation work required, in compliance with the MOU between the North Carolina Department of Environment and Natural Resources and the United States Army Corps of Engineers, Wilmington District, dated November 4, 1998.

Special Conditions - Action ID 200800373, Town of Cary

In addition, the Permittee shall execute and cause to be recorded in the Wake County Register of Deeds a Conservation Declaration, the form of which was transmitted to USACE in a December 19, 2008, email from Mr. Eric Simpson, which shall preserve in perpetuity 3,565 linear feet of stream and 1.2 acres of wetland described on the map attached to the email as "WETLANDS_PRESERVE". The December 19, 2008, email states that the Permittee will use the Corps approved language for Declaration of Restrictions verbatim. The permittee shall enforce the terms of the conservation declaration and shall take no action on the property described in the declaration inconsistent with the terms thereof. The permittee shall record the conservation declaration no later than May 1, 2009. The permittee shall provide a copy of the recorded declaration to the Corps of Engineers within 30 days of recording.

6. As the plans for phases 1B and 2 are finalized, permit modifications showing the finalized plans must be submitted to the Corps for review and evaluation. Compensatory mitigation for impacts under phases 1B and 2 will be addressed at the time of each respective permit modification and completed prior to impacts to jurisdictional features.

Culverts

7. Measures will be included in the construction/installation that will promote the safe passage of fish and other aquatic organisms. The dimension, pattern, and profile of the stream above and below a pipe or culvert should not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed opening should be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow should be determined from gage data, if available. In the absence of such data, bankfull flow can be used as a comparable level.

Culverts greater than 48 inches in diameter will be buried at least one foot below the bed of the stream. Culverts 48 inches in diameter or less shall be buried or placed on the stream bed as practicable and appropriate to maintain aquatic passage, and every effort shall be made to maintain the existing channel slope. The bottom of the culvert must be placed at a depth below the natural stream bottom to provide for passage during drought or low flow conditions. Destabilizing the channel and head cutting upstream should be considered in the placement of the culvert. A waiver from the depth specifications in this condition may be requested in writing. The waiver will be issued if it can be demonstrated that the proposal would result in the least impacts to the aquatic environment. Culverts placed in wetlands do not have to be buried.

Special Conditions - Action ID 200800373, Town of Cary

Related Laws

8. All mechanized equipment will be regularly inspected and maintained to prevent contamination of waters and wetlands from fuels, lubricants, hydraulic fluids, or other toxic materials. In the event of a spill of petroleum products or any other hazardous waste, the permittee shall immediately report it to the N.C. Division of Water Quality at (919) 733-5083, Ext. 526 or (800) 662-7956 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act will be followed.

Project Maintenance

9. The permittee shall advise the Corps in writing prior to beginning the work authorized by this permit and again upon completion of the work authorized by this permit. In addition, a pre-construction meeting shall take place prior to beginning the construction activities. This meeting shall be comprised of the applicant, the contractors, any sub-contractors and their equipment operators working within jurisdictional areas. Please contact the Corps of Engineers Project Manager at least 2 weeks prior to the commencement of construction to schedule this meeting.

10. Unless otherwise authorized by this permit, all fill material placed in waters or wetlands shall be generated from an upland source and will be clean and free of any pollutants except in trace quantities. Metal products, organic materials (including debris from land clearing activities), or unsightly debris will not be used.

11. The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit. A copy of this permit, including all conditions, shall be available at the project site during construction and maintenance of this project.

12. The permittee shall employ all sedimentation and erosion control measures necessary to prevent an increase in sedimentation or turbidity within waters and wetlands outside the permit area. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project must remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4).

Special Conditions - Action ID 200800373, Town of Cary

13. The permittee, upon receipt of a notice of revocation of this permit or upon its expiration before completion of the work will, without expense to the United States and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the water or wetland to its pre-project condition.

Enforcement

14. Violations of these conditions or violations of Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act must be reported in writing to the Wilmington District U.S. Army Corps of Engineers within 24 hours of the permittee's discovery of the violation.

P-12

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

404 Permit Mod
2 pages

REPLY TO
ATTENTION OF

September 12, 2016

Regulatory Division/1200A

Action ID: SAW-2008-00373

Mr. Kyle Hubert, P.E.
Town of Cary Transportation and Facilities Department
316 North Academy Street
Cary, North Carolina 27513

Dear Mr. Hubert:

Reference is made to your letter dated July 21, 2016, requesting modification to the Department of the Army permit issued to the Town of Cary on January 30, 2009 for impacts associated with the Morrisville Parkway Phase III roadway extension project. The original permit consisted of a three stage extension of Morrisville Parkway from the intersection of North Carolina Highway 55 (NC 55) and Morrisville Parkway westward 3 miles to a terminus at the intersection of Green Level Church Road and Morrisville Parkway, 5.8 miles northwest of Cary, Wake County, North Carolina. The site contains several unnamed tributaries and forested wetlands which drain to Panther Creek in the Haw watershed of the Cape Fear River Basin (8-Digit Cataloging Unit 03030002).

The subject modification request is to complete the construction of approximately 2,800 linear foot section of the larger roadway project approved under the original permit. This new phase, herein referred to as Stage 1B Phase II, will begin 2,300 linear feet west of the Morrisville Parkway intersection with Green Level Church Road and end approximately 1,450 linear feet east of the existing Morrisville Parkway Bridge over NC 540. This phase includes the impacts to 815 linear feet of stream channel at stream crossing SC- 3 and 333 linear feet of stream channel at stream crossing SC-4 and impacts to wetlands at WC-2 of 0.21 acre and WC-3 of 0.01 acre to facilitate the construction of the interchange of Morrisville Parkway and NC 540.

The Corps has completed the evaluation of your request for modification and concurs with modified plans dated June 28, 2015. Permit Special Conditions are modified as follow:

Special condition 1 of your permit is hereby modified to read:

All work authorized by this permit must be performed in strict accordance with the original permit plans, Sheets 1-21 titled Final Design Drawings, and the supplemental detailed plans for Stage 1B Phase I, Sheets 1-5 dated October 25, 2012, and Stage 1B Phase II, Sheets 1-14 dated June 28, 2015, which are made part of this permit. Any further modification to the plans must be approved by the US Army Corps of Engineers (USACE) prior to implementation.

Printed on Recycled Paper

Special Condition 15 is added and reads:

In order to compensate for impacts associated with Stage 1B Phase II, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the attached Compensatory Mitigation Responsibility Transfer Form. The requirements of this form, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit authorization.

Please note that this permit modification is not valid until receipt of a modified 401 permit as issued from the North Carolina Division of Division of Water Resources. If you have questions, please contact Ms. Tasha Alexander by telephone (919) 554-4884, Extension 35.

Sincerely,

Andrew Williams for

Kevin P. Landers, Sr.
Colonel, U.S. Army
District Commander

Enclosures

Copy Furnished:

Mr. Jeff Meador, P.E.
Water Resources Project Manager
Rummel, Klepper & Kahl, LLP (RK&K)
900 Ridgefield Drive, Suite 350
Raleigh, North Carolina 27609

Mr. Rob Ridings
NC-Division of Water Resources
Transportation Permitting Unit
1617 Mail Service Center
Raleigh, North Carolina 27699-1617

Printed on Recycled Paper

Figure 1:
Vicinity Map
Morrisville Parkway
Extension Phase III
TOC Project No.
ST-1123
Legend
Proposed Centerline
N
0 500 1,000 Feet
URS
Morrisville, NC
Sources: Wake County, NC;
ESRI, Inc; Town of Cary, NC;
USGS 7.5 minute Cary, NC
and Green Level, NC
topographic quads.
Indian Wells Road
NC 55
Wakena Road
Twlya Road
Proposed Morrisville Parkway Phase III
Green Level to Durham Road
Green Level Church Road
Green Hope School Road
Greenlevel Church Road
Sheet 1 of 21
ORANGE
DURHAM
WAKE
CHATHAM
Raleigh
Pittsboro
Project Location
State Highways
County Boundaries

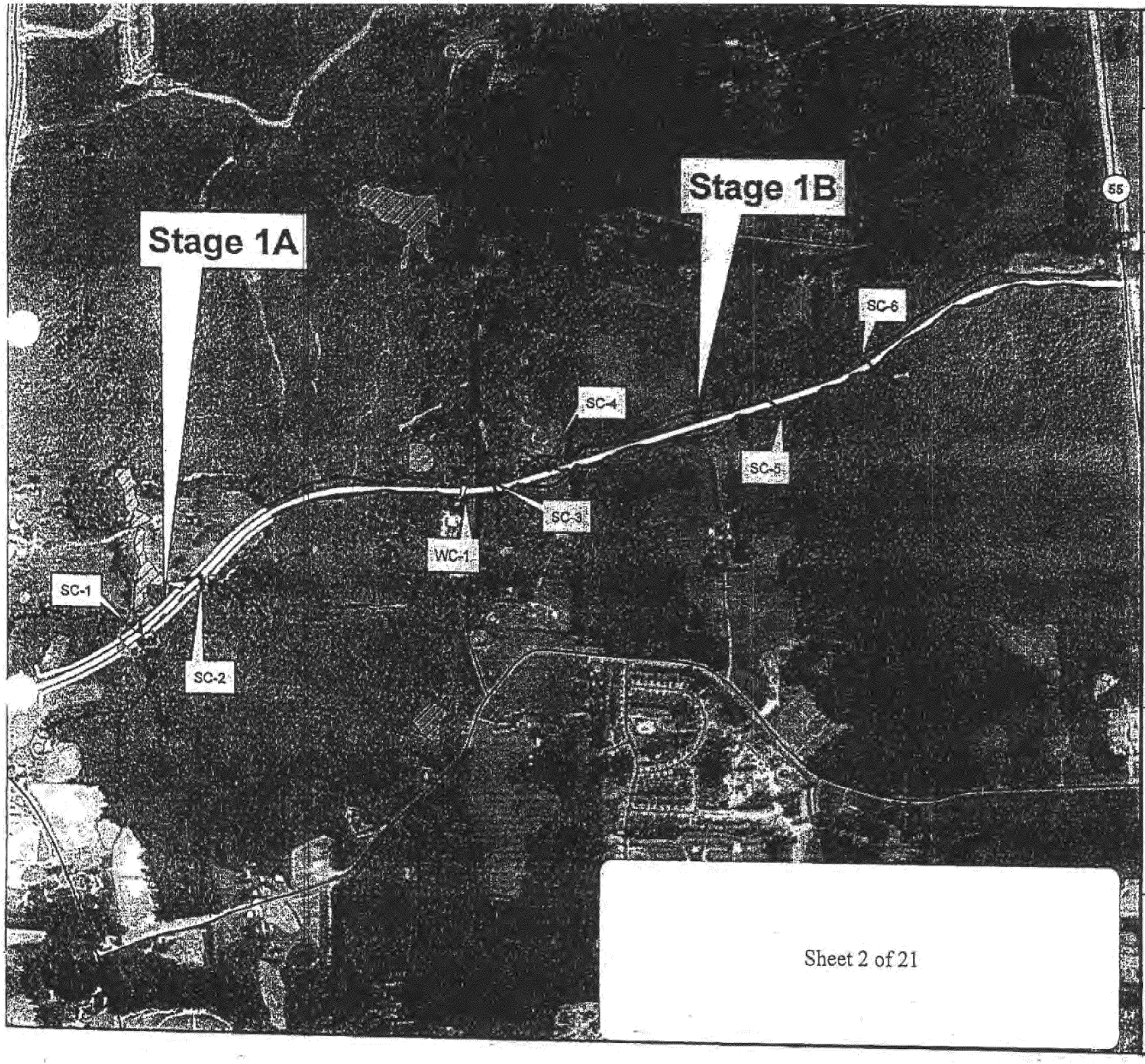


Figure 3:
Stage 1 Impacts

Morrisville Parkway
Extension Phase III

TOC Project No.
ST-1123

Legend
Proposed Centerline
Stage 1A Right-of-Way
Stage 1A Disturbance Limits
Stage 1B Slope Stake Limits
Stream Impacts
Wetland Impacts
Streams
Wetlands

SC-# Stream Crossing
WC-# Wetland Crossing

N

0 1,000 Feet

URS
Morrisville, NC

Sheet 2 of 21

Sources: Wake County, NC; ESRI, Inc; Town of Cary, NC; and URS Corp.

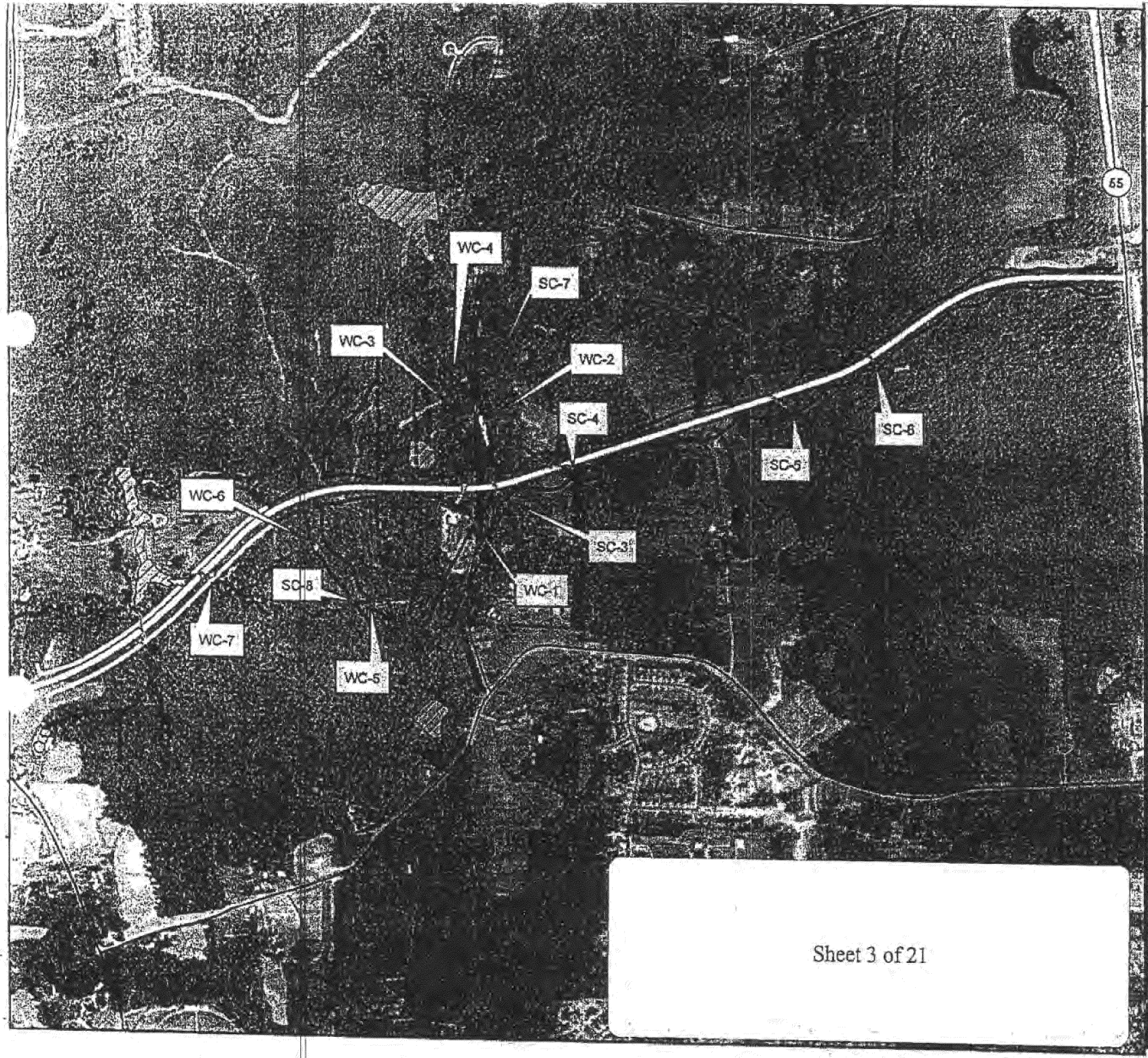


Figure 4:
Stage 2 Impacts

Morrisville Parkway
Extension Phase III

TOC Project No.
ST-1123

Legend

- Proposed Centerline
- Stage 2 - Greystone R/W Limits
- Stage 2 Slope Stake Limits
- Future I-540 Disturbance Limits
- Stage 2 Stream Impacts
- Stage 2 Wetlands Impacts
- Stage 1 Stream Impacts
- Stage 1 Wetland Impacts
- Streams
- Wetlands

SC-# Stream Crossing

WC-# Wetland Crossing

N

0 1,000 Feet

URS
Morrisville, NC

Sheet 3 of 21

Sources: Wake County, NC; ESRI, Inc; Town of Cary, NC; and URS Corp.

STAGE 1A - (GREYSTONE SUBDIVISION AREA) WETLAND AND STREAM IMPACTS

Figure No.	Impact No.**	Permanent Impact Type	linear feet**	square feet**
SC-1	1A	Perennial Stream	365	1,135
	1B	Section 404 Forested Wetland	N/A	91
	1C	Section 404 Forested Wetland	N/A	153
SC-2	2A	Perennial Stream	366	1,274
	2B	Section 404 Forested Wetland		2,617
	2C	Section 404 Forested Wetland		4,538
		Total	731	9,808

** Based on final design (see Appendix B for plan drawings).

STAGE 1B – 2-LANE ROADWAY: NC-55 TO GREYSTONE SUBDIVISON WETLAND AND STREAM IMPACTS

Figure No.	Permanent Impact Type	linear feet*	square feet*
SC-3	Perennial Stream	241	2,410
SC-4	Perennial Stream	361	3,610
SC-5	Perennial Stream	495	4,950
SC-6	Perennial Stream	200	2,000
WC-1	Section 404 Forested Wetland	N/A	4,356
	Total	1297	17,326

* Estimate based on preliminary design.

STAGE 2 – 4-LANE ROADWAY: NC-55 TO GREEN LEVEL CHURCH ROAD WETLAND AND STREAM IMPACTS

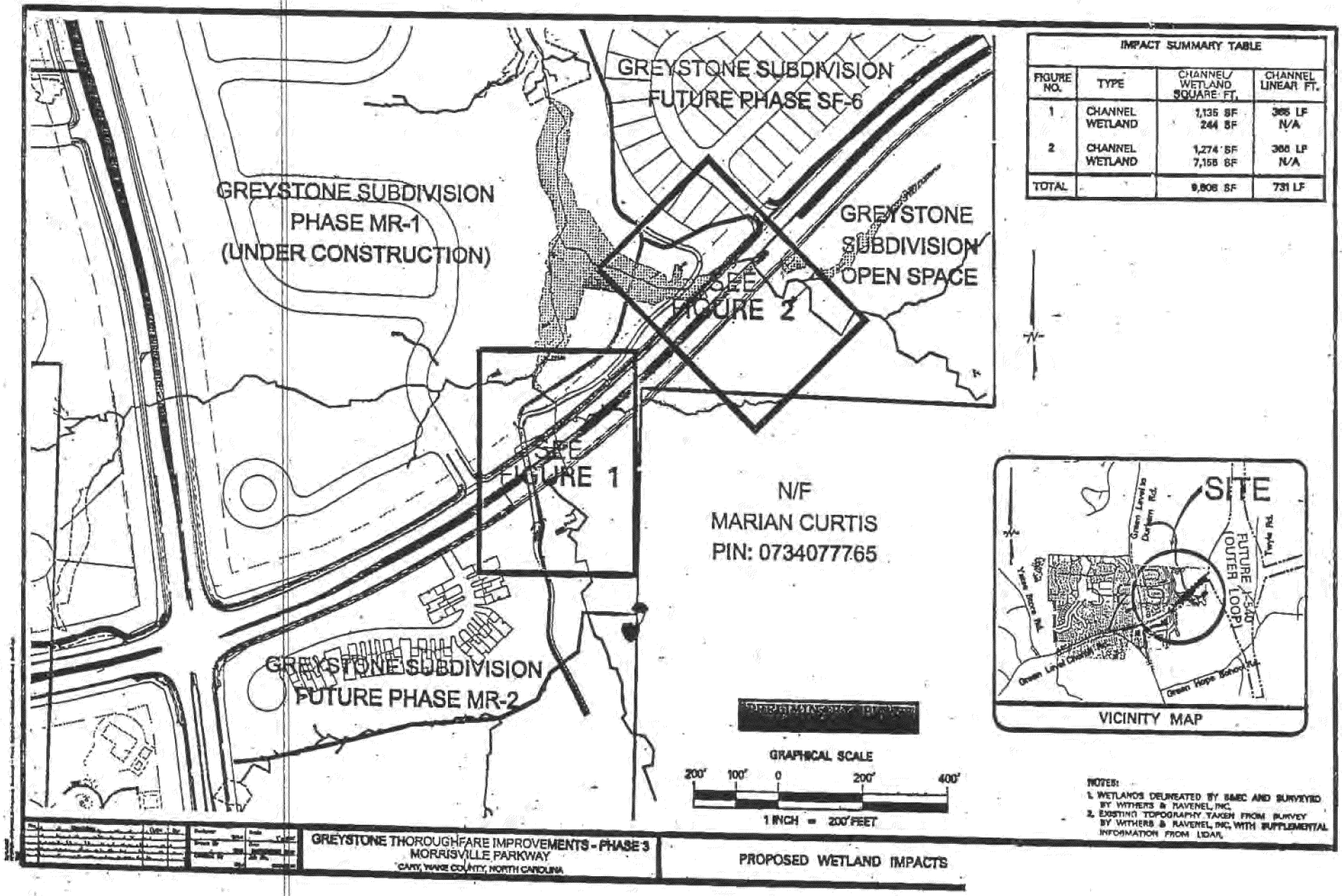
Figure No.	Permanent Impact Type	linear feet***	square feet***
SC-1	Perennial Stream	0	0
SC-2	Perennial Stream	0	0
SC-3	Perennial Stream	546	5,460
SC-4	Perennial Stream	84	840
SC-5	Perennial Stream	50	500
SC-6	Perennial Stream	60	600
SC-7	Perennial Stream	508	508
SC-8	Perennial Stream	136	136
WC-1	Section 404 Forested Wetland	N/A	2,178
WC-2	Section 404 Forested Wetland	N/A	9,583
WC-3	Section 404 Forested Wetland	N/A	1,307
WC-4	Section 404 Forested Wetland	N/A	871
WC-5	Section 404 Forested Wetland	N/A	871
WC-6	Section 404 Forested Wetland	N/A	2,614
WC-7	Section 404 Forested Wetland	N/A	2,000
	Total	1,384	27,468

*** Estimate based on preliminary design for the Stage 2 additional impacts.

SUMMARY OF OVERALL WETLAND AND STREAM IMPACTS (ALL STAGES)

		Project Stage			
		Stage 1A	Stage 1B	Stage 2	
		Greystone Subdivision	2-Lane Road (NC 55 to Greystone Subdivision)*	4-Lane Road (NC 55 to Green Level Chruch Road)*	Total*.
Permanent Impacts	Section 404 Forested Wetlands (acre)	0.17	0.10	0.45	0.72
	Perennial Streams (linear feet)	731	1,297	1,384	3,412
Temporary Impacts	Section 404 Forested Wetlands (acre)	0.00	To be determined (TBD)	TBD	TBD
	Perennial Streams (linear feet)	0	TBD	TBD	TBD

* Estimate based on preliminary design.



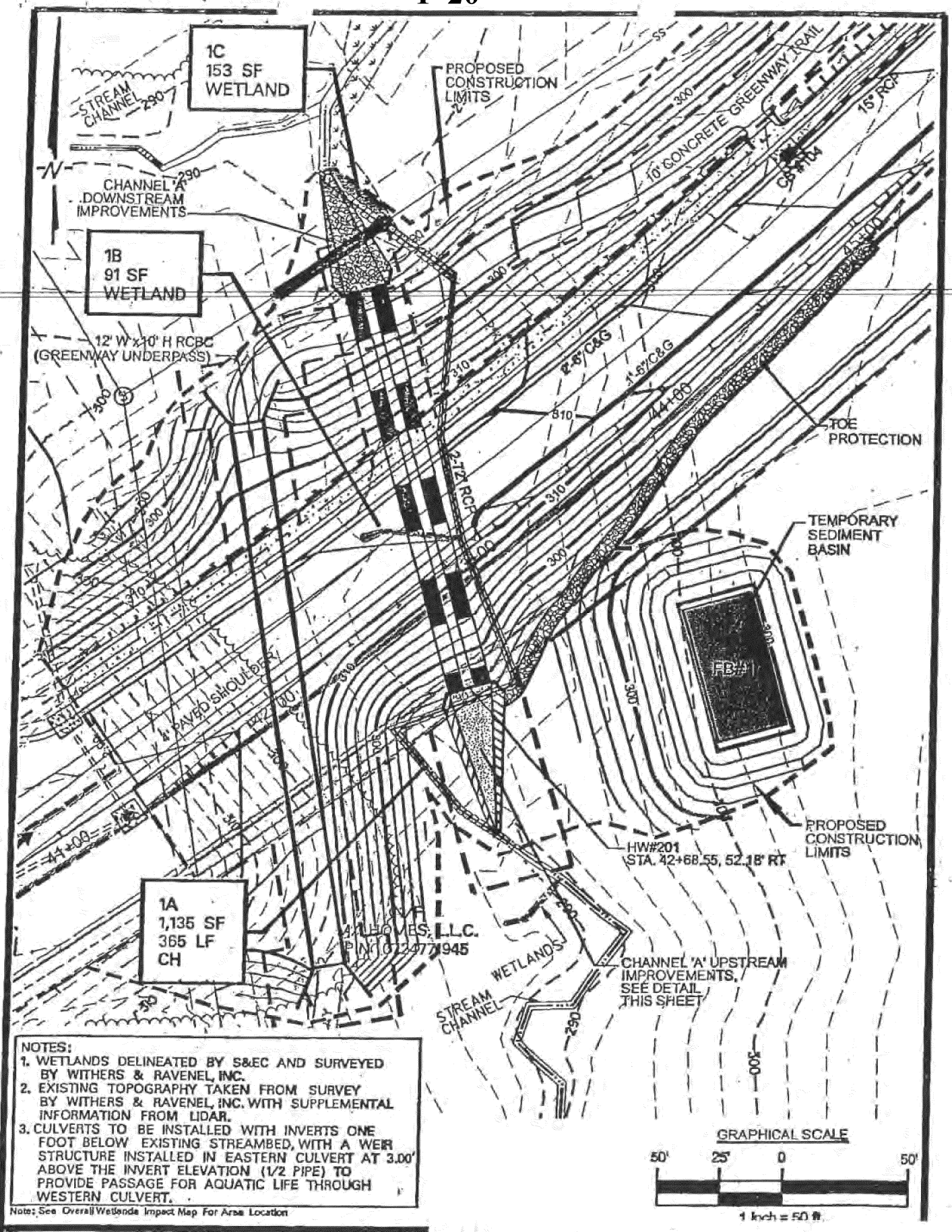
IMPACT SUMMARY TABLE

FIGURE NO.	TYPE	CHANNEL/ WETLAND SQUARE FT.	CHANNEL LINEAR FT.
1	CHANNEL	1,135 SF	365 LF
	WETLAND	244 SF	N/A
2	CHANNEL	1,274 SF	366 LF
	WETLAND	7,158 SF	N/A
TOTAL		9,806 SF	731 LF

P-19

Stage 1A - Final Design Drawings

Sheet 6 of 21

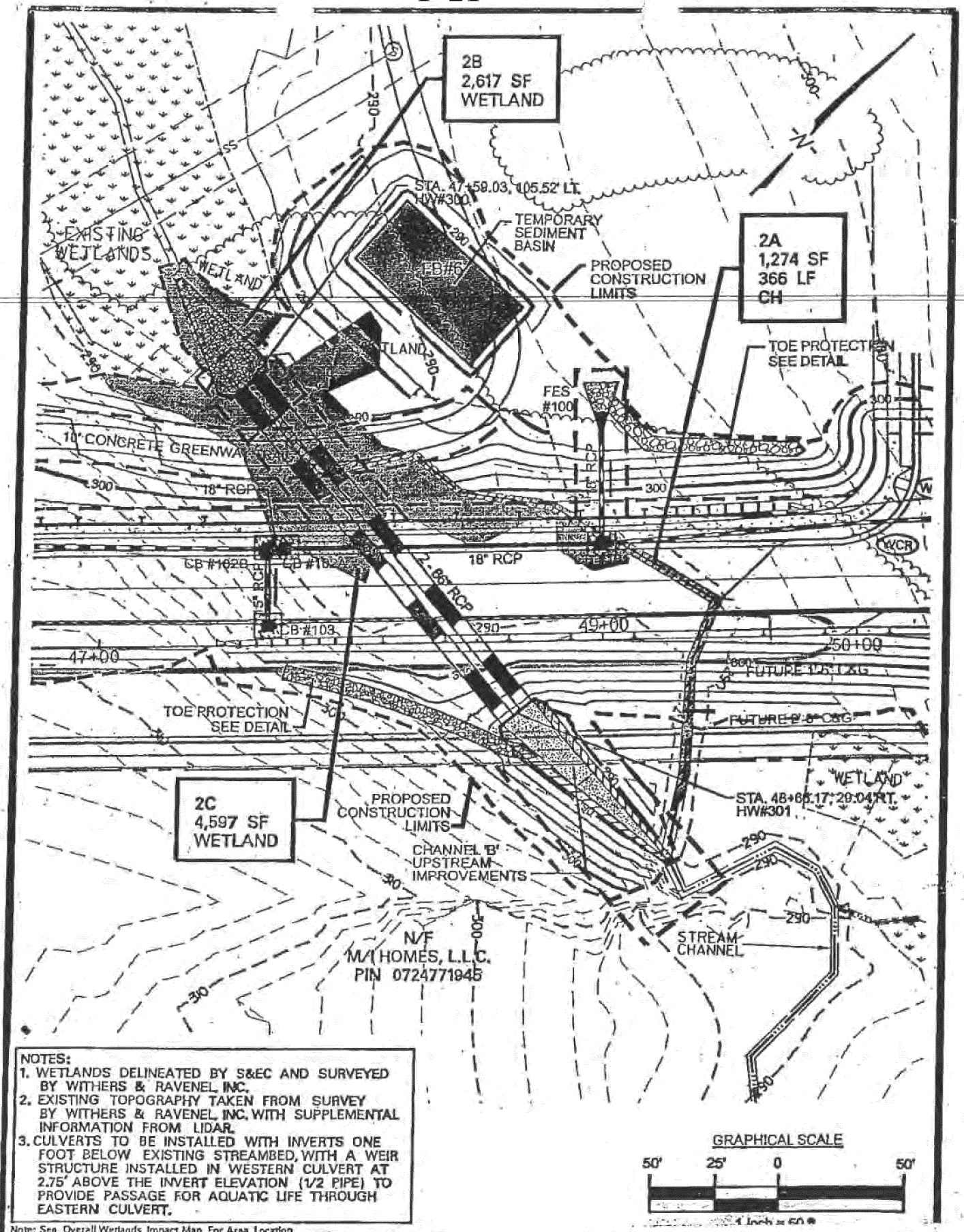


NOTES:
1. WETLANDS DELINEATED BY S&EC AND SURVEYED BY WITHERS & RAVENEL, INC.
2. EXISTING TOPOGRAPHY TAKEN FROM SURVEY BY WITHERS & RAVENEL, INC. WITH SUPPLEMENTAL INFORMATION FROM LIDAR.
3. CULVERTS TO BE INSTALLED WITH INVERTS ONE FOOT BELOW EXISTING STREAMBED, WITH A WEIR STRUCTURE INSTALLED IN EASTERN CULVERT AT 3.00' ABOVE THE INVERT ELEVATION (1/2 PIPE) TO PROVIDE PASSAGE FOR AQUATIC LIFE THROUGH WESTERN CULVERT.

Note: See Overall Wetlands Impact Map For Area Location

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS

Stage 1A - Final Design Drawings

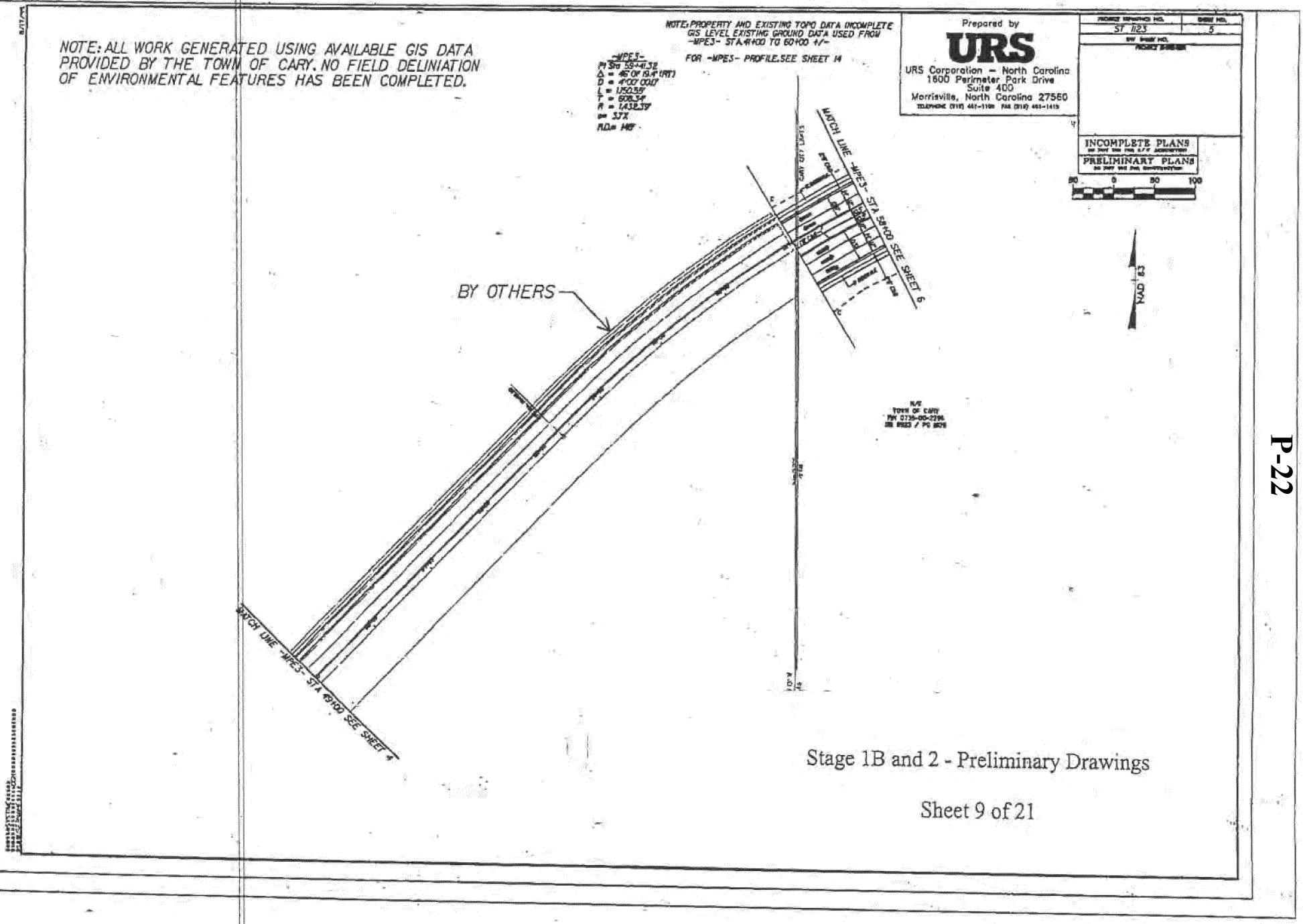


NOTES:
1. WETLANDS DELINEATED BY S&EC AND SURVEYED BY WITHERS & RAVENEL, INC.
2. EXISTING TOPOGRAPHY TAKEN FROM SURVEY BY WITHERS & RAVENEL, INC. WITH SUPPLEMENTAL INFORMATION FROM LIDAR.
3. CULVERTS TO BE INSTALLED WITH INVERTS ONE FOOT BELOW EXISTING STREAMBED, WITH A WEIR STRUCTURE INSTALLED IN WESTERN CULVERT AT 2.75' ABOVE THE INVERT ELEVATION (1/2 PIPE) TO PROVIDE PASSAGE FOR AQUATIC LIFE THROUGH EASTERN CULVERT.

Note: See Overall Wetlands Impact Map For Area Location

WITHERS & RAVENEL
ENGINEERS | PLANNERS | SURVEYORS

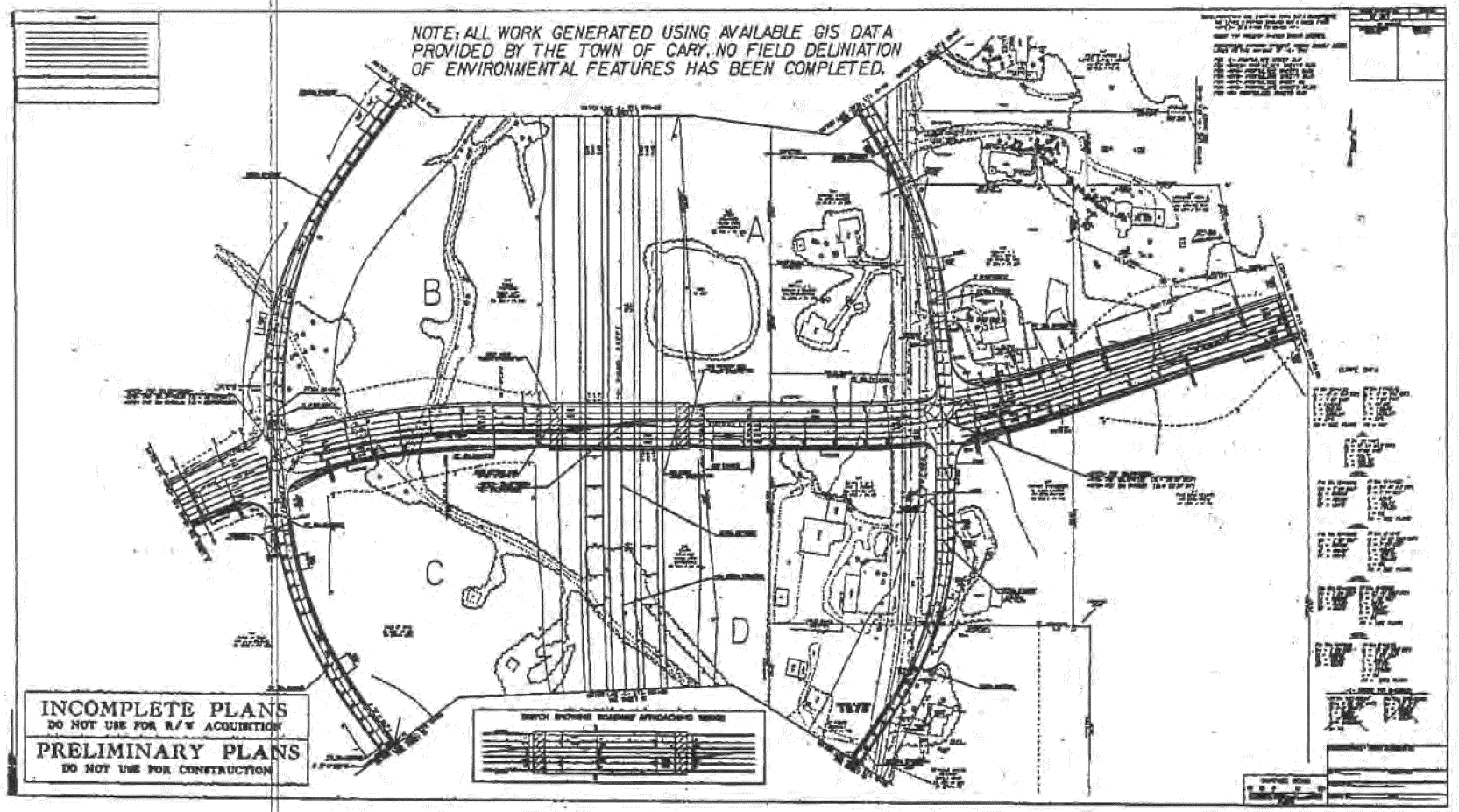
Stage 1A - Final Design Drawings



P-22

Stage 1B and 2 - Preliminary Drawings

Sheet 9 of 21



TO PLOT 24"/HALF SIZE

P-23

NOTE: ALL WORK GENERATED USING AVAILABLE GIS DATA PROVIDED BY THE TOWN OF CARY. NO FIELD DELINIATION OF ENVIRONMENTAL FEATURES HAS BEEN COMPLETED.

NOTE: PROPERTY AND EXISTING TOPO DATA INCOMPLETE FOR -WPE3- PROFILE. SEE SHEET 15

Prepared by

URS

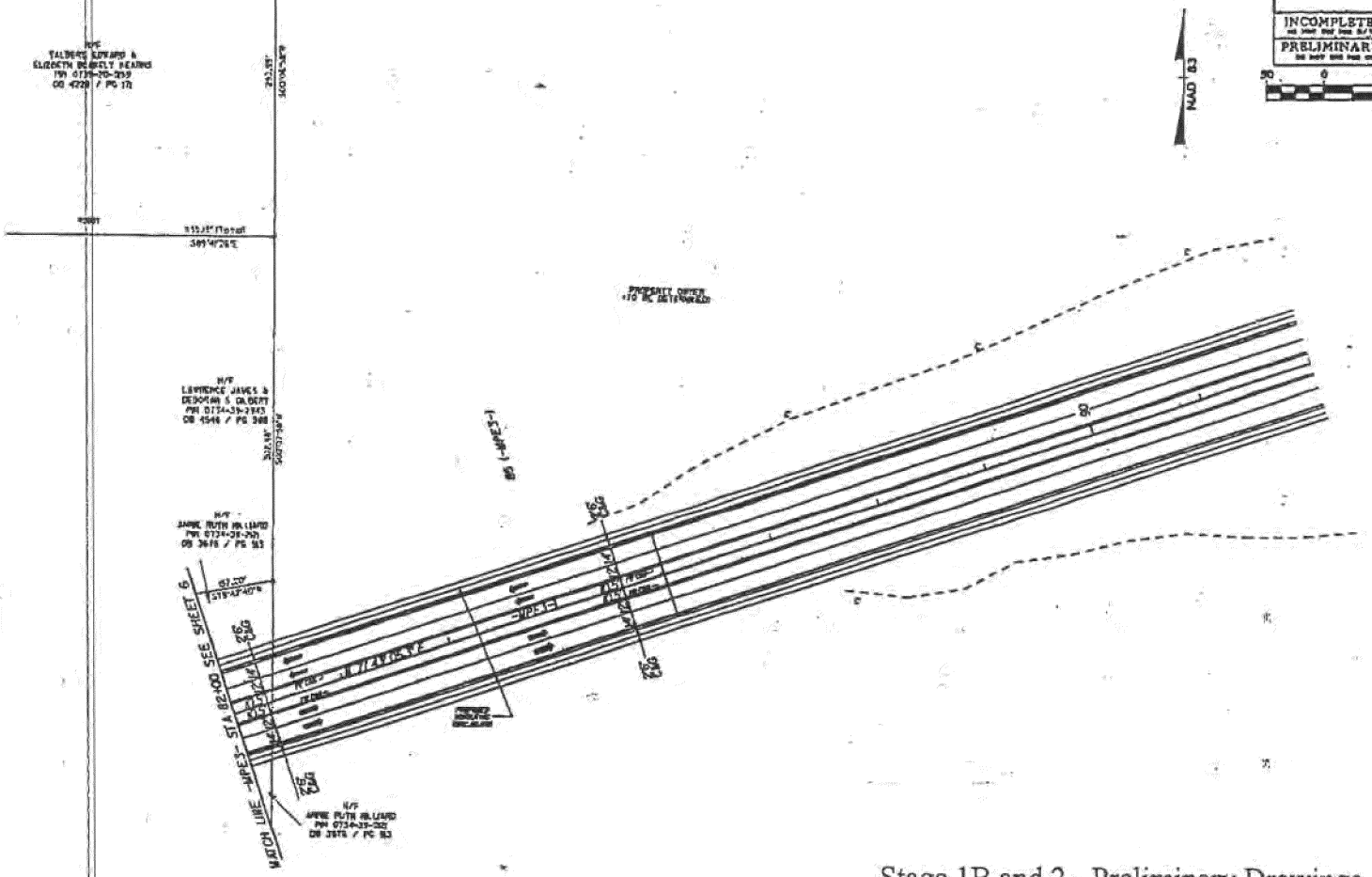
URS Corporation – North Carolina
1600 Perimeter Park Drive
Suite 400
Morrisville, North Carolina 27560

ST 1123

INCOMPLETE PLANS

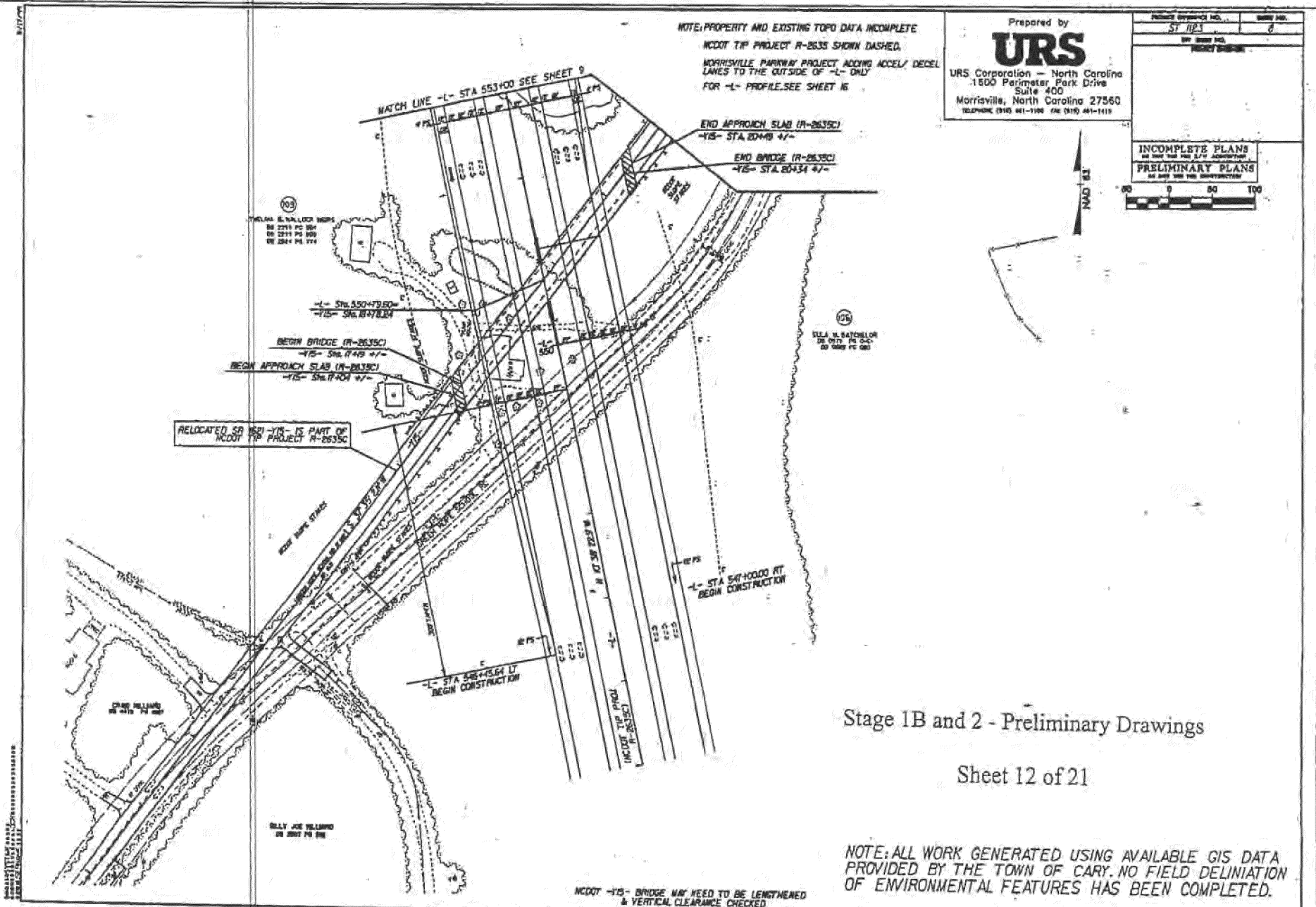
PRELIMINARY PLANS

50 0 50 100



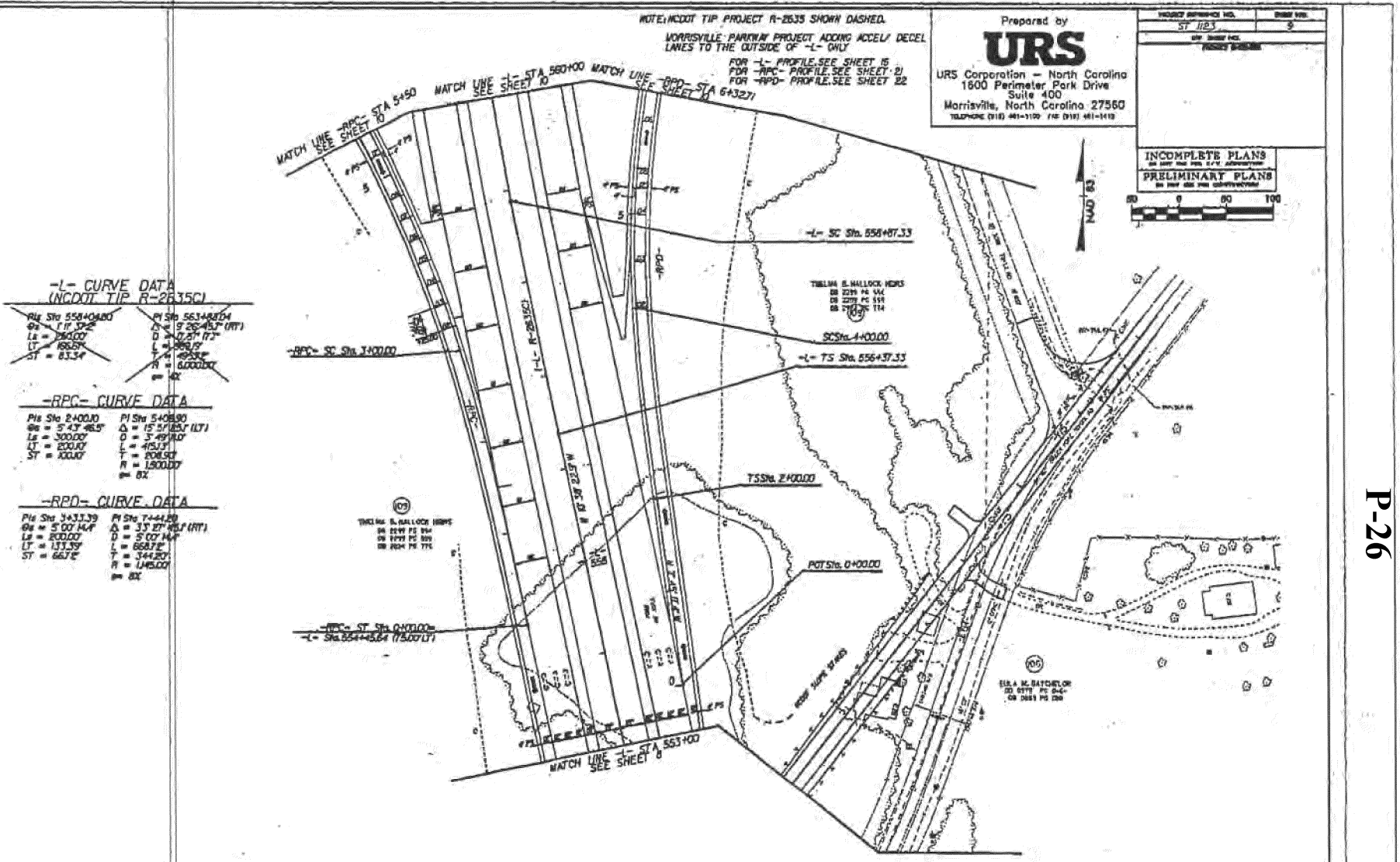
Stage 1B and 2 - Preliminary Drawings

Sheet 11 of 21



Stage 1B and 2 - Preliminary Drawings

Sheet 12 of 21

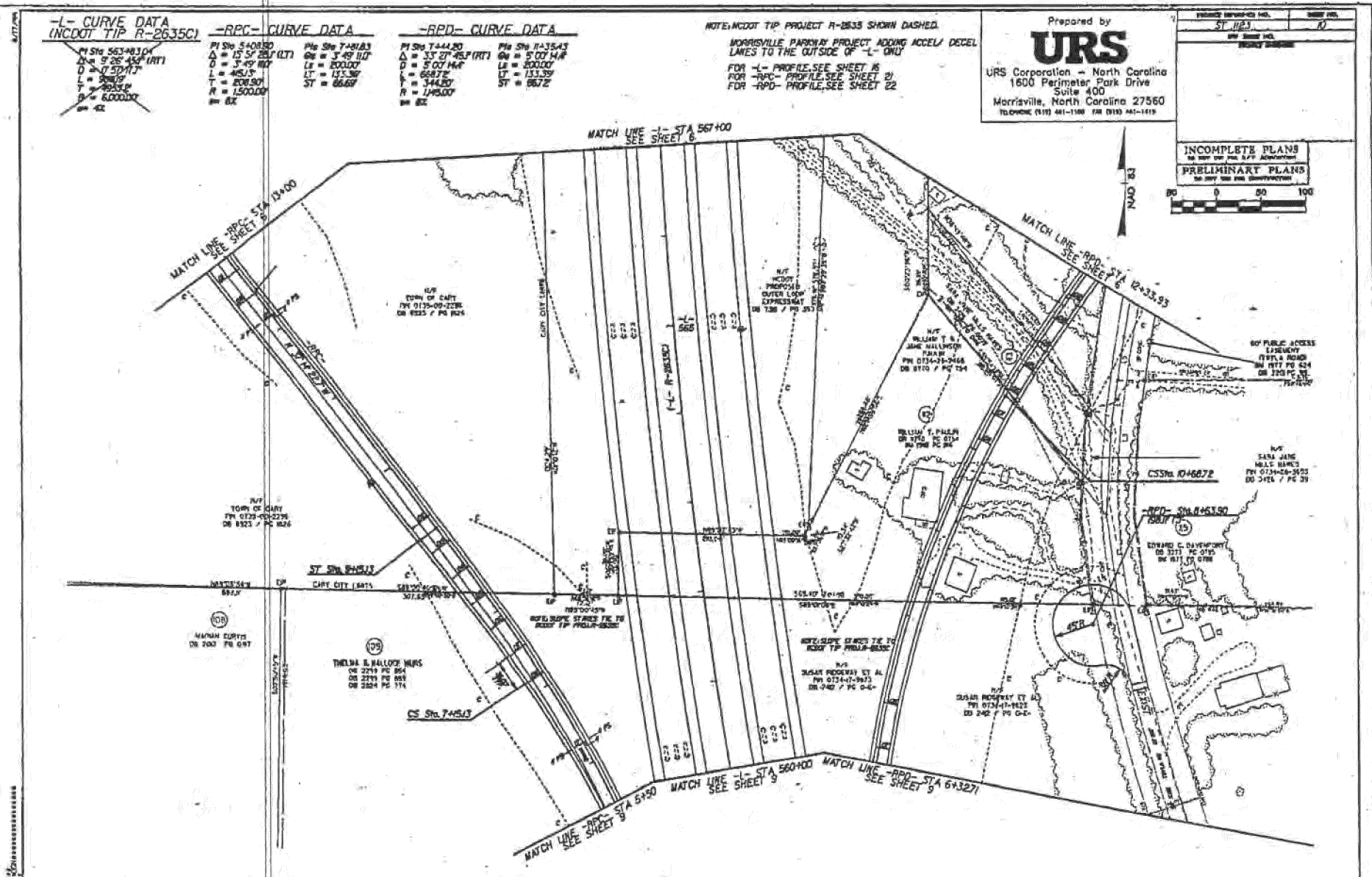


NOTE: ALL WORK GENERATED USING AVAILABLE GIS DATA PROVIDED BY THE TOWN OF CARY. NO FIELD DELINIATION OF ENVIRONMENTAL FEATURES HAS BEEN COMPLETED.

Stage 1B and 2 - Preliminary Drawings

Sheet 13 of 21

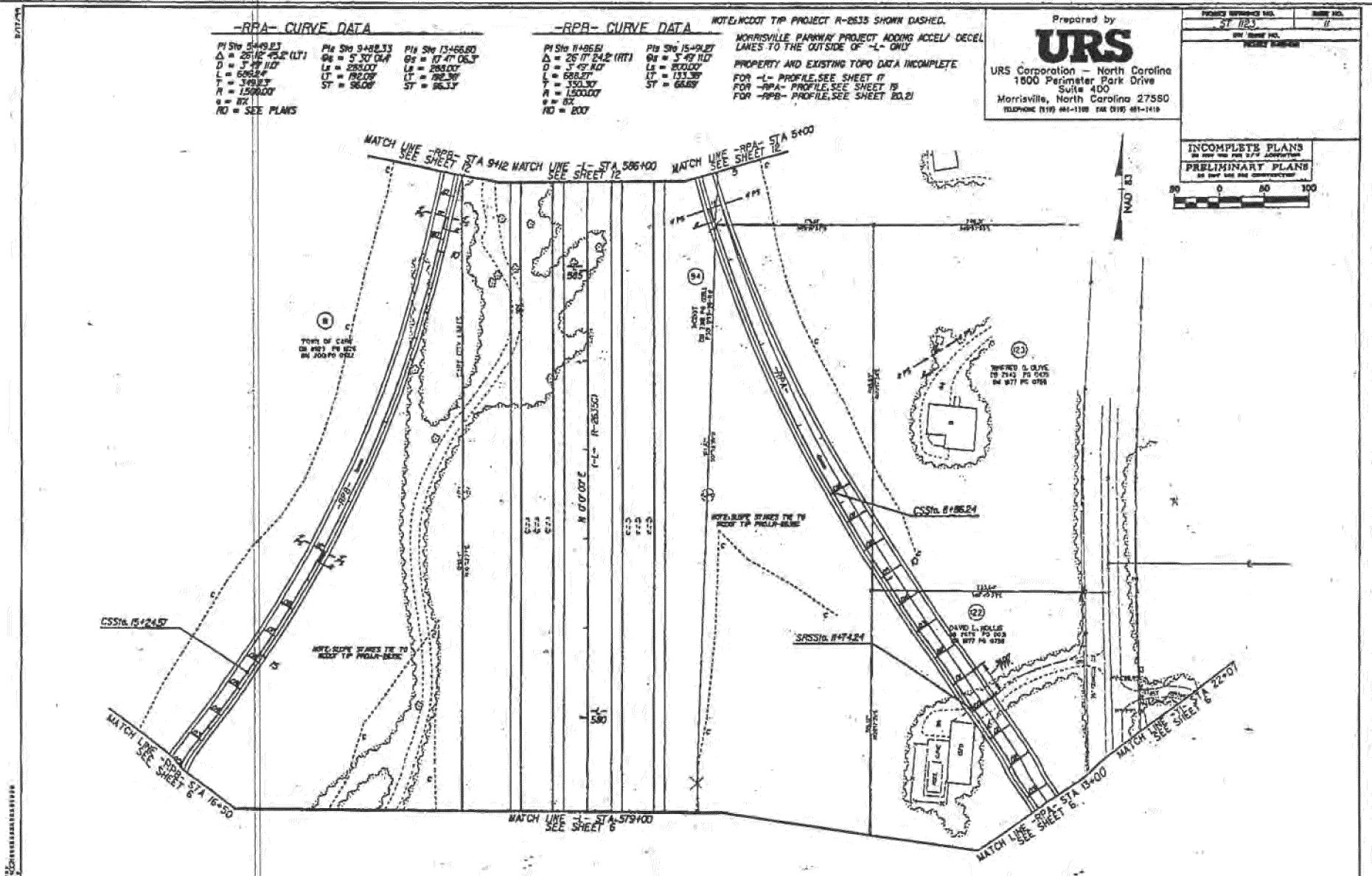
P-26



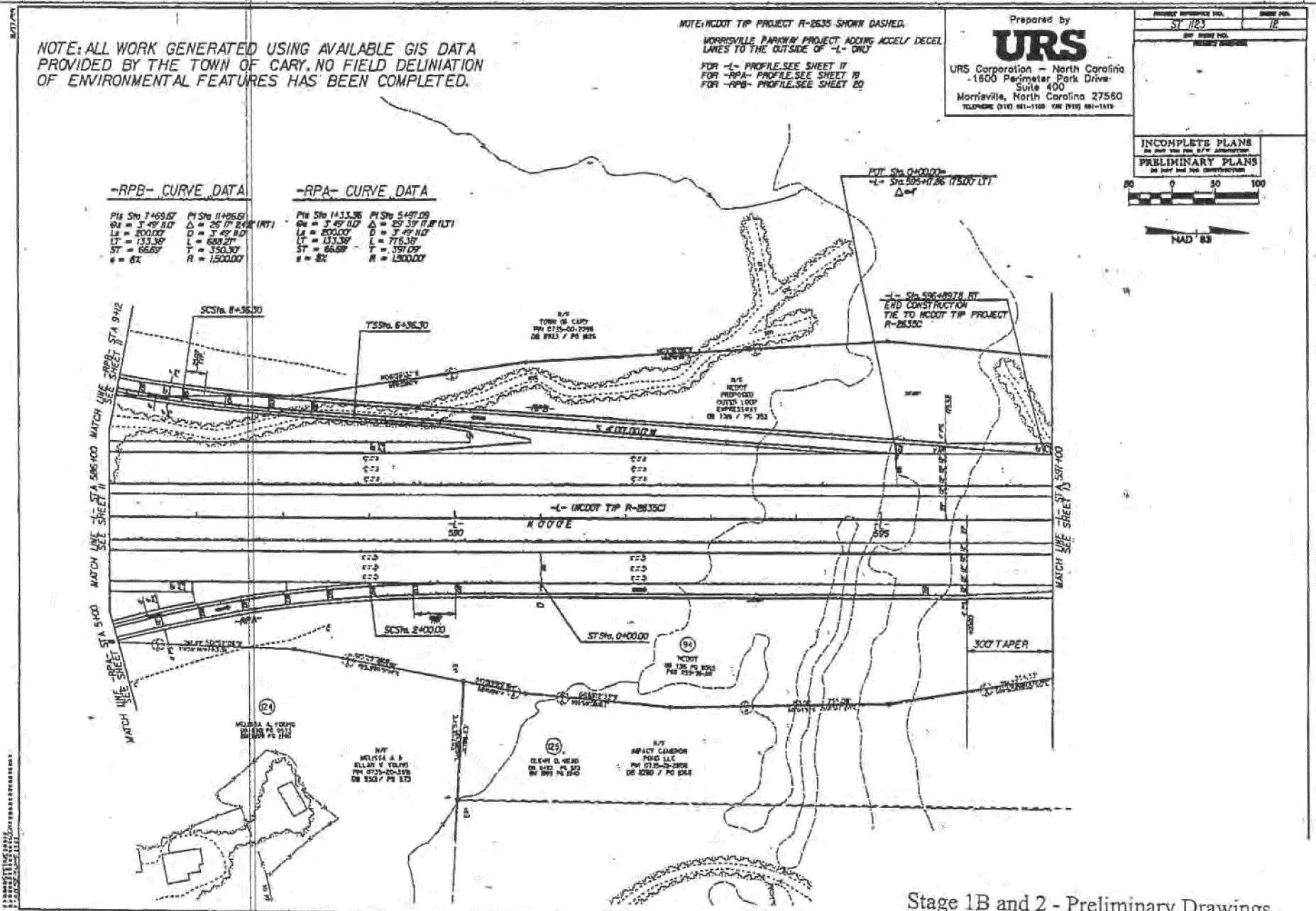
Stage 1B and 2 - Preliminary Drawings

Sheet 14 of 21

P-27


-RPA- CURVE DATA
-RPB- CURVE DATA
NOTE: NCDOT TIP PROJECT R-2635 SHOWN DASHED.
MORRISVILLE PARKWAY PROJECT ADDING ACCEL/ DECEL LANES TO THE OUTSIDE OF -L- ONLY
PROPERTY AND EXISTING TOPO DATA INCOMPLETE
FOR -L- PROFILE, SEE SHEET 17
FOR -RPA- PROFILE, SEE SHEET 19
FOR -RPB- PROFILE, SEE SHEET 20, 21
Prepared by
URS
URS Corporation – North Carolina
1600 Perimeter Park Drive
Suite 400
Morrisville, North Carolina 27560
INCOMPLETE PLANS
PRELIMINARY PLANS
MATCH LINE -RPB- STA 9+12 SEE SHEET 12
MATCH LINE -L- STA 586+00 SEE SHEET 12
MATCH LINE -RPA- STA 5+00 SEE SHEET 12
MATCH LINE -RPB- STA 16+50 SEE SHEET 6
MATCH LINE -L- STA 579+00 SEE SHEET 6
MATCH LINE -RPA- STA 13+00 SEE SHEET 6
MATCH LINE -L- STA 22+01 SEE SHEET 6
CSSta. 15+24.57
CSSta. 8+86.24
SRSSta. 11+47.24
TOWN OF CARY
DAVID L. HOLLIS
NOTE: ALL WORK GENERATED USING AVAILABLE GIS DATA PROVIDED BY THE TOWN OF CARY. NO FIELD DELINIATION OF ENVIRONMENTAL FEATURES HAS BEEN COMPLETED.

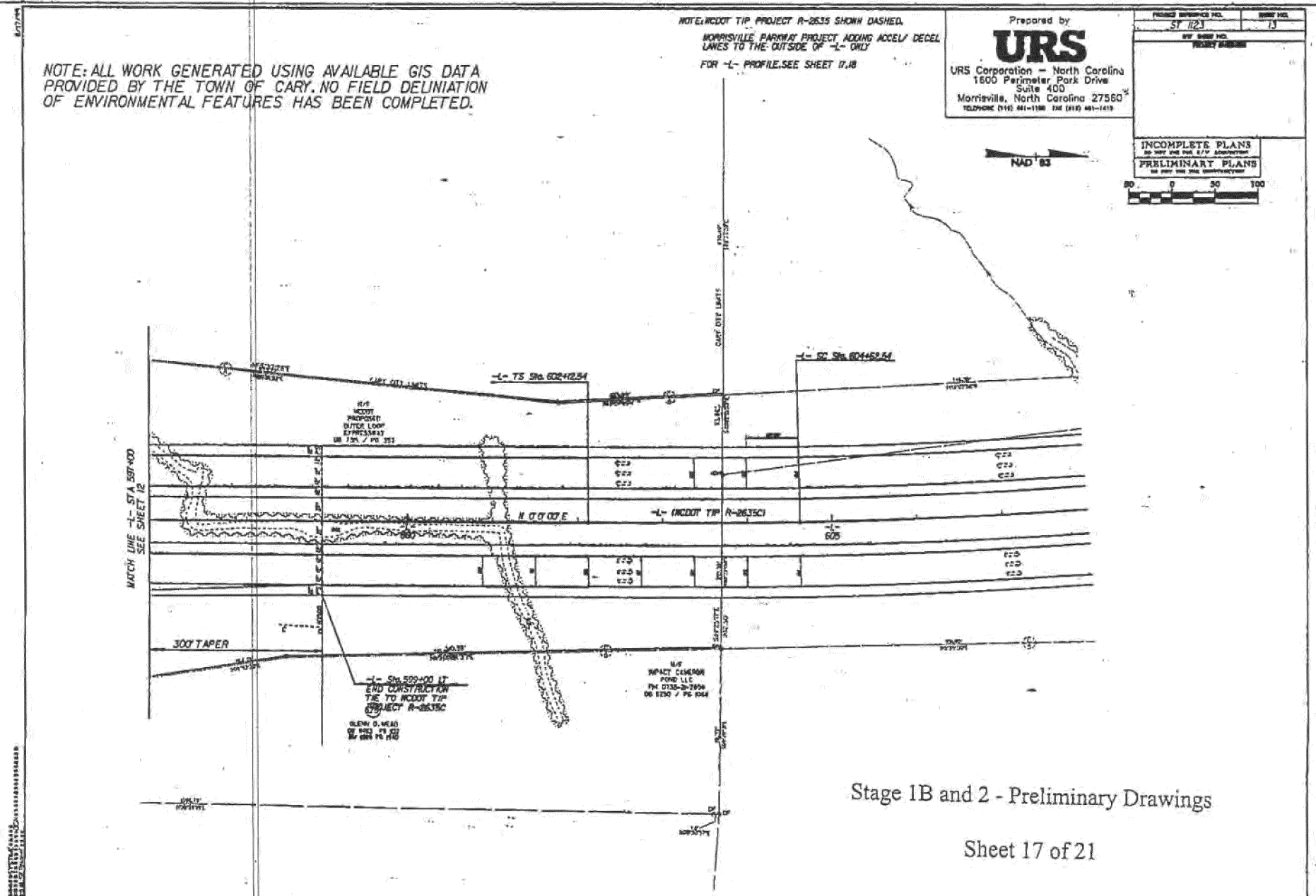
P-28



Stage 1B and 2 - Preliminary Drawings

Sheet 16 of 21

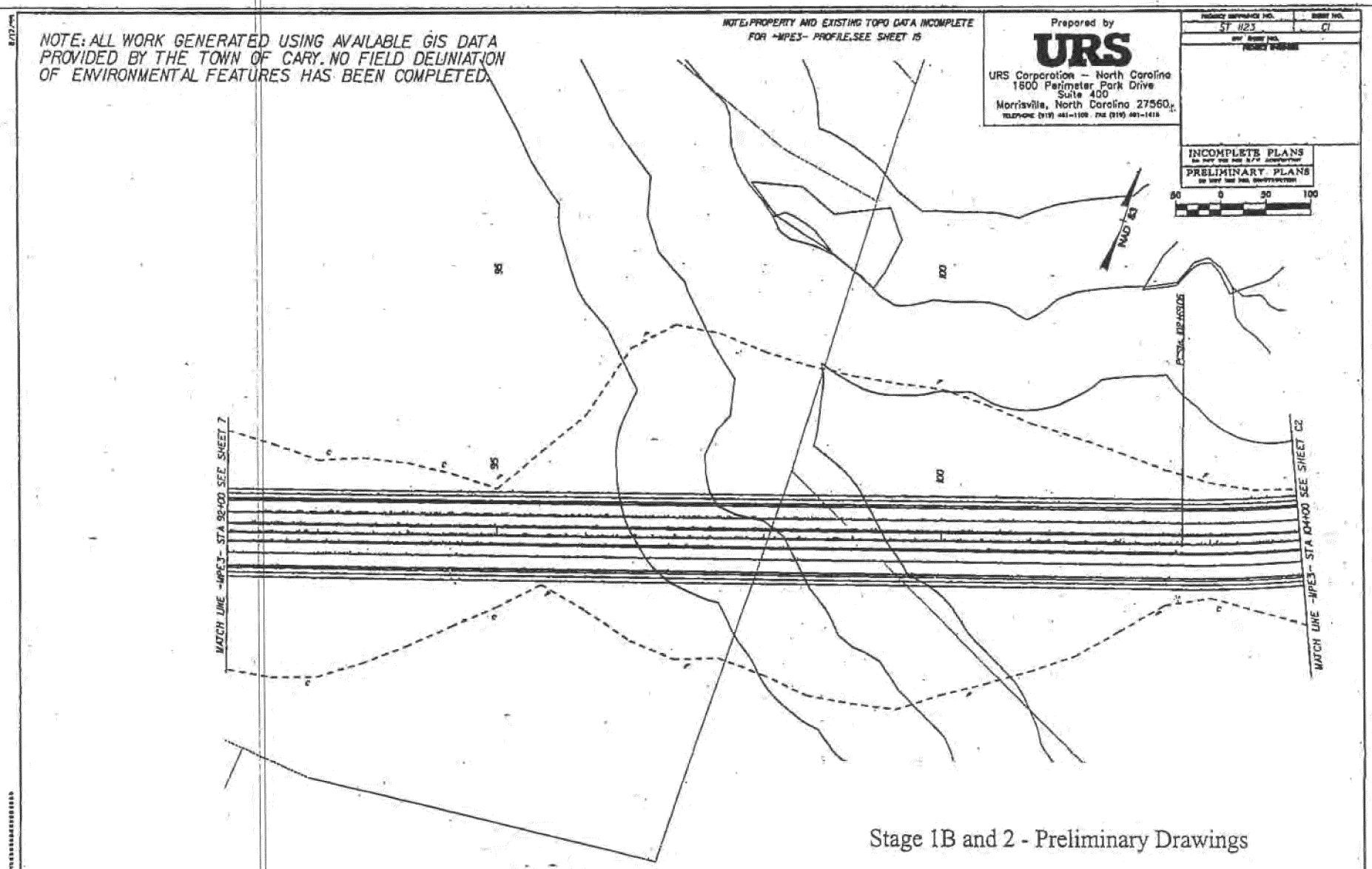
P-29



Stage 1B and 2 - Preliminary Drawings

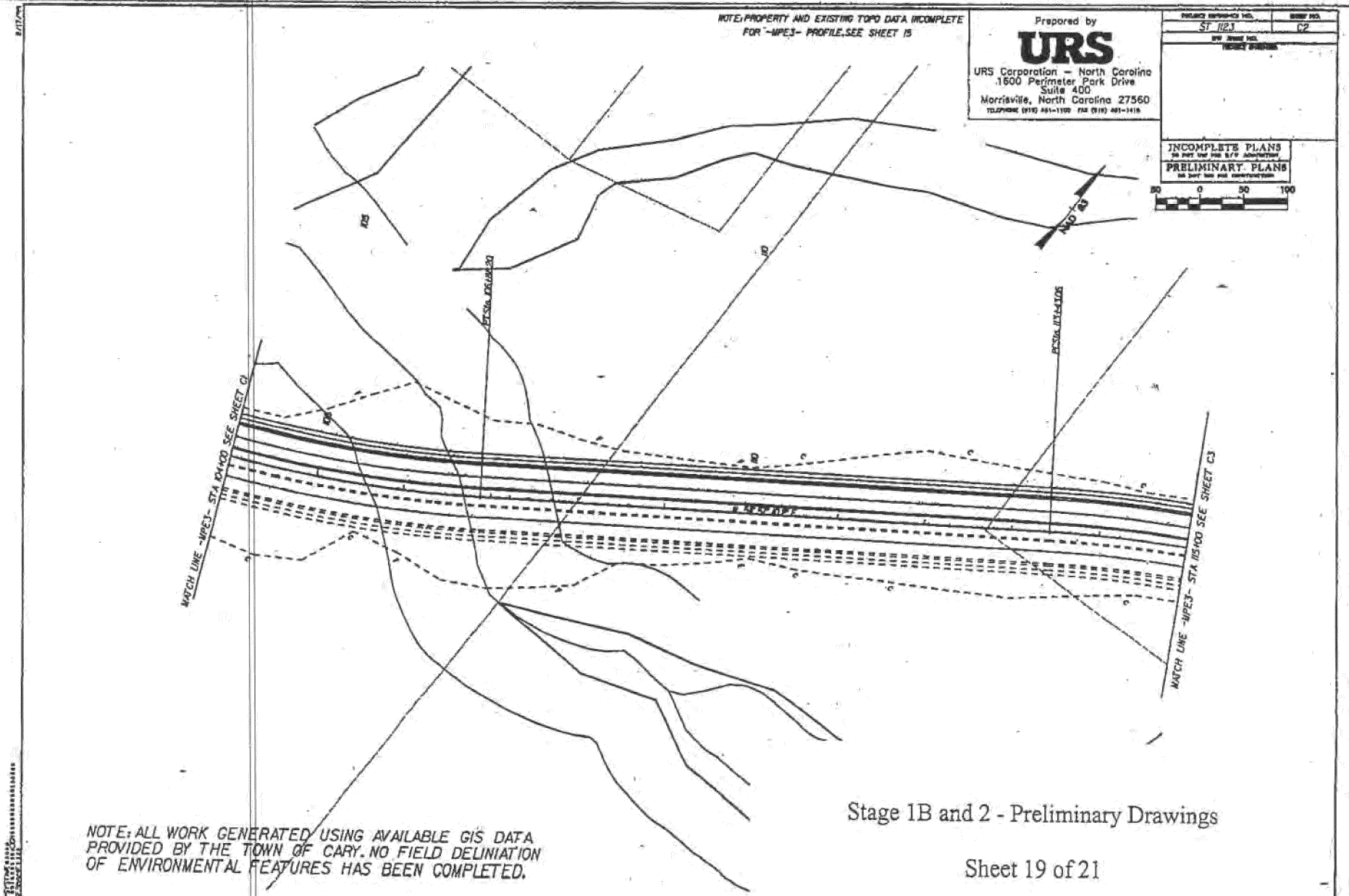
Sheet 17 of 21

P-30



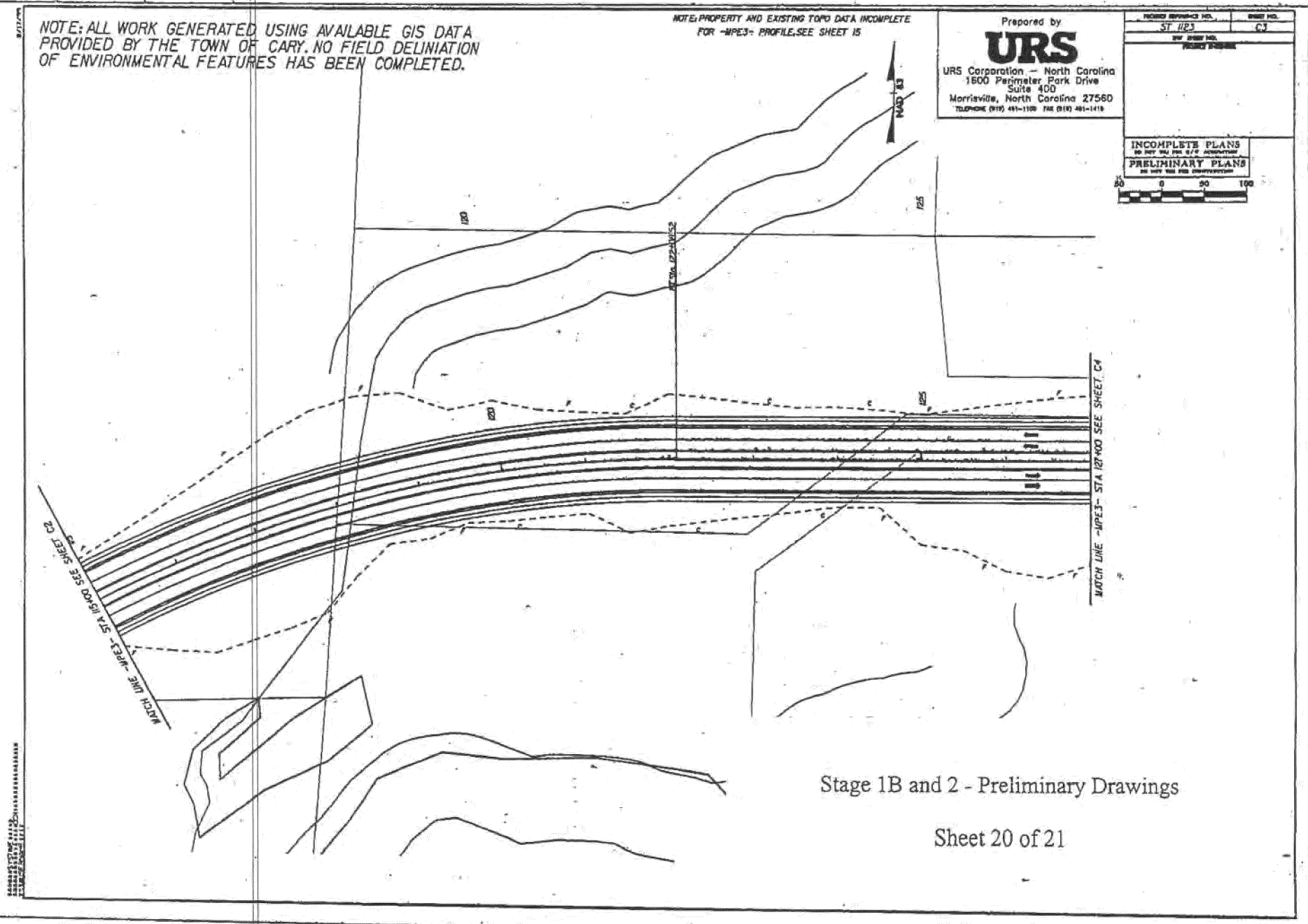
Stage 1B and 2 - Preliminary Drawings

Sheet 18 of 21



Stage 1B and 2 - Preliminary Drawings

Sheet 19 of 21



Stage 1B and 2 - Preliminary Drawings

Sheet 20 of 21

P-33

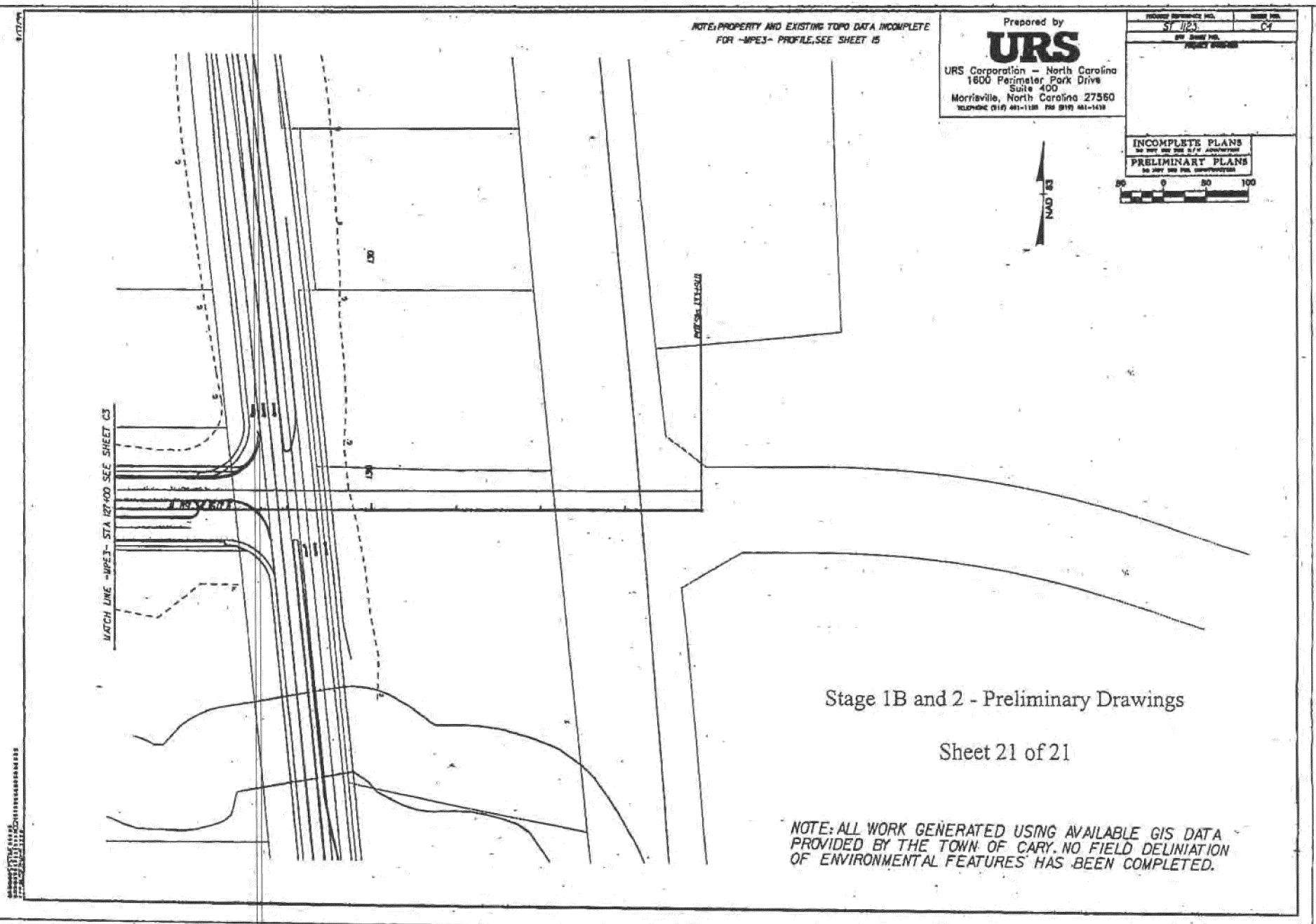

NOTE: PROPERTY AND EXISTING TOPO DATA INCOMPLETE FOR -WPE3- PROFILE, SEE SHEET 15
Prepared by
URS
URS Corporation – North Carolina
1600 Perimeter Park Drive
Suite 400
Morrisville, North Carolina 27560
INCOMPLETE PLANS
PRELIMINARY PLANS
NAD 83
MATCH LINE -WPE3- STA 127+00 SEE SHEET C3
Stage 1B and 2 - Preliminary Drawings
Sheet 21 of 21
NOTE: ALL WORK GENERATED USING AVAILABLE GIS DATA PROVIDED BY THE TOWN OF CARY. NO FIELD DELINIATION OF ENVIRONMENTAL FEATURES HAS BEEN COMPLETED.

Exhibit 4

Michael F. Easley, Governor

William G. Ross Jr., Secretary
North Carolina Department of Environment and Natural Resources

Coleen H. Sullins, Director
Division of Water Quality

April 8, 2008

RECEIVED
APR 0 9 2008
RALEIGH REGULATORY FIELD OFFICE

Mr. Russ Overton
Town of Cary – Engineering Department
P.O. Box 8005
Cary, NC 27512-8005

Re: Town of Cary Morrisville Parkway Extension – Phase III, Wake County
DWQ #20080640; USACE Action ID. No. SAW-2008-00373
Ut to Panther Creek [030605, 16-41-1-17-3, WSIV, NSW]
APPROVAL of 401 Water Quality Certification with Additional Conditions

Dear Mr. Overton:

Attached hereto is a copy of Certification No. 3737 issued to Mr. Russ Overton and Town of Cary, dated April 8, 2008. In addition, you should get any other federal, state or local permits before you go ahead with your project including (but not limited to) Solid Waste, Sediment and Erosion Control, Stormwater, Dam Safety, Non-discharge and Water Supply Watershed regulations.

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

Sincerely,

Coleen H. Sullins

CHS/cbk/*ijm*

Attachments: NCDWQ 401 WQC Summary of Permanent Impacts and Mitigation Requirements
Certificate of Completion

cc: Becky Fox, EPA, 1307 Firefly Road, Whittier, NC 28789
U.S. Army Corps of Engineers, Raleigh Regulatory Field Office, Wilmington District, USACE
Lauren Witherspoon, DWQ, Raleigh Regional Office
DLR Raleigh Regional Office
File Copy
Central Files
Charles Benton, URS Corporation, 1600 Perimeter Park Drive, Suite 400, Morrisville, NC 27560-8421

Filename: **080640MorrisvilleParkwayExtPhIII(Wake)401_IC**

NORTH CAROLINA 401 WATER QUALITY CERTIFICATION

THIS PERMIT AUTHORIZATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality (DWQ) Regulations in 15 NCAC 2H, Section .0500 to Mr. Russ Overton and Town of Cary, to fill or otherwise permanently impact 0.72 acres of 404/wetland and 3,412 linear feet of perennial stream to construct the proposed Town of Cary - Morrisville Parkway Extension – roadway segment Phase III, which is located between NC Highway 55 and SR 1625, Green Level to Durham Road at SR 1600, Green Level Church Road, near Cary, Wake County, North Carolina, pursuant to an application dated January 25, 2008 and received by the DWQ on January 30, 2008, and by Public Notice by the U.S. Army Corps of Engineers issued on the 15th day of February of 2008 (received by DWQ on February 15, 2008).

The application and supporting documentation provides adequate assurance that the proposed work 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, the supporting documentation, and conditions hereinafter set forth.

This Approval is only valid for the purpose and design submitted in the application materials and as described in the Public Notice. If the project is changed, prior to notification a new application for a new Approval is required. If the property is sold, the new owner must be given a copy of the Approval and Approval letter and is thereby responsible for complying with all conditions of this Approval. Any new owner must notify the Division and request the Approval be issued in their name. Should wetland or stream fill be requested in the future, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). If any plan revisions from the approved site plan result in a change in stream or wetland impact or an increase in impervious surfaces, the DWQ shall be notified in writing and a new application for 401 Certification may be required. For this Approval to be valid, compliance with the conditions listed below is required.

Conditions of Approval:

1. Impacts Approved

   The following impacts are hereby approved as long as all of the other specific and general conditions of this Approval are met. No other impacts are approved including incidental impacts:

Type of Impact	Amount Approved (Units)	Plan Location or Reference
404/Wetland	0.72 (acres)	Application and PN
Stream - perennial	3,412 (linear feet)	Application and PN

Sediment and Erosion Control:

2. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface waters standards:

   a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual.*
   b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most

recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.

c. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.

3. No waste, spoil, solids, or fill of any kind shall occur in wetlands, waters, or riparian areas beyond the footprint of the impacts depicted in the 404/401Permit Application. All construction activities, including the design, installation, operation, and maintenance of sediment and erosion control Best Management Practices, shall be performed so that no violations of state water quality standards, statutes, or rules occur;

4. Sediment and erosion control measures shall not be placed in wetlands or waters to the maximum extent practicable. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, they shall be removed and the natural grade restored within six months of the date that the Division of Land Resources has released the project;

5. Protective Fencing - The outside buffer, wetland or water boundary and along the construction corridor within these boundaries approved under this authorization shall be clearly marked with orange warning fencing (or similar high visibility material) for the areas that have been approved to infringe within the buffer, wetland or water prior to any land disturbing activities;

Continuing Compliance:

6. Mr. Russ Overton and Town of Cary shall conduct construction activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with section 303(d) of the Clean Water Act) and any other appropriate requirements of State law and federal law. If the Division determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, the Division may reevaluate and modify this Approval to include conditions appropriate to assure compliance with such standards and requirements in accordance with 15A NCAC 2H.0507(d). Before modifying the Approval, the Division shall notify Mr. Russ Overton and Town of Cary, and the US Army Corps of Engineers, provide public notice in accordance with 15A NCAC 2H.0503 and provide opportunity for public hearing in accordance with 15A NCAC 2H.0504. Any new or revised conditions shall be provided to Mr. Russ Overton and Town of Cary in writing, shall be provided to the United States Army Corps of Engineers for reference in any Permit issued pursuant to Section 404 of the Clean Water Act, and shall also become conditions of the 404 Permit for the project;

Mitigation:

7. Compensatory Mitigation Using the Ecosystem Enhancement Program (EEP)

   Mitigation must be provided for the proposed impacts as specified in the table below. We understand that you wish to make a payment to the Wetlands Restoration Fund administered by the NC Ecosystem Enhancement Program (EEP) to meet this mitigation requirement. This has been determined by the DWQ to be a suitable method to meet the mitigation requirement. Until the EEP receives and clears your check (made payable to: DENR – Ecosystem Enhancement Program Office), no impacts specified in this Authorization Certificate shall occur. The EEP should be contacted at (919) 733-5205 if you have any questions concerning payment into a

restoration fund. You have *90 days* from the date of this approval to make this payment. **For accounting purposes, this Authorization Certificate authorizes payment into the Wetlands Restoration Fund to meet the following compensatory mitigation requirement:**

Type of Impact	Compensatory Mitigation Required	River and Sub-basin Number
Stream (perennial)	3,412 (linear feet)	Cape Fear/03030003

8. Construction Stormwater Permit NCG010000

Upon the approval of an Erosion and Sedimentation Control Plan issued by the Division of Land Resources (DLR) or a DLR delegated local erosion and sedimentation control program, an NPDES General stormwater permit (NCG010000) administered by DWQ is automatically issued to the project. This General Permit allows stormwater to be discharged during land disturbing construction activities as stipulated by conditions in the permit. If your project is covered by this permit [applicable to construction projects that disturb one (1) or more acres], full compliance with permit conditions including the sedimentation control plan, self-monitoring, record keeping and reporting requirements are required. A copy of this permit and monitoring report forms may be found at *http://h2o.enr.state.nc.us/su/Forms_Documents.htm.*;

9. Certificate of Completion

Upon completion of all work approved within this Approval, and any subsequent modifications, the applicant is required to return the attached certificate of completion to the 401 Oversight/Express Review Permitting Unit, North Carolina Division of Water Quality, 1650 Mail Service Center, Raleigh, NC, 27699-1650.

Also, this Approval to proceed with your proposed impacts or to conduct impacts to waters as depicted in your application shall expire upon expiration of the 404 or CAMA Permit.

If this Approval is unacceptable to you, you have the right to an adjudicatory hearing upon written request within sixty (60) days following receipt of this Approval. This request must be in the form of a written petition conforming to Chapter 150B of the North Carolina General Statutes and filed with the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, N.C. 27699-6714. If modifications are made to an original Approval, you have the right to an adjudicatory hearing on the modifications upon written request within sixty (60) days following receipt of the Approval. Unless such demands are made, this Approval shall be final and binding.

This the 8th day of April 2008
DIVISION OF WATER QUALITY

for Coleen H. Sullins

3737

CHS/cbk/*ijm*

ichael F. Easley, Governor

William G. Ross Jr., Secretary
North Carolina Department of Environment and Natural Resources

Alan W. Klimek, P.E. Director
Division of Water Quality

North Carolina Division of Water Quality
401 Water Quality Certification
Summary of Permitted Impacts and Mitigation Requirements

In accordance with 15A NCAC 2H.0500, Mr. Russ Overton of the Town of Cary, have permission as outlined below to fill or otherwise impact 0.72 acres of 404/wetland and 3,412 linear feet of perennial stream associated with construction of the proposed Morrisville Parkway Extension, Phase III which is located between NC Highway 55 and SR 1625, Green Level to Durham Road at SR 1600, Green Level Church Road, near Cary, in Wake County, North Carolina. All activities associated with these authorized impacts must be conducted with the conditions listed in the attached Permit transmittal letter. THIS CERTIFICATION IS NOT VALID WITHOUT THE ATTACHMENTS.

COMPENSATORY MITIGATION REQUIREMENTS, ECOSYSTEM ENHANCEMENT PROGRAM

DWQ PROJECT #: 20051360, Ver. 4
LOCATION: Cary
COUNTY Wake
BASIN/ SUB BASIN Cape Fear/03030003

As required by 15A NCAC 2H.0500, and the conditions of this Certification, you are required to compensate for the above mitigable impacts through the restoration, creation, enhancement or preservation of wetlands, surface waters and riparian buffers as outlined below prior to conducting any activities that impact or degrade the waters of the state.

Note: Acreage requirements proposed to be mitigated through the Ecosystem Enhancement Program must be rounded to one-quarter acre increments and linear foot requirements must be rounded up to the nearest foot according to 15 2R.0503(b).

Impacts	Mitigation
3,412 Linear Feet of Perennial Stream	3,412 Linear Feet of Perennial Stream

One of the options you have available to satisfy the compensatory mitigation requirement is through the payment of a fee to the Wetlands Restoration Fund per NCAC 2R.0503. If you choose this option, please sign this form and mail the form along with a copy of your 401 Certification or Buffer Approval to the Ecosystem Enhancement Program at the address below. An invoice for the appropriate amount of payment will be sent to you upon receipt of this form. PLEASE NOTE, THE ABOVE IMPACTS ARE NOT AUTHORIZED UNTIL YOU RECEIVE NOTIFICATION THAT YOUR PAYMENT HAS BEEN PROCESSED BY THE ECOSYTEM ENHANCMENT PROGRAM.

Signature _____ Date _____

ECOSYSTEM ENHANCEMENT PROGRAM
1652 Mail Service Center
RALEIGH, N.C. 27699-1652
(919) 733-5205

Filename: 080640MorrisvilleParkwayExtPhIII(Wake)401_IC_EEP

Environmental Quality

PAT MCCRORY
Governor
DONALD R. VAN DER VAART
Secretary
JAY ZIMMERMAN
DWR Director

September 12, 2016

Mr. Kyle Hubert, P.E.
Town of Cary
PO Box 8005
Cary, NC 27513

Subject: MODIFICATION of 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS for Proposed Phase III extension of Morrisville Parkway to in Wake County, Federal Aid Project No. STPDA-0503(19), NCDOT TIP No U-5315 B&C. NCDWR Project No. 20080640 ver 3.

Dear Mr. Hancock:

Attached hereto is a copy of the Modification to Certification No. 3737 issued to the Town of Cary dated April 8, 2008.

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

Sincerely,

for S. Jay Zimmerman, Director
Division of Water Resources

Attachments

Electronic copy only distribution:
Eric Alsmeyer, US Army Corps of Engineers, Raleigh Field Office
Chris Murray, NCDOT Division 5 Environmental Officer
Jeff Meador, P.E., RK&K
Beth Harmon, Division of Mitigation Services
File Copy

MODIFICATION of 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, version 3, authorizes the Town of Cary to impact 0.22 acres of jurisdictional wetlands, and 1204 linear feet of jurisdictional streams in Wake County. The project shall be constructed pursuant to the application modification received August 3, 2016. The authorized modified impacts are as described below:

Phase III Stream Impacts in the Cape Fear River Basin

Site	Permanent Fill in Perennial Stream (linear ft)	Riprap Stabilization in Perennial Stream (linear ft)	Temporary Impact to Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
1	815	0	10	825	815
2	305	28	46	379	333
Total	**1120**	**28**	**56**	**1204**	**1148**

Total Stream Impact for Phase III: 1204 linear feet

Phase III Wetland Impacts in the Cape Fear River Basin

Site	Permanent Fill (ac)	Mechanized Clearing (ac)	Total Wetland Impact (ac)
1	0.21	0	0.21
3	0	0.01	0.01
Total	**0.21**	**0.01**	**0.22**

Total Wetland Impact for Phase III: 0.22 acres.

The application provides adequate assurance that the discharge of fill material into the waters of the Cape Fear River Basin in conjunction with the proposed development will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the State of North Carolina certifies that this activity will not violate the applicable portions of Sections 301, 302, 303, 306, 307 of PL 92-500 and PL 95-217 if conducted in accordance with the application and conditions hereinafter set forth.

This approval is only valid for the purpose and design that you submitted in your modification application received August 3,2016. 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). Additional buffer impacts may require compensatory mitigation as described in 15A NCAC 2B.0267. For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

Conditions of Certification:

1. Compensatory mitigation for 1148 linear feet of impact to streams 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 July 26, 2016 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. Any modifications to this 401 Water Quality Certification that propose additional stream impacts or increased impervious surface requiring additional stormwater management may be subject the Jordan Water Supply Nutrient Strategy (15A NCAC02B .0267). The permittee shall coordinate with the NCDWR prior to submitting a modification request to determine the applicability of the Jordan Water Supply Nutrient Strategy. This condition does not apply to major modifications for additional sections of the project that were covered under the Finding of No Significant Impact or approved in the Avoidance and Minimization stage of the project.

3. Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams, shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and down stream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by the NCDWR. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact the NCDWR for guidance on how to proceed and to determine whether or not a permit modification will be required. [15A NCAC 02H.0506(b)(2)]

4. Riprap shall not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be properly designed, sized and installed. [15A NCAC 02H.0506(b)(2)]

5. For all being impacted due to site dewatering activities, the site shall be graded to its preconstruction contours and revegetated with appropriate native species. [15A NCAC 02H.0506(b)(2)]

6. The stream channel shall be excavated no deeper than the natural bed material of the stream, to the maximum extent practicable. Efforts must be made to minimize impacts to the stream banks, as well as to vegetation responsible for maintaining the stream bank stability. Any applicable riparian buffer impact for access to stream channel shall be temporary and be revegetated with native riparian species. [15A NCAC 02H.0506(b)(2)]

7. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills. [15A NCAC 02B.0200]

8. During the construction of the project, no staging of equipment of any kind is permitted in waters of the U.S., or protected riparian buffers. [15A NCAC 02H.0506(b)(2)]

9. The dimension, pattern and profile of the stream above and below the crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions. [15A NCAC 02H.0506(b)(2)]

10. The use of rip-rap above the Normal High Water Mark shall be minimized. Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage. [15A NCAC 02H.0506(b)(2)]

11. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval. [15A NCAC 02H .0507 (c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

12. All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water. [15A NCAC 02H.0506(b)(3) and (c)(3)]

13. Heavy equipment shall be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the introduction of other pollutants into the stream. [15A NCAC 02H.0506(b)(3)]

14. All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials. [15A NCAC 02H.0506(b)(3)]

15. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification. [15A NCAC 02H.0506(b)(3)]

16. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited. [15A NCAC 02H.0506(b)(3)]

17. The permittee and its authorized agents shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act) and any other appropriate requirements of State and Federal law. If the NCDWR determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, the NCDWR may reevaluate and modify this certification. [15A NCAC 02B.0200]

18. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification. [15A NCAC 02H.0506(b)(2)]

19. A copy of this Water Quality Certification shall be maintained on the construction site at all times. In addition, the Water Quality Certification and all subsequent modifications, if any, shall be maintained with the on-site project manager. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

20. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization, including all non-commercial borrow and waste sites associated with the project, shall be clearly marked by highly visible fencing prior to any land disturbing activities. Impacts to areas within the fencing are prohibited unless otherwise authorized by this certification. [15A NCAC 02H.0501 and .0502]

21. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.

22. The Permittee shall report any violations of this certification to the Division of Water Resources within 24 hours of discovery. [15A NCAC 02B.0506(b)(2)]

23. Upon completion of the project (including any impacts at associated borrow or waste sites), the Permittee shall complete and return the enclosed "Certification of Completion Form" to notify the NCDWR when all work included in the 401 Certification has been completed. [15A NCAC 02H.0502(f)]

24. Native riparian vegetation (i.e., trees and shrubs native to your geographic region) must be reestablished in the riparian areas within the construction limits of the project by the end of the growing season following completion of construction. [15A NCAC 02B.0506(b)(2)]

25. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities. [15A NCAC 02H.0506(b)(3) and (c)(3)]

26. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface waters standards [15A NCAC 02H.0506(b)(3) and (c)(3)]:

a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*.
b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.
d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.

27. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification. [15A NCAC 02H.0506(b)(3) and (c)(3)]

28. All other conditions in the Original Water Quality Certification dated April 8, 2008, and Version 2 dated November 11, 2012, still apply.

Violations of any condition herein set forth may result in revocation of this Certification and may result in criminal and/or civil penalties. This Certification shall become null and void unless the above conditions are made conditions of the Federal 404 and/or Coastal Area Management Act Permit. This Certification shall expire upon the expiration of the 404 or CAMA permit.

If you wish to contest any statement in the attached Certification you must file a petition for an administrative hearing. You may obtain the petition form from the office of Administrative hearings. You must file the petition with the office of Administrative Hearings within sixty (60) days of receipt of this notice. A petition is considered filed when it is received in the office of Administrative Hearings during normal office hours. The Office of Administrative Hearings accepts filings Monday through Friday between the hours of 8:00am and 5:00pm, except for official state holidays. The original and one (1) copy of the petition must be filed with the Office of Administrative Hearings.

The petition may be faxed-provided the original and one copy of the document is received by the Office of Administrative Hearings within five (5) business days following the faxed transmission.
The mailing address for the Office of Administrative Hearings is:

Office of Administrative Hearings
6714 Mail Service Center
Raleigh, NC 27699-6714
Telephone: (919) 431-3000, Facsimile: (919) 431-3100

A copy of the petition must also be served on DEQ as follows:

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

This the 12th day of September 2016

DIVISION OF WATER RESOURCES

for S. Jay Zimmerman, Director

WQC No. 3737

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)
1 (SC-3, WC-2)	-L- 74+62 TO 75+36	42" RCP	0.21					0.06	< 0.01	815	10	
2 (SC-4)	-L- 82+69 TO 83+66	7' X 8' RCBC						0.03	< 0.01	305	46	
2 (SC-4)	-L- 82+69 TO 83+66	BANK STABILIZATION						< 0.01		28		
3 (WC-3)	-Y1- 15+85 TO 16+23 LT.	UTILITIES				0.01						
TOTALS*:			0.21			0.01		0.09	< 0.01	1148	56	0

*Rounded totals are sum of actual impacts

NOTES:
SITE 2 - INCLUDES TEMPORARY STREAM IMPACTS FOR WATER, SEWER, RECLAIMED WATER INSTALLATION
SITE 3 - MECHANIZED CLEARING REQUIRED FOR OVERHEAD UTILITY INSTALLATION

Revised 2013 10 24

TOWN OF CARY, NORTH CAROLINA
WAKE COUNTY
6/28/2015
U-5315A/U-5315B
MORRISVILLE PARKWAY EXTENTION - PHASE III
STAGE 1B- PHASE 2
SHEET 1 OF 14

Mod Permit Drawings
14 pages

CARY PROJECT: ST 1123/1220 TIP PROJECT: U-5315 A&B

09/28/99

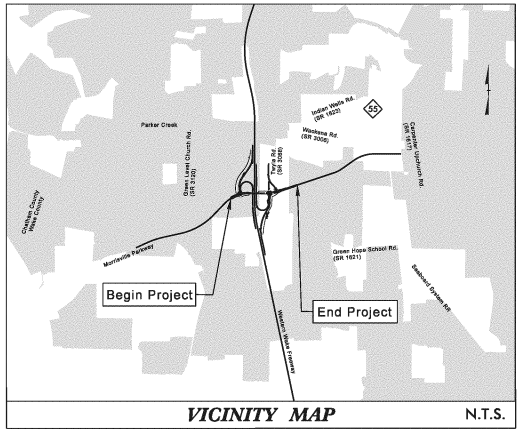
6/28/2016
R:\Hydraulics\PERMITS_Environmental\Drawings\u5315_Hyd_wet_tsh.dgn
default

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5315A/U-5315B	1	

STATE PROJ. NO.		F. A. PROJ. NO.	DESCRIPTION
U-5315A	45429.1.F2	STPDA-0503(19)	PE
U-5315A	45429.2.F2		R/W, UTILITIES
U-5315A	45429.3.F2		CONST.
U-5315B	45429.1.F3		PE
U-5315B	45429.2.F3		R/W, UTILITIES
U-5315B	45429.3.F3		CONST.
U-5315B	45429.5.TA1		CONST.
U-5315B	45429.5.TA2		
U-5315B	45429.5.TA3		R/W, UTILITIES



VICINITY MAP N.T.S.

NOTES:
1. CLEARING AND GRUBBING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

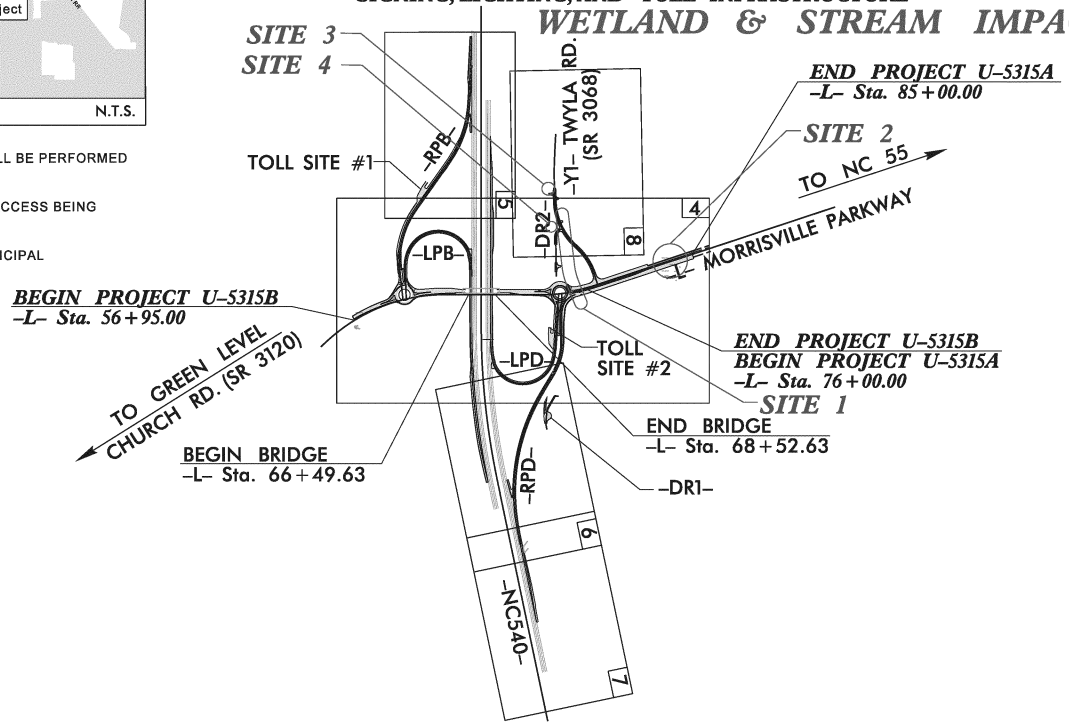
2. THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

3. A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF CARY.

LOCATION: MORRISVILLE PARKWAY EXTENSION AND NC 540 INTERCHANGE FROM WEST OF HIGHCROFT DRIVE TO EAST OF MILLS PARK DRIVE IN CARY

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, SIGNING, LIGHTING, AND TOLL INFRASTRUCTURE

WETLAND & STREAM IMPACTS



NAD 83/95

ENGLISH

PERMIT DRAWING
SHEET 2 OF 14

P-46

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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 = 10,700
ADT 2035 = 22,200
DHV = 12 %
D = 60 %
T = 4 % *
V = 50 MPH

* (TTST 1% + DUALS 3%)

FUNC. CLASS = MAJOR THOROUGHFARE / URBAN ARTERIAL

PROJECT LENGTH

LENGTH OF PROJECT U-5315B.....0.36 mi
LENGTH OF PROJECT U-5315A.....0.17 mi
TOTAL LENGTH.....0.53 mi

PREPARED IN THE OFFICE OF:
RK&K
RUMMEL, KLEPPER & KAHL, LLP
905 RIDGEFIELD DRIVE, SUITE 350
RALEIGH, NORTH CAROLINA 27609
NC LICENSE NO. F-0112
FOR NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 20, 2015

LETTING DATE:
APRIL 18, 2017

STEPHEN ROBERTS, P.E.
PROJECT ENGINEER

BRIAN PEELER, P.E.
PROJECT DESIGN ENGINEER

NCDOT CONTACT:
CHRISTOPHER K. HAIRE, PE
SPECIAL DESIGN PROJECT ENGINEER
ROADWAY DESIGN UNIT

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROJECT REFERENCE NO.	SHEET NO.
U-5315 A&B	2D-1
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

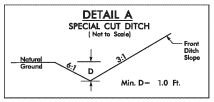
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

ENGLISH

PERMIT DRAWING SHEET 3 OF 14

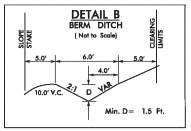
P-47

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)



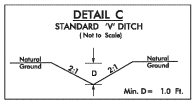
-RPB- STA. 16+00 TO STA. 18+37 RT

DETAIL B
BERM DITCH
(Not to Scale)



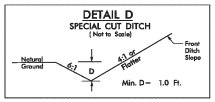
-LPB- STA. 10+00 TO STA. 11+60 LT.
-LPB- STA. 13+50 TO STA. 14+50 LT.
-LPB- STA. 16+50 TO STA. 19+50 LT.
-RPB- STA. 22+50 TO STA. 24+00 LT.
-RPD- STA. 14+00 TO STA. 19+35 RT.

DETAIL C
STANDARD 'V' DITCH
(Not to Scale)



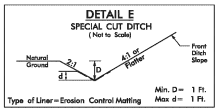
-L- STA. 59+00 RT. L=120' S=2.58%
BEG EL.=347.1 END EL.=344.0
-LPD- STA. 14+28 RT. L=44' S=0.75%
BEG EL.=342.3 END EL.=342.0
-RPD- STA. 22+50 RT. L=58' S=1.55%
BEG EL.=353.0 END EL.=352.1
-LPD- STA. 14+28 RT. L=44' S=0.75%
BEG EL.=342.3 END EL.=342.0
-RPD- STA. 19+47 LT. L=100' S=5.40%
BEG EL.=347.7 END EL.=342.3 (CL B RIPRAP)

DETAIL D
SPECIAL CUT DITCH
(Not to Scale)



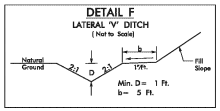
-LPD- STA. 13+00 TO STA. 14+50 RT.
-NC540- STA. 566+00 TO STA. 569+00 LT.
-NC540- STA. 570+50 TO STA. 572+50 LT.
-NC540- STA. 367+39 TO STA. 572+00 RT.
-NC540- STA. 573+50 TO STA. 577+00 RT.
-RPD- STA. 10+75 TO STA. 18+00 RT.

DETAIL E
SPECIAL CUT DITCH
(Not to Scale)



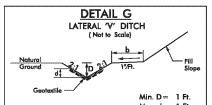
-NC540- STA. 569+00 TO STA. 570+50 LT
-NC540- STA. 580+00 TO STA. 585+00 RT

DETAIL F
LATERAL 'V' DITCH
(Not to Scale)



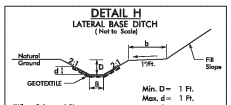
-L- STA. 72+00 TO STA. 72+64 RT.
-NC540- STA. 559+00 TO STA. 562+00 LT.

DETAIL G
LATERAL 'V' DITCH
(Not to Scale)



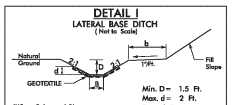
-LPD- STA. 19+50 TO STA. 22+00 RT.
-NC540- STA. 562+00 TO STA. 563+50 LT.

DETAIL H
LATERAL BASE DITCH
(Not to Scale)



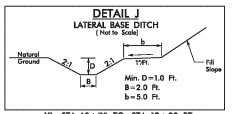
-L- STA. 70+50 TO STA. 72+00 RT.
-NC540- STA. 578+23 TO STA. 579+50 RT.
-Y1- STA. 15+00 TO STA. 15+50 RT.

DETAIL I
LATERAL BASE DITCH
(Not to Scale)



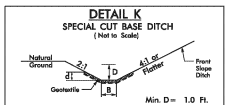
-Y1- STA. 12+40 TO STA. 14+75 LT.
-Y1- STA. 16+25 TO STA. 17+00 RT.
-NC540- STA. 563+50 TO STA. 566+00 LT.
-NC540- STA. 577+00 TO STA. 578+23 RT.

DETAIL J
LATERAL BASE DITCH
(Not to Scale)



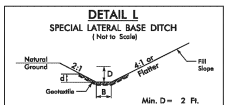
-Y1- STA. 10+75 TO STA. 12+00 RT.
-Y1- STA. 11+00 TO STA. 12+40 LT.

DETAIL K
SPECIAL CUT BASE DITCH
(Not to Scale)



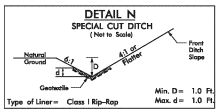
-Y1- STA. 12+00 TO STA. 15+00 RT.

DETAIL L
SPECIAL LATERAL BASE DITCH
(Not to Scale)



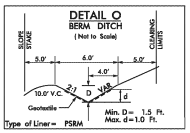
-Y1- STA. 17+00 TO STA. 19+00 LT.

DETAIL N
SPECIAL CUT DITCH
(Not to Scale)



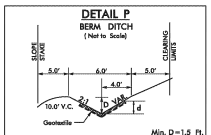
-LPD- STA. 14+50 TO STA. 15+50 RT.

DETAIL O
BERM DITCH
(Not to Scale)



-LPB- STA. 14+50 TO STA. 16+50 LT.
-LPB- STA. 19+50 TO STA. 20+50 LT.
-RPD- STA. 11+00 TO STA. 12+50 RT.
-RPD- STA. 20+25 TO STA. 22+92 RT.

DETAIL P
BERM DITCH
(Not to Scale)



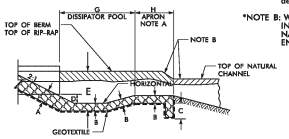
-LPB- STA. 11+60 TO STA. 13+50 LT.
-RPB- STA. 18+50 TO STA. 22+50 LT.
-RPD- STA. 12+50 TO STA. 14+00 RT.
-RPD- STA. 19+35 TO STA. 20+25 RT.

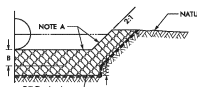
DETAIL M
RIP-RAPPED ENERGY DISSIPATOR BASIN

*NOTE A: IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A-A SUCH THAT Q des/CROSS SECTION AREA AT SEC. A-A)= SPECIFIED VELOCITY.

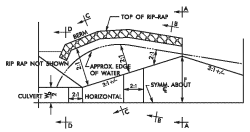
*NOTE B: WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL TOP OF RIP-RAP IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A-A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.

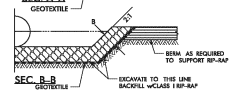
℄ SECTION

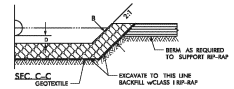


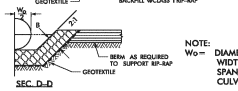


HALF PLAN









DIM.	RIP RAP BASIN #						
	1	2	3	4	5	6	7	8
A	3.0							
B	2.25							
C	2.0							
D	1.5							
E	7.0							
F	6.5							
G	11.0							
H	6.0							

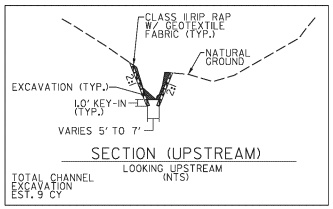
*ALL DIMENSIONS APPROXIMATE IN FEET
USE CLASS I RIP RAP FOR BASIN

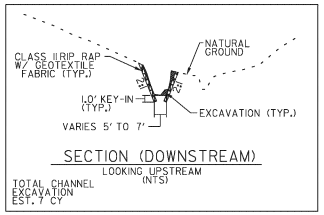
BASIN #	LOCATION (AT OUTLET)
1	-L- 74+75 LT.
2	
3	
4	
5	
6	
7	
8	

NOTE:
Wo= DIAMETER OF PIPE, WIDTH OF BOX OR SPAN OF PIPE-ARCH CULVERTS

5/05

CULVERT INLET/OUTLET DETAILS





PLANS PREPARED BY :

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

6/2/98
7/15/2016
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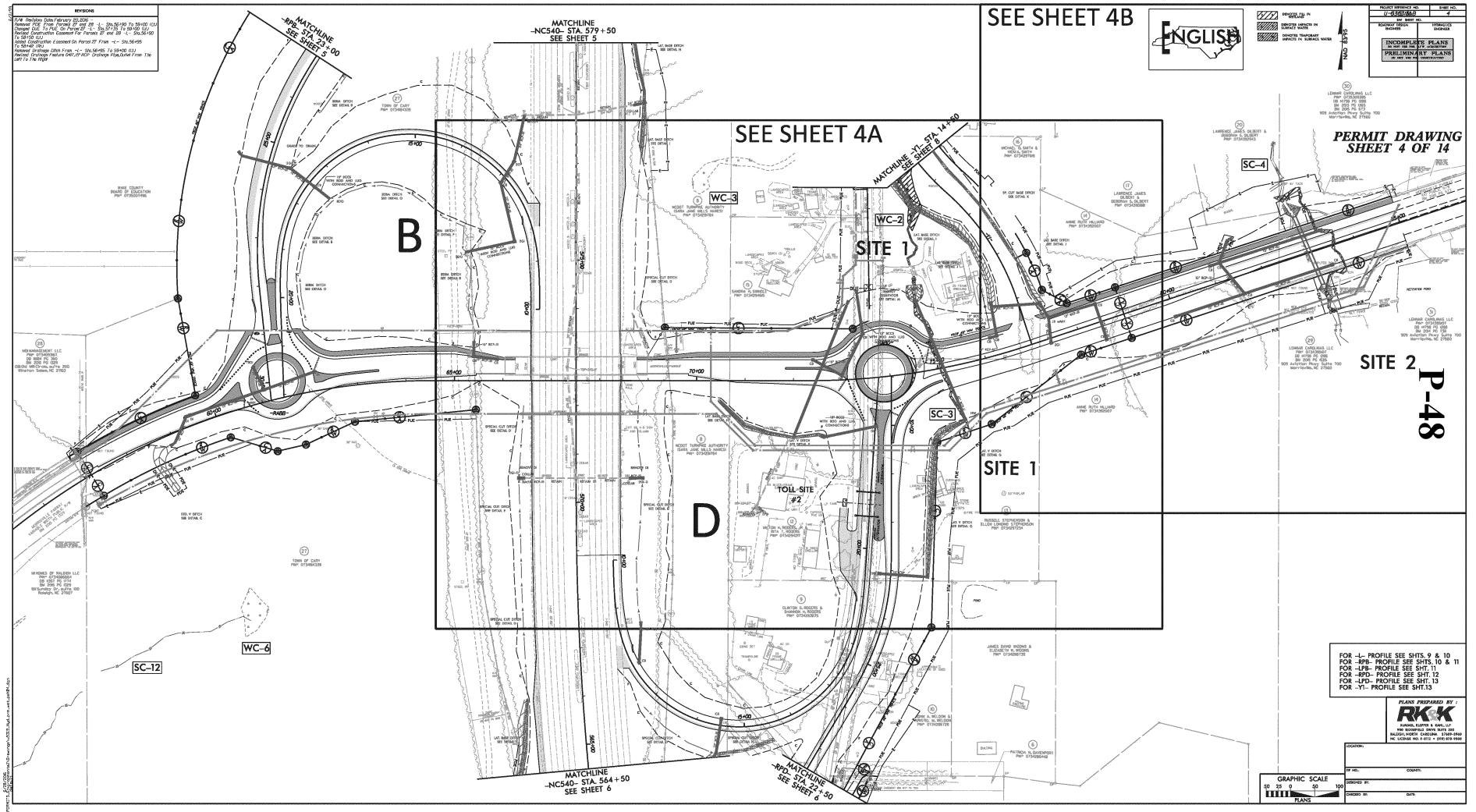
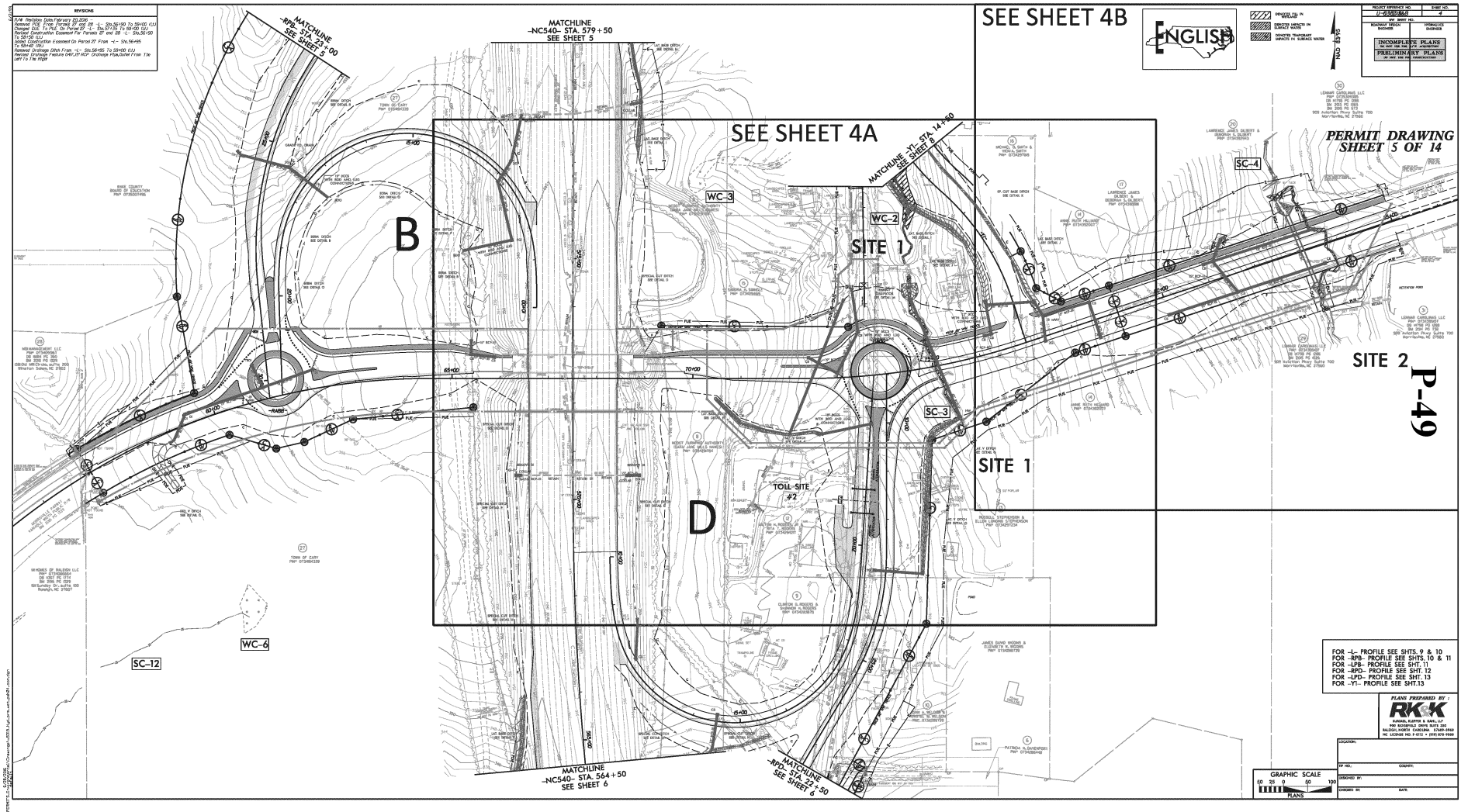
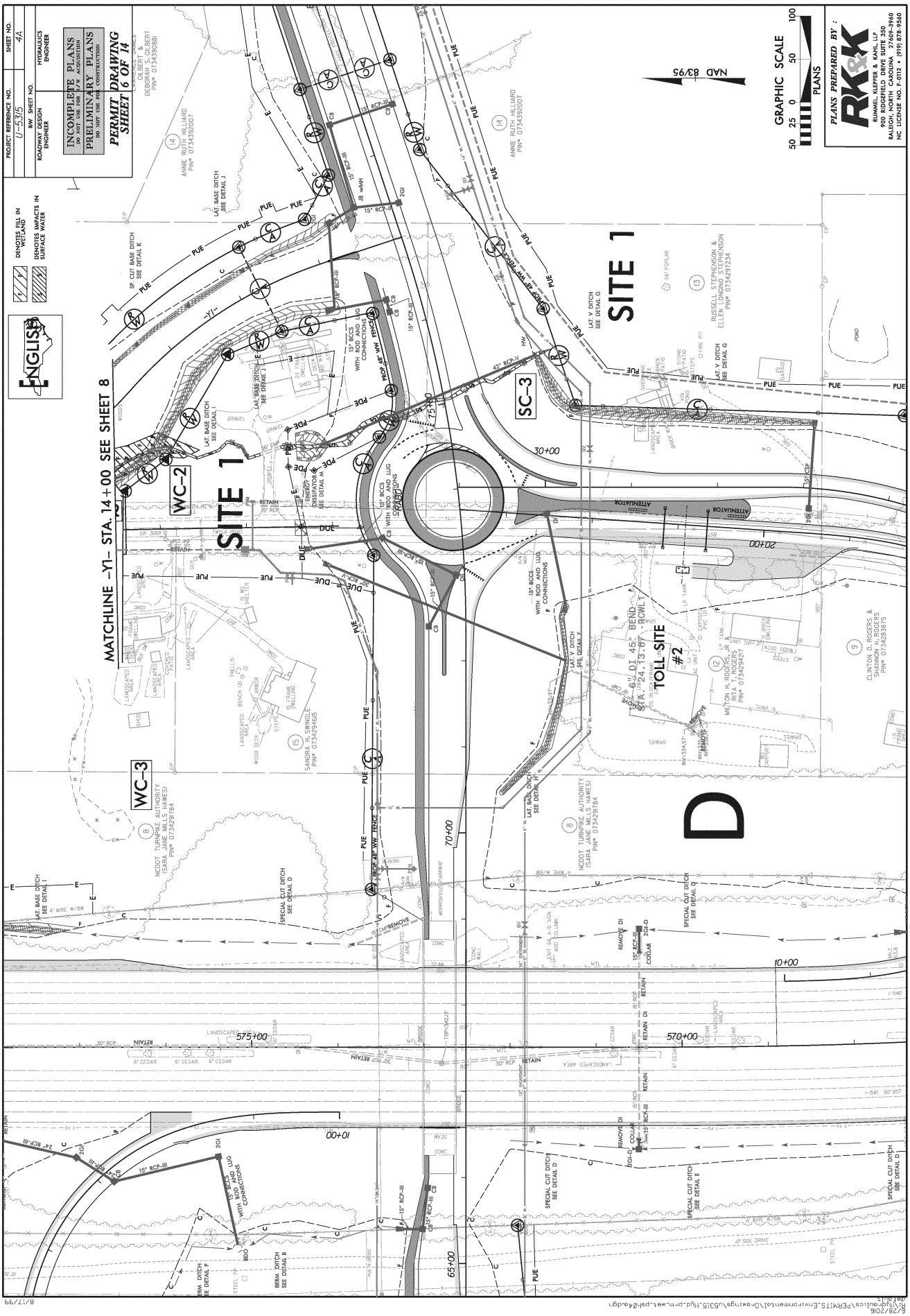
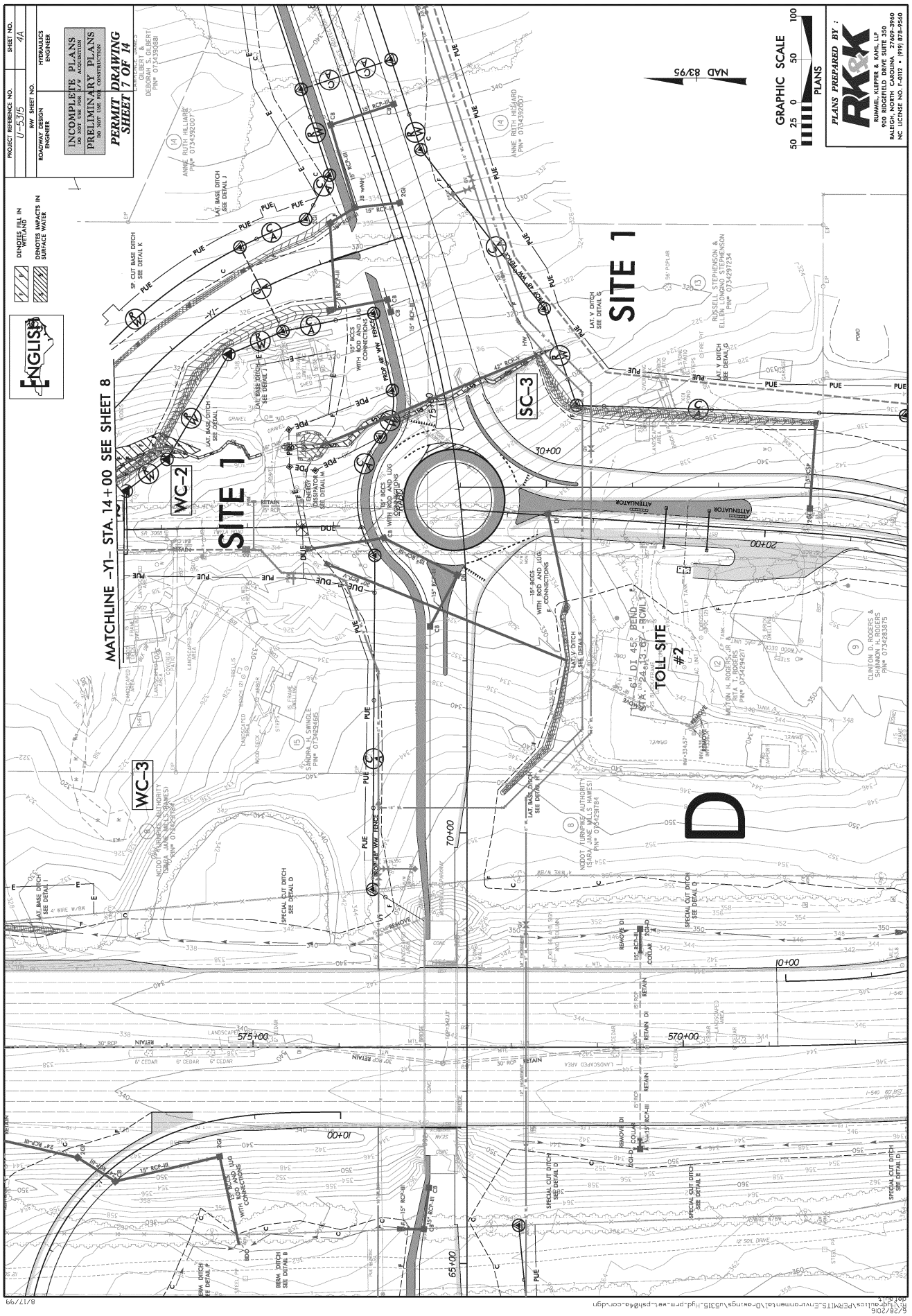

SEE SHEET 4B
SEE SHEET 4A
MATCHLINE -RPB- STA. 13+00 SEE SHEET 5
MATCHLINE -NC540- STA. 579+50 SEE SHEET 5
MATCHLINE -Y1- STA. 14+50 SEE SHEET 8
MATCHLINE -NC540- STA. 564+50 SEE SHEET 6
MATCHLINE -RPD- STA. 22+50 SEE SHEET 6
B
D
SITE 1
SITE 2
TOLL SITE #2
WC-2
WC-3
WC-6
SC-3
SC-4
SC-12
ENGLISH
PERMIT DRAWING SHEET 4 OF 14
P-48
INCOMPLETE PLANS
PRELIMINARY PLANS
FOR -L- PROFILE SEE SHTS. 9 & 10
FOR -RPB- PROFILE SEE SHTS. 10 & 11
FOR -LPB- PROFILE SEE SHT. 11
FOR -RPD- PROFILE SEE SHT. 12
FOR -LPD- PROFILE SEE SHT. 13
FOR -Y1- PROFILE SEE SHT.13
PLANS PREPARED BY :
RK&K
GRAPHIC SCALE
PLANS


REVISIONS
PLAN Preliminary Date: February 20, 2026
Changed -L- To Begin At Sta. 56+78 -L- Sta.56+90 To Sta.60+00 (LU)
Changed -RLT- To -RLT- On Parcel 27 -L- Sta.57+35 To Sta.59+00 (LU)
Revised Construction Easement For Parcels 27 and 28 -L- Sta.56+90 To Sta.59+00 (LU)
Added Construction Easement On Parcel 27 From -L- Sta.56+55
To Sta.56+78 (LU)
Removed Drainage Ditch From -L- Sta.56+85 To Sta.59+00 (LU)
Revised Drainage Feature DA41, DA RCP, Drainage Map, Outlet From The Left To The Right
MATCHLINE -RPB- STA. 13+00 SEE SHEET 5
MATCHLINE -NC540- STA. 579+50 SEE SHEET 5
SEE SHEET 4B
SEE SHEET 4A
ENGLISH
PROJECT REFERENCE NO. U-5405/5548
SHEET NO. 4
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
PERMIT DRAWING
SHEET 5 OF 14
P-49
B
D
SITE 1
SITE 2
TOLL SITE #2
WC-2
WC-3
SC-3
SC-4
WC-6
SC-12
MATCHLINE -NC540- STA. 564+50 SEE SHEET 6
MATCHLINE -RPD- STA. 22+50 SEE SHEET 6
MATCHLINE -Y1- STA. 14+50 SEE SHEET 6
FOR -L- PROFILE SEE SHTS. 9 & 10
FOR -RPB- PROFILE SEE SHTS. 10 & 11
FOR -LPB- PROFILE SEE SHT. 11
FOR -RPD- PROFILE SEE SHT. 12
FOR -LPD- PROFILE SEE SHT. 13
FOR -Y1- PROFILE SEE SHT.13
PLANS PREPARED BY:
RK&K
RAMEY, KEMP & ASSOC., LLC
5121 KINGDOM WAY, SUITE 200
RALEIGH, NORTH CAROLINA 27607
PHONE: (919) 872-5800
NC LICENSE NO. P-0112 • (919) 872-5980
LOCATION:
TIP NO.:
COUNTY:
DESIGNED BY:
CHECKED BY:
DATE:
GRAPHIC SCALE
50 25 0 50 100
PLANS


PROJECT REFERENCE NO.
U-5315
SHEET NO.
4A
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
PERMIT DRAWING
SHEET 6 OF 14
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
ENGLISH
MATCHLINE -Y1- STA. 14+00 SEE SHEET 8
SITE 1
SITE 1
WC-2
WC-3
SC-3
TOLL SITE #2
D
GRAPHIC SCALE
50 25 0 50 100
PLANS
NAD 83/95
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
ANNIE RUTH HILLIARD
PIN# 0734392007
RUSSELL STEPHENSON & ELLEN LONGINO STEPHENSON
PIN# 0734297234
CLINTON D. ROGERS & SHANNON H. ROGERS
PIN# 0734283875
MILTON H. ROGERS, JR & RITA T. ROGERS
PIN# 0734294217
NCDOT TURNPIKE AUTHORITY (SARA JANE MILLS HAWES)
PIN# 0734291784
SANDRA H. SWINGLE
PIN# 0734294615
LAT. BASE DITCH SEE DETAIL J
LAT. BASE DITCH SEE DETAIL K
LAT. V DITCH SEE DETAIL G
LAT. BASE DITCH SEE DETAIL I
SPECIAL CUT DITCH SEE DETAIL D
SPECIAL CUT DITCH SEE DETAIL E
BERM DITCH SEE DETAIL B
15" BCCS WITH ROD AND LUG CONNECTIONS
ENERGY DISSIPATOR SEE DETAIL M
ATTENUATOR
30+00
20+00
10+00
70+00
575+00
570+00
65+00
8/17/99
6/28/2016


PROJECT REFERENCE NO.
U-5315
SHEET NO.
4A
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
PERMIT DRAWING
SHEET 7 OF 14
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
ENGLISH
GRAPHIC SCALE
50 25 0 50 100
PLANS
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
NAD 83/95
MATCHLINE -Y1- STA. 14+00 SEE SHEET 8
SITE 1
SITE 1
WC-2
WC-3
SC-3
TOLL SITE #2
D
30+00
20+00
10+00
70+00
65+00
575+00
570+00
ATTENUATOR
RUSSELL STEPHENSON & ELLEN LONGINO STEPHENSON PIN# 0734297234
CLINTON D. ROGERS & SHANNON H. ROGERS PIN# 0734283875
NCDOT TURNPIKE AUTHORITY (SARA JANE MILLS HAWES) PIN# 0734291784
SANDRA H. SWINGLE PIN# 0734294615
ANNIE RUTH HILLIARD PIN# 0734392007
GILBERT & DEBORAH S. GILBERT PIN# 0734390881
LAT. BASE DITCH SEE DETAIL J
LAT. BASE DITCH SEE DETAIL E
LAT. BASE DITCH SEE DETAIL I
SPECIAL CUT DITCH SEE DETAIL D
SPECIAL CUT DITCH SEE DETAIL E
SPECIAL CUT DITCH SEE DETAIL Q
BERM DITCH SEE DETAIL B
BERM DITCH SEE DETAIL P
15" BCCS WITH ROD AND LUG CONNECTIONS
15" RCP-III
PROP 48" WW FENCE
RETAIN
REMOVE
PUE
DUE
6" DT 45° BEND
STA. 24+13.67 - RCWL
LANDSCAPED AREA
6" CEDAR
30" RCP
6/28/2016
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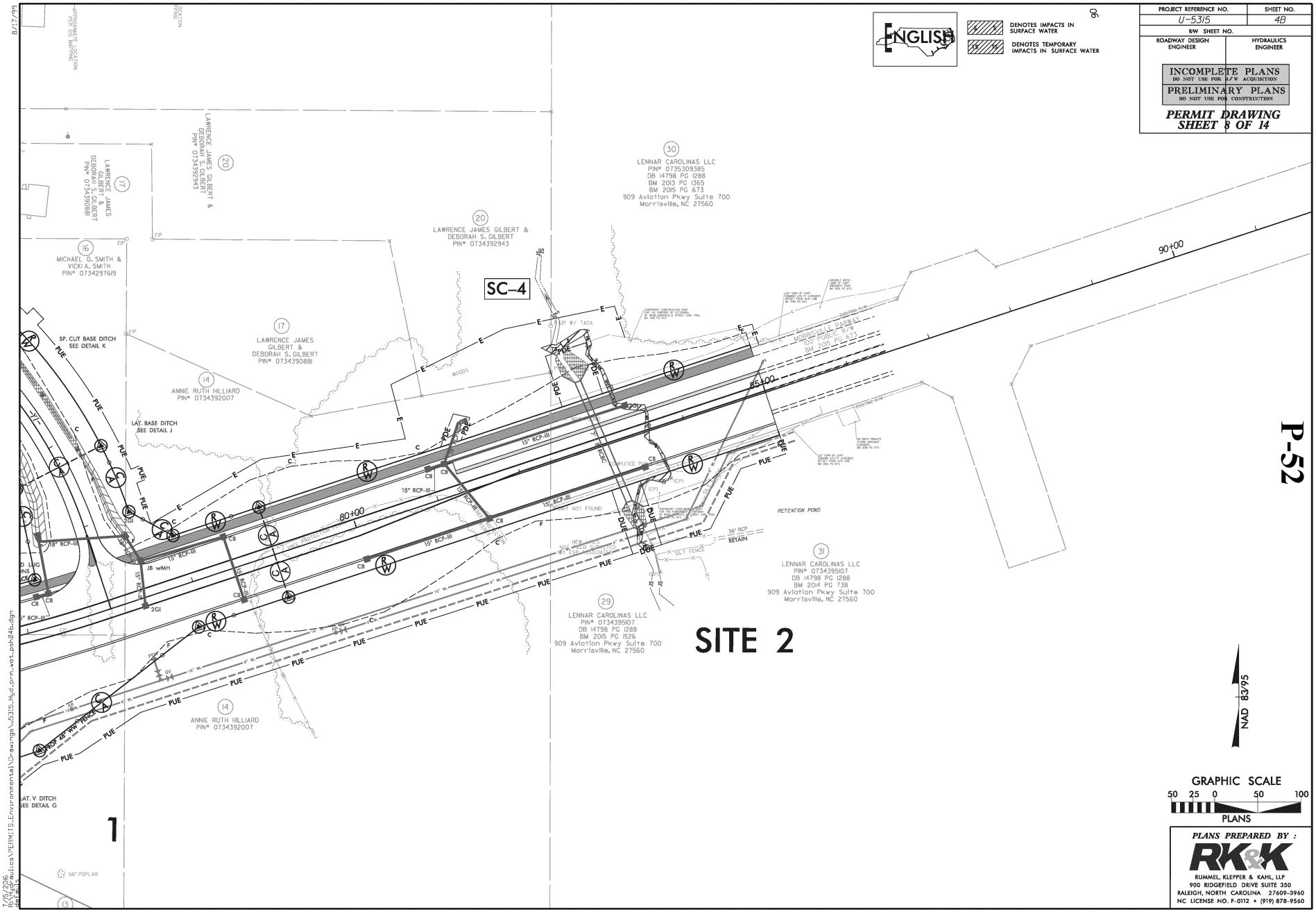
8/17/99


ENGLISH
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PROJECT REFERENCE NO.
U-5315
SHEET NO.
4B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
PERMIT DRAWING
SHEET 8 OF 14
P-52
SC-4
SITE 2
SP. CUT BASE DITCH SEE DETAIL K
LAT. BASE DITCH SEE DETAIL J
LAT. V DITCH SEE DETAIL G
LENNAR CAROLINAS LLC
PIN# 0735309385
DB 14798 PG 1288
BM 2013 PG 1365
BM 2015 PG 673
909 Aviation Pkwy Suite 700
Morrisville, NC 27560
LAWRENCE JAMES GILBERT & DEBORAH S. GILBERT
PIN# 0734392943
LAWRENCE JAMES GILBERT & DEBORAH S. GILBERT
PIN# 07343908811
MICHAEL O. SMITH & VICKI A. SMITH
PIN# 0734297819
ANNIE RUTH HILLIARD
PIN# 0734392007
LENNAR CAROLINAS LLC
PIN# 0734395107
DB 14798 PG 1288
BM 2014 PG 738
909 Aviation Pkwy Suite 700
Morrisville, NC 27560
LENNAR CAROLINAS LLC
PIN# 0734395107
DB 14798 PG 1288
BM 2015 PG 1526
909 Aviation Pkwy Suite 700
Morrisville, NC 27560
MORRISVILLE TOWN OF PUBLIC R/W BM 2015 PG 673
RETENTION POND
80+00
90+00
85+00
NAD 83/95
GRAPHIC SCALE
50 25 0 50 100
PLANS
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
8/17/99
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7/6/2016
RKK\jbaulieu

PROJECT REFERENCE NO.	SHEET NO.
U-5315	4B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

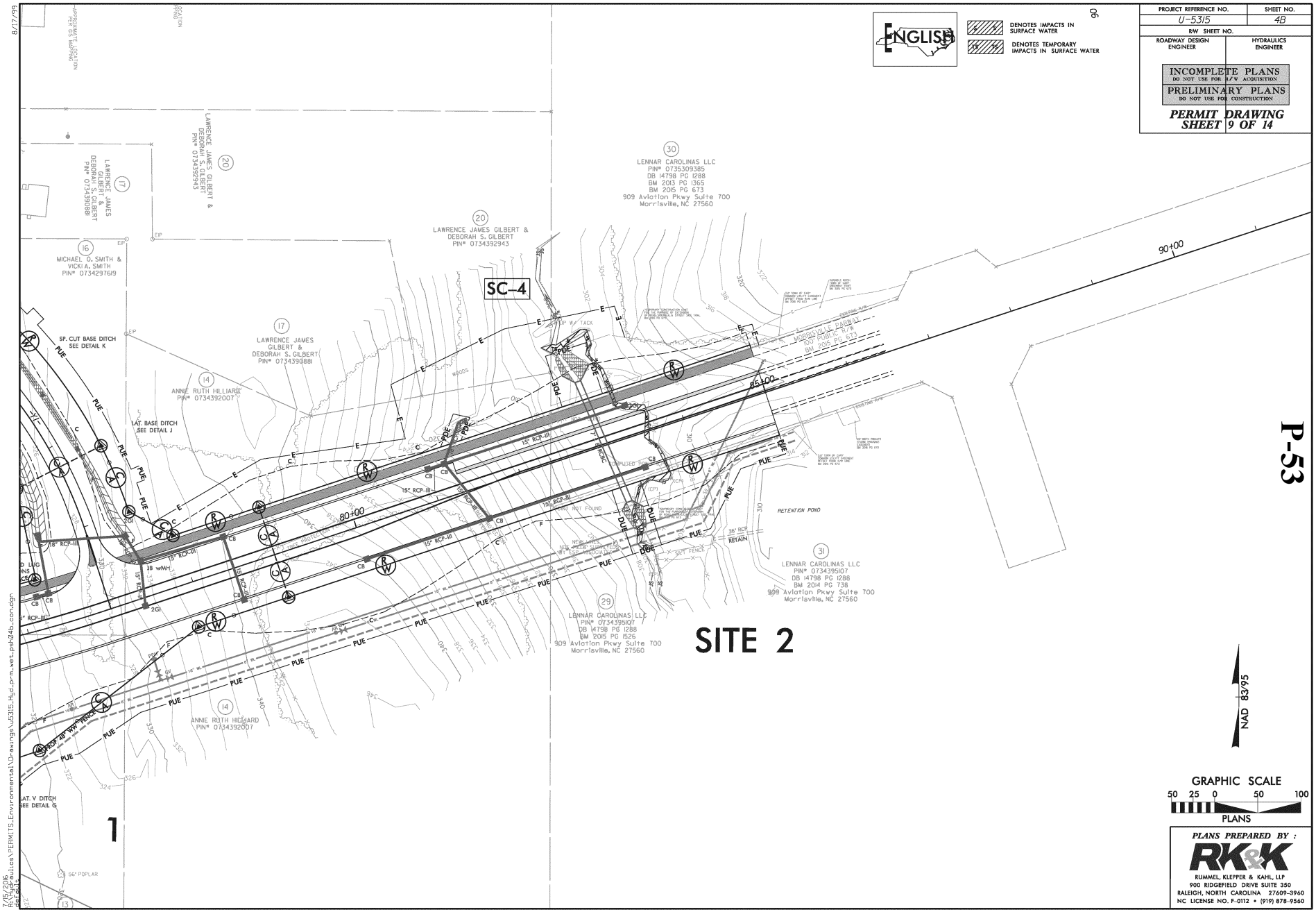
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 9 OF 14

ENGLISH

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER



PLANS PREPARED BY :
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900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

P-53

8/17/99

7/15/2016
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PROJECT REFERENCE NO.	SHEET NO.
U-5315	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

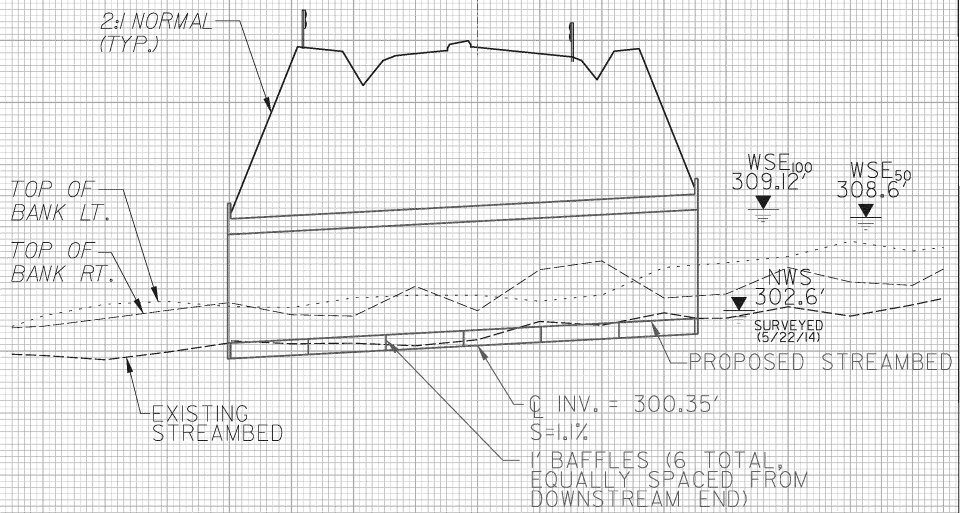
PERMIT DRAWING SHEET 10 OF 14

ENGLISH

GRAPHIC SCALE
0 25 50
HORIZONTAL
0 5 10
VERTICAL

SITE 2
–L– 83+40

℄ STA. 83+04.00
7' X 8' RCBC (1.0' BURY)
ELEV. = 319.53'
SKEW = 85°



330
320
310
300
290

100' LT 50' LT 0 50' RT 100' RT

PROPOSED 7'X8' RCBC

BOX CULVERT DETAIL
(NOT TO SCALE)
SINGLE BARREL CULVERT LOW FLOW CHANNEL AND SILLS

*NOTES:

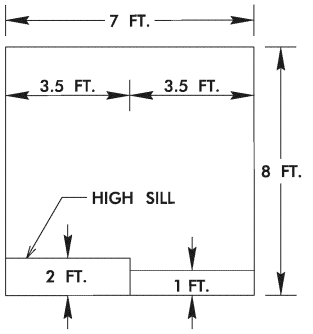
1) NATIVE MATERIAL BETWEEN SILLS/BAFFLES IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

2) SILLS/BAFFLES ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

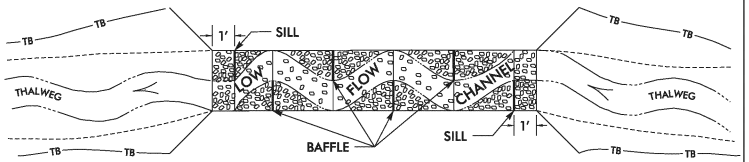
3) TOP OF LOW FLOW SILLS/BAFFLES SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM. (THALWEG)

4) DO NOT SET ELEVATION OF HIGH SILL/BAFFLES ABOVE BANK FULL.

5) NUMBER OF SILL/BAFFLES DETERMINED BY THE ENGINEER.



SILLS AT INLET AND OUTLET



NUMBER OF BAFFLES=6
ON 25 FT CENTERS FROM DOWNSTREAM SILL

SILLS SHALL BE PLACED ONE FOOT INSIDE OF CULVERT AND INLET AND OUTLET. SIX BAFFELS SHALL BE PLACED AND EQUALLY SPACED FROM THE DOWNSTREAM SILL.

PLAN VIEW

9/13

5/14/99

6/28/2016
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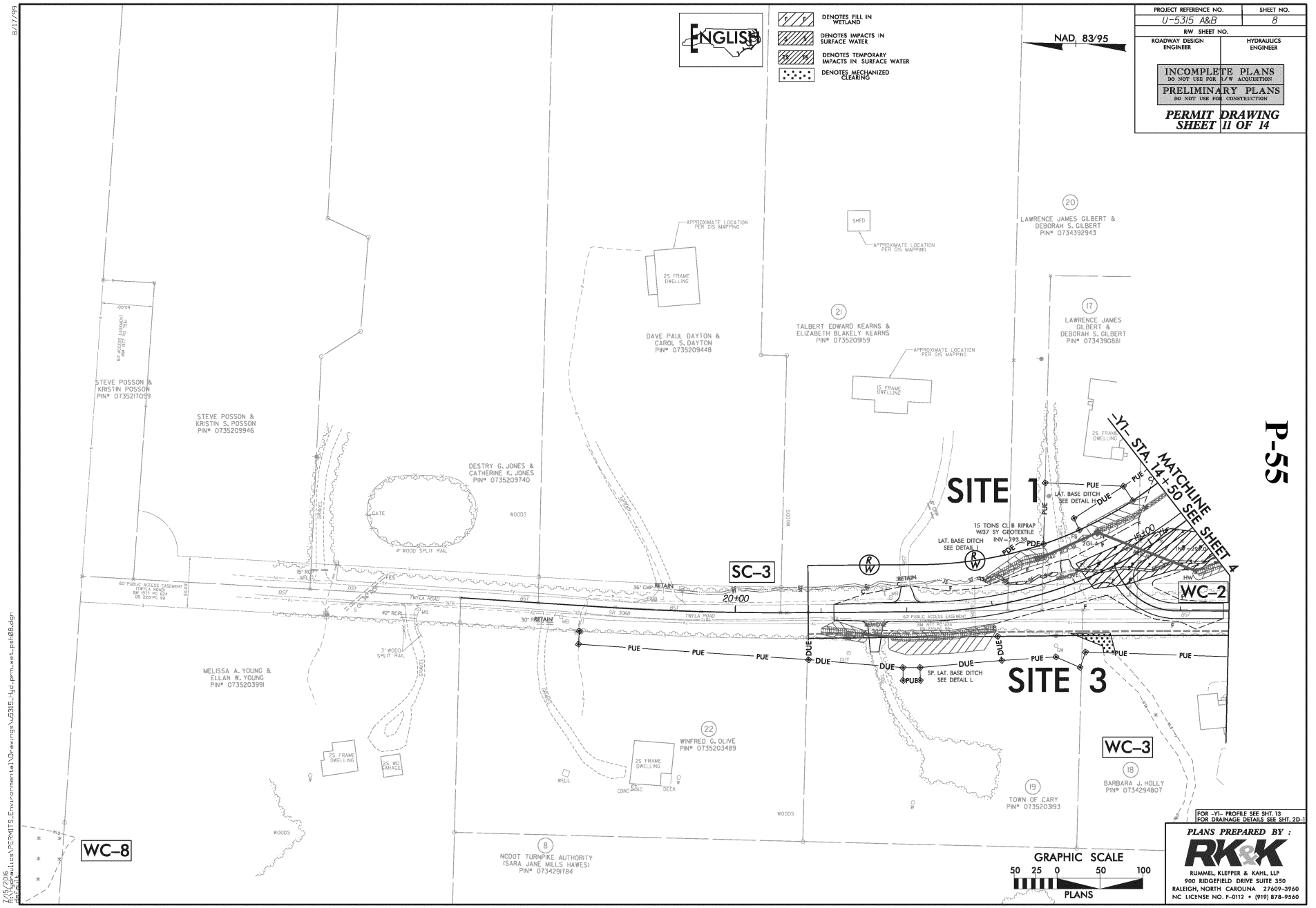
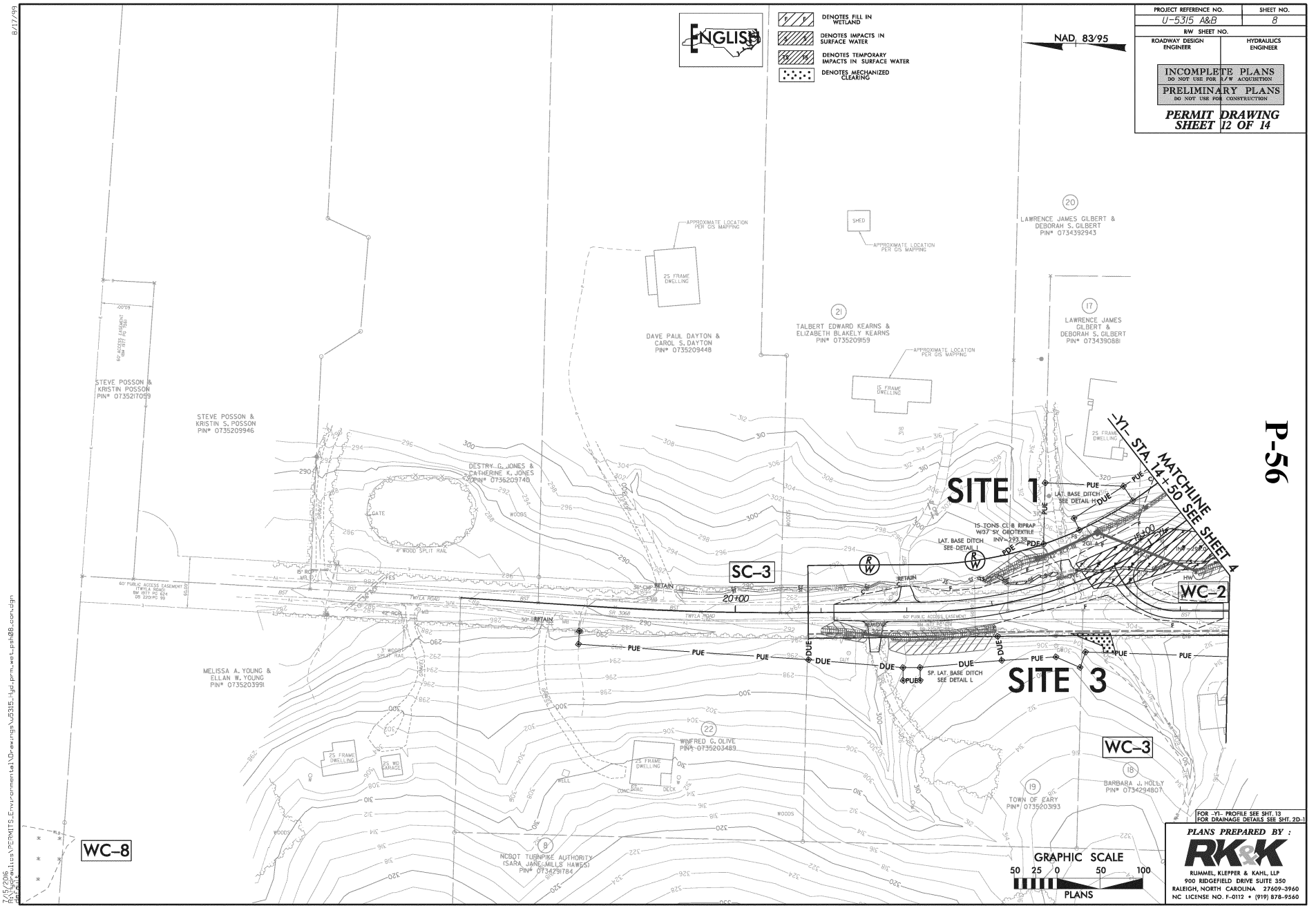
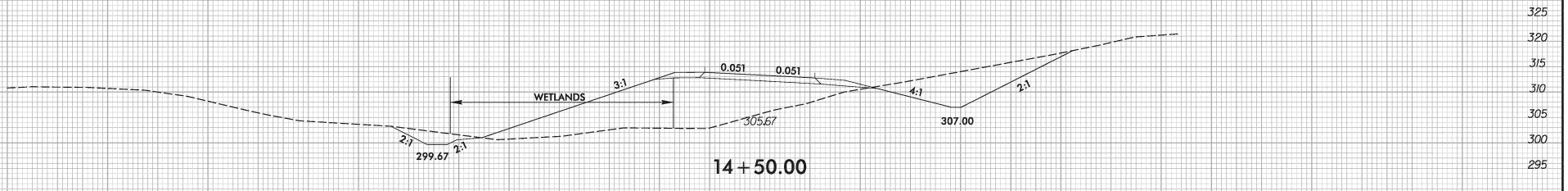

ENGLISH
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
NAD 83/95
PROJECT REFERENCE NO.
U-5315 A&B
SHEET NO.
8
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
PERMIT DRAWING
SHEET 11 OF 14
P-55
SITE 1
SITE 3
-Y1- STA. 14+50 MATCHLINE SEE SHEET 4
SC-3
WC-2
WC-3
WC-8
STEVE POSSON & KRISTIN POSSON PIN# 0735217059
STEVE POSSON & KRISTIN S. POSSON PIN# 0735209946
DESTRY G. JONES & CATHERINE K. JONES PIN# 0735209740
DAVE PAUL DAYTON & CAROL S. DAYTON PIN# 0735209448
TALBERT EDWARD KEARNS & ELIZABETH BLAKELY KEARNS PIN# 0735209959
LAWRENCE JAMES GILBERT & DEBORAH S. GILBERT PIN# 0734392943
LAWRENCE JAMES GILBERT & DEBORAH S. GILBERT PIN# 0734390881
MELISSA A. YOUNG & ELLAN W. YOUNG PIN# 0735203991
WINFRED G. OLIVE PIN# 0735203489
BARBARA J. HOLLY PIN# 0734294807
TOWN OF CARY PIN# 0735203193
NCDOT TURNPIKE AUTHORITY (SARA JANE MILLS HAWES) PIN# 0734291784
TWYLA ROAD
20+00
15 TONS CL B RIPRAP W/37 SY GEOTEXTILE
LAT. BASE DITCH SEE DETAIL H
LAT. BASE DITCH SEE DETAIL I
SP. LAT. BASE DITCH SEE DETAIL L
PUE
DUE
PDE
FOR -Y1- PROFILE SEE SHT. 13
FOR DRAINAGE DETAILS SEE SHT. 20-1
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560
GRAPHIC SCALE
50 25 0 50 100
PLANS


ENGLISH
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
NAD 83/95
PROJECT REFERENCE NO.
U-5315 A&B
SHEET NO.
8
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
PERMIT DRAWING
SHEET 12 OF 14
P-56
SITE 1
SITE 3
SC-3
WC-2
WC-3
WC-8
-Y1- STA. 14+50 SEE SHEET 4
MATCHLINE
STEVE POSSON & KRISTIN POSSON PIN# 0735217059
STEVE POSSON & KRISTIN S. POSSON PIN# 0735209946
DESTRY G. JONES & CATHERINE K. JONES PIN# 0735209740
DAVE PAUL DAYTON & CAROL S. DAYTON PIN# 0735209448
TALBERT EDWARD KEARNS & ELIZABETH BLAKELY KEARNS PIN# 0735209959
LAWRENCE JAMES GILBERT & DEBORAH S. GILBERT PIN# 0734392943
LAWRENCE JAMES GILBERT & DEBORAH S. GILBERT PIN# 0734390881
MELISSA A. YOUNG & ELLAN W. YOUNG PIN# 0735203991
WINFRED G. OLIVE PIN# 0735203489
NCDOT TURNPIKE AUTHORITY (SARA JANE MILLS HAWES) PIN# 0734291784
BARBARA J. HOLLY PIN# 0734294807
TOWN OF CARY PIN# 0735203193
TWYLA ROAD
15-TONS CL B RIPRAP W/7 SY GEOTEXTILE
LAT. BASE DITCH SEE DETAIL H
LAT. BASE DITCH SEE DETAIL I
SP. LAT. BASE DITCH SEE DETAIL L
PUE
DUE
PDE
RETAIN
FOR -Y1- PROFILE SEE SHT. 13
FOR DRAINAGE DETAILS SEE SHT. 20-1
GRAPHIC SCALE
50 25 0 50 100
PLANS
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

PROJ. REFERENCE NO.	SHEET NO.
U-5315	X-58

ENGLISH

PERMIT DRAWING
SHEET 13 OF 14



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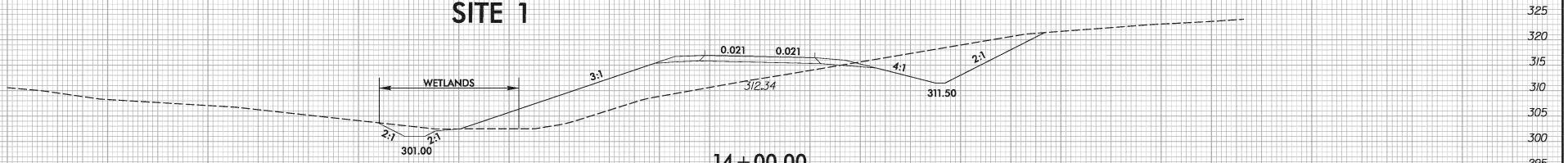

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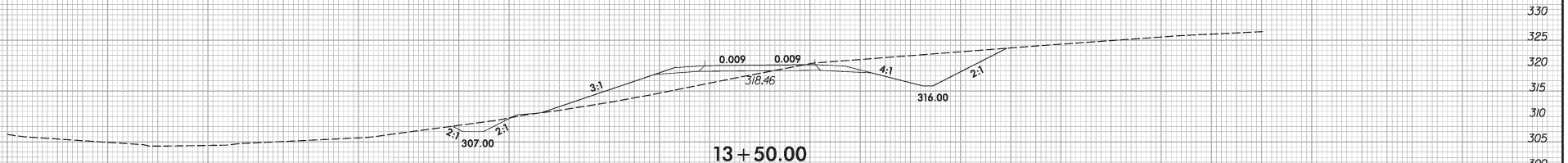

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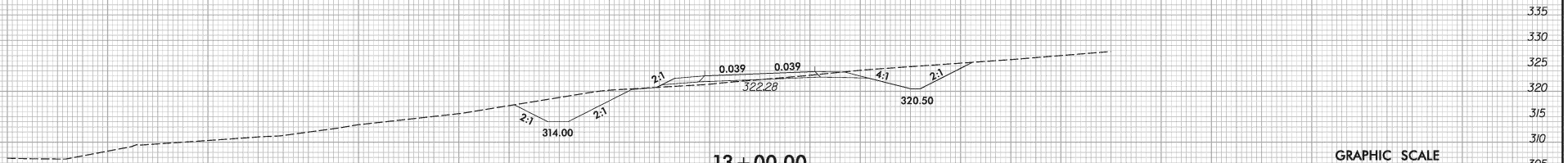

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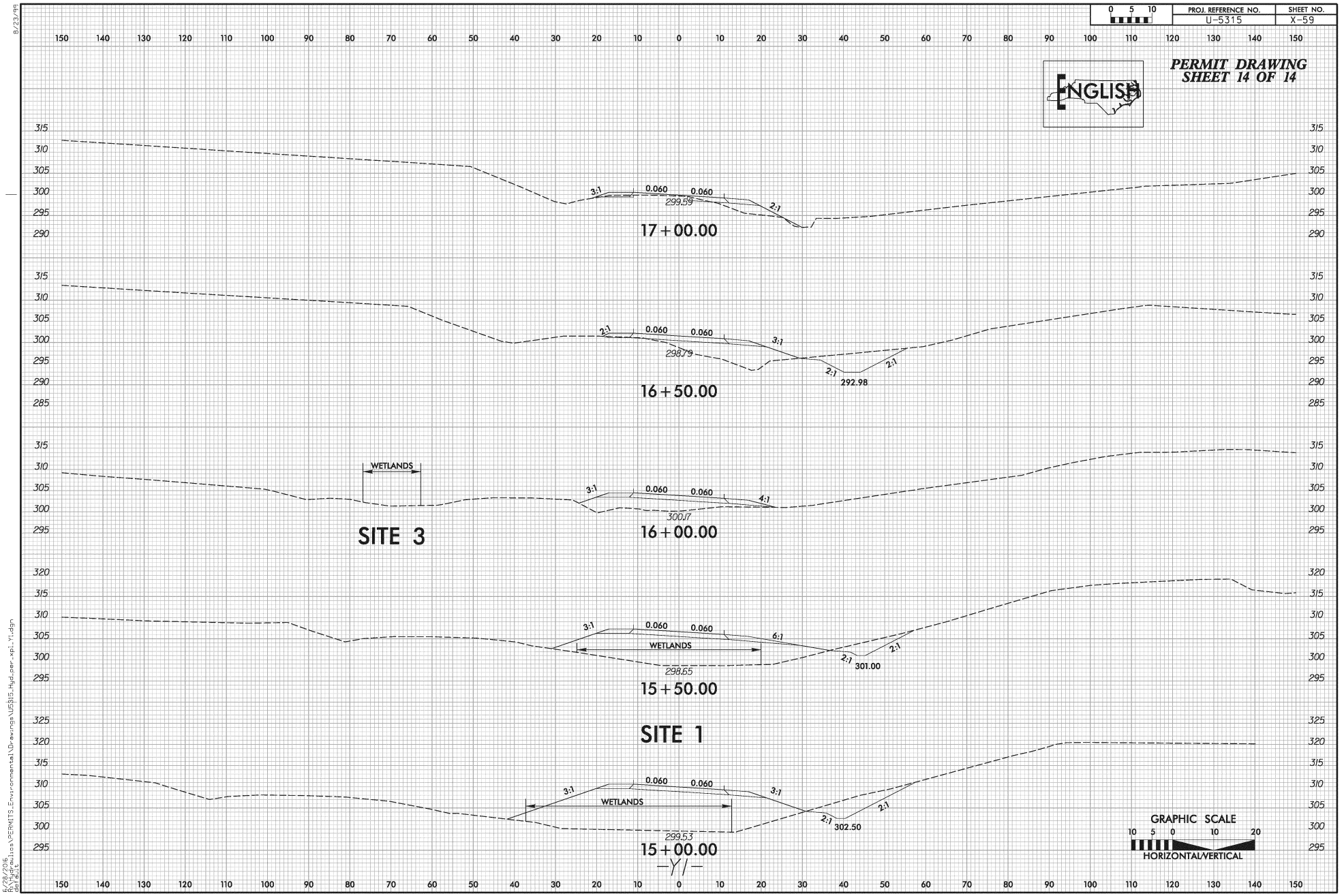
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County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
			ROADWAY ITEMS			
0001	0000100000-N	800	MOBILIZATION	Lump Sum	L.S.	
0002	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	Lump Sum	L.S.	
0003	0008000000-E	200	SUPPLEMENTARY CLEARING & GRUBBING	2 ACR		
0004	0015000000-N	205	SEALING ABANDONED WELLS	16 EA		
0005	0022000000-E	225	UNCLASSIFIED EXCAVATION	161,970 CY		
0006	0036000000-E	225	UNDERCUT EXCAVATION	2,400 CY		
0007	0106000000-E	230	BORROW EXCAVATION	78,490 CY		
0008	0134000000-E	240	DRAINAGE DITCH EXCAVATION	2,880 CY		
0009	0141000000-E	240	BERM DITCH CONSTRUCTION	2,900 LF		
0010	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	1,020 SY		
0011	0163000000-E	250	REMOVAL OF EXISTING CONCRETE PAVEMENT	7,820 SY		
0012	0177000000-E	250	BREAKING OF EXISTING ASPHALT PAVEMENT	1,680 SY		
0013	0195000000-E	265	SELECT GRANULAR MATERIAL	1,600 CY		
0014	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZATION	2,750 SY		
0015	0318000000-E	300	FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES	610 TON		
0016	0320000000-E	300	FOUNDATION CONDITIONING GEOTEXTILE	1,900 SY		
0017	0342000000-E	310	**" SIDE DRAIN PIPE (30")	40 LF		
0018	0343000000-E	310	15" SIDE DRAIN PIPE	32 LF		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0019	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (30", V)	296 LF		
0020	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (42", V)	272 LF		
0021	0366000000-E	310	15" RC PIPE CULVERTS, CLASS III	2,916 LF		
0022	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	544 LF		
0023	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	168 LF		
0024	0384000000-E	310	30" RC PIPE CULVERTS, CLASS III	448 LF		
0025	0390000000-E	310	36" RC PIPE CULVERTS, CLASS III	88 LF		
0026	0396000000-E	310	42" RC PIPE CULVERTS, CLASS III	196 LF		
0027	0582000000-E	310	15" CS PIPE CULVERTS, 0.064" THICK	720 LF		
0028	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (15", 0.064")	24 EA		
0029	0995000000-E	340	PIPE REMOVAL	552 LF		
0030	0996000000-N	350	PIPE CLEAN-OUT	5 EA		
0031	1011000000-N	500	FINE GRADING	Lump Sum	L.S.	
0032	1115000000-E	SP	GEOTEXTILE FOR PAVEMENT STA-BILIZATION	9,570 SY		
0033	1121000000-E	520	AGGREGATE BASE COURSE	24,700 TON		
0034	1154000000-E	540	AGGREGATE FOR CEMENT TREATED BASE COURSE	320 TON		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0035	1165000000-E	540	PORTLAND CEMENT FOR CEMENT TREATED BASE COURSE	13 TON		
0036	1209000000-E	543	ASPHALT CURING SEAL	70 GAL		
0037	1275000000-E	600	PRIME COAT	1,840 GAL		
0038	1489000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0B	4,670 TON		
0039	1498000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B	7,090 TON		
0040	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	6,110 TON		
0041	1525000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A	590 TON		
0042	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	955 TON		
0043	1847000000-E	710	*****" PORT CEM CONC PAVEMENT, THROUGH LANES (WITH DOWELS) (13-1/2")	9,570 SY		
0044	1881000000-E	SP	GENERIC PAVING ITEM MILLED RUMBLE STRIPS (CONCRETE SHOULDERS)	5,390 LF		
0045	1902000000-N	710	SURFACE TESTING CONCRETE PAVE-MENT	Lump Sum	L.S.	
0046	1913000000-E	720	CONCRETE SHOULDERS ADJACENT TO ******" PAVEMENT (13-1/2")	3,272 SY		
0047	2000000000-N	806	RIGHT OF WAY MARKERS	25 EA		
0048	2020000000-N	806	CONTROL OF ACCESS MARKERS	28 EA		
0049	2022000000-E	815	SUBDRAIN EXCAVATION	336 CY		
0050	2033000000-E	815	SUBDRAIN FINE AGGREGATE	252 CY		
0051	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	1,500 LF		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0052	2070000000-N	815	SUBDRAIN PIPE OUTLET	3 EA		
0053	2077000000-E	815	6" OUTLET PIPE	18 LF		
0054	2099000000-E	816	SHOULDER DRAIN	3,700 LF		
0055	2110000000-E	816	4" SHOULDER DRAIN PIPE	3,650 LF		
0056	2121000000-E	816	4" OUTLET PIPE FOR SHOULDER DRAINS	190 LF		
0057	2132000000-N	816	CONCRETE PAD FOR SHOULDER DRAIN PIPE OUTLET	6 EA		
0058	2143000000-E	818	BLOTTING SAND	10 TON		
0059	2209000000-E	838	ENDWALLS	9 CY		
0060	2253000000-E	840	PIPE COLLARS	3.062 CY		
0061	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	50 EA		
0062	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	33.1 LF		
0063	2364000000-N	840	FRAME WITH TWO GRATES, STD 840.16	6 EA		
0064	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	4 EA		
0065	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	16 EA		
0066	2366000000-N	840	FRAME WITH TWO GRATES, STD 840.24	3 EA		
0067	2367000000-N	840	FRAME WITH TWO GRATES, STD 840.29	1 EA		
0068	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	3 EA		
0069	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	7 EA		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0070	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	7 EA		
0071	2396000000-N	840	FRAME WITH COVER, STD 840.54	3 EA		
0072	2451000000-N	852	CONCRETE TRANSITIONAL SECTION FOR DROP INLET	8 EA		
0073	2473000000-N	SP	GENERIC DRAINAGE ITEM TIE PROPOSED PIPE TO EXIST DRAINAGE STRUCTURE	3 EA		
0074	2542000000-E	846	1'-6" CONCRETE CURB & GUTTER	4,440 LF		
0075	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	5,380 LF		
0076	2556000000-E	846	SHOULDER BERM GUTTER	527 LF		
0077	2605000000-N	848	CONCRETE CURB RAMP	2 EA		
0078	2619000000-E	850	4" CONCRETE PAVED DITCH	70 SY		
0079	2655000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)	560 SY		
0080	2724000000-E	857	PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED	110 LF		
0081	2738000000-E	SP	GENERIC PAVING ITEM BRICK PAVERS FOR ISLANDS AND ROUNDABOUTS	1,920 SY		
0082	2752000000-E	SP	GENERIC PAVING ITEM MEDIAN HAZARD PROTECTION	200 LF		
0083	2815000000-N	858	ADJUSTMENT OF DROP INLETS	1 EA		
0084	3000000000-N	SP	IMPACT ATTENUATOR UNIT, TYPE 350	2 EA		
0085	3030000000-E	862	STEEL BM GUARDRAIL	5,200 LF		
0086	3045000000-E	862	STEEL BM GUARDRAIL, SHOP CURVED	437.5 LF		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0087	3105000000-N	862	STEEL BM GUARDRAIL TERMINAL SECTIONS	2 EA		
0088	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	46 EA		
0089	3210000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE CAT-1	11 EA		
0090	3287000000-N	SP	GUARDRAIL END UNITS, TYPE TL-3	16 EA		
0091	3317000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE B-77	7 EA		
0092	3345000000-E	864	REMOVE & RESET EXISTING GUARD-RAIL	310 LF		
0093	3503000000-E	866	WOVEN WIRE FENCE, 47" FABRIC	6,340 LF		
0094	3509000000-E	866	4" TIMBER FENCE POSTS, 7'-6" LONG	385 EA		
0095	3515000000-E	866	5" TIMBER FENCE POSTS, 8'-0" LONG	125 EA		
0096	3628000000-E	876	RIP RAP, CLASS I	3,006 TON		
0097	3635000000-E	876	RIP RAP, CLASS II	80 TON		
0098	3649000000-E	876	RIP RAP, CLASS B	220 TON		
0099	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	3,868 SY		
0100	4025000000-E	901	CONTRACTOR FURNISHED, TYPE *** SIGN (A)	2,135.5 SF		
0101	4025000000-E	901	CONTRACTOR FURNISHED, TYPE *** SIGN (B)	218.75 SF		
0102	4025000000-E	901	CONTRACTOR FURNISHED, TYPE *** SIGN (D)	104.5 SF		
0103	4025000000-E	901	CONTRACTOR FURNISHED, TYPE *** SIGN (E)	508.5 SF		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0104	4025000000-E	901	CONTRACTOR FURNISHED, TYPE *** SIGN (MILEMARKER)	73.5 SF		
0105	4025000000-E	901	CONTRACTOR FURNISHED, TYPE *** SIGN (OVERLAY)	4 SF		
0106	4048000000-E	902	REINFORCED CONCRETE SIGN FOUNDATIONS	9 CY		
0108	4057000000-E	SP	OVERHEAD FOOTING	105.4 CY		
0109	4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	8,991 LB		
0110	4066000000-E	903	SUPPORTS, SIMPLE STEEL BEAM	1,434 LB		
0111	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	1,447 LF		
0112	4096000000-N	904	SIGN ERECTION, TYPE D	9 EA		
0113	4102000000-N	904	SIGN ERECTION, TYPE E	68 EA		
0114	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	9 EA		
0115	4114000000-N	904	SIGN ERECTION, MILEMARKERS	5 EA		
0116	4116000000-N	904	SIGN ERECTION, OVERLAY (GROUND MOUNTED)	1 EA		
0117	4149000000-N	907	DISPOSAL OF SIGN SYSTEM, OVERHEAD	4 EA		
0118	4152000000-N	907	DISPOSAL OF SIGN SYSTEM, STEEL BEAM	3 EA		
0119	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	6 EA		
0120	4360000000-N	SP	GENERIC SIGNING ITEM SIGN ERECTION, TOLL ROUTE ASSEMBLY	13 EA		
0121	4361000000-E	SP	GENERIC SIGNING ITEM REINFORCING STEEL (AESTHETIC COLUMNS ONLY)	42,859 LB		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0122	4365000000-E	SP	GENERIC SIGNING ITEM CLASS A CONCRETE (AESTHETIC COLUMNS ONLY)	251.1 CY		
0123	4366000000-E	SP	GENERIC SIGNING ITEM CONTRACTOR FURNISHED, TOLL ROUTE ASSEMBLY	484.25 SF		
0124	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 20+14(GNTRY T16 IN, TRUSS ONLY)	Lump Sum	L.S.	
0125	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 20+64(GNTRY T16 OUT, TRUSS ONLY)	Lump Sum	L.S.	
0126	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 20+66(GNTRY T15 OUT, TRUSS ONLY)	Lump Sum	L.S.	
0127	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 21+16(GNTRY T15 IN, TRUSS ONLY)	Lump Sum	L.S.	
0128	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 475+00 (A, TRUSS ONLY)	Lump Sum	L.S.	
0129	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 527+50 (B, TRUSS ONLY)	Lump Sum	L.S.	
0130	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 550+00 (C, TRUSS ONLY)	Lump Sum	L.S.	
0131	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 590+21 (D, TRUSS ONLY)	Lump Sum	L.S.	
0132	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 655+00 (E, TRUSS ONLY)	Lump Sum	L.S.	
0133	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 691+50 (F, TRUSS ONLY)	Lump Sum	L.S.	
0134	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	504 SF		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0135	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	352 SF		
0136	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	70 SF		
0137	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	1 EA		
0138	4430000000-N	1130	DRUMS	100 EA		
0139	4435000000-N	1135	CONES	43 EA		
0140	4445000000-E	1145	BARRICADES (TYPE III)	192 LF		
0141	4455000000-N	1150	FLAGGER	180 DAY		
0142	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	1 EA		
0143	4470000000-N	1160	RESET TEMPORARY CRASH CUSHION	2 EA		
0144	4480000000-N	1165	TMA	2 EA		
0145	4485000000-E	1170	PORTABLE CONCRETE BARRIER	4,240 LF		
0146	4500000000-E	1170	RESET PORTABLE CONCRETE BAR-RIER	8,070 LF		
0147	4510000000-N	SP	LAW ENFORCEMENT	120 HR		
0148	4600000000-N	SP	GENERIC TRAFFIC CONTROL ITEM REMOVE & REPLACE SNOWPLOWABLE PAVEMENT MARKER REFLECTOR	222 EA		
0149	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	351 EA		
0150	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	4,764 LF		
0151	4686000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)	5,703 LF		
0152	4688000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 90 MILS)	8,258 LF		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0153	4690000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 120 MILS)	227 LF		
0154	4695000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)	918 LF		
0155	4697000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 120 MILS)	115 LF		
0156	4700000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)	200 LF		
0157	4702000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 120 MILS)	55 LF		
0158	4710000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)	144 LF		
0159	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	88 EA		
0160	4770000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)	1,000 LF		
0161	4775000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (6") (IV)	22,102 LF		
0162	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	22,501 LF		
0163	4815000000-E	1205	PAINT PAVEMENT MARKING LINES (6")	18,308 LF		
0164	4820000000-E	1205	PAINT PAVEMENT MARKING LINES (8")	1,940 LF		
0165	4825000000-E	1205	PAINT PAVEMENT MARKING LINES (12")	620 LF		
0166	4835000000-E	1205	PAINT PAVEMENT MARKING LINES (24")	288 LF		
0167	4845000000-N	1205	PAINT PAVEMENT MARKING SYMBOL	149 EA		
0168	4847000000-E	1205	POLYUREA PAVEMENT MARKING LINES (4", **********) (HIGHLY REFLECTIVE ELEMENTS)	812 LF		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0169	4847100000-E	1205	POLYUREA PAVEMENT MARKING LINES (6", **********) (HIGHLY REFLECTIVE ELEMENTS)	23,476 LF		
0170	4847120000-E	1205	POLYUREA PAVEMENT MARKING LINES (12", **********) (HIGHLY REFLECTIVE ELEMENTS)	2,015 LF		
0171	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	408 LF		
0172	4855000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (6")	17,684 LF		
0173	4900000000-N	1251	PERMANENT RAISED PAVEMENT MARKERS	113 EA		
0174	4905000000-N	1253	SNOWPLOWABLE PAVEMENT MARKERS	248 EA		
0175	4955000000-N	1264	OBJECT MARKERS (END OF ROAD)	6 EA		
0176	5005000000-E	1401	80' HIGH MOUNT STANDARD	1 EA		
0177	5010000000-E	1401	100' HIGH MOUNT STANDARD	6 EA		
0178	5020000000-N	1401	PORTABLE DRIVE UNIT	1 EA		
0179	5025000000-E	SP	HIGH MOUNT FOUNDATIONS	46.6 CY		
0180	5050000000-N	1404	LIGHT STANDARD, TYPE MTLT ********** (40' MH, 17" SA)	30 EA		
0181	5070000000-N	1405	STANDARD FOUNDATION ********* (R1)	28 EA		
0182	5070000000-N	1405	STANDARD FOUNDATION ********* (R2)	2 EA		
0183	5120000000-N	1407	ELECTRIC SERVICE POLE **** ******** (30' CLASS 4)	1 EA		
0184	5125000000-E	1407	ELECTRIC SERVICE LATERAL ********** (3 #1/0 USE)	25 LF		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0185	5145000000-N	1408	LIGHT CONTROL EQUIPMENT, TYPE RW ********** (240/480 V)	1 EA		
0186	5155000000-E	1409	ELECTRICAL DUCT, TYPE BD, SIZE ***** (2")	396 LF		
0187	5155000000-E	1409	ELECTRICAL DUCT, TYPE BD, SIZE ***** (3")	101 LF		
0188	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (3")	783 LF		
0189	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (4")	379 LF		
0190	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (6")	95 LF		
0191	5170000000-E	1410	** #8 W/G FEEDER CIRCUIT (2)	630 LF		
0192	5180000000-E	1410	** #4 W/G FEEDER CIRCUIT (2)	180 LF		
0193	5185000000-E	1410	** #2 W/G FEEDER CIRCUIT (2)	1,700 LF		
0194	5190000000-E	1410	********** FEEDER CIRCUIT (MCM 4-WIRE COPPER)	3,950 LF		
0195	5205000000-E	1410	** #8 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 1-1/2)	4,100 LF		
0196	5215000000-E	1410	** #4 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 1-1/2)	1,410 LF		
0197	5220000000-E	1410	** #2 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 1-1/2)	10,000 LF		
0198	5270000000-N	SP	GENERIC LIGHTING ITEM 100' HIGH MOUNT LUMINAIRE - LED	36 EA		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0199	5270000000-N	SP	GENERIC LIGHTING ITEM 80' HIGH MOUNT LUMINAIRE - LED	8 EA		
0200	5270000000-N	SP	GENERIC LIGHTING ITEM ELECTRICAL JUNCTION BOXES, PC18	51 EA		
0201	5270000000-N	SP	GENERIC LIGHTING ITEM ELECTRICAL JUNCTION BOXES, PC24	9 EA		
0202	5270000000-N	SP	GENERIC LIGHTING ITEM ELECTRICAL JUNCTION BOXES, PC36	2 EA		
0203	5270000000-N	SP	GENERIC LIGHTING ITEM ROADWAY LIGHT STANDARD LUMINAIRE - 240V, 208W LED	4 EA		
0204	5270000000-N	SP	GENERIC LIGHTING ITEM ROADWAY LIGHT STANDARD LUMINAIRE - 480V, 208W LED	26 EA		
0205	5325800000-E	1510	8" WATER LINE	390 LF		
0206	5326600000-E	1510	16" WATER LINE	2,980 LF		
0207	5546000000-E	1515	8" VALVE	1 EA		
0208	5558600000-E	1515	16" VALVE	2 EA		
0209	5589200000-E	1515	2" AIR RELEASE VALVE	3 EA		
0210	5666000000-E	1515	FIRE HYDRANT	3 EA		
0211	5810000000-E	1530	ABANDON 16" UTILITY PIPE	980 LF		
0212	5906000000-E	SP	GENERIC UTILITY ITEM DUCTILE IRON WATER PIPE FITTINGS	5,435 LB		
0213	6000000000-E	1605	TEMPORARY SILT FENCE	20,650 LF		
0214	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	175 TON		
0215	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	2,045 TON		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0216	6012000000-E	1610	SEDIMENT CONTROL STONE	2,400 TON		
0217	6015000000-E	1615	TEMPORARY MULCHING	52 ACR		
0218	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	3,400 LB		
0219	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEEDING	18.5 TON		
0220	6024000000-E	1622	TEMPORARY SLOPE DRAINS	1,865 LF		
0221	6029000000-E	SP	SAFETY FENCE	1,600 LF		
0222	6030000000-E	1630	SILT EXCAVATION	11,460 CY		
0223	6036000000-E	1631	MATTING FOR EROSION CONTROL	49,020 SY		
0224	6037000000-E	SP	COIR FIBER MAT	100 SY		
0225	6038000000-E	SP	PERMANENT SOIL REINFORCEMENT MAT	610 SY		
0226	6042000000-E	1632	1/4" HARDWARE CLOTH	2,550 LF		
0227	6046000000-E	1636	TEMPORARY PIPE FOR STREAM CROSSING	25 LF		
0228	6069000000-E	1638	STILLING BASINS	322 CY		
0229	6071012000-E	SP	COIR FIBER WATTLE	2,940 LF		
0230	6071020000-E	SP	POLYACRYLAMIDE (PAM)	1,165 LB		
0231	6071030000-E	1640	COIR FIBER BAFFLE	3,025 LF		
0232	6071050000-E	SP	**" SKIMMER (1.5")	6 EA		
0233	6071050000-E	SP	**" SKIMMER (2")	7 EA		
0234	6071050000-E	SP	**" SKIMMER (2.5")	1 EA		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0235	6084000000-E	1660	SEEDING & MULCHING	51 ACR		
0236	6087000000-E	1660	MOWING	30 ACR		
0237	6090000000-E	1661	SEED FOR REPAIR SEEDING	550 LB		
0238	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	1.5 TON		
0239	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	1,175 LB		
0240	6108000000-E	1665	FERTILIZER TOPDRESSING	35.25 TON		
0241	6111000000-E	SP	IMPERVIOUS DIKE	76 LF		
0242	6114500000-N	1667	SPECIALIZED HAND MOWING	10 MHR		
0243	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	25 EA		
0244	6120000000-E	SP	CULVERT DIVERSION CHANNEL	413 CY		
0245	6123000000-E	1670	REFORESTATION	0.77 ACR		
0246	6132000000-N	SP	GENERIC EROSION CONTROL ITEM CONCRETE WASHOUT STRUCTURE	3 EA		
0247	6135000000-E	SP	GENERIC EROSION CONTROL ITEM COMPOST BLANKET	5 ACR		
0248	7279000000-E	1715	TRACER WIRE	1,385 LF		
0249	7300000000-E	1715	UNPAVED TRENCHING (**********) (1, 2")	715 LF		
0250	7300000000-E	1715	UNPAVED TRENCHING (**********) (2, 2")	760 LF		
0251	7300000000-E	1715	UNPAVED TRENCHING (**********) (4, 3")	1,060 LF		
0252	7300000000-E	1715	UNPAVED TRENCHING (**********) (4,1")	2,680 LF		
0253	7301000000-E	1715	DIRECTIONAL DRILL (**********) (2, 2")	335 LF		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0254	7301000000-E	1715	DIRECTIONAL DRILL (**********) (4, 2" & 4, 3")	470 LF		
0255	7301000000-E	1715	DIRECTIONAL DRILL (**********) (4, 2")	535 LF		
0256	7301000000-E	1715	DIRECTIONAL DRILL (**********) (4, 3")	165 LF		
0257	7312000000-N	1716	JUNCTION BOX (**********) (36"X 24"X24')	7 EA		
0258	7348000000-N	1716	JUNCTION BOX (OVER-SIZED, HEA-VY DUTY)	38 EA		
0259	7484000000-N	SP	MICROWAVE VEHICLE DETECTOR	4 EA		
0260	7516000000-E	1730	COMMUNICATIONS CABLE (**FIBER) (72)	8,850 LF		
0261	7528000000-E	1730	DROP CABLE	1,680 LF		
0262	7540000000-N	1731	SPLICE ENCLOSURE	7 EA		
0263	7552000000-N	1731	INTERCONNECT CENTER	2 EA		
0264	7575142200-N	SP	NEW ELECTRICAL SERVICE	2 EA		
0265	7575160000-E	1734	REMOVE EXISTING COMMUNICATIONS CABLE	6,630 LF		
0266	7613000000-N	SP	SOIL TEST	6 EA		
0267	7614100000-E	SP	DRILLED PIER FOUNDATION	58.59 CY		
0268	7960000000-N	SP	METAL POLE FOUNDATION REMOVAL	3 EA		
0269	7972000000-N	SP	METAL POLE REMOVAL	2 EA		
0270	7980000000-N	SP	GENERIC SIGNAL ITEM CABINET, TYPE 336, POLE MOUNT-ED	2 EA		
0271	7980000000-N	SP	GENERIC SIGNAL ITEM CABINET, TYPE 5052 H-32 ALUM NEMA 3S, POLE MOUNTED	3 EA		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0272	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV CAMERA ASSEMBLY	1 EA		
0273	7980000000-N	SP	GENERIC SIGNAL ITEM ETHERNET EDGE SWITCH	2 EA		
0274	7980000000-N	SP	GENERIC SIGNAL ITEM METAL ITS POLE DESIGN	6 EA		
0275	7980000000-N	SP	GENERIC SIGNAL ITEM METAL POLE FOR ITS DEVICE	5 EA		
0276	7980000000-N	SP	GENERIC SIGNAL ITEM MVD TERMINAL SERVER ASSEMBLY	2 EA		
0277	7980000000-N	SP	GENERIC SIGNAL ITEM RELOCATE CCTV ASSEMBLY	1 EA		
0278	7980000000-N	SP	GENERIC SIGNAL ITEM REMOVE RWIS ASSEMBLY	1 EA		
0279	7985000000-N	SP	GENERIC SIGNAL ITEM AET TOLL ZONE SITES	Lump Sum	L.S.	
0280	7985000000-N	SP	GENERIC SIGNAL ITEM TRAINING	Lump Sum	L.S.	
0281	7990000000-E	SP	GENERIC SIGNAL ITEM RS-485 CABLE	5,230 LF		
0286	0000400000-N	801	CONSTRUCTION SURVEYING	Lump Sum	L.S.	
0287	1330000000-E	607	INCIDENTAL MILLING	201 SY		
0288	1891000000-E	SP	GENERIC PAVING ITEM DIAMOND GRINDING PCC PAVEMENT	12,850 SY		
0289	2591000000-E	848	4" CONCRETE SIDEWALK	2,700 SY		
0290	3565000000-E	866	DOUBLE GATES, **' HIGH, **' WIDE, **' OPENING (47", 6', 12')	1 EA		
0291	5606000000-E	1515	2" BLOW OFF	1 EA		
0292	8175000000-E	420	CLASS AA CONCRETE (BRIDGE)	36 CY		

County : Wake

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0293	8224000000-E	425	EPOXY COATED REINFORCING STEEL (BRIDGE)	1,951 LB		
0294	8692000000-N	SP	FOAM JOINT SEALS	Lump Sum	L.S.	
			CULVERT ITEMS			
0282	8126000000-N	414	CULVERT EXCAVATION, STA ****** (83+04.00-L-)	Lump Sum	L.S.	
0283	8133000000-E	414	FOUNDATION CONDITIONING MATERIAL, BOX CULVERT	135 TON		
0284	8196000000-E	420	CLASS A CONCRETE (CULVERT)	181.8 CY		
0285	8245000000-E	425	REINFORCING STEEL (CULVERT)	37,027 LB		

DBE GOAL SET: 12.00%
DBE GOAL OBT: 12.14%

Vendor 1 of 9: BARNHILL CONTRACTING COMPANY (3516)
Call Order 002 (Proposal: C203991)

Bid Information

Proposal County: WAKE
Vendor Address: 4325 PLEASANT VALLEY ROAD
RALEIGH , NORTH CAROLINA , 27612
Signature Check: Kenneth_Cates_3516
Time Bid Received: December 19, 2017 12:44 PM
Amendment Count: 1

Bid Checksum: 5C3DF6E9
Bid Total: $15,204,114.61
Items Total: $15,204,114.61
Time Total: $0.00

Bidding Errors:
None.

Vendor 1 of 9: BARNHILL CONTRACTING COMPANY (3516)
Call Order 002 (Proposal: C203991)

Bid Bond Information

Projects:		**Bond Maximum:**	
Counties:		**State of Incorporation:**	
Bond ID:	SNC17374435	**Agency Execution Date:**	12/4/2017 12
Paid by Check:	No	**Surety Name:**	surety2000
Bond Percent:	5%	**Bond Agency Name:**	Travelers Casualty and Surety Company of America

Bidder 1 of 9

Vendor 3516's Bid Information for Call 002, Letting L171219, 12/19/17

BARNHILL CONTRACTING COMPANY (3516)
Call Order 002 (Proposal ID C203991)

LIST OF DBE PARTICIPANTS

	VENDOR NUMBER	DBE NAME / ADDRESS	WORK CODE	TYPE OF WORK	CERT TYPE	AMOUNT	
WB	12278	CLIFTON CONSTRUCTION CO., INC. 1435 GIDDENSVILLE ROAD , FAISON, NC 28341			Sub	82,152.00	COMMITTED
WB	3080	CURTIN TRUCKING & DRAINAGE INC POST OFFICE BOX 38220 , CHARLOTTE, NC 282781003			Sub	172,529.00	COMMITTED
WB	4898	BULLINGTON CONSTRUCTION INC 417 FOXGLOVE LANE , INDIAN TRAIL, NC 28079			Sub	217,133.25	COMMITTED
WB	4247	SEAL BROTHERS CONTRACTING LLC 131 W. CLEVE STREET , MOUNT AIRY, NC 27030			Sub	78,875.00	COMMITTED
MB	5602	CALLIS CONTRACTORS INCORPORATED 1306 BROAD STREET , DURHAM, NC 27705			Sub	472,944.00	COMMITTED
WB	7423	1ST CLASS TRUCKING INC 4700 HARPER RENN RD , OXFORD, NC 27565			Sub	146,919.00	COMMITTED
MB	12291	CERTIFIED CONCRETE CONSTRUCTION 10416 CHAPEL HILL ROAD , MORRISVILLE, NC 27560			Sub	675,286.73	COMMITTED
					TOTAL:	$1,845,838.98 12.14%	

Vendor 3516's Bid Information for Call 002, Letting L171219, 12/19/17

BARNHILL CONTRACTING COMPANY (3516)
Call Order 002 (Proposal ID C203991)

Miscelleneous Data Info - Contractor Responses:
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NON-COLLUSION AND DEBARMENT CERTIFICATION

Explanation of the prospective bidder that is unable to certify to any of the statements in this certification:

Explanation:
NOT ANSWERED
NOT ANSWERED
NOT ANSWERED
NOT ANSWERED

AWARD LIMITS ON MULTIPLE PROJECTS

By answering YES to this statement, the bidder acknowleges that they are using the award limits on multiple projects. No

It is the desire of the Bidder to be awarded contracts, the value of which will not exceed a total of NOT ANSWERED 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
NOT ANSWERED	
NOT ANSWERED	

Bidder 1 of 9

NOT ANSWERED
NOT ANSWERED
NOT ANSWERED
NOT ANSWERED

Bid Bond Data Info - Contractor Responses:
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BondID: SNC17374435
Surety Registry Agency: surety2000
Verified?: Yes
Surety Agency: Travelers Casualty and Surety Company of America
Bond Execution Date: 12/4/2017 12
Bond Amount: $760,205.73 (Five Percent of Bid)

Contract ID: C203991 Project(s): STPDA-0540(39)
Letting Date: 12-19-17 Call Order: 002
Bidder: 3516 - BARNHILL CONTRACTING COMPANY

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0012	0177000000-E BREAKING OF EXISTING ASPHALT PAVEMENT	1,680.000 SY	2.45000		4,116.00	
0013	0195000000-E SELECT GRANULAR MATERIAL	1,600.000 CY	36.00000		57,600.00	
0014	0196000000-E GEOTEXTILE FOR SOIL STABILIZA-TION	2,750.000 SY	1.35000		3,712.50	
0015	0318000000-E FOUNDATION CONDITIONING MATE- RIAL, MINOR STRUCTURES	610.000 TON	35.80000		21,838.00	
0016	0320000000-E FOUNDATION CONDITIONING GEO-TEXTILE	1,900.000 SY	1.00000		1,900.00	
0017	0342000000-E **" SIDE DRAIN PIPE (30")	40.000 LF	75.65000		3,026.00	
0018	0343000000-E 15" SIDE DRAIN PIPE	32.000 LF	57.80000		1,849.60	
0019	0354000000-E ***" RC PIPE CULVERTS, CLASS ***** (30", V)	296.000 LF	79.30000		23,472.80	
0020	0354000000-E ***" RC PIPE CULVERTS, CLASS ***** (42", V)	272.000 LF	130.30000		35,441.60	
0021	0366000000-E 15" RC PIPE CULVERTS, CLASS III	2,916.000 LF	29.10000		84,855.60	
0022	0372000000-E 18" RC PIPE CULVERTS, CLASS III	544.000 LF	38.00000		20,672.00	
0023	0378000000-E 24" RC PIPE CULVERTS, CLASS III	168.000 LF	49.70000		8,349.60	

Contract ID: C203991 Project(s): STPDA-0540(39)
Letting Date: 12-19-17 Call Order: 002
Bidder: 3516 - BARNHILL CONTRACTING COMPANY

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0024	0384000000-E 30" RC PIPE CULVERTS, CLASS III	448.000 LF	68.60000		30,732.80	
0025	0390000000-E 36" RC PIPE CULVERTS, CLASS III	88.000 LF	92.60000		8,148.80	
0026	0396000000-E 42" RC PIPE CULVERTS, CLASS III	196.000 LF	107.80000		21,128.80	
0027	0582000000-E 15" CS PIPE CULVERTS, 0.064" THICK	720.000 LF	41.40000		29,808.00	
0028	0636000000-E **" CS PIPE ELBOWS, *****" THICK (15", 0.064")	24.000 EA	325.20000		7,804.80	
0029	0995000000-E PIPE REMOVAL	552.000 LF	14.10000		7,783.20	
0030	0996000000-N PIPE CLEAN-OUT	5.000 EA	2,000.00000		10,000.00	
0031	1011000000-N FINE GRADING	LUMP	LUMP		219,000.00	
0032	1115000000-E GEOTEXTILE FOR PAVEMENT STA-BILIZATION	9,570.000 SY	2.70000		25,839.00	
0033	1121000000-E AGGREGATE BASE COURSE	24,700.000 TON	24.45000		603,915.00	
0034	1154000000-E AGGREGATE FOR CEMENT TREATED BASE COURSE	320.000 TON	40.85000		13,072.00	
0035	1165000000-E PORTLAND CEMENT FOR CEMENT TREATED BASE COURSE	13.000 TON	1,500.00000		19,500.00	

Contract ID: C203991 Project(s): STPDA-0540(39)
Letting Date: 12-19-17 Call Order: 002
Bidder: 3516 - BARNHILL CONTRACTING COMPANY

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0036	1209000000-E ASPHALT CURING SEAL	70.000 GAL	75.00000		5,250.00	
0037	1275000000-E PRIME COAT	1,840.000 GAL	7.20000		13,248.00	
0038	1489000000-E ASPHALT CONC BASE COURSE, TYPE B25.0B	4,670.000 TON	64.55000		301,448.50	
0039	1498000000-E ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B	7,090.000 TON	61.25000		434,262.50	
0040	1519000000-E ASPHALT CONC SURFACE COURSE, TYPE S9.5B	6,110.000 TON	62.80000		383,708.00	
0041	1525000000-E ASPHALT CONC SURFACE COURSE, TYPE SF9.5A	590.000 TON	85.55000		50,474.50	
0042	1575000000-E ASPHALT BINDER FOR PLANT MIX	955.000 TON	370.00000		353,350.00	
0043	1847000000-E *****" PORT CEM CONC PAVEMENT,THROUGH LANES (WITH DOWELS) (13-1/2")	9,570.000 SY	118.50000		1,134,045.00	
0044	1881000000-E GENERIC PAVING ITEM MILLED RUMBLE STRIPS (CONCRETE SHOULDERS)	5,390.000 LF	1.00000		5,390.00	
0045	1902000000-N SURFACE TESTING CONCRETE PAVE-MENT	LUMP	LUMP		10,000.00	
0046	1913000000-E CONCRETE SHOULDERS ADJACENT TO******" PAVEMENT (13-1/2")	3,272.000 SY	118.50000		387,732.00	

Contract ID: C203991 Project(s): STPDA-0540(39)
Letting Date: 12-19-17 Call Order: 002
Bidder: 3516 - BARNHILL CONTRACTING COMPANY

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0047	2000000000-N RIGHT OF WAY MARKERS	25.000 EA	236.00000		5,900.00	
0048	2020000000-N CONTROL OF ACCESS MARKERS	28.000 EA	286.00000		8,008.00	
0049	2022000000-E SUBDRAIN EXCAVATION	336.000 CY	25.00000		8,400.00	
0050	2033000000-E SUBDRAIN FINE AGGREGATE	252.000 CY	45.00000		11,340.00	
0051	2044000000-E 6" PERFORATED SUBDRAIN PIPE	1,500.000 LF	18.00000		27,000.00	
0052	2070000000-N SUBDRAIN PIPE OUTLET	3.000 EA	350.00000		1,050.00	
0053	2077000000-E 6" OUTLET PIPE	18.000 LF	35.00000		630.00	
0054	2099000000-E SHOULDER DRAIN	3,700.000 LF	6.75000		24,975.00	
0055	2110000000-E 4" SHOULDER DRAIN PIPE	3,650.000 LF	1.50000		5,475.00	
0056	2121000000-E 4" OUTLET PIPE FOR SHOULDER DRAINS	190.000 LF	7.80000		1,482.00	
0057	2132000000-N CONCRETE PAD FOR SHOULDER DRAIN PIPE OUTLET	6.000 EA	300.00000		1,800.00	
0058	2143000000-E BLOTTING SAND	10.000 TON	130.45000		1,304.50	

Contract ID: C203991 Project(s): STPDA-0540(39)
Letting Date: 12-19-17 Call Order: 002
Bidder: 3516 - BARNHILL CONTRACTING COMPANY

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0059	2209000000-E ENDWALLS	9.000 CY	661.30000		5,951.70	
0060	2253000000-E PIPE COLLARS	3.062 CY	1,704.00000		5,217.65	
0061	2286000000-N MASONRY DRAINAGE STRUCTURES	50.000 EA	1,150.00000		57,500.00	
0062	2308000000-E MASONRY DRAINAGE STRUCTURES	33.100 LF	279.50000		9,251.45	
0063	2364000000-N FRAME WITH TWO GRATES, STD 840.16	6.000 EA	455.00000		2,730.00	
0064	2364200000-N FRAME WITH TWO GRATES, STD 840.20	4.000 EA	455.00000		1,820.00	
0065	2365000000-N FRAME WITH TWO GRATES, STD 840.22	16.000 EA	460.00000		7,360.00	
0066	2366000000-N FRAME WITH TWO GRATES, STD 840.24	3.000 EA	470.00000		1,410.00	
0067	2367000000-N FRAME WITH TWO GRATES, STD 840.29	1.000 EA	460.00000		460.00	
0068	2374000000-N FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	3.000 EA	595.00000		1,785.00	
0069	2374000000-N FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	7.000 EA	615.00000		4,305.00	
0070	2374000000-N FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	7.000 EA	615.00000		4,305.00	

Contract ID: C203991 Project(s): STPDA-0540(39)
Letting Date: 12-19-17 Call Order: 002
Bidder: 3516 - BARNHILL CONTRACTING COMPANY

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0071	2396000000-N FRAME WITH COVER, STD 840.54	3.000 EA	345.00000		1,035.00	
0072	2451000000-N CONCRETE TRANSITIONAL SECTION FOR DROP INLET	8.000 EA	400.00000		3,200.00	
0073	2473000000-N GENERIC DRAINAGE ITEM TIE PROPOSED PIPE TO EXIST DRAINAGE STRUCTURE	3.000 EA	1,345.00000		4,035.00	
0074	2542000000-E 1'-6" CONCRETE CURB & GUTTER	4,440.000 LF	12.62000		56,032.80	
0075	2549000000-E 2'-6" CONCRETE CURB & GUTTER	5,380.000 LF	14.88000		80,054.40	
0076	2556000000-E SHOULDER BERM GUTTER	527.000 LF	17.89000		9,428.03	
0077	2605000000-N CONCRETE CURB RAMP	2.000 EA	1,850.00000		3,700.00	
0078	2619000000-E 4" CONCRETE PAVED DITCH	70.000 SY	38.25000		2,677.50	
0079	2655000000-E 5" MONOLITHIC CONCRETE ISLANDS(KEYED IN)	560.000 SY	66.15000		37,044.00	
0080	2724000000-E PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED	110.000 LF	160.00000		17,600.00	
0081	2738000000-E GENERIC PAVING ITEM BRICK PAVERS FOR ISLANDS AND ROUNDABOUTS	1,920.000 SY	126.10000		242,112.00	

Contract ID: C203991 Project(s): STPDA-0540(39)
Letting Date: 12-19-17 Call Order: 002
Bidder: 3516 - BARNHILL CONTRACTING COMPANY

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0082	2752000000-E GENERIC PAVING ITEM MEDIAN HAZARD PROTECTION	200.000 LF	200.00000		40,000.00	
0083	2815000000-N ADJUSTMENT OF DROP INLETS	1.000 EA	500.00000		500.00	
0084	3000000000-N IMPACT ATTENUATOR UNIT, TYPE 350	2.000 EA	12,400.00000		24,800.00	
0085	3030000000-E STEEL BM GUARDRAIL	5,200.000 LF	15.50000		80,600.00	
0086	3045000000-E STEEL BM GUARDRAIL, SHOP CURVED	437.500 LF	17.50000		7,656.25	
0087	3105000000-N STEEL BM GUARDRAIL TERMINAL SECTIONS	2.000 EA	75.00000		150.00	
0088	3150000000-N ADDITIONAL GUARDRAIL POSTS	46.000 EA	42.00000		1,932.00	
0089	3210000000-N GUARDRAIL ANCHOR UNITS, TYPE CAT-1	11.000 EA	550.00000		6,050.00	
0090	3287000000-N GUARDRAIL END UNITS, TYPE TL-3	16.000 EA	3,000.00000		48,000.00	
0091	3317000000-N GUARDRAIL ANCHOR UNITS, TYPE B-77	7.000 EA	1,650.00000		11,550.00	
0092	3345000000-E REMOVE & RESET EXISTING GUARD-RAIL	310.000 LF	9.50000		2,945.00	
0093	3503000000-E WOVEN WIRE FENCE, 47" FABRIC	6,340.000 LF	3.50000		22,190.00	

Contract ID: C203991 Project(s): STPDA-0540(39)
Letting Date: 12-19-17 Call Order: 002
Bidder: 3516 - BARNHILL CONTRACTING COMPANY

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0094	3509000000-E 4" TIMBER FENCE POSTS, 7'-6" LONG	385.000 EA	16.00000		6,160.00	
0095	3515000000-E 5" TIMBER FENCE POSTS, 8'-0" LONG	125.000 EA	32.00000		4,000.00	
0096	3628000000-E RIP RAP, CLASS I	3,006.000 TON	45.00000		135,270.00	
0097	3635000000-E RIP RAP, CLASS II	80.000 TON	59.85000		4,788.00	
0098	3649000000-E RIP RAP, CLASS B	220.000 TON	53.95000		11,869.00	
0099	3656000000-E GEOTEXTILE FOR DRAINAGE	3,868.000 SY	1.80000		6,962.40	
0100	4025000000-E CONTRACTOR FURNISHED, TYPE ***SIGN (A)	2,135.500 SF	27.00000		57,658.50	
0101	4025000000-E CONTRACTOR FURNISHED, TYPE ***SIGN (B)	218.750 SF	35.00000		7,656.25	
0102	4025000000-E CONTRACTOR FURNISHED, TYPE ***SIGN (D)	104.500 SF	22.00000		2,299.00	
0103	4025000000-E CONTRACTOR FURNISHED, TYPE ***SIGN (E)	508.500 SF	14.00000		7,119.00	
0104	4025000000-E CONTRACTOR FURNISHED, TYPE ***SIGN (MILEMARKER)	73.500 SF	16.00000		1,176.00	
0105	4025000000-E CONTRACTOR FURNISHED, TYPE ***SIGN (OVERLAY)	4.000 SF	13.00000		52.00	

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Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0106	4048000000-E REINFORCED CONCRETE SIGN FOUN-DATIONS	9.000 CY	1,300.00000		11,700.00	
0108	4057000000-E OVERHEAD FOOTING	105.400 CY	2,900.00000		305,660.00	
0109	4060000000-E SUPPORTS, BREAKAWAY STEEL BEAM	8,991.000 LB	4.50000		40,459.50	
0110	4066000000-E SUPPORTS, SIMPLE STEEL BEAM	1,434.000 LB	2.75000		3,943.50	
0111	4072000000-E SUPPORTS, 3-LB STEEL U-CHANNEL	1,447.000 LF	10.00000		14,470.00	
0112	4096000000-N SIGN ERECTION, TYPE D	9.000 EA	125.00000		1,125.00	
0113	4102000000-N SIGN ERECTION, TYPE E	68.000 EA	70.00000		4,760.00	
0114	4110000000-N SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	9.000 EA	675.00000		6,075.00	
0115	4114000000-N SIGN ERECTION, MILEMARKERS	5.000 EA	15.00000		75.00	
0116	4116000000-N SIGN ERECTION, OVERLAY (GROUNDMOUNTED)	1.000 EA	350.00000		350.00	
0117	4149000000-N DISPOSAL OF SIGN SYSTEM, OVER-HEAD	4.000 EA	10,400.00000		41,600.00	
0118	4152000000-N DISPOSAL OF SIGN SYSTEM, STEELBEAM	3.000 EA	1,000.00000		3,000.00	

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Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0119	4155000000-N DISPOSAL OF SIGN SYSTEM, U- CHANNEL	6.000 EA	1.00000		6.00	
0120	4360000000-N GENERIC SIGNING ITEM SIGN ERECTION, TOLL ROUTE ASSEMBLY	13.000 EA	675.00000		8,775.00	
0121	4361000000-E GENERIC SIGNING ITEM REINFORCING STEEL (AESTHETIC COLUMNS ONLY)	42,859.000 LB	2.10000		90,003.90	
0122	4365000000-E GENERIC SIGNING ITEM CLASS A CONCRETE (AESTHETIC COLUMNS ONLY)	251.100 CY	1,900.00000		477,090.00	
0123	4366000000-E GENERIC SIGNING ITEM CONTRACTOR FURNISHED, TOLL ROUTE ASSEMBLY	484.250 SF	22.50000		10,895.63	
0124	4370000000-N GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 20+14(GNTRY T16 IN, TRUSS ONLY)	LUMP	LUMP		90,000.00	
0125	4370000000-N GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 20+64(GNTRY T16 OUT, TRUSSONLY)	LUMP	LUMP		90,000.00	
0126	4370000000-N GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 20+66(GNTRY T15 OUT, TRUSSONLY)	LUMP	LUMP		100,000.00	
0127	4370000000-N GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 21+16(GNTRY T15 IN, TRUSS ONLY)	LUMP	LUMP		100,000.00	

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Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0128	4370000000-N GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 475+00 (A, TRUSS ONLY)	LUMP	LUMP		41,375.00	
0129	4370000000-N GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 527+50 (B, TRUSS ONLY)	LUMP	LUMP		16,575.00	
0130	4370000000-N GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 550+00 (C, TRUSS ONLY)	LUMP	LUMP		44,150.00	
0131	4370000000-N GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 590+21 (D, TRUSS ONLY)	LUMP	LUMP		44,400.00	
0132	4370000000-N GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 655+00 (E, TRUSS ONLY)	LUMP	LUMP		16,575.00	
0133	4370000000-N GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 691+50 (F, TRUSS ONLY)	LUMP	LUMP		42,000.00	
0134	4400000000-E WORK ZONE SIGNS (STATIONARY)	504.000 SF	8.40000		4,233.60	
0135	4405000000-E WORK ZONE SIGNS (PORTABLE)	352.000 SF	27.10000		9,539.20	
0136	4410000000-E WORK ZONE SIGNS (BARRICADE MOUNTED)	70.000 SF	8.10000		567.00	
0137	4420000000-N PORTABLE CHANGEABLE MESSAGE SIGN	1.000 EA	9,620.00000		9,620.00	

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Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0138	4430000000-N DRUMS	100.000 EA	86.25000		8,625.00	
0139	4435000000-N CONES	43.000 EA	37.00000		1,591.00	
0140	4445000000-E BARRICADES (TYPE III)	192.000 LF	58.70000		11,270.40	
0141	4455000000-N FLAGGER	180.000 DAY	235.00000		42,300.00	
0142	4465000000-N TEMPORARY CRASH CUSHIONS	1.000 EA	8,250.00000		8,250.00	
0143	4470000000-N RESET TEMPORARY CRASH CUSHION	2.000 EA	2,500.00000		5,000.00	
0144	4480000000-N TMA	2.000 EA	4,005.00000		8,010.00	
0145	4485000000-E PORTABLE CONCRETE BARRIER	4,240.000 LF	24.85000		105,364.00	
0146	4500000000-E RESET PORTABLE CONCRETE BARRIER	8,070.000 LF	4.50000		36,315.00	
0147	4510000000-N LAW ENFORCEMENT	120.000 HR	38.00000		4,560.00	
0148	4600000000-N GENERIC TRAFFIC CONTROL ITEM REMOVE & REPLACE SNOWPLOWABLE PAVEMENT MARKER REFLECTOR	222.000 EA	5.00000		1,110.00	

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Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0149	4650000000-N TEMPORARY RAISED PAVEMENT MARKERS	351.000 EA	5.00000		1,755.00	
0150	4685000000-E THERMOPLASTIC PAVEMENT MARKINGLINES (4", 90 MILS)	4,764.000 LF	0.75000		3,573.00	
0151	4686000000-E THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)	5,703.000 LF	0.85000		4,847.55	
0152	4688000000-E THERMOPLASTIC PAVEMENT MARKINGLINES (6", 90 MILS)	8,258.000 LF	1.25000		10,322.50	
0153	4690000000-E THERMOPLASTIC PAVEMENT MARKINGLINES (6", 120 MILS)	227.000 LF	1.50000		340.50	
0154	4695000000-E THERMOPLASTIC PAVEMENT MARKINGLINES (8", 90 MILS)	918.000 LF	3.00000		2,754.00	
0155	4697000000-E THERMOPLASTIC PAVEMENT MARKINGLINES (8", 120 MILS)	115.000 LF	3.00000		345.00	
0156	4700000000-E THERMOPLASTIC PAVEMENT MARKINGLINES (12", 90 MILS)	200.000 LF	4.00000		800.00	
0157	4702000000-E THERMOPLASTIC PAVEMENT MARKINGLINES (12", 120 MILS)	55.000 LF	4.00000		220.00	
0158	4710000000-E THERMOPLASTIC PAVEMENT MARKINGLINES (24", 120 MILS)	144.000 LF	15.00000		2,160.00	
0159	4725000000-E THERMOPLASTIC PAVEMENT MARKINGSYMBOL (90 MILS)	88.000 EA	200.00000		17,600.00	

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Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0160	4770000000-E COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)	1,000.000 LF	1.70000		1,700.00	
0161	4775000000-E COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (6") (IV)	22,102.000 LF	1.95000		43,098.90	
0162	4810000000-E PAINT PAVEMENT MARKING LINES (4")	22,501.000 LF	0.45000		10,125.45	
0163	4815000000-E PAINT PAVEMENT MARKING LINES (6")	18,308.000 LF	0.50000		9,154.00	
0164	4820000000-E PAINT PAVEMENT MARKING LINES (8")	1,940.000 LF	0.90000		1,746.00	
0165	4825000000-E PAINT PAVEMENT MARKING LINES (12")	620.000 LF	1.00000		620.00	
0166	4835000000-E PAINT PAVEMENT MARKING LINES (24")	288.000 LF	3.00000		864.00	
0167	4845000000-N PAINT PAVEMENT MARKING SYMBOL	149.000 EA	25.00000		3,725.00	
0168	4847000000-E POLYUREA PAVEMENT MARKING LINES (4", **********) (HIGHLY REFLECTIVE ELEMENTS)	812.000 LF	1.50000		1,218.00	
0169	4847100000-E POLYUREA PAVEMENT MARKING LINES (6", **********) (HIGHLY REFLECTIVE ELEMENTS)	23,476.000 LF	2.00000		46,952.00	

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Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0170	4847120000-E POLYUREA PAVEMENT MARKING LINES (12", **********) (HIGHLY REFLECTIVE ELEMENTS)	2,015.000 LF	4.00000		8,060.00	
0171	4850000000-E REMOVAL OF PAVEMENT MARKING LINES (4")	408.000 LF	0.75000		306.00	
0172	4855000000-E REMOVAL OF PAVEMENT MARKING LINES (6")	17,684.000 LF	0.75000		13,263.00	
0173	4900000000-N PERMANENT RAISED PAVEMENT MARKERS	113.000 EA	10.00000		1,130.00	
0174	4905000000-N SNOWPLOWABLE PAVEMENT MARKERS	248.000 EA	28.00000		6,944.00	
0175	4955000000-N OBJECT MARKERS (END OF ROAD)	6.000 EA	90.00000		540.00	
0176	5005000000-E 80' HIGH MOUNT STANDARD	1.000 EA	17,000.00000		17,000.00	
0177	5010000000-E 100' HIGH MOUNT STANDARD	6.000 EA	19,000.00000		114,000.00	
0178	5020000000-N PORTABLE DRIVE UNIT	1.000 EA	4,900.00000		4,900.00	
0179	5025000000-E HIGH MOUNT FOUNDATIONS	46.600 CY	900.00000		41,940.00	
0180	5050000000-N LIGHT STANDARD, TYPE MTLT ********** (40' MH, 17" SA)	30.000 EA	2,000.00000		60,000.00	

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Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0181	5070000000-N STANDARD FOUNDATION ********* (R1)	28.000 EA	800.00000		22,400.00	
0182	5070000000-N STANDARD FOUNDATION ********* (R2)	2.000 EA	800.00000		1,600.00	
0183	5120000000-N ELECTRIC SERVICE POLE ********** (30' CLASS 4)	1.000 EA	950.00000		950.00	
0184	5125000000-E ELECTRIC SERVICE LATERAL ********** (3 #1/0 USE)	25.000 LF	30.00000		750.00	
0185	5145000000-N LIGHT CONTROL EQUIPMENT, TYPE RW ********** (240/480 V)	1.000 EA	12,500.00000		12,500.00	
0186	5155000000-E ELECTRICAL DUCT, TYPE BD, SIZE ***** (2")	396.000 LF	7.25000		2,871.00	
0187	5155000000-E ELECTRICAL DUCT, TYPE BD, SIZE ***** (3")	101.000 LF	8.00000		808.00	
0188	5160000000-E ELECTRICAL DUCT, TYPE JA, SIZE ***** (3")	783.000 LF	14.50000		11,353.50	
0189	5160000000-E ELECTRICAL DUCT, TYPE JA, SIZE ***** (4")	379.000 LF	17.50000		6,632.50	
0190	5160000000-E ELECTRICAL DUCT, TYPE JA, SIZE ***** (6")	95.000 LF	27.50000		2,612.50	
0191	5170000000-E ** #8 W/G FEEDER CIRCUIT (2)	630.000 LF	3.50000		2,205.00	

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Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0192	5180000000-E ** #4 W/G FEEDER CIRCUIT (2)	180.000 LF	5.25000		945.00	
0193	5185000000-E ** #2 W/G FEEDER CIRCUIT (2)	1,700.000 LF	6.50000		11,050.00	
0194	5190000000-E ********** * FEEDER CIRCUIT (MCM 4-WIRE COPPER)	3,950.000 LF	9.25000		36,537.50	
0195	5205000000-E ** #8 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 1-1/2)	4,100.000 LF	9.75000		39,975.00	
0196	5215000000-E ** #4 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 1-1/2)	1,410.000 LF	11.00000		15,510.00	
0197	5220000000-E ** #2 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 1-1/2)	10,000.000 LF	12.00000		120,000.00	
0198	5270000000-N GENERIC LIGHTING ITEM 100' HIGH MOUNT LUMINAIRE - LED	36.000 EA	1,800.00000		64,800.00	
0199	5270000000-N GENERIC LIGHTING ITEM 80' HIGH MOUNT LUMINAIRE - LED	8.000 EA	1,350.00000		10,800.00	
0200	5270000000-N GENERIC LIGHTING ITEM ELECTRICAL JUNCTION BOXES, PC18	51.000 EA	700.00000		35,700.00	
0201	5270000000-N GENERIC LIGHTING ITEM ELECTRICAL JUNCTION BOXES, PC24	9.000 EA	975.00000		8,775.00	
0202	5270000000-N GENERIC LIGHTING ITEM ELECTRICAL JUNCTION BOXES, PC36	2.000 EA	1,550.00000		3,100.00	

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0203	5270000000-N GENERIC LIGHTING ITEM ROADWAY LIGHT STANDARD LUMINAIRE - 240V, 208W LED	4.000 EA	800.00000		3,200.00	
0204	5270000000-N GENERIC LIGHTING ITEM ROADWAY LIGHT STANDARD LUMINAIRE - 480V, 208W LED	26.000 EA	850.00000		22,100.00	
0205	5325800000-E 8" WATER LINE	390.000 LF	49.00000		19,110.00	
0206	5326600000-E 16" WATER LINE	2,980.000 LF	87.00000		259,260.00	
0207	5546000000-E 8" VALVE	1.000 EA	1,500.00000		1,500.00	
0208	5558600000-E 16" VALVE	2.000 EA	7,600.00000		15,200.00	
0209	5589200000-E 2" AIR RELEASE VALVE	3.000 EA	5,200.00000		15,600.00	
0210	5666000000-E FIRE HYDRANT	3.000 EA	7,900.00000		23,700.00	
0211	5810000000-E ABANDON 16" UTILITY PIPE	980.000 LF	25.00000		24,500.00	
0212	5906000000-E GENERIC UTILITY ITEM DUCTILE IRON WATER PIPE FITTINGS	5,435.000 LB	6.20000		33,697.00	
0213	6000000000-E TEMPORARY SILT FENCE	20,650.000 LF	1.65000		34,072.50	

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Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0214	6006000000-E STONE FOR EROSION CONTROL, CLASS A	175.000 TON	53.95000		9,441.25	
0215	6009000000-E STONE FOR EROSION CONTROL, CLASS B	2,045.000 TON	42.00000		85,890.00	
0216	6012000000-E SEDIMENT CONTROL STONE	2,400.000 TON	25.00000		60,000.00	
0217	6015000000-E TEMPORARY MULCHING	52.000 ACR	700.00000		36,400.00	
0218	6018000000-E SEED FOR TEMPORARY SEEDING	3,400.000 LB	5.00000		17,000.00	
0219	6021000000-E FERTILIZER FOR TEMPORARY SEED-ING	18.500 TON	900.00000		16,650.00	
0220	6024000000-E TEMPORARY SLOPE DRAINS	1,865.000 LF	16.70000		31,145.50	
0221	6029000000-E SAFETY FENCE	1,600.000 LF	1.65000		2,640.00	
0222	6030000000-E SILT EXCAVATION	11,460.000 CY	1.00000		11,460.00	
0223	6036000000-E MATTING FOR EROSION CONTROL	49,020.000 SY	1.25000		61,275.00	
0224	6037000000-E COIR FIBER MAT	100.000 SY	8.00000		800.00	
0225	6038000000-E PERMANENT SOIL REINFORCEMENT MAT	610.000 SY	6.00000		3,660.00	

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Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0226	6042000000-E 1/4" HARDWARE CLOTH	2,550.000 LF	4.75000		12,112.50	
0227	6046000000-E TEMPORARY PIPE FOR STREAM CROSSING	25.000 LF	205.00000		5,125.00	
0228	6069000000-E STILLING BASINS	322.000 CY	14.45000		4,652.90	
0229	6071012000-E COIR FIBER WATTLE	2,940.000 LF	7.25000		21,315.00	
0230	6071020000-E POLYACRYLAMIDE (PAM)	1,165.000 LB	8.00000		9,320.00	
0231	6071030000-E COIR FIBER BAFFLE	3,025.000 LF	5.25000		15,881.25	
0232	6071050000-E **" SKIMMER (1.5")	6.000 EA	990.00000		5,940.00	
0233	6071050000-E **" SKIMMER (2")	7.000 EA	1,095.00000		7,665.00	
0234	6071050000-E **" SKIMMER (2.5")	1.000 EA	1,195.00000		1,195.00	
0235	6084000000-E SEEDING & MULCHING	51.000 ACR	1,600.00000		81,600.00	
0236	6087000000-E MOWING	30.000 ACR	70.00000		2,100.00	
0237	6090000000-E SEED FOR REPAIR SEEDING	550.000 LB	8.00000		4,400.00	

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0238	6093000000-E FERTILIZER FOR REPAIR SEEDING	1.500 TON	1,100.00000		1,650.00	
0239	6096000000-E SEED FOR SUPPLEMENTAL SEEDING	1,175.000 LB	4.50000		5,287.50	
0240	6108000000-E FERTILIZER TOPDRESSING	35.250 TON	800.00000		28,200.00	
0241	6111000000-E IMPERVIOUS DIKE	76.000 LF	56.40000		4,286.40	
0242	6114500000-N SPECIALIZED HAND MOWING	10.000 MHR	70.00000		700.00	
0243	6117000000-N RESPONSE FOR EROSION CONTROL	25.000 EA	200.00000		5,000.00	
0244	6120000000-E CULVERT DIVERSION CHANNEL	413.000 CY	11.10000		4,584.30	
0245	6123000000-E REFORESTATION	0.770 ACR	2,500.00000		1,925.00	
0246	6132000000-N GENERIC EROSION CONTROL ITEM CONCRETE WASHOUT STRUCTURE	3.000 EA	1,620.00000		4,860.00	
0247	6135000000-E GENERIC EROSION CONTROL ITEM COMPOST BLANKET	5.000 ACR	4,225.00000		21,125.00	
0248	7279000000-E TRACER WIRE	1,385.000 LF	0.65000		900.25	

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0249	7300000000-E UNPAVED TRENCHING (**********) (1, 2")	715.000 LF	6.50000		4,647.50	
0250	7300000000-E UNPAVED TRENCHING (**********) (2, 2")	760.000 LF	9.00000		6,840.00	
0251	7300000000-E UNPAVED TRENCHING (**********) (4, 3")	1,060.000 LF	14.00000		14,840.00	
0252	7300000000-E UNPAVED TRENCHING (**********) (4,1")	2,680.000 LF	15.00000		40,200.00	
0253	7301000000-E DIRECTIONAL DRILL (**********) (2, 2")	335.000 LF	50.00000		16,750.00	
0254	7301000000-E DIRECTIONAL DRILL (**********) (4, 2" & 4, 3")	470.000 LF	150.00000		70,500.00	
0255	7301000000-E DIRECTIONAL DRILL (**********) (4, 2")	535.000 LF	62.00000		33,170.00	
0256	7301000000-E DIRECTIONAL DRILL (**********) (4, 3")	165.000 LF	125.00000		20,625.00	
0257	7312000000-N JUNCTION BOX (***************) (36"X 24"X24')	7.000 EA	1,050.00000		7,350.00	
0258	7348000000-N JUNCTION BOX (OVER-SIZED, HEA-VY DUTY)	38.000 EA	750.00000		28,500.00	
0259	7484000000-N MICROWAVE VEHICLE DETECTOR	4.000 EA	8,000.00000		32,000.00	
0260	7516000000-E COMMUNICATI ONS CABLE (**FIBER) (72)	8,850.000 LF	2.75000		24,337.50	

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Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0261	7528000000-E DROP CABLE	1,680.000 LF	2.75000		4,620.00	
0262	7540000000-N SPLICE ENCLOSURE	7.000 EA	2,230.00000		15,610.00	
0263	7552000000-N INTERCONNECT CENTER	2.000 EA	2,240.00000		4,480.00	
0264	7575142200-N NEW ELECTRICAL SERVICE	2.000 EA	1,800.00000		3,600.00	
0265	7575160000-E REMOVE EXISTING COMMUNICATIONSCABLE	6,630.000 LF	0.52000		3,447.60	
0266	7613000000-N SOIL TEST	6.000 EA	1,200.00000		7,200.00	
0267	7614100000-E DRILLED PIER FOUNDATION	58.590 CY	850.00000		49,801.50	
0268	7960000000-N METAL POLE FOUNDATION REMOVAL	3.000 EA	1,500.00000		4,500.00	
0269	7972000000-N METAL POLE REMOVAL	2.000 EA	650.00000		1,300.00	
0270	7980000000-N GENERIC SIGNAL ITEM CABINET, TYPE 336, POLE MOUNT-ED	2.000 EA	5,200.00000		10,400.00	
0271	7980000000-N GENERIC SIGNAL ITEM CABINET, TYPE 5052 H-32 ALUM NEMA 3S, POLE MOUNTED	3.000 EA	5,200.00000		15,600.00	

Contract ID: C203991 Project(s): STPDA-0540(39)
Letting Date: 12-19-17 Call Order: 002
Bidder: 3516 - BARNHILL CONTRACTING COMPANY

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0272	7980000000-N GENERIC SIGNAL ITEM CCTV CAMERA ASSEMBLY	1.000 EA	5,800.00000		5,800.00	
0273	7980000000-N GENERIC SIGNAL ITEM ETHERNET EDGE SWITCH	2.000 EA	1,000.00000		2,000.00	
0274	7980000000-N GENERIC SIGNAL ITEM METAL ITS POLE DESIGN	6.000 EA	500.00000		3,000.00	
0275	7980000000-N GENERIC SIGNAL ITEM METAL POLE FOR ITS DEVICE	5.000 EA	6,500.00000		32,500.00	
0276	7980000000-N GENERIC SIGNAL ITEM MVD TERMINAL SERVER ASSEMBLY	2.000 EA	500.00000		1,000.00	
0277	7980000000-N GENERIC SIGNAL ITEM RELOCATE CCTV ASSEMBLY	1.000 EA	3,500.00000		3,500.00	
0278	7980000000-N GENERIC SIGNAL ITEM REMOVE RWIS ASSEMBLY	1.000 EA	4,000.00000		4,000.00	
0279	7985000000-N GENERIC SIGNAL ITEM AET TOLL ZONE SITES	LUMP	LUMP		522,944.00	
0280	7985000000-N GENERIC SIGNAL ITEM TRAINING	LUMP	LUMP		6,000.00	
0281	7990000000-E GENERIC SIGNAL ITEM RS-485 CABLE	5,230.000 LF	6.50000		33,995.00	
0286	0000400000-N CONSTRUCTION SURVEYING	LUMP	LUMP		150,000.00	
0287	1330000000-E INCIDENTAL MILLING	201.000 SY	35.00000		7,035.00	

Contract ID: C203991 Project(s): STPDA-0540(39)
Letting Date: 12-19-17 Call Order: 002
Bidder: 3516 - BARNHILL CONTRACTING COMPANY

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0288	1891000000-E GENERIC PAVING ITEM DIAMOND GRINDING PCC PAVEMENT	12,850.000 SY	5.44000		69,904.00	
0289	2591000000-E 4" CONCRETE SIDEWALK	2,700.000 SY	30.60000		82,620.00	
0290	3565000000-E DOUBLE GATES, **" HIGH, **' WIDE, **' OPENING (47", 6', 12')	1.000 EA	1,100.00000		1,100.00	
0291	5606000000-E 2" BLOW OFF	1.000 EA	2,600.00000		2,600.00	
0292	8175000000-E CLASS AA CONCRETE (BRIDGE)	36.000 CY	1,700.00000		61,200.00	
0293	8224000000-E EPOXY COATED REINFORCING STEEL(BRIDGE)	1,951.000 LB	2.00000		3,902.00	
0294	8692000000-N FOAM JOINT SEALS	LUMP	LUMP		6,000.00	
	Section 0001 Total				15,018,425.11	

Section 0002 CULVERT ITEMS

Alt Group

0282	8126000000-N CULVERT EXCAVATION, STA ****** (83+04.00-L-)	LUMP	LUMP		6,292.00	
0283	8133000000-E FOUNDATION CONDITIONING MATER-IAL, BOX CULVERT	135.000 TON	45.25000		6,108.75	
0284	8196000000-E CLASS A CONCRETE (CULVERT)	181.800 CY	943.00000		171,437.40	

Contract ID: C203991 Project(s): STPDA-0540(39)
Letting Date: 12-19-17 Call Order: 002
Bidder: 3516 - BARNHILL CONTRACTING COMPANY

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars	Unit Price Cts	Bid Amount Dollars	Bid Amount Ct
0285	8245000000-E REINFORCING STEEL (CULVERT)	37,027.000 LB	0.05000		1,851.35	
	Section 0002 Total				185,689.50	
	Bid Total				15,204,114.61	

NON-COLLUSION AND DEBARMENT CERTIFICATION

The bidder certifies that neither he, nor any official, agent or employee of the bidder 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 bid, and that the bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor. In addition, submitting this electronic bid constitutes the bidder's certification of Status under penalty of perjury under the laws of the United States and in accordance with the Debarment Certification on file with the Department.

By submitting this bid, the 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.

Where the prospective bidder is unable to certify to any of the statements in this certification, the bidder shall submit an explanation in the blanks provided herein. The explanation will not necessarily result in denial of participation in a contract.

Explanation:
NOT ANSWERED
NOT ANSWERED
NOT ANSWERED
NOT ANSWERED

If the prequalified bidder's status changes, he shall immediately submit a new fully executed non-collusion affidavit and debarment certification with an explanation of the change to the Contract Office prior to submitting the bid.

Failure to furnish a certification or an explanation will be grounds for rejection of a bid

AWARD LIMITS ON MULTIPLE PROJECTS

By answering YES to this statement, the bidder acknowleges that they are using the award limits on multiple projects. 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 NOT ANSWERED 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
NOT ANSWERED	
NOT ANSWERED	
NOT ANSWERED	
NOT ANSWERED	
NOT ANSWERED	
NOT ANSWERED	

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.

PROPOSAL: C203991
LETTING: L171219 CALL: 002
VENDOR: 3516 BARNHILL CONTRACTING COMPANY

LINE NO.	ITEM NO.	ITEM DESC.	UNIT TYPE	SUBCONTRACTOR QUANTITY	SUBCONTRACTOR UNIT PRICE	EXTENDED AMOUNT
DBE SUBCONTRACTOR: 12278 CLIFTON CONSTRUCTION CO., INC.						
Will Use Quote: Yes						
0049	2022000000-E	SUBDRAIN EXC	CY	336.000	25.00000	8400.00
0050	2033000000-E	SUBDRAIN FIN	CY	252.000	45.00000	11340.00
0051	2044000000-E	6" PERF SUBD	LF	1500.000	18.00000	27000.00
0052	2070000000-N	SUBDRN PIPE	EA	3.000	350.00000	1050.00
0053	2077000000-E	6" OUTLET PI	LF	18.000	35.00000	630.00
0054	2099000000-E	SHOULDER DRA	LF	3700.000	6.75000	24975.00
0055	2110000000-E	4" SHOULDER	LF	3650.000	1.50000	5475.00
0056	2121000000-E	4" OUTLET PI	LF	190.000	7.80000	1482.00
0057	2132000000-N	CONC PAD SHL	EA	6.000	300.00000	1800.00
		DBE COMMITMENT TOTAL FOR SUBCONTRACTOR:				82,152.00
		DBE COMMITMENT TOTAL FOR VENDOR (SubContractor)				82,152.
DBE SUBCONTRACTOR: 3080 CURTIN TRUCKING & DRAINAGE INC						
Will Use Quote: Yes						
0080	2724000000-E	PC REINF BAR	LF	110.000	160.00000	17600.00
0142	4465000000-N	TEMPORARY CR	EA	1.000	8250.00000	8250.00
0143	4470000000-N	RESET CRASH	EA	2.000	2500.00000	5000.00
0145	4485000000-E	PORT CONC BA	LF	4240.000	24.85000	105364.00
0146	4500000000-E	RESET PORT C	LF	8070.000	4.50000	36315.00
		DBE COMMITMENT TOTAL FOR SUBCONTRACTOR:				172,529.00
		DBE COMMITMENT TOTAL FOR VENDOR (SubContractor)				172,529
DBE SUBCONTRACTOR: 4898 BULLINGTON CONSTRUCTION INC						
Will Use Quote: Yes						
0084	3000000000-N	IMPACT ATTEN	EA	2.000	12400.00000	24800.00
0085	3030000000-E	STL BM GUARD	LF	5200.000	15.50000	80600.00
0086	3045000000-E	SBGR SHOP CU	LF	437.500	17.50000	7656.25
0087	3105000000-N	SBGR TERM SE	EA	2.000	75.00000	150.00
0088	3150000000-N	ADDIT GUARDR	EA	46.000	42.00000	1932.00
0089	3210000000-N	GR ANCHOR TY	EA	11.000	550.00000	6050.00
0090	3287000000-N	GR END TYPE	EA	16.000	3000.00000	48000.00
0091	3317000000-N	GR ANCHOR TY	EA	7.000	1650.00000	11550.00
0092	3345000000-E	REMOVE & RES	LF	310.000	9.50000	2945.00
0093	3503000000-E	WOVEN WIRE F	LF	6340.000	3.50000	22190.00
0094	3509000000-E	4" TIMBER PO	EA	385.000	16.00000	6160.00
0095	3515000000-E	5" TIMBER PO	EA	125.000	32.00000	4000.00
0290	3565000000-E	DBL GATE **H	EA	1.000	1100.00000	1100.00

LINE NO.	ITEM NO.	ITEM DESC.	UNIT TYPE	SUBCONTRACTOR QUANTITY	SUBCONTRACTOR UNIT PRICE	EXTENDED AMOUNT
		DBE COMMITMENT TOTAL FOR SUBCONTRACTOR:				217,133.25
		DBE COMMITMENT TOTAL FOR VENDOR (SubContractor)				217,133
DBE SUBCONTRACTOR: 4247 SEAL BROTHERS CONTRACTING LLC Will Use Quote: Yes						
0213	6000000000-E	TEMPORARY SI	LF	19000.000	1.65000	31350.00
0221	6029000000-E	SAFETY FENCE	LF	1500.000	1.65000	2475.00
0226	6042000000-E	1/4" HARDWAR	LF	2000.000	4.75000	9500.00
0229	6071012000-E	COIR FIBER W	LF	2600.000	7.25000	18850.00
0231	6071030000-E	COIR FIBER B	LF	2800.000	5.25000	14700.00
0243	6117000000-N	RESPONSE FOR	EA	10.000	200.00000	2000.00
		DBE COMMITMENT TOTAL FOR SUBCONTRACTOR:				78,875.00
		DBE COMMITMENT TOTAL FOR VENDOR (SubContractor)				78,875.
DBE SUBCONTRACTOR: 5602 CALLIS CONTRACTORS INCORPORATED Will Use Quote: Yes						
0279	7985000000-N	GENERIC SIGN	LS	1.000	472944.00000	472944.00
		Partial - Toll Vault Consructtion Only				
		DBE COMMITMENT TOTAL FOR SUBCONTRACTOR:				472,944.00
		DBE COMMITMENT TOTAL FOR VENDOR (SubContractor)				472,944
DBE SUBCONTRACTOR: 7423 1ST CLASS TRUCKING INC Will Use Quote: Yes						
0015	0318000000-E	FND CONDIT M	TON	610.000	4.25000	2592.50
		Haul stone only				
0033	1121000000-E	AGGREGATE BA	TON	24700.000	4.25000	104975.00
		Haul stone only				
0096	3628000000-E	RIP RAP, CLA	TON	3006.000	5.25000	15781.50
		Haul Stone Only				
0097	3635000000-E	RIP RAP, CLA	TON	80.000	5.25000	420.00
		Haul Stone Only				
0098	3649000000-E	RIP RAP, CLA	TON	220.000	4.75000	1045.00
		Haul Stone Only				
0214	6006000000-E	EROS CONTRL	TON	175.000	4.75000	831.25
		Haul Stone Only				
0215	6009000000-E	EROS CONTRL	TON	2045.000	4.75000	9713.75
		Haul Stone Only				
0216	6012000000-E	SEDIMENT CON	TON	2400.000	4.25000	10200.00
		Haul Stone Only				
0034	1154000000-E	AGGR FOR CEM	TON	320.000	4.25000	1360.00
		Haul Stone Only				
		DBE COMMITMENT TOTAL FOR SUBCONTRACTOR:				146,919.00
		DBE COMMITMENT TOTAL FOR VENDOR (SubContractor)				146,919

LINE NO.	ITEM NO.	ITEM DESC.	UNIT TYPE	SUBCONTRACTOR QUANTITY	SUBCONTRACTOR UNIT PRICE	EXTENDED AMOUNT
DBE SUBCONTRACTOR: 12291 CERTIFIED CONCRETE CONSTRUCTION INC						
Will Use Quote: Yes						
0072	2451000000-N	CONC TRANS S	EA	8.000	400.00000	3200.00
0074	2542000000-E	1'-6" CONC C	LF	4440.000	12.62000	56032.80
0075	2549000000-E	2'-6" CONC C	LF	5380.000	14.88000	80054.40
0076	2556000000-E	SHOULDER BER	LF	527.000	17.89000	9428.03
0077	2605000000-N	CONCRETE CUR	EA	2.000	1850.00000	3700.00
0078	2619000000-E	4" CONCRETE	SY	70.000	38.25000	2677.50
0079	2655000000-E	5" MONO CONC	SY	560.000	66.15000	37044.00
0289	2591000000-E	4" CONCRETE	SY	2700.000	30.60000	82620.00
0043	1847000000-E	******"PCC P	SY	3380.000	118.50000	400530.00
Partial						
						675,286.73
DBE COMMITMENT TOTAL FOR SUBCONTRACTOR:						675,286.73
DBE COMMITMENT TOTAL FOR VENDOR (SubContractor)						675,286

TOTAL DBE COMMITMENT FOR VENDOR:	Entered:	12.14% or	1845838.98
	Required:	12.00% or	1824493.75
			<GOAL MET>

THIS PROPOSAL CONTAINS THE FOLLOWING ERRORS/WARNINGS (IF ANY)

This Bid contains 1 amendment files

00001 12-12-17 MODIFY, ADD AND DELETE ITEMS

Electronic Bid Submission

By submitting this bid electronically, I hereby acknowledge that all requirements included in the hard copy proposal, addendum, amendments, plans, standard specifications, supplemental specifications and special provisions are part of the bid and contract. Further, I acknowledge that I have read, understand, accept, acknowledge and agree to comply with all statements in this electronic bid.

I Hereby certify that I have the authority to submit this bid.

Signature	Agency	Date

Contract Item Sheets For C203991

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
			ROADWAY ITEMS			
0001	0000100000-N	800	MOBILIZATION	Lump Sum LS	755,000.00	755,000.00
0002	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	Lump Sum LS	1,500,000.00	1,500,000.00
0003	0008000000-E	200	SUPPLEMENTARY CLEARING & GRUBBING	2 ACR	5,000.00	10,000.00
0004	0015000000-N	205	SEALING ABANDONED WELLS	16 EA	2,000.00	32,000.00
0005	0022000000-E	225	UNCLASSIFIED EXCAVATION	161,970 CY	6.00	971,820.00
0006	0036000000-E	225	UNDERCUT EXCAVATION	2,400 CY	15.00	36,000.00
0007	0106000000-E	230	BORROW EXCAVATION	78,490 CY	11.00	863,390.00
0008	0134000000-E	240	DRAINAGE DITCH EXCAVATION	2,880 CY	10.10	29,088.00
0009	0141000000-E	240	BERM DITCH CONSTRUCTION	2,900 LF	1.90	5,510.00
0010	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	1,020 SY	5.25	5,355.00
0011	0163000000-E	250	REMOVAL OF EXISTING CONCRETE PAVEMENT	7,820 SY	20.10	157,182.00
0012	0177000000-E	250	BREAKING OF EXISTING ASPHALT PAVEMENT	1,680 SY	2.45	4,116.00
0013	0195000000-E	265	SELECT GRANULAR MATERIAL	1,600 CY	36.00	57,600.00
0014	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZATION	2,750 SY	1.35	3,712.50
0015	0318000000-E	300	FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES	610 TON	35.80	21,838.00
0016	0320000000-E	300	FOUNDATION CONDITIONING GEOTEXTILE	1,900 SY	1.00	1,900.00
0017	0342000000-E	310	**" SIDE DRAIN PIPE (30")	40 LF	75.65	3,026.00
0018	0343000000-E	310	15" SIDE DRAIN PIPE	32 LF	57.80	1,849.60

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0019	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (30", V)	296 LF	79.30	23,472.80
0020	0354000000-E	310	***" RC PIPE CULVERTS, CLASS ***** (42", V)	272 LF	130.30	35,441.60
0021	0366000000-E	310	15" RC PIPE CULVERTS, CLASS III	2,916 LF	29.10	84,855.60
0022	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	544 LF	38.00	20,672.00
0023	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	168 LF	49.70	8,349.60
0024	0384000000-E	310	30" RC PIPE CULVERTS, CLASS III	448 LF	68.60	30,732.80
0025	0390000000-E	310	36" RC PIPE CULVERTS, CLASS III	88 LF	92.60	8,148.80
0026	0396000000-E	310	42" RC PIPE CULVERTS, CLASS III	196 LF	107.80	21,128.80
0027	0582000000-E	310	15" CS PIPE CULVERTS, 0.064" THICK	720 LF	41.40	29,808.00
0028	0636000000-E	310	**" CS PIPE ELBOWS, *****" THICK (15", 0.064")	24 EA	325.20	7,804.80
0029	0995000000-E	340	PIPE REMOVAL	552 LF	14.10	7,783.20
0030	0996000000-N	350	PIPE CLEAN-OUT	5 EA	2,000.00	10,000.00
0031	1011000000-N	500	FINE GRADING	Lump Sum LS	219,000.00	219,000.00
0032	1115000000-E	SP	GEOTEXTILE FOR PAVEMENT STA-BILIZATION	9,570 SY	2.70	25,839.00
0033	1121000000-E	520	AGGREGATE BASE COURSE	24,700 TON	24.45	603,915.00
0034	1154000000-E	540	AGGREGATE FOR CEMENT TREATED BASE COURSE	320 TON	40.85	13,072.00
0035	1165000000-E	540	PORTLAND CEMENT FOR CEMENT TREATED BASE COURSE	13 TON	1,500.00	19,500.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0036	1209000000-E	543	ASPHALT CURING SEAL	70 GAL	75.00	5,250.00
0037	1275000000-E	600	PRIME COAT	1,840 GAL	7.20	13,248.00
0038	1489000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0B	4,670 TON	64.55	301,448.50
0039	1498000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B	7,090 TON	61.25	434,262.50
0040	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	6,110 TON	62.80	383,708.00
0041	1525000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A	590 TON	85.55	50,474.50
0042	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	955 TON	370.00	353,350.00
0043	1847000000-E	710	*****" PORT CEM CONC PAVEMENT, THROUGH LANES (WITH DOWELS) (13-1/2")	9,570 SY	118.50	1,134,045.00
0044	1881000000-E	SP	GENERIC PAVING ITEM MILLED RUMBLE STRIPS (CONCRETE SHOULDERS)	5,390 LF	1.00	5,390.00
0045	1902000000-N	710	SURFACE TESTING CONCRETE PAVE-MENT	Lump Sum LS	10,000.00	10,000.00
0046	1913000000-E	720	CONCRETE SHOULDERS ADJACENT TO ******" PAVEMENT (13-1/2")	3,272 SY	118.50	387,732.00
0047	2000000000-N	806	RIGHT OF WAY MARKERS	25 EA	236.00	5,900.00
0048	2020000000-N	806	CONTROL OF ACCESS MARKERS	28 EA	286.00	8,008.00
0049	2022000000-E	815	SUBDRAIN EXCAVATION	336 CY	25.00	8,400.00
0050	2033000000-E	815	SUBDRAIN FINE AGGREGATE	252 CY	45.00	11,340.00
0051	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	1,500 LF	18.00	27,000.00
0052	2070000000-N	815	SUBDRAIN PIPE OUTLET	3 EA	350.00	1,050.00
0053	2077000000-E	815	6" OUTLET PIPE	18 LF	35.00	630.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0054	2099000000-E	816	SHOULDER DRAIN	3,700 LF	6.75	24,975.00
0055	2110000000-E	816	4" SHOULDER DRAIN PIPE	3,650 LF	1.50	5,475.00
0056	2121000000-E	816	4" OUTLET PIPE FOR SHOULDER DRAINS	190 LF	7.80	1,482.00
0057	2132000000-N	816	CONCRETE PAD FOR SHOULDER DRAIN PIPE OUTLET	6 EA	300.00	1,800.00
0058	2143000000-E	818	BLOTTING SAND	10 TON	130.45	1,304.50
0059	2209000000-E	838	ENDWALLS	9 CY	661.30	5,951.70
0060	2253000000-E	840	PIPE COLLARS	3.062 CY	1,704.00	5,217.65
0061	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	50 EA	1,150.00	57,500.00
0062	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	33.1 LF	279.50	9,251.45
0063	2364000000-N	840	FRAME WITH TWO GRATES, STD 840.16	6 EA	455.00	2,730.00
0064	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	4 EA	455.00	1,820.00
0065	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	16 EA	460.00	7,360.00
0066	2366000000-N	840	FRAME WITH TWO GRATES, STD 840.24	3 EA	470.00	1,410.00
0067	2367000000-N	840	FRAME WITH TWO GRATES, STD 840.29	1 EA	460.00	460.00
0068	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	3 EA	595.00	1,785.00
0069	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	7 EA	615.00	4,305.00
0070	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	7 EA	615.00	4,305.00
0071	2396000000-N	840	FRAME WITH COVER, STD 840.54	3 EA	345.00	1,035.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0072	2451000000-N	852	CONCRETE TRANSITIONAL SECTION FOR DROP INLET	8 EA	400.00	3,200.00
0073	2473000000-N	SP	GENERIC DRAINAGE ITEM TIE PROPOSED PIPE TO EXIST DRAINAGE STRUCTURE	3 EA	1,345.00	4,035.00
0074	2542000000-E	846	1'-6" CONCRETE CURB & GUTTER	4,440 LF	12.62	56,032.80
0075	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	5,380 LF	14.88	80,054.40
0076	2556000000-E	846	SHOULDER BERM GUTTER	527 LF	17.89	9,428.03
0077	2605000000-N	848	CONCRETE CURB RAMP	2 EA	1,850.00	3,700.00
0078	2619000000-E	850	4" CONCRETE PAVED DITCH	70 SY	38.25	2,677.50
0079	2655000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)	560 SY	66.15	37,044.00
0080	2724000000-E	857	PRECAST REINFORCED CONCRETE BARRIER, SINGLE FACED	110 LF	160.00	17,600.00
0081	2738000000-E	SP	GENERIC PAVING ITEM BRICK PAVERS FOR ISLANDS AND ROUNDABOUTS	1,920 SY	126.10	242,112.00
0082	2752000000-E	SP	GENERIC PAVING ITEM MEDIAN HAZARD PROTECTION	200 LF	200.00	40,000.00
0083	2815000000-N	858	ADJUSTMENT OF DROP INLETS	1 EA	500.00	500.00
0084	3000000000-N	SP	IMPACT ATTENUATOR UNIT, TYPE 350	2 EA	12,400.00	24,800.00
0085	3030000000-E	862	STEEL BM GUARDRAIL	5,200 LF	15.50	80,600.00
0086	3045000000-E	862	STEEL BM GUARDRAIL, SHOP CURVED	437.5 LF	17.50	7,656.25
0087	3105000000-N	862	STEEL BM GUARDRAIL TERMINAL SECTIONS	2 EA	75.00	150.00
0088	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	46 EA	42.00	1,932.00
0089	3210000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE CAT-1	11 EA	550.00	6,050.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0090	3287000000-N	SP	GUARDRAIL END UNITS, TYPE TL-3	16 EA	3,000.00	48,000.00
0091	3317000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE B-77	7 EA	1,650.00	11,550.00
0092	3345000000-E	864	REMOVE & RESET EXISTING GUARD-RAIL	310 LF	9.50	2,945.00
0093	3503000000-E	866	WOVEN WIRE FENCE, 47" FABRIC	6,340 LF	3.50	22,190.00
0094	3509000000-E	866	4" TIMBER FENCE POSTS, 7'-6" LONG	385 EA	16.00	6,160.00
0095	3515000000-E	866	5" TIMBER FENCE POSTS, 8'-0" LONG	125 EA	32.00	4,000.00
0096	3628000000-E	876	RIP RAP, CLASS I	3,006 TON	45.00	135,270.00
0097	3635000000-E	876	RIP RAP, CLASS II	80 TON	59.85	4,788.00
0098	3649000000-E	876	RIP RAP, CLASS B	220 TON	53.95	11,869.00
0099	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	3,868 SY	1.80	6,962.40
0100	4025000000-E	901	CONTRACTOR FURNISHED, TYPE *** SIGN (A)	2,135.5 SF	27.00	57,658.50
0101	4025000000-E	901	CONTRACTOR FURNISHED, TYPE *** SIGN (B)	218.75 SF	35.00	7,656.25
0102	4025000000-E	901	CONTRACTOR FURNISHED, TYPE *** SIGN (D)	104.5 SF	22.00	2,299.00
0103	4025000000-E	901	CONTRACTOR FURNISHED, TYPE *** SIGN (E)	508.5 SF	14.00	7,119.00
0104	4025000000-E	901	CONTRACTOR FURNISHED, TYPE *** SIGN (MILEMARKER)	73.5 SF	16.00	1,176.00
0105	4025000000-E	901	CONTRACTOR FURNISHED, TYPE *** SIGN (OVERLAY)	4 SF	13.00	52.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0106	4048000000-E	902	REINFORCED CONCRETE SIGN FOUN-DATIONS	9 CY	1,300.00	11,700.00
0108	4057000000-E	SP	OVERHEAD FOOTING	105.4 CY	2,900.00	305,660.00
0109	4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	8,991 LB	4.50	40,459.50
0110	4066000000-E	903	SUPPORTS, SIMPLE STEEL BEAM	1,434 LB	2.75	3,943.50
0111	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	1,447 LF	10.00	14,470.00
0112	4096000000-N	904	SIGN ERECTION, TYPE D	9 EA	125.00	1,125.00
0113	4102000000-N	904	SIGN ERECTION, TYPE E	68 EA	70.00	4,760.00
0114	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	9 EA	675.00	6,075.00
0115	4114000000-N	904	SIGN ERECTION, MILEMARKERS	5 EA	15.00	75.00
0116	4116000000-N	904	SIGN ERECTION, OVERLAY (GROUND MOUNTED)	1 EA	350.00	350.00
0117	4149000000-N	907	DISPOSAL OF SIGN SYSTEM, OVER-HEAD	4 EA	10,400.00	41,600.00
0118	4152000000-N	907	DISPOSAL OF SIGN SYSTEM, STEEL BEAM	3 EA	1,000.00	3,000.00
0119	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	6 EA	1.00	6.00
0120	4360000000-N	SP	GENERIC SIGNING ITEM SIGN ERECTION, TOLL ROUTE ASSEMBLY	13 EA	675.00	8,775.00
0121	4361000000-E	SP	GENERIC SIGNING ITEM REINFORCING STEEL (AESTHETIC COLUMNS ONLY)	42,859 LB	2.10	90,003.90
0122	4365000000-E	SP	GENERIC SIGNING ITEM CLASS A CONCRETE (AESTHETIC COLUMNS ONLY)	251.1 CY	1,900.00	477,090.00
0123	4366000000-E	SP	GENERIC SIGNING ITEM CONTRACTOR FURNISHED, TOLL ROUTE ASSEMBLY	484.25 SF	22.50	10,895.63

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0124	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 20+14(GNTRY T16 IN, TRUSS ONLY)	Lump Sum LS	90,000.00	90,000.00
0125	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 20+64(GNTRY T16 OUT, TRUSS ONLY)	Lump Sum LS	90,000.00	90,000.00
0126	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 20+66(GNTRY T15 OUT, TRUSS ONLY)	Lump Sum LS	100,000.00	100,000.00
0127	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 21+16(GNTRY T15 IN, TRUSS ONLY)	Lump Sum LS	100,000.00	100,000.00
0128	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 475+00 (A, TRUSS ONLY)	Lump Sum LS	41,375.00	41,375.00
0129	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 527+50 (B, TRUSS ONLY)	Lump Sum LS	16,575.00	16,575.00
0130	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 550+00 (C, TRUSS ONLY)	Lump Sum LS	44,150.00	44,150.00
0131	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 590+21 (D, TRUSS ONLY)	Lump Sum LS	44,400.00	44,400.00
0132	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 655+00 (E, TRUSS ONLY)	Lump Sum LS	16,575.00	16,575.00
0133	4370000000-N	SP	GENERIC SIGNING ITEM SUPPORTS, OVERHEAD SIGN STR AT STA 691+50 (F, TRUSS ONLY)	Lump Sum LS	42,000.00	42,000.00
0134	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	504 SF	8.40	4,233.60
0135	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	352 SF	27.10	9,539.20
0136	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	70 SF	8.10	567.00
0137	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	1 EA	9,620.00	9,620.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0138	4430000000-N	1130	DRUMS	100 EA	86.25	8,625.00
0139	4435000000-N	1135	CONES	43 EA	37.00	1,591.00
0140	4445000000-E	1145	BARRICADES (TYPE III)	192 LF	58.70	11,270.40
0141	4455000000-N	1150	FLAGGER	180 DAY	235.00	42,300.00
0142	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	1 EA	8,250.00	8,250.00
0143	4470000000-N	1160	RESET TEMPORARY CRASH CUSHION	2 EA	2,500.00	5,000.00
0144	4480000000-N	1165	TMA	2 EA	4,005.00	8,010.00
0145	4485000000-E	1170	PORTABLE CONCRETE BARRIER	4,240 LF	24.85	105,364.00
0146	4500000000-E	1170	RESET PORTABLE CONCRETE BAR-RIER	8,070 LF	4.50	36,315.00
0147	4510000000-N	SP	LAW ENFORCEMENT	120 HR	38.00	4,560.00
0148	4600000000-N	SP	GENERIC TRAFFIC CONTROL ITEM REMOVE & REPLACE SNOWPLOWABLE PAVEMENT MARKER REFLECTOR	222 EA	5.00	1,110.00
0149	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	351 EA	5.00	1,755.00
0150	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	4,764 LF	0.75	3,573.00
0151	4686000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)	5,703 LF	0.85	4,847.55
0152	4688000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 90 MILS)	8,258 LF	1.25	10,322.50
0153	4690000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 120 MILS)	227 LF	1.50	340.50
0154	4695000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)	918 LF	3.00	2,754.00
0155	4697000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 120 MILS)	115 LF	3.00	345.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0156	4700000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)	200 LF	4.00	800.00
0157	4702000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 120 MILS)	55 LF	4.00	220.00
0158	4710000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)	144 LF	15.00	2,160.00
0159	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	88 EA	200.00	17,600.00
0160	4770000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)	1,000 LF	1.70	1,700.00
0161	4775000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (6") (IV)	22,102 LF	1.95	43,098.90
0162	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	22,501 LF	0.45	10,125.45
0163	4815000000-E	1205	PAINT PAVEMENT MARKING LINES (6")	18,308 LF	0.50	9,154.00
0164	4820000000-E	1205	PAINT PAVEMENT MARKING LINES (8")	1,940 LF	0.90	1,746.00
0165	4825000000-E	1205	PAINT PAVEMENT MARKING LINES (12")	620 LF	1.00	620.00
0166	4835000000-E	1205	PAINT PAVEMENT MARKING LINES (24")	288 LF	3.00	864.00
0167	4845000000-N	1205	PAINT PAVEMENT MARKING SYMBOL	149 EA	25.00	3,725.00
0168	4847000000-E	1205	POLYUREA PAVEMENT MARKING LINES (4", **********) (HIGHLY REFLECTIVE ELEMENTS)	812 LF	1.50	1,218.00
0169	4847100000-E	1205	POLYUREA PAVEMENT MARKING LINES (6", **********) (HIGHLY REFLECTIVE ELEMENTS)	23,476 LF	2.00	46,952.00
0170	4847120000-E	1205	POLYUREA PAVEMENT MARKING LINES (12", **********) (HIGHLY REFLECTIVE ELEMENTS)	2,015 LF	4.00	8,060.00
0171	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	408 LF	0.75	306.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0172	4855000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (6")	17,684 LF	0.75	13,263.00
0173	4900000000-N	1251	PERMANENT RAISED PAVEMENT MARKERS	113 EA	10.00	1,130.00
0174	4905000000-N	1253	SNOWPLOWABLE PAVEMENT MARKERS	248 EA	28.00	6,944.00
0175	4955000000-N	1264	OBJECT MARKERS (END OF ROAD)	6 EA	90.00	540.00
0176	5005000000-E	1401	80' HIGH MOUNT STANDARD	1 EA	17,000.00	17,000.00
0177	5010000000-E	1401	100' HIGH MOUNT STANDARD	6 EA	19,000.00	114,000.00
0178	5020000000-N	1401	PORTABLE DRIVE UNIT	1 EA	4,900.00	4,900.00
0179	5025000000-E	SP	HIGH MOUNT FOUNDATIONS	46.6 CY	900.00	41,940.00
0180	5050000000-N	1404	LIGHT STANDARD, TYPE MTLT ********** (40' MH, 17" SA)	30 EA	2,000.00	60,000.00
0181	5070000000-N	1405	STANDARD FOUNDATION ********* (R1)	28 EA	800.00	22,400.00
0182	5070000000-N	1405	STANDARD FOUNDATION ********* (R2)	2 EA	800.00	1,600.00
0183	5120000000-N	1407	ELECTRIC SERVICE POLE **** ******** (30' CLASS 4)	1 EA	950.00	950.00
0184	5125000000-E	1407	ELECTRIC SERVICE LATERAL ********** (3 #1/0 USE)	25 LF	30.00	750.00
0185	5145000000-N	1408	LIGHT CONTROL EQUIPMENT, TYPE RW ********** (240/480 V)	1 EA	12,500.00	12,500.00
0186	5155000000-E	1409	ELECTRICAL DUCT, TYPE BD, SIZE ***** (2")	396 LF	7.25	2,871.00
0187	5155000000-E	1409	ELECTRICAL DUCT, TYPE BD, SIZE ***** (3")	101 LF	8.00	808.00

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Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0188	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (3")	783 LF	14.50	11,353.50
0189	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (4")	379 LF	17.50	6,632.50
0190	5160000000-E	1409	ELECTRICAL DUCT, TYPE JA, SIZE ***** (6")	95 LF	27.50	2,612.50
0191	5170000000-E	1410	** #8 W/G FEEDER CIRCUIT (2)	630 LF	3.50	2,205.00
0192	5180000000-E	1410	** #4 W/G FEEDER CIRCUIT (2)	180 LF	5.25	945.00
0193	5185000000-E	1410	** #2 W/G FEEDER CIRCUIT (2)	1,700 LF	6.50	11,050.00
0194	5190000000-E	1410	********** FEEDER CIRCUIT (MCM 4-WIRE COPPER)	3,950 LF	9.25	36,537.50
0195	5205000000-E	1410	** #8 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 1-1/2)	4,100 LF	9.75	39,975.00
0196	5215000000-E	1410	** #4 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 1-1/2)	1,410 LF	11.00	15,510.00
0197	5220000000-E	1410	** #2 W/G FEEDER CIRCUIT IN *****" CONDUIT (2, 1-1/2)	10,000 LF	12.00	120,000.00
0198	5270000000-N	SP	GENERIC LIGHTING ITEM 100' HIGH MOUNT LUMINAIRE - LED	36 EA	1,800.00	64,800.00
0199	5270000000-N	SP	GENERIC LIGHTING ITEM 80' HIGH MOUNT LUMINAIRE - LED	8 EA	1,350.00	10,800.00
0200	5270000000-N	SP	GENERIC LIGHTING ITEM ELECTRICAL JUNCTION BOXES, PC18	51 EA	700.00	35,700.00
0201	5270000000-N	SP	GENERIC LIGHTING ITEM ELECTRICAL JUNCTION BOXES, PC24	9 EA	975.00	8,775.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0202	5270000000-N	SP	GENERIC LIGHTING ITEM ELECTRICAL JUNCTION BOXES, PC36	2 EA	1,550.00	3,100.00
0203	5270000000-N	SP	GENERIC LIGHTING ITEM ROADWAY LIGHT STANDARD LUMINAIRE - 240V, 208W LED	4 EA	800.00	3,200.00
0204	5270000000-N	SP	GENERIC LIGHTING ITEM ROADWAY LIGHT STANDARD LUMINAIRE - 480V, 208W LED	26 EA	850.00	22,100.00
0205	5325800000-E	1510	8" WATER LINE	390 LF	49.00	19,110.00
0206	5326600000-E	1510	16" WATER LINE	2,980 LF	87.00	259,260.00
0207	5546000000-E	1515	8" VALVE	1 EA	1,500.00	1,500.00
0208	5558600000-E	1515	16" VALVE	2 EA	7,600.00	15,200.00
0209	5589200000-E	1515	2" AIR RELEASE VALVE	3 EA	5,200.00	15,600.00
0210	5666000000-E	1515	FIRE HYDRANT	3 EA	7,900.00	23,700.00
0211	5810000000-E	1530	ABANDON 16" UTILITY PIPE	980 LF	25.00	24,500.00
0212	5906000000-E	SP	GENERIC UTILITY ITEM DUCTILE IRON WATER PIPE FITTINGS	5,435 LB	6.20	33,697.00
0213	6000000000-E	1605	TEMPORARY SILT FENCE	20,650 LF	1.65	34,072.50
0214	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	175 TON	53.95	9,441.25
0215	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	2,045 TON	42.00	85,890.00
0216	6012000000-E	1610	SEDIMENT CONTROL STONE	2,400 TON	25.00	60,000.00
0217	6015000000-E	1615	TEMPORARY MULCHING	52 ACR	700.00	36,400.00
0218	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	3,400 LB	5.00	17,000.00
0219	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEED-ING	18.5 TON	900.00	16,650.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0220	6024000000-E	1622	TEMPORARY SLOPE DRAINS	1,865 LF	16.70	31,145.50
0221	6029000000-E	SP	SAFETY FENCE	1,600 LF	1.65	2,640.00
0222	6030000000-E	1630	SILT EXCAVATION	11,460 CY	1.00	11,460.00
0223	6036000000-E	1631	MATTING FOR EROSION CONTROL	49,020 SY	1.25	61,275.00
0224	6037000000-E	SP	COIR FIBER MAT	100 SY	8.00	800.00
0225	6038000000-E	SP	PERMANENT SOIL REINFORCEMENT MAT	610 SY	6.00	3,660.00
0226	6042000000-E	1632	1/4" HARDWARE CLOTH	2,550 LF	4.75	12,112.50
0227	6046000000-E	1636	TEMPORARY PIPE FOR STREAM CROSSING	25 LF	205.00	5,125.00
0228	6069000000-E	1638	STILLING BASINS	322 CY	14.45	4,652.90
0229	6071012000-E	SP	COIR FIBER WATTLE	2,940 LF	7.25	21,315.00
0230	6071020000-E	SP	POLYACRYLAMIDE (PAM)	1,165 LB	8.00	9,320.00
0231	6071030000-E	1640	COIR FIBER BAFFLE	3,025 LF	5.25	15,881.25
0232	6071050000-E	SP	**" SKIMMER (1.5")	6 EA	990.00	5,940.00
0233	6071050000-E	SP	**" SKIMMER (2")	7 EA	1,095.00	7,665.00
0234	6071050000-E	SP	**" SKIMMER (2.5")	1 EA	1,195.00	1,195.00
0235	6084000000-E	1660	SEEDING & MULCHING	51 ACR	1,600.00	81,600.00
0236	6087000000-E	1660	MOWING	30 ACR	70.00	2,100.00
0237	6090000000-E	1661	SEED FOR REPAIR SEEDING	550 LB	8.00	4,400.00
0238	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	1.5 TON	1,100.00	1,650.00
0239	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	1,175 LB	4.50	5,287.50

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0240	6108000000-E	1665	FERTILIZER TOPDRESSING	35.25 TON	800.00	28,200.00
0241	6111000000-E	SP	IMPERVIOUS DIKE	76 LF	56.40	4,286.40
0242	6114500000-N	1667	SPECIALIZED HAND MOWING	10 MHR	70.00	700.00
0243	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	25 EA	200.00	5,000.00
0244	6120000000-E	SP	CULVERT DIVERSION CHANNEL	413 CY	11.10	4,584.30
0245	6123000000-E	1670	REFORESTATION	0.77 ACR	2,500.00	1,925.00
0246	6132000000-N	SP	GENERIC EROSION CONTROL ITEM CONCRETE WASHOUT STRUCTURE	3 EA	1,620.00	4,860.00
0247	6135000000-E	SP	GENERIC EROSION CONTROL ITEM COMPOST BLANKET	5 ACR	4,225.00	21,125.00
0248	7279000000-E	1715	TRACER WIRE	1,385 LF	0.65	900.25
0249	7300000000-E	1715	UNPAVED TRENCHING (**********) (1, 2")	715 LF	6.50	4,647.50
0250	7300000000-E	1715	UNPAVED TRENCHING (**********) (2, 2")	760 LF	9.00	6,840.00
0251	7300000000-E	1715	UNPAVED TRENCHING (**********) (4, 3")	1,060 LF	14.00	14,840.00
0252	7300000000-E	1715	UNPAVED TRENCHING (**********) (4,1")	2,680 LF	15.00	40,200.00
0253	7301000000-E	1715	DIRECTIONAL DRILL (**********) (2, 2")	335 LF	50.00	16,750.00
0254	7301000000-E	1715	DIRECTIONAL DRILL (**********) (4, 2" & 4, 3")	470 LF	150.00	70,500.00
0255	7301000000-E	1715	DIRECTIONAL DRILL (**********) (4, 2")	535 LF	62.00	33,170.00
0256	7301000000-E	1715	DIRECTIONAL DRILL (**********) (4, 3")	165 LF	125.00	20,625.00
0257	7312000000-N	1716	JUNCTION BOX (**********) (36"X 24"X24')	7 EA	1,050.00	7,350.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0258	7348000000-N	1716	JUNCTION BOX (OVER-SIZED, HEA-VY DUTY)	38 EA	750.00	28,500.00
0259	7484000000-N	SP	MICROWAVE VEHICLE DETECTOR	4 EA	8,000.00	32,000.00
0260	7516000000-E	1730	COMMUNICATIONS CABLE (**FIBER) (72)	8,850 LF	2.75	24,337.50
0261	7528000000-E	1730	DROP CABLE	1,680 LF	2.75	4,620.00
0262	7540000000-N	1731	SPLICE ENCLOSURE	7 EA	2,230.00	15,610.00
0263	7552000000-N	1731	INTERCONNECT CENTER	2 EA	2,240.00	4,480.00
0264	7575142200-N	SP	NEW ELECTRICAL SERVICE	2 EA	1,800.00	3,600.00
0265	7575160000-E	1734	REMOVE EXISTING COMMUNICATIONS CABLE	6,630 LF	0.52	3,447.60
0266	7613000000-N	SP	SOIL TEST	6 EA	1,200.00	7,200.00
0267	7614100000-E	SP	DRILLED PIER FOUNDATION	58.59 CY	850.00	49,801.50
0268	7960000000-N	SP	METAL POLE FOUNDATION REMOVAL	3 EA	1,500.00	4,500.00
0269	7972000000-N	SP	METAL POLE REMOVAL	2 EA	650.00	1,300.00
0270	7980000000-N	SP	GENERIC SIGNAL ITEM CABINET, TYPE 336, POLE MOUNT-ED	2 EA	5,200.00	10,400.00
0271	7980000000-N	SP	GENERIC SIGNAL ITEM CABINET, TYPE 5052 H-32 ALUM NEMA 3S, POLE MOUNTED	3 EA	5,200.00	15,600.00
0272	7980000000-N	SP	GENERIC SIGNAL ITEM CCTV CAMERA ASSEMBLY	1 EA	5,800.00	5,800.00
0273	7980000000-N	SP	GENERIC SIGNAL ITEM ETHERNET EDGE SWITCH	2 EA	1,000.00	2,000.00
0274	7980000000-N	SP	GENERIC SIGNAL ITEM METAL ITS POLE DESIGN	6 EA	500.00	3,000.00
0275	7980000000-N	SP	GENERIC SIGNAL ITEM METAL POLE FOR ITS DEVICE	5 EA	6,500.00	32,500.00

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0276	7980000000-N	SP	GENERIC SIGNAL ITEM MVD TERMINAL SERVER ASSEMBLY	2 EA	500.00	1,000.00
0277	7980000000-N	SP	GENERIC SIGNAL ITEM RELOCATE CCTV ASSEMBLY	1 EA	3,500.00	3,500.00
0278	7980000000-N	SP	GENERIC SIGNAL ITEM REMOVE RWIS ASSEMBLY	1 EA	4,000.00	4,000.00
0279	7985000000-N	SP	GENERIC SIGNAL ITEM AET TOLL ZONE SITES	Lump Sum LS	522,944.00	522,944.00
0280	7985000000-N	SP	GENERIC SIGNAL ITEM TRAINING	Lump Sum LS	6,000.00	6,000.00
0281	7990000000-E	SP	GENERIC SIGNAL ITEM RS-485 CABLE	5,230 LF	6.50	33,995.00
0286	0000400000-N	801	CONSTRUCTION SURVEYING	Lump Sum LS	150,000.00	150,000.00
0287	1330000000-E	607	INCIDENTAL MILLING	201 SY	35.00	7,035.00
0288	1891000000-E	SP	GENERIC PAVING ITEM DIAMOND GRINDING PCC PAVEMENT	12,850 SY	5.44	69,904.00
0289	2591000000-E	848	4" CONCRETE SIDEWALK	2,700 SY	30.60	82,620.00
0290	3565000000-E	866	DOUBLE GATES, **" HIGH, **' WIDE, **' OPENING (47", 6', 12')	1 EA	1,100.00	1,100.00
0291	5606000000-E	1515	2" BLOW OFF	1 EA	2,600.00	2,600.00
0292	8175000000-E	420	CLASS AA CONCRETE (BRIDGE)	36 CY	1,700.00	61,200.00
0293	8224000000-E	425	EPOXY COATED REINFORCING STEEL (BRIDGE)	1,951 LB	2.00	3,902.00
0294	8692000000-N	SP	FOAM JOINT SEALS	Lump Sum LS	6,000.00	6,000.00

Contract Item Sheets For C203991

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0282	8126000000-N	414	CULVERT EXCAVATION, STA ****** (83+04.00-L-)	Lump Sum LS	6,292.00	6,292.00
0283	8133000000-E	414	FOUNDATION CONDITIONING MATERIAL, BOX CULVERT	135 TON	45.25	6,108.75
0284	8196000000-E	420	CLASS A CONCRETE (CULVERT)	181.8 CY	943.00	171,437.40
0285	8245000000-E	425	REINFORCING STEEL (CULVERT)	37,027 LB	0.05	1,851.35
			TOTAL AMOUNT OF BID FOR ENTIRE PROJECT			**$15,204,114.61**

0928/Jan02/Q820352.172/D1246556234200/E293

Contract No. C203991

County Wake

Rev. 1-16-18

EXECUTION OF CONTRACT
NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION

CORPORATION

The Contractor being duly sworn, solemnly swears (or affirms) 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

Barnhill Contracting Company
Full name of Corporation

P.O. Box 7948 Rocky Mount, NC 27804
Address as Prequalified

Attest _____ By _____

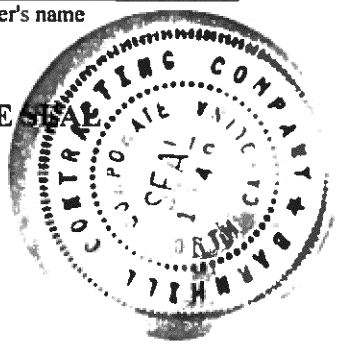
Secretary/Assistant Secretary
Select appropriate title

President/Vice President/Assistant Vice President
Select appropriate title

Bob Rush
Print or type Signer's name

Kenneth Cates
Print or type Signer's name

CORPORATE SEAL



Contract No. C203991
County Wake

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 C203991 Rev. 1-16-18

County Wake

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 affidavit 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. **C203991**

County (ies): **Wake**

ACCEPTED BY THE
DEPARTMENT OF TRANSPORTATION

DocuSigned by:
Ronald E. Davenport, Jr.
F81B6038A47A442...
Contract Officer

1/5/2018
Date

Execution of Contract and Bonds
Approved as to Form:

DocuSigned by:
Joseph Herrin
5FBB09F93D07493...
Attorney General

1/5/2018
Date

BOND NO.: 106808978

Contract No. C203991
County Wake

Rev 5-17-11

CONTRACT PAYMENT BOND

Date of Payment Bond Execution	**December 21, 2017**
Name of Principal Contractor	**Barnhill Contracting Company**
Name of Surety:	**Travelers Casualty and Surety Company of America**
Name of Contracting Body:	**North Carolina Department of Transportation**
	Raleigh, North Carolina
Amount of Bond:	**$15,204,114.61**
Contract ID No.:	**C203991**
County Name:	**Wake**

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.

BOND NO.: 106808978

Rev 5-17-11

Contract No. C203991

County Wake

CONTRACT PAYMENT BOND

Affix Seal of Surety Company

Travelers Casualty and Surety Company of America

Print or type Surety Company Name

By *Shirley A. Johnson, Attorney-in-fact*

Print, stamp or type name of Attorney-in-Fact

Signature of Attorney-in-Fact

Signature of Witness

Melina Braddy

Print or type Signer's name

5417 S. Miami Blvd., Durham NC 27703

Address of Attorney-in-Fact

BOND NO.: 106808978

Rev 5-17-11

Contract No. C203991
County Wake

CONTRACT PAYMENT BOND

CORPORATION

SIGNATURE OF CONTRACTOR (Principal)

Barnhill Contracting Company

Full name of Corporation

P O Box 7948, Rocky Mount, North Carolina 27804

Address as prequalified

By _____

Signature of ~~President~~, Vice President, ~~Assistant Vice President~~

Select appropriate title

Kenneth Cates

Print or type Signer's name

Affix Corporate Seal

Attest _____

Signature of ~~Secretary~~, Assistant Secretary

Select appropriate title

Bob Rush

Print or type Signer's name

BOND NO.: 106808978

Contract No. C203991
County Wake

Rev 5-17-11

CONTRACT PERFORMANCE BOND

Date of Performance Bond Execution:	**December 21, 2017**
Name of Principal Contractor:	**Barnhill Contracting Company**
Name of Surety:	**Travelers Casualty and Surety Company of America**
Name of Contracting Body:	**North Carolina Department of Transportation**
	Raleigh, North Carolina
Amount of Bond:	**$15,204,114.61**
Contract ID No.:	**C203991**
County Name:	**Wake**

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.

BOND NO.: 106808978

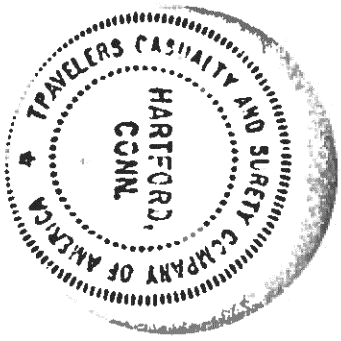
Contract No. C203991

County Wake

Rev 5-17-11

CONTRACT PERFORMANCE BOND

Affix Seal of Surety Company



Travelers Casualty and Surety Company of America
Print or type Surety Company Name

By *Shirley A. Johnson, Attorney-in-fact*
Print, stamp or type name of Attorney-in-Fact

Signature of Attorney-in-Fact

Signature of Witness

Melinda Braddy
Print or type Signer's name

5417 S. Miami Blvd., Durham NC 27703
Address of Attorney-in-Fact

BOND NO.: 106808978

Contract No. C203991

County Wake

Rev 5-17-11

CONTRACT PERFORMANCE BOND

CORPORATION

SIGNATURE OF CONTRACTOR (Principal)

Barnhill Contracting Company

Full name of Corporation

P O Box 7948, Rocky Mount, North Carolina 27804

Address as prequalified

By _____

Signature of **President, Vice President, Assistant Vice President**

Select appropriate title

Kenneth Cates

Print or type Signer's name

Affix Corporate Seal



Attest _____

Signature of **Secretary, Assistant Secretary**

Select appropriate title

Bob Rush

Print or type Signer's name

WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER

TRAVELERS

POWER OF ATTORNEY

Farmington Casualty Company
Fidelity and Guaranty Insurance Company
Fidelity and Guaranty Insurance Underwriters, Inc.
St. Paul Fire and Marine Insurance Company
St. Paul Guardian Insurance Company
St. Paul Mercury Insurance Company
Travelers Casualty and Surety Company
Travelers Casualty and Surety Company of America
United States Fidelity and Guaranty Company

Attorney-In Fact No. 229627 **Certificate No.** 007370503

KNOW ALL MEN BY THESE PRESENTS: That Farmington Casualty Company, St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company are corporations duly organized under the laws of the State of Connecticut, that Fidelity and Guaranty Insurance Company is a corporation duly organized under the laws of the State of Iowa, and that Fidelity and Guaranty Insurance Underwriters, Inc., is a corporation duly organized under the laws of the State of Wisconsin (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint

Barry C. Curtis, Cathy N. Hall, Shirley A. Johnson, Tara J. Smithwick, Sandra B. Fisher, Melinda Braddy, and Robert M. Good

of the City of Durham, State of North Carolina, their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, 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 any 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 7th day of September, 2017.

Farmington Casualty Company
Fidelity and Guaranty Insurance Company
Fidelity and Guaranty Insurance Underwriters, Inc.
St. Paul Fire and Marine Insurance Company
St. Paul Guardian Insurance Company
St. Paul Mercury Insurance Company
Travelers Casualty and Surety Company
Travelers Casualty and Surety Company of America
United States Fidelity and Guaranty Company

State of Connecticut
City of Hartford ss.

By: _____
Robert L. Raney, Senior Vice President

On this the 7th day of September, 2017, before me personally appeared Robert L. Raney, who acknowledged himself to be the Senior Vice President of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations 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.

MARIE C. TETREAULT NOTARY PUBLIC CONNECTICUT

_____
Marie C. Tetreault, Notary Public

58440-5-16 Printed in U.S.A.

WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER

WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, which resolutions are now in full 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, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and 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 sign 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 a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke 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 Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such 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 conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if 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 one 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 Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile 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 Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 1st day of December 2017

Kevin E. Hughes, Assistant Secretary

To verify the authenticity of this Power of Attorney, call 1-800-421-3880 or contact us at www.travelersbond.com. Please refer to the Attorney-In-Fact number, the above-named individuals and the details of the bond to which the power is attached.

TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA
HARTFORD, CONN.

WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER