

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

C203198

CONTRACT AND
CONTRACT BONDS

FOR CONTRACT NO. C203198

WBS 34491.3.GVS4 NHS-0017(131)

T.I.P NO. R-2633BB

COUNTY OF BRUNSWICK, NEW HANOVER

THIS IS THE ROADWAY & STRUCTURE CONTRACT

ROUTE NUMBER US 17 LENGTH 2.940 MILES

LOCATION US-17 (WILMINGTON BYPASS) FROM SR-1430 (CEDAR HILL RD) TO
WEST OF US-421 NORTH OF WILMINGTON.

CONTRACTOR BALFOUR BEATTY INFRASTRUCTURE INC

ADDRESS 999 PEACHTREE ST NE, STE 200
ATLANTA, GA 30309

BIDS OPENED SEPTEMBER 17, 2013

CONTRACT EXECUTION OCT 17 2013

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

PROPOSAL

DATE AND TIME OF BID OPENING: **SEPTEMBER 17, 2013 AT 2:00 PM**

CONTRACT ID C203198
WBS 34491.3.GVS4

FEDERAL-AID NO. NHS-0017(131)
COUNTY BRUNSWICK, NEW HANOVER
T.I.P. NO. R-2633BB
MILES 2.940
ROUTE NO. US 17
LOCATION US-17 (WILMINGTON BYPASS) FROM SR-1430 (CEDAR HILL RD) TO
WEST OF US-421 NORTH OF WILMINGTON.
TYPE OF WORK GRADING, DRAINAGE, PAVING, SIGNING, AND STRUCTURES.

NOTICE:

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

BIDS WILL BE RECEIVED AS SHOWN BELOW:

THIS IS A ROADWAY & STRUCTURE PROPOSAL

5% BID BOND OR BID DEPOSIT REQUIRED

**PROPOSAL FOR THE CONSTRUCTION OF
CONTRACT No. C203198 IN BRUNSWICK-NEW HANOVER COUNTIES, 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. **C203198**; 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. **C203198** in **Brunswick-New Hanover Counties**, 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.

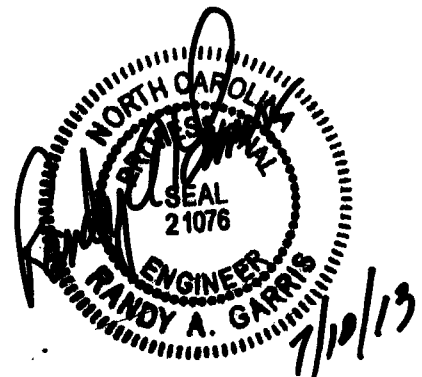
The published volume entitled *North Carolina Department of Transportation, Raleigh, Standard Specifications for Roads and Structures, January 2012* with all amendments and supplements thereto, is by reference incorporated into and made a part of this contract; that, except as herein modified, all the 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

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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 **October 28, 2013**, 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 **April 30, 2018**.

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 **October 28, 2013**.

The completion date for this intermediate contract time is **November 1, 2017**.

The liquidated damages for this intermediate contract time are **Twenty Thousand Dollars (\$20,000.00)** 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) (5-6-13)

108

SP1 G14 A

The Contractor shall complete the required work of installing, maintaining, and removing the traffic control devices for lane closures and restoring traffic to the existing traffic pattern. The Contractor shall not close or narrow a lane of traffic on **US 421** during the following time restrictions:

DAY AND TIME RESTRICTIONS**Monday through Friday****7:00 A.M. – 9:00 A.M.****And****1:00 P.M. – 6:00 P.M.**

In addition, the Contractor shall not close or narrow a lane of traffic on **US 421**, detain and/or alter the traffic flow on or during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy, including the following schedules:

HOLIDAY AND HOLIDAY WEEKEND LANE CLOSURE RESTRICTIONS

1. For **unexpected occurrence** that creates unusually high traffic volumes, as directed by the Engineer.
2. For **New Year's Day**, between the hours of **7:00 A.M.** December 31st and **6:00 P.M.** January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until **6:00 P.M.** the following Tuesday.
3. For **Easter**, between the hours of **7:00 A.M.** Thursday and **6:00 P.M.** Monday.
4. For **Memorial Day**, between the hours of **7:00 A.M.** Friday and **6:00 P.M.** Tuesday.
5. For **Independence Day**, between the hours of **7:00 A.M.** the day before Independence Day and **6:00 P.M.** the day after Independence Day.

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

6. For **Labor Day**, between the hours of **7:00 A.M.** Friday and **6:00 P.M.** Tuesday.
7. For **Thanksgiving Day**, between the hours of **7:00 A.M.** Tuesday and **6:00 P.M.** Monday.
8. For **Christmas**, between the hours of **7:00 A.M.** the Friday before the week of Christmas Day and **6:00 P.M.** the following Tuesday after the week of Christmas Day.
9. For **"Beach2BattleShip"**, on day of event (usually on 3rd or 4th Saturday in October) **12:01 A.M. to 12:00 Midnight.**

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

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

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

The liquidated damages are **One Thousand Dollars (\$1,000.00)** per hour.

INTERMEDIATE CONTRACT TIME NUMBER 3 AND LIQUIDATED DAMAGES:

(2-20-07) (6-24-13)

108

SPI 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 **SR 1394 (Sutton Steam Plant Road)** during the following time restrictions:

DAY AND TIME RESTRICTIONS

Monday through Sunday 5:00 A.M. to 12:00 A.M. (Midnight)

The maximum allowable time for **girder installation** is **30** minutes for **SR 1394 (Sutton Steam Plant Road)**. The Contractor shall reopen the travel lanes to traffic until the existing traffic queue is depleted.

The time of availability for this intermediate contract time will be the time the Contractor begins to install traffic control devices required for the 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 **Two Hundred Fifty Dollars (\$250.00)** per **15** minute time period.

INTERMEDIATE CONTRACT TIME NUMBER 4 AND LIQUIDATED DAMAGES:

(2-20-07) (6-24-13)

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 **US 17 / I-140** during the following time restrictions:

DAY AND TIME RESTRICTIONS**Monday through Sunday 6:00 A.M. to 12:00 A.M. (Midnight)**

The maximum allowable time for **removing and installing overhead signs** is **30 minutes** for **US 17 / I-140**. The Contractor shall reopen the travel lanes to traffic until the existing traffic queue is depleted.

The time of availability for this intermediate contract time will be the time the Contractor begins to install traffic control devices required for the 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 **Five Hundred Dollars (\$500.00)** per **15 minute** time period.

PERMANENT VEGETATION ESTABLISHMENT:

(2-16-12)

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 80% coverage of permanent vegetation 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*.

Once the Engineer has determined that 80% coverage of permanent vegetation has been established, 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.

CONSTRUCTION MORATORIUM

(01-06-12)

SPI 1-15 (REV.)

The NCDOT has committed to no in-water work in the Cape Fear River and Toomers Creek between February 1 and June 15 of any year. In-water is defined for this project as the main channel where the vegetation line meets open water and extends 35 meters (115 feet) into adjacent wetlands on both sides of the channel but does not include uplands. The in-water work moratorium prohibits pile installation (both vibratory and impact) and activities associated with the construction of any temporary work bridge.

MAJOR CONTRACT ITEMS:

(2-19-02)

104

SPI G28

The following listed items are the major contract items for this contract (see Article 104-5 of the *2012 Standard Specifications*):

Line #	Description
13	Borrow Excavation
204	Reinforced Concrete Deck Slab
248	78" Prestressed Concrete Girders

SPECIALTY ITEMS:

(7-1-95)(Rev. 1-17-12)

108-6

SPI G37

Items listed below will be the specialty items for this contract (see Article 108-6 of the *2012 Standard Specifications*).

Line #	Description
75 thru 87	Guardrail
88 thru 99	Fencing
103 thru 121	Signing
133 thru 138	Long-Life Pavement Markings
139	Permanent Pavement Markers
140 thru 142	Utility Construction
143 thru 171 and 173	Erosion Control
172	Reforestation
174 thru 198	Signals/ITS System

FUEL PRICE ADJUSTMENT:

(11-15-05) (Rev. 1-17-12)

109-8

SPI 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 **\$2.9570** 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
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
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

PAYOUT SCHEDULE:

(1-19-10) (Rev. 1-17-12)

108

SP1 G57

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

SCHEDULE OF ESTIMATED COMPLETION PROGRESS:

(7-15-08) (Rev. 5-21-13)

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)
2014 (7/01/13 - 6/30/14)	25% of Total Amount Bid
2015 (7/01/14 - 6/30/15)	31% of Total Amount Bid
2016 (7/01/15 - 6/30/16)	24% of Total Amount Bid
2017 (7/01/16 - 6/30/17)	16% of Total Amount Bid
2018 (7/01/17 - 6/30/18)	4% 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. 5-21-13)

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.
<http://www.ncdot.org/doh/forms/files/DBE-IS.xls>

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\(Federal\).doc](http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/08%20DBE%20Subcontractors%20(Federal).doc)

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 **8.0 %**

- (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://partner.ncdot.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

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.

- (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.
 - (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 DBE goal.
- (2) *If the DBE goal is zero,* bidders, at the time the bid proposal is submitted, shall enter the word "None"; or the number "0"; or if there is participation, add the value on the *Listing of DBE Subcontractors* contained elsewhere in the contract documents.

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 12:00 noon 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 12:00 noon 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 12:00 noon 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 12:00 noon 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 12:00 noon 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 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 Development Manager in the Business Opportunity and Work Force Development Unit 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 Contractor Utilization 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.

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.

(A) Electronic Bids Reporting

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

(B) Paper Bids Reporting

The Contractor shall report the accounting of payments on the Department's DBE-IS (*Subcontractor Payment Information*) with each invoice. Invoices will not be processed for payment until the DBE-IS is received.

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.

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.

RESOURCE CONSERVATION:

(5-21-13)

104-13

SP1 G118

In accordance with North Carolina Executive Order 156, NCGS 130A-309.14(2), and NCGS 136-28.8, it is the policy of the Department to aid in the reduction of materials that become a part of our solid waste stream, to divert materials from landfills, and to find ways to recycle and reuse materials for the benefit of the Citizens of North Carolina.

Initiate, develop and use products and construction methods that incorporate the use of recycled or solid waste products in accordance with Article 104-13 of the *2012 Standard Specifications*. Report the quantities of reused or recycled materials either incorporated in the project or diverted from landfills on the Project Construction Reuse and Recycling Reporting Form.

A location-based tool for finding local recycling facilities and the Project Construction Reuse and Recycling Reporting Form are available at:

<http://connect.ncdot.gov/resources/Environmental/Pages/North-Carolina-Recycling-Locations.aspx>

DOMESTIC STEEL:

(4-16-13)

106

SP1 G120

Revise the *2012 Standard Specifications* as follows:

Page 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.

MAINTENANCE OF THE PROJECT:

(11-20-07) (Rev. 1-17-12)

104-10

SP1 G125

Revise the *2012 Standard Specifications* as follows:

Page 1-35, Article 104-10 Maintenance of the Project, line 25, add the following after the first sentence of the first paragraph:

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

Page 1-35, Article 104-10 Maintenance of the Project, line 30, add the following as the last sentence of the first paragraph:

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

Page 1-35, Article 104-10 Maintenance of the Project, lines 42-44, replace the last sentence of the last paragraph with the following:

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

COOPERATION BETWEEN CONTRACTORS:
(7-1-95) 105-7

SP1 G133

The Contractor's attention is directed to Article 105-7 of the *2012 Standard Specifications*.

R-2633BA, Brunswick County, located on the west end of this project is scheduled to be let during the construction of R-2633BB.

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

BID DOCUMENTATION:
(1-1-02) (Rev. 9-18-12)

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.

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 copy of the Escrow Agreement will be mailed to the Bidder with 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 by him 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 by him. Bid documentation will be considered a certified copy if the Bidder includes a letter to the Department from a chief officer of the company stating that the enclosed documentation is an *EXACT* copy of the original documentation. The letter 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 letter.
- (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

In addition to the bid documentation, an affidavit signed under oath by an individual authorized by the Bidder to execute the bid shall be included. The affidavit shall 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. 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 such bid documentation has been included.

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 disposition 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.

EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:

(1-16-07) (Rev 9-18-12)

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, twice weekly for construction related *Federal Clean Water Act, Section 303(d)* impaired streams with turbidity violations, and within 24 hours after a significant rainfall event of 0.5 inch that occurs within a 24 hour period.
 - (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 *Cease 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”.

NOTES TO CONTRACTOR:

1. As part of the first operation, install proposed 10' chain link fence on Parcel 079.
2. Progress Energy (Parcel 079) has no available borrow material and shall not be contacted for such.
3. Mr. Mitchel Beason shall be invited to all project update and monthly construction meetings for this project. His contact information is:

Mitchel Beason
Operations & Maintenance Superintendent
Sutton Energy Complex
801 Sutton Steam Plant Rd.
Wilmington, NC 28401
910-341-4713 (O)
910-774-2288 (C)
910-341-4732 (F)

PROJECT SPECIAL PROVISIONS**ROADWAY****CLEARING AND GRUBBING - METHOD III:**

(4-6-06) (Rev. 1-17-12)

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*.

BURNING RESTRICTIONS:

(7-1-95)

200, 210, 215

SP2 R05

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

BUILDING REMOVAL:

(1-1-02) (Rev. 4-16-13)

215

SP2 R15 C

Remove the buildings, underground storage tanks and appurtenances listed below in accordance with Section 215 of the *2012 Standard Specifications*:

Building Removal

**Parcel 059A – Left of Survey Station 317+50, Survey Line L
Five-Story Block Factory (Dilapidated)**

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

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*.

SURCHARGES AND WAITING PERIODS:

(2-17-04) (Rev. 2-19-13)

235

SP2 R65

Revise the *2012 Standard Specifications* as follows:

Page 2-22, Article 235-1 DESCRIPTION, add the following:

Surcharges and waiting periods may be required for embankments and retaining walls to minimize and control the effects of settlement on structures, approach slabs, pavements, pipes, utilities, etc.

Page 2-24, Article 235-3 CONSTRUCTION METHODS, add the following:

(E) Surcharges and Waiting Periods

Place surcharges at locations shown in the plans. Unless required otherwise in the contract, surcharge embankments after embankments are constructed to the grade and cross section shown in the plans. Construct surcharges with side slopes as directed, 2:1 (H:V) end slopes outside of surcharge limits and surcharge heights shown in the plans. Place and compact surcharge material in accordance with Subarticles 235-3(B)

and 235-3(C). Construct and maintain adequate drainage of surface runoff to prevent erosion of surcharge material.

Waiting period durations are in accordance with the contract and as directed. Surcharge waiting periods apply to surcharge locations shown in the plans and begin after surcharges are constructed to the height shown in the plans.

Unless required otherwise in the contract, bridge waiting periods are required in accordance with the following:

- (1) Apply to bridge embankments and retaining walls within 100 ft of end bent and bent locations shown in the plans and
- (2) Begin after bridge embankments and retaining walls are constructed to the elevations noted in the plans.

Unless required otherwise in the contract, embankment waiting periods are required in accordance with the following:

- (1) Apply to embankment locations shown in the plans and retaining walls for embankments with waiting periods and
- (2) Begin after embankments and retaining walls are constructed to the elevations, grade and cross section shown in the plans.

Except for maintaining embankments, do not perform any work on embankments or structures with waiting periods until waiting periods end unless otherwise approved. Place and compact additional material in accordance with Subarticles 235-3(B) and 235-3(C) to maintain embankment grade elevations during waiting periods. Remove surcharges to the grade and cross section shown in the plans after surcharge waiting periods end.

Page 2-24, Article 235-5 MEASUREMENT AND PAYMENT, add the following:

Borrow Excavation for surcharge material and additional material for maintaining embankment grade elevations will be measured and paid in accordance with Article 230-5. *Unclassified Excavation* for surcharge material, additional material for maintaining embankment grade elevations and removing surcharges will be measured and paid in accordance with Article 225-7. When there is no pay item for *Borrow Excavation* or *Unclassified Excavation* in the contract, surcharge and additional material and removing surcharges will be paid as extra work in accordance with Article 104-7.

PIPE INSTALLATION:

(11-20-12)

300

SP3 R01

Revise the *2012 Standard Specifications* as follows:

Page 3-1, Article 300-2, Materials, line 23-24, replace sentence with:

Provide foundation conditioning geotextile in accordance with Section 1056 for Type 4 geotextile.

BRIDGE APPROACH FILLS:

(10-19-10) (Rev. 1-17-12)

422

SP4 R02

Description

Bridge approach fills include bridge approach fills for sub regional tier bridges and reinforced bridge approach fills. Construct bridge approach fills in accordance with the contract and Standard Drawing No. 422.10 or 422.11 of the *2012 Roadway Standard Drawings*. Define “geosynthetics” as geotextiles or geomembranes.

Materials

Refer to Division 10 of the *2012 Standard Specifications*.

Item	Section
Anchor Pins	1056-2
Geotextiles	1056
Portland Cement Concrete	1000
Select Material	1016
Subsurface Drainage Materials	1044
Wire Staples	1060-8(D)

For bridge approach fills for sub regional tier bridges, provide Type 1 geotextile for filtration geotextiles. For reinforced bridge approach fills, provide Type 5 geotextile for geotextile reinforcement and Type 1 geotextile and No. 78M stone for drains. Use Class B concrete for concrete pads.

Use Class III or V select material for reinforced bridge approach fills and only Class V select material (standard size No. 78M stone) for bridge approach fills for sub regional tier bridges. Provide PVC pipes, fittings and outlet pipes for subsurface drainage materials. For drains and PVC pipes behind end bents, use pipes with perforations that meet AASHTO M 278.

Use PVC, HDPE or linear low density polyethylene (LLDPE) geomembranes for reinforced bridge approach fills. For PVC geomembranes, provide grade PVC30 geomembranes that meet ASTM D7176. For HDPE and LLDPE geomembranes, use geomembranes with a nominal thickness of at least 30 mils that meet Geosynthetic Research Institute Standard Specifications GM13 or GM17, respectively. Handle and store geomembranes in accordance with Article 1056-2 of the *2012 Standard Specifications*. Provide material certifications for geomembranes in accordance with Article 1056-3 of the *2012 Standard Specifications*.

Construction Methods

Excavate as necessary for bridge approach fills in accordance with the contract. Notify the Engineer when foundation excavation is complete. Do not place geomembranes or filtration geotextiles until excavation dimensions and foundation material are approved. Attach geomembranes and filtration geotextiles to end bent cap back and wing walls with adhesives, tapes or other approved methods. Glue or weld geomembrane seams to prevent leakage.

For reinforced bridge approach fills, place geotextile reinforcement within 3" of locations shown in Standard Drawing No. 422.10 of the *2012 Roadway Standard Drawings* and in slight tension free of kinks, folds, wrinkles or creases. Install geotextile reinforcement with the orientation, dimensions and number of layers shown in Standard Drawing No. 422.10 of the *2012 Roadway Standard Drawings*. Place first layer of geotextile reinforcement directly on geomembranes with no void or material in between. Install geotextile reinforcement with the machine direction (MD) parallel to the roadway centerline. The MD is the direction of the length or long dimension of the geotextile roll. Do not splice or overlap geotextile reinforcement in the MD so seams are perpendicular to the roadway centerline. Wrap geotextile reinforcement at end bent cap back and wing walls as shown in Standard Drawing No. 422.10 of the *2012 Roadway Standard Drawings* and directed by the Engineer. Extend geotextile reinforcement at least 4 ft back behind end bent cap back and wing walls into select material.

Overlap adjacent geotextiles at least 18" with seams oriented parallel to the roadway centerline. Hold geotextiles in place with wire staples or anchor pins as needed. Contact the Engineer when existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with geosynthetics.

For reinforced bridge approach fills, construct one foot square drains consisting of 4" diameter continuous perforated PVC pipes surrounded by No. 78M stone wrapped in Type 1 geotextiles. Install drains in accordance with Standard Drawing No. 422.10 of the *2012 Roadway Standard Drawings*. For bridge approach fills for sub regional tier bridges, install 4" diameter continuous perforated PVC drain pipes in accordance with Standard Drawing No. 422.11 of the *2012 Roadway Standard Drawings*.

Use solvent cement to connect PVC pipes so joints do not leak. Connect perforated pipes to outlet pipes just behind wing walls. Provide drain pipes and drains with positive drainage towards outlets. Place pipe sleeves in or under wing walls for outlet pipes so positive drainage is maintained. Use sleeves that can withstand wing wall loads.

Place select material in 8" to 10" thick lifts. Use only hand operated compaction equipment to compact select material for bridge approach fills. Compact Class III select material in accordance with Subarticle 235-3(C) of the *2012 Standard Specifications*. Compact No. 78M stone with a vibratory compactor to the satisfaction of the Engineer. Do not displace or damage geosynthetics, drain pipes or drains when placing and compacting select material. End dumping directly on geosynthetics is not permitted. Do not operate heavy equipment on geosynthetics, drain pipes or drains until they are covered with at least 8" of select material. Replace any damaged geosynthetics, drain pipes or drains to the satisfaction of the Engineer.

Cover open ends of outlet pipes with rodent screens as shown in Standard Drawing No. 815.03 of the *2012 Roadway Standard Drawings*. Connect ends of outlet pipes to concrete pads or existing drainage structures as directed by the Engineer. Construct concrete pads with an Ordinary surface finish that meets Subarticle 825-6(B) of the *2012 Standard Specifications*.

Measurement and Payment

Reinforced Bridge Approach Fill, Station ____ will be paid at the contract lump sum price. The contract lump sum price for *Reinforced Bridge Approach Fill, Station ____* will be full compensation for labor, tools, equipment and reinforced bridge approach fill materials, excavating, backfilling, hauling and removing excavated materials, compacting select material, connecting outlet pipes to existing drainage structures and supplying select materials, geosynthetics, drains, pipe sleeves and outlet components and any incidentals necessary to construct all reinforced bridge approach fills at each bridge.

Bridge Approach Fill - Sub Regional Tier, Station ____ will be paid at the contract lump sum price. The contract lump sum price for *Bridge Approach Fill - Sub Regional Tier, Station ____* will be full compensation for labor, tools, equipment and bridge approach fill materials, excavating, backfilling, hauling and removing excavated materials, compacting No. 78M stone, connecting outlet pipes to existing drainage structures and supplying No. 78M stone, filtration geotextiles, drain pipes, pipe sleeves and outlet components and any incidentals necessary to construct all bridge approach fills at each sub regional tier bridge.

Payment will be made under:

Pay Item	Pay Unit
Reinforced Bridge Approach Fill, Station ____	Lump Sum
Bridge Approach Fill - Sub Regional Tier, Station ____	Lump Sum

PREPARATION OF SUBGRADE AND BASE:

(1-16-96)

610

SP5 R05

On mainline portions and ramps of this project, prepare the subgrade and base beneath the pavement structure in accordance with the applicable sections of the *2012 Standard Specifications* except use an automatically controlled fine grading machine using string lines, laser controls or other approved methods to produce final subgrade and base surfaces meeting the lines, grades and cross sections required by the plans or established by the Engineer.

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

AUTOMATED MACHINE GUIDANCE

(1-2-11)

SPI 5-5

General

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

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

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

Submittals

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

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

Inspection

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

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

Subgrade and Base Controls

If the Contractor elects to use AMG for fine grading and placement of base or other roadway materials, the GPS shall be supplemented with a laser or robotic total station. Include details of the proposed system in the AMG work plan. In addition, the following requirements apply for the use of AMG for subgrade and base construction.

Provide control points at intervals along the project not to exceed 1,000 feet. The horizontal position of these points shall be determined by static GPS sessions or by traverse connection from the original base line control points. The elevation of these control points shall be established using differential leveling from project benchmarks, forming closed loops where

practical. A copy of all new control point information shall be provided to the Engineer prior to construction activities.

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

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

Measurement and Payment

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

ASPHALT PAVEMENTS - SUPERPAVE:

(6-19-12) (Rev. 4-16-13)

605, 609, 610

SP6 R01

Revise the *2012 Standard Specifications* as follows:

Page 6-3, Article 605-7 APPLICATION RATES AND TEMPERATURES, replace this article, including Table 601-1, 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 6-7, 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/WMA%20Approved%20Lists.pdf>

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

**TABLE 610-1
DESIGN MIXING TEMPERATURE AT THE ASPHALT PLANT^A**

Binder Grade	HMA JMF Temperature	WMA JMF Temperature Range
PG 64-22	300°F	225 - 275°F
PG 70-22	315°F	240 - 290°F
PG 76-22	335°F	260 - 310°F

A. The mix temperature, when checked in the truck at the roadway, shall be within plus 15° and minus 25° of the temperature specified on the JMF.

Page 6-21, Subarticle 610-3(C) Job Mix Formula (JMF), lines 4-6, delete first sentence of the second paragraph. Line 7, in the second sentence of the second paragraph, replace "275°F" with "275°F or greater."

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
S9.5C, S12.5C	45°F
S9.5D, S12.5D	50°F

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”.

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 **\$593.44** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **July 1, 2013**.

GUARDRAIL ANCHOR UNITS, TYPE M-350:

(4-20-04) (Rev. 1-17-12)

862

SP8 R60

Description

Furnish and install guardrail anchor 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

The Contractor may, at his option, furnish any one of the following guardrail anchor units or approved equal.

The guardrail anchor unit (SRT-350) as manufactured by:

Trinity Industries, Inc.
2525 N. Stemmons Freeway
Dallas, Texas 75207
Telephone: 800-644-7976

The guardrail anchor unit (FLEAT) as manufactured by:

Road Systems, Inc.
3616 Old Howard County Airport
Big Springs, Texas 79720
Telephone: 915-263-2435

The guardrail anchor unit (REGENT) as manufactured by:

Energy Absorption Systems, Inc.
One East Wacker Drive
Chicago, Illinois 60601-2076
Telephone: 888-32-ENERGY

Prior to installation the Contractor shall submit to the Engineer:

- (A) FHWA acceptance letter for each guardrail anchor 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 guardrail anchor unit in accordance with Article 105-2 of the *2012 Standard Specifications*.

No modifications shall be made to the guardrail anchor 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 shall be 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 anchor 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

Guardrail Anchor Units, Type M-350

Pay Unit

Each

GUARDRAIL ANCHOR UNITS, TYPE 350:

(4-20-04) (Rev. 8-16-11)

862

SP8 R65

Description

Furnish and install guardrail anchor 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

The Contractor may at his option, furnish any one of the guardrail anchor units or approved equal.

Guardrail anchor unit (ET-Plus) as manufactured by:

Trinity Industries, Inc.
2525 N. Stemmons Freeway
Dallas, Texas 75207
Telephone: 800-644-7976

The guardrail anchor unit (SKT 350) as manufactured by:

Road Systems, Inc.
3616 Old Howard County Airport
Big Spring, Texas 79720
Telephone: 915-263-2435

Prior to installation the Contractor shall submit to the Engineer:

- (A) FHWA acceptance letter for each guardrail anchor 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 guardrail anchor unit in accordance with Article 105-2 of the *2012 Standard Specifications*.

No modifications shall be made to the guardrail anchor 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 anchor 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 Anchor Units, Type 350	Each

IMPACT ATTENUATOR UNITS, TYPE 350:

(4-20-04) (Rev. 1-17-12)

SP8 R75

Description

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

Materials

The Contractor may at his option, furnish any one of the **NON-GATING** impact attenuator units or approved equal:

The impact attenuator unit (QUADGUARD) as manufactured by:

Energy Absorption Systems, Inc.
One East Wacker Drive
Chicago, Illinois 60601-2076
Telephone: 312-467-6750

The impact attenuator unit (TRACC) as manufactured by:

Trinity Industries, Inc.
2525 N. Stemmons Freeway
Dallas, Texas 75207
Telephone: 800-644-7976

The Contractor may at his option, furnish any one of the **GATING** impact attenuator units or approved equal:

The impact attenuator unit (BRAKEMASTER) as manufactured by:

Energy Absorption Systems, Inc.
One East Wacker Drive
Chicago, Illinois 60601-2076
Telephone: 312-467-6750

The impact attenuator unit (CAT) as manufactured by:

Trinity Industries, Inc.
2525 N. Stemmons Freeway
Dallas, Texas 75207
Telephone: 800-644-7976

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 one of the NON-GATING Impact Attenuator Units listed in the Materials Section herein.

If the median width is greater than 40 feet, the Contractor may use any of the GATING or NON-GATING Impact Attenuator Units listed in the Materials Section herein.

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
Impact Attenuator Units, Type 350

Pay Unit
Each

FOUNDATIONS AND ANCHOR ROD ASSEMBLIES FOR METAL POLES:

(1-17-12) (Rev. 5-21-13)

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, Nonshrink	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
$\leq 1 \frac{1}{2}$	1/3 turn (2 flats)
$> 1 \frac{1}{2}$	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
$\geq 1 \frac{1}{2}$	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. 5-21-13)

1000, 1005, 1050, 1074, 1078, 1080, 1081, 1087, 1092

SP10 R01

Revise the *2012 Standard Specifications* as follows:**Page 10-1, Article 1000-1, DESCRIPTION, line 14, add the following:**

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

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.
<i>Units</i>	<i>psi</i>					<i>inch</i>	<i>inch</i>	<i>lb/cy</i>	<i>lb/cy</i>	<i>lb/cy</i>	<i>lb/cy</i>
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	2.5	4	508	-	545	-
B Slip Formed	2,500	0.488	0.567	-	-	1.5	-	508	-	-	-
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 10-65, Article 1050-1, GENERAL, line 41, replace the first sentence with:

All fencing material and accessories shall meet Section 106.

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
4	100	90-100	20-55	0-15	-	0-5	-	-	-	-	-	A
467M	100	95-100	-	35-70	-	0-30	0-5	-	-	-	-	A
5	-	100	90-100	20-55	0-10	0-5	-	-	-	-	-	A
57	-	100	95-100	-	25-60	-	0-10	0-5	-	-	-	A
57M	-	100	95-100	-	25-45	-	0-10	0-5	-	-	-	A
6M	-	-	100	90-100	20-55	0-20	0-8	-	-	-	-	A
67	-	-	100	90-100	-	20-55	0-10	0-5	-	-	-	A
78M	-	-	-	100	98-100	75-100	20-45	0-15	-	-	-	A
14M	-	-	-	-	-	100	35-70	5-20	-	0-8	-	A
9	-	-	-	-	-	100	85-100	10-40	-	0-10	-	A
ABC	-	100	75-97	-	55-80	-	35-55	-	25-45	-	14-30	4-12 ^B
ABC (M)	-	100	75-100	-	45-79	-	20-40	-	0-25	-	-	0-12 ^B
Light-weight C	-	-	-	-	100	80-100	5-40	0-20	-	0-10	-	0-2.5
Remarks												
Asphalt Plant Mix												
Asphalt Plant Mix												
AST, Sediment Control Stone												
AST, Str. Concrete, Shoulder Drain, Sediment Control Stone												
AST, Concrete Pavement												
AST												
AST, Str. Concrete, Asphalt Plant Mix												
Asphalt Plant Mix, AST, Str. Conc, Weep Hole Drains												
Asphalt Plant Mix, AST, Weep Hole Drains, Str. Concrete												
AST												
Aggregate Base Course, Aggregate Stabilization												
Maintenance Stabilization												
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 10-115, Subarticle 1074-7(B), Gray Iron Castings, lines 10-11, replace with 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 lbs.) 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 10-162, Subarticle 1081-1(A) Classifications, lines 4-7, delete the second and third sentences of the description for Type 3A.

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

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.

Page 10-204, Subarticle 1092-2(A) Performance and Test Requirements, replace **Table 1092-3 Minimum Coefficient of Retroreflection for NC Grade A** with the following:

TABLE 1092-3 MINIMUM COEFFICIENT OF RETROREFLECTION FOR NC GRADE A (Candelas Per Lux Per Square Meter)								
Observation Angle, degrees	Entrance Angle, degrees	White	Yellow	Green	Red	Blue	Fluorescent Yellow Green	Fluorescent Yellow
0.2	-4.0	525	395	52	95	30	420	315
0.2	30.0	215	162	22	43	10	170	130
0.5	-4.0	310	230	31	56	18	245	185
0.5	30.0	135	100	14	27	6	110	81
1.0	-4.0	120	60	8	16	3.6	64	48
1.0	30.0	45	34	4.5	9	2	36	27

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.

TABLE 1019-1A ADDITIONAL LIMESTONE APPLICATION RATE TO RAISE pH			
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.

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.

FIELD OFFICE (Lump Sum):

(6-1-07)

SP18-1

Description

This work consists of furnishing, erecting, equipping, and maintaining a field office for the exclusive use of Department Engineers and Inspectors at a location on the project approved by the Engineer. Provide a field office that complies with the current ADA Design and Accessibility Standards, the National Electric Code, local, state, and federal regulations, and the following requirements.

Procedures

The field office and equipment will remain the property of the Contractor upon completion of the contract. The field office shall be separated from buildings and trailers used by the Contractor and shall be erected and functional as an initial operation. Failure to have the field office functional when work first begins on the project will result in withholding payment of the Contractor's monthly progress estimate. The field office shall be operational throughout the duration of the project and shall be removed upon completion and final acceptance of the project.

Provide a field office that is weatherproof, tightly floored and roofed, constructed with an air space above the ceiling for ventilation, supported above the ground, has a width of at least 10 feet, and the floor-to-ceiling height that is at least 7 feet 6 inches. Provide inside walls and a ceiling constructed of plywood, masonite, gypsum board, or other suitable materials. Have the exterior walls, ceiling, and floor insulated.

Provide a field office with at least 500 square feet of floor space and that is equipped with the following:

<u>Number</u>	<u>Item</u>
1	Double-pedestal desk (approximately 60 by 34 inches, at least 2,000 square inches).
1	Plan and drafting table (approximately 30 by 96 inches) with adjustable stool.
1	Computer table at least 48 by 30 by 29 inches.
1	Plan rack for 24 by 36 inch drawings with 6 plan clamps.
1	Printing calculator.
2	2-drawer fire protection file, 15 inch drawer width, minimum UL rating of Class 350.
6	Office chairs with at least two chairs having casters.
2	Wastebaskets.
1	Pencil sharpener.
1	Copy machine (8 inch x 11 inch copies)
1	Telephone.
1	Fax Machine.
1	Answering machine.

Windows and Doors

Provide a field office with at least three windows with blinds, each having an area of at least 540 square inches, capable of being easily opened and secured from the inside and having at least two exterior passage doors. Provide doors at least 30 inches in width and 78 inches in height. Provide screens for windows and doors. Equip exterior passage doors with locks, and furnish at least two keys to the Engineer.

Steps

Provide accessibility in compliance with the current ADA Design and Accessibility Standards, and the State Building Code and maintain them free from obstructions.

Storage Facility For Nuclear Gage

Furnish the field office with an outside storage facility for the Department's nuclear gage. The storage facility shall not be located within 10 feet of any other structure including the field office.

Lighting, Heating, and Air Conditioning

The field office shall have satisfactory lighting, electrical outlets, heating equipment, an exhaust fan, and an air conditioner connected to an operational power source. Provide at least one of the light fixtures that is a fluorescent light situated over the plan and drafting table. Furnish electrical current and fuel for heating equipment.

Fire Extinguishers

Furnish and maintain one fire extinguisher for each required exterior passage door. Fire extinguisher may be chemical or dry powder. UL Classification 10-B:C (minimum), suitable for Type A:B:C: fires. Mount and maintain fire extinguishers in accordance with OSHA Safety and Health Standards.

Toilets

Provide a toilet conforming to the requirements of the state and local boards of health or other bodies or courts having jurisdiction in the area. When separate facilities for men and women are not available, place a sign with the words "Rest Room" (with letters at least 1 inch in height) over the doorway, and provide an adequate positive locking system on the inside of the doorway. Maintain responsibility for the water and sewer connections or the installation and connection of a water well and septic tank and drain field. These facilities shall conform to all local and state permits.

Utilities

Except for telephone service, make necessary utility connections, maintain utilities, pay utility service fees and bills, and handle final disconnection of utilities. Furnish a telephone in each field office and permit the work necessary to install it.

Storage Facility for Test Equipment

Provide the field office with a storage facility, separate from the office for storage of test equipment, other than the nuclear gage. Provide a facility that has at least 64 square feet of floor space, is weatherproof, tightly floored and roofed, and has a tamper resistant key operated lock.

Miscellaneous Items

The field office shall also include the following:

1. A certification that the office is free of asbestos and other hazardous materials.
2. A broom, dust pan, mop and bucket, and general cleaning supplies.
3. Provide and maintain an all weather parking area for six vehicles, including graveled access to the paved surface.

Measurement and Payment

Payment at the contract lump sum bid price for *Field Office* will be full compensation for all work covered by this provision including but not limited to furnishing, erecting, maintaining, and removing the field office as outlined in this provision.

Installation and service fees for the telephone will be paid for by the Department.

Payment will be made under:

Pay Item

Field Office

Pay Unit

Lump Sum

PROJECT SPECIAL PROVISIONS

GEOTECHNICAL

MECHANICALLY STABILIZED EARTH RETAINING WALLS

(7-17-12)

1.0 GENERAL

Construct mechanically stabilized earth (MSE) retaining walls consisting of steel or geogrid reinforcement in the reinforced zone connected to vertical facing elements. The facing elements may be precast concrete panels or segmental retaining wall (SRW) units unless required otherwise in the plans or the *NCDOT Policy for Mechanically Stabilized Earth Retaining Walls* prohibits the use of SRW units. At the Contractor's option, use coarse or fine aggregate in the reinforced zone of MSE retaining walls except do not use fine aggregate for walls subject to scour, walls that support or are adjacent to railroads or walls with design heights greater than 35 ft or internal acute corners less than 45°. Provide reinforced concrete coping as required. Design and construct MSE retaining walls based on actual elevations and wall dimensions in accordance with the contract and accepted submittals. Use a prequalified MSE Wall Installer to construct MSE retaining walls.

Define "MSE wall" as a mechanically stabilized earth retaining wall and "MSE Wall Vendor" as the vendor supplying the chosen MSE wall system. Define a "segmental retaining wall" as an MSE wall with SRW units and an "abutment wall" as an MSE wall with bridge foundations in the reinforced zone. Define "reinforcement" as steel or geogrid reinforcement and "aggregate" as coarse or fine aggregate. Define "panel" as a precast concrete panel and "coping" as precast or cast-in-place concrete coping.

Use an approved MSE wall system in accordance with the plans, NCDOT MSE wall policy and any NCDOT restrictions for the chosen system. Value engineering proposals for other MSE wall systems will not be considered. Do not use segmental retaining walls or MSE wall systems with an "approved for provisional use" status code for critical walls or MSE walls connected to critical walls. Critical walls are defined in the NCDOT MSE wall policy. The list of approved MSE wall systems and NCDOT MSE wall policy are available from:

www.ncdot.org/doh/preconstruct/highway/geotech/msewalls

2.0 MATERIALS

Refer to the *Standard Specifications*.

Item	Section
Aggregate	1014
Anchor Pins	1056-2
Curing Agents	1026
Geotextiles, Type 2	1056
Joint Materials	1028
Portland Cement Concrete, Class A	1000
Precast Retaining Wall Coping	1077

Reinforcing Steel	1070
Retaining Wall Panels	1077
Segmental Retaining Wall Units	1040-4
Shoulder Drain Materials	816-2
Wire Staples	1060-8(D)

Provide Type 2 geotextile for filtration and separation geotextiles. Use Class A concrete for cast-in-place coping, leveling concrete and pads.

Provide panels and SRW units produced by a manufacturer approved or licensed by the MSE Wall Vendor. Unless required otherwise in the contract, produce panels with a smooth flat final finish that meets Article 1077-11 of the *Standard Specifications*. Accurately locate and secure reinforcement connectors in panels and maintain required concrete cover. Produce panels within 1/4" of the panel dimensions shown in the accepted submittals.

Damaged panels or SRW units with excessive discoloration, chips or cracks as determined by the Engineer will be rejected. Do not damage reinforcement connection devices or mechanisms in handling or storing panels and SRW units.

Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Handle and store geogrids in accordance with Article 1056-2 of the *Standard Specifications*. Load, transport, unload and store MSE wall materials so materials are kept clean and free of damage.

A. Aggregate

Use standard size No. 57, 57M, 67 or 78M that meets Table 1005-1 of the *Standard Specifications* for coarse aggregate except do not use No. 57 or 57M stone in the reinforced zone of MSE walls with geogrid reinforcement. Use the following for fine aggregate:

1. Standard size No. 1S, 2S, 2MS or 4S that meets Table 1005-2 of the *Standard Specifications* or
2. Gradation that meets Class III, Type 3 select material in accordance with Article 1016-3 of the *Standard Specifications*.

Fine aggregate is exempt from mortar strength and siliceous particle content referenced in Subarticles 1014-1(E) and 1014-1(H) of the *Standard Specifications*. Provide fine aggregate that meets the following requirements:

FINE AGGREGATE REQUIREMENTS

Reinforcement or Connector Material	pH	Resistivity	Chlorides	Sulfates	Organics
Steel	5-10	$\geq 3,000 \Omega \cdot \text{cm}$	$\leq 100 \text{ ppm}$	$\leq 200 \text{ ppm}$	$\leq 1\%$

Polyester Type (PET) Geogrid	5-8	N/A*	N/A*	N/A*	≤ 1%
Polyolefin Geogrid	4.5-9	N/A*	N/A*	N/A*	≤ 1%

* Resistivity, chlorides and sulfates are not applicable to geogrid.

Use fine aggregate from a source that meets the *Mechanically Stabilized Earth Wall Fine Aggregate Sampling and Testing Manual*. Perform organic content tests in accordance with AASHTO T 267 instead of Subarticle 1014-1(D) of the *Standard Specifications*. Perform electrochemical tests in accordance with the following test procedures:

Property	Test Method
pH	AASHTO T 289
Resistivity	AASHTO T 288
Chlorides	AASHTO T 291
Sulfates	AASHTO T 290

B. Reinforcement

Provide steel or geogrid reinforcement supplied by the MSE Wall Vendor or a manufacturer approved or licensed by the vendor. Use approved reinforcement for the chosen MSE wall system. The list of approved reinforcement for each MSE wall system is available from the website shown elsewhere in this provision.

1. Steel Reinforcement

Provide Type 1 material certifications in accordance with Article 106-3 of the *Standard Specifications* for steel reinforcement. Use welded wire grid reinforcement (“mesh”, “mats” and “ladders”) that meet Article 1070-3 of the *Standard Specifications* and metallic strip reinforcement (“straps”) that meet ASTM A572 or A1011. Galvanize steel reinforcement in accordance with Section 1076 of the *Standard Specifications*.

2. Geogrid Reinforcement

Define “machine direction” (MD) for geogrids in accordance with ASTM D4439. Provide Type 1 material certifications for geogrid strengths in the MD in accordance with Article 1056-3 of the *Standard Specifications*. Test geogrids in accordance with ASTM D6637.

C. Bearing Pads

Use bearing pads that meet Section 3.6.1.a of the *FHWA Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes – Volume I* (Publication No. FHWA-NHI-10-024).

D. Miscellaneous Components

Miscellaneous components may include connectors (e.g., anchors, bars, clamps, pins, plates, ties, etc.), fasteners (e.g., bolts, nuts, washers, etc.) and any other MSE wall components not included above. Galvanize steel components in accordance with Section 1076 of the *Standard Specifications*. Provide approved miscellaneous components for the chosen MSE wall system. The list of approved miscellaneous components for each MSE wall system is available from the website shown elsewhere in this provision.

3.0 PRECONSTRUCTION REQUIREMENTS

A. MSE Wall Surveys

The Retaining Wall Plans show a plan view, typical sections, details, notes and an elevation or profile view (wall envelope) for each MSE wall. Before beginning MSE wall design, survey existing ground elevations shown in the plans and other elevations in the vicinity of MSE wall locations as needed. Based on these elevations, finished grades and actual MSE wall dimensions and details, submit revised wall envelopes for acceptance. Use accepted wall envelopes for design.

B. MSE Wall Designs

Submit 11 copies of working drawings and 3 copies of design calculations and a PDF copy of each for MSE wall designs at least 30 days before the preconstruction meeting. Do not begin MSE wall construction until a design submittal is accepted.

Use a prequalified MSE Wall Design Consultant to design MSE walls. Provide designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for the MSE Wall Design Consultant.

Design MSE walls in accordance with the plans, *AASHTO LRFD Bridge Design Specifications* and any NCDOT restrictions for the chosen MSE wall system unless otherwise required. Design MSE walls for seismic if walls are located in seismic zone 2 based on Figure 2-1 of the *Structure Design Manual*. Use a uniform reinforcement length throughout the wall height of at least $0.7H$ with H as defined for the embedment requirements in this provision or 6 ft, whichever is greater, unless shown otherwise in the plans. Extend the reinforced zone at least 6" beyond end of reinforcement. Do not locate drains, the reinforced zone or leveling pads outside right-of-way or easement limits.

Use the simplified method for determining maximum reinforcement loads and approved design parameters for the chosen MSE wall system or default values in accordance with the AASHTO LRFD specifications. Design steel components including reinforcement and connectors for the design life noted in the plans and aggregate type in the reinforced zone. Use corrosion loss rates for galvanizing in accordance with the AASHTO LRFD specifications for nonaggressive backfill and carbon steel corrosion rates in accordance with the following:

CARBON STEEL CORROSION RATES

Aggregate Type (in the reinforced zone)	Corrosion Loss Rate (after zinc depletion)
Coarse	0.47 mil/year
Fine (except abutment walls)	0.58 mil/year
Fine (abutment walls)	0.70 mil/year

For geogrid reinforcement and connectors, use approved geogrid properties for the design life noted in the plans and aggregate type in the reinforced zone.

When noted in the plans, design MSE walls for a live load (traffic) surcharge of 250 lb/sf in accordance with Figure C11.5.5-3(b) of the AASHTO LRFD specifications. For steel beam guardrail with 8 ft posts or concrete barrier rail above MSE walls, analyze top 2 reinforcement layers for traffic impact loads in accordance with Section 7.2 of the FHWA MSE wall manual shown elsewhere in this provision except use the following for geogrid reinforcement rupture:

$$\phi T_{al} R_c \geq T_{max} + (T_I / RF_{CR})$$

Where,

- ϕ = resistance factor for tensile resistance in accordance with Section 7.2.1 of the FHWA MSE wall manual,
- T_{al} = long-term geogrid design strength approved for chosen MSE wall system,
- R_c = reinforcement coverage ratio = 1 for continuous geogrid reinforcement,
- T_{max} = factored static load in accordance with Section 7.2 of the FHWA MSE wall manual,
- T_I = factored impact load in accordance with Section 7.2 of the FHWA MSE wall manual and
- RF_{CR} = creep reduction factor approved for chosen MSE wall system.

If existing or future obstructions such as foundations, guardrail, fence or handrail posts, moment slabs, pavements, pipes, inlets or utilities will interfere with reinforcement, maintain a clearance of at least 3" between obstructions and reinforcement unless otherwise approved. Locate reinforcement layers so all of reinforcement length is within 3" of corresponding connection elevations.

Use 6" thick cast-in-place unreinforced concrete leveling pads beneath panels and SRW units that are continuous at steps and extend at least 6" in front of and behind bottom row of panels or SRW units. Unless required otherwise in the plans, embed top of leveling pads in accordance with the following requirements:

EMBEDMENT REQUIREMENTS		
Front Slope¹ (H:V)	Minimum Embedment Depth² (whichever is greater)	
6:1 or flatter (except abutment walls)	H/20	1 ft for $H \leq 10$ ft 2 ft for $H > 10$ ft

6:1 or flatter (abutment walls)	H/10	2 ft
> 6:1 to < 3:1	H/10	2 ft
3:1 to 2:1	H/7	2 ft

1. Front slope is as shown in the plans.
2. Define "H" as the maximum design height plus embedment per wall with the design height and embedment as shown in the plans.

When noted in the plans, locate a continuous aggregate shoulder drain along base of reinforced zone behind aggregate. Provide wall drainage systems consisting of drains and outlet components in accordance with Standard Drawing No. 816.02 of the *Roadway Standard Drawings*.

For MSE walls with panels, place at least 2 bearing pads in each horizontal panel joint so the final horizontal joint opening is between 5/8" and 7/8". Additional bearing pads may be required for panels wider than 5 ft as determined by the Engineer. Cover joints at back of panels with filtration geotextiles at least 12" wide.

For segmental retaining walls, fill SRW unit core spaces with coarse aggregate and between and behind SRW units with coarse aggregate for a horizontal distance of at least 18".

Separation geotextiles are required between aggregate and overlying fill or pavement sections except when concrete pavement, full depth asphalt or cement treated base is placed directly on aggregate. Separation geotextiles may also be required between coarse aggregate and backfill or natural ground as determined by the Engineer.

Unless required otherwise in the plans, use reinforced concrete coping at top of walls. Extend coping at least 6" above where the grade intersects back of coping unless required otherwise in the plans. Use coping dimensions shown in the plans and cast-in-place concrete coping for segmental retaining walls and when noted in the plans. At the Contractor's option, connect cast-in-place concrete coping to panels and SRW units with dowels or extend coping down back of MSE walls. Also, connect cast-in-place leveling concrete for precast concrete coping to panels with dowels. When concrete barrier rail is required above MSE walls, use concrete barrier rail with moment slab as shown in the plans.

Submit working drawings and design calculations for acceptance in accordance with Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, wall profiles with required resistances, typical sections with reinforcement and connection details, aggregate locations and types, geotextile locations and details of leveling pads, panels or SRW units, coping, bin walls, slip joints, etc. If necessary, include details on working drawings for concrete barrier rail with moment slab, reinforcement splices if allowed for the chosen MSE wall system, reinforcement connected to end bent caps and obstructions extending through walls or interfering with reinforcement, leveling pads, barriers or moment slabs. Submit design calculations for each wall section with different surcharge loads, geometry or material parameters. At

least one analysis is required for each wall section with different reinforcement lengths. When designing MSE walls with computer software other than MSEW, use MSEW version 3.0 with update 14.2 or later, manufactured by ADAMA Engineering, Inc. to verify the design. At least one MSEW analysis is required per 100 ft of wall length with at least one MSEW analysis for the wall section with the longest reinforcement. Submit electronic MSEW input files and PDF output files with design calculations.

C. Preconstruction Meeting

Before starting MSE wall construction, hold a preconstruction meeting to discuss the construction and inspection of the MSE walls. Schedule this meeting after all MSE wall submittals have been accepted. The Resident or Bridge Maintenance Engineer, Bridge Construction Engineer, Geotechnical Operations Engineer, Contractor and MSE Wall Installer Superintendent will attend this preconstruction meeting.

4.0 CORROSION MONITORING

Corrosion monitoring is required for MSE walls with steel reinforcement. The Engineer will determine the number of monitoring locations and where to install the instrumentation. Contact the Materials and Tests (M&T) Unit before beginning wall construction. M&T will provide the corrosion monitoring instrumentation kits and if necessary, assistance with installation.

5.0 SITE ASSISTANCE

Unless otherwise approved, provide an MSE Wall Vendor representative to assist and guide the MSE Wall Installer on-site for at least 8 hours when the first panels or SRW units and reinforcement layer are placed. If problems are encountered during construction, the Engineer may require the vendor representative to return to the site for a time period determined by the Engineer.

6.0 CONSTRUCTION METHODS

Control drainage during construction in the vicinity of MSE walls. Direct run off away from MSE walls, aggregate and backfill. Contain and maintain aggregate and backfill and protect material from erosion.

Excavate as necessary for MSE walls in accordance with the accepted submittals. If applicable and at the Contractor's option, use temporary shoring for wall construction instead of temporary slopes to construct MSE walls. Define "temporary shoring for wall construction" as temporary shoring not shown in the plans or required by the Engineer including shoring for OSHA reasons or the Contractor's convenience.

Unless required otherwise in the plans, install foundations located in the reinforced zone before placing aggregate or reinforcement. Notify the Engineer when foundation excavation is complete. Do not place leveling pad concrete, aggregate or reinforcement until excavation dimensions and foundation material are approved.

Construct cast-in-place concrete leveling pads at elevations and with dimensions shown in the accepted submittals and in accordance with Section 420 of the *Standard Specifications*. Cure leveling pads at least 24 hours before placing panels or SRW units.

Erect and support panels and stack SRW units with no negative batter (wall face leaning forward) so the final wall position is as shown in the accepted submittals. Place SRW units with a maximum vertical joint width of 3/8".

Set panels with a vertical joint width of 3/4". Place bearing pads in horizontal panel joints and cover all panel joints with filtration geotextiles as shown in the accepted submittals. Attach filtration geotextiles to back of panels with adhesives, tapes or other approved methods.

Stagger panels and SRW units to create a running bond by centering panels or SRW units over joints in the row below as shown in the accepted submittals. Construct MSE walls with the following tolerances:

- A. SRW units are level from front to back and between units when checked with a 3 ft long level,
- B. Final wall face is within 3/4" of horizontal and vertical alignment shown in the accepted submittals when measured along a 10 ft straightedge and
- C. Final wall plumbness (batter) is within 0.5° of vertical unless otherwise approved.

Place reinforcement at locations and elevations shown in the accepted submittals and within 3" of corresponding connection elevations. Install reinforcement with the direction shown in the accepted submittals. Place reinforcement in slight tension free of kinks, folds, wrinkles or creases. Reinforcement may be spliced once per reinforcement length if shown in the accepted submittals. Use reinforcement pieces at least 6 ft long. Contact the Engineer when unanticipated existing or future obstructions such as foundations, guardrail, fence or handrail posts, pavements, pipes, inlets or utilities will interfere with reinforcement. To avoid obstructions, deflect, skew or modify reinforcement as shown in the accepted submittals.

Place aggregate in the reinforced zone in 8" to 10" thick lifts. Compact fine aggregate in accordance with Subarticle 235-3(C) of the *Standard Specifications*. Use only hand operated compaction equipment to compact aggregate within 3 ft of panels or SRW units. At a distance greater than 3 ft, compact aggregate with at least 4 passes of an 8 ton to 10 ton vibratory roller in a direction parallel to the wall face. Smooth wheeled or rubber tired rollers are also acceptable for compacting aggregate. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage reinforcement when placing and compacting aggregate. End dumping directly on geogrids is not permitted. Do not operate heavy equipment on reinforcement until it is covered with at least 8" of aggregate. Replace any damaged reinforcement to the satisfaction of the Engineer.

Backfill for MSE walls outside the reinforced zone in accordance with Article 410-8 of the *Standard Specifications*. If a drain is required, install wall drainage systems as shown in

the accepted submittals and in accordance with Section 816 of the *Standard Specifications*.

Place and construct coping and leveling concrete as shown in the accepted submittals. Construct leveling concrete in accordance with Section 420 of the *Standard Specifications*. Construct cast-in-place concrete coping in accordance with Subarticle 452-3(C) of the *Standard Specifications*. When single faced precast concrete barrier is required in front of and against MSE walls, stop coping just above barrier so coping does not interfere with placing barrier up against wall faces.

When separation geotextiles are required, overlap adjacent geotextiles at least 18" and hold separation geotextiles in place with wire staples or anchor pins as needed. Seal joints above and behind MSE walls between coping and ditches or concrete slope protection with silicone sealant.

7.0 MEASUREMENT AND PAYMENT

MSE Retaining Wall No. __ will be measured and paid in square feet. MSE walls will be measured as the square feet of exposed wall face area with the height equal to the difference between top and bottom of wall elevations. Define "top of wall" as top of coping or top of panels or SRW units for MSE walls without coping. Define "bottom of wall" as shown in the plans and no measurement will be made for portions of MSE walls embedded below bottom of wall elevations.

The contract unit price for *MSE Retaining Wall No. __* will be full compensation for providing designs, submittals, labor, tools, equipment and MSE wall materials, excavating, backfilling, hauling and removing excavated materials and supplying site assistance, leveling pads, panels, SRW units, reinforcement, aggregate, wall drainage systems, geotextiles, bearing pads, coping, miscellaneous components and any incidentals necessary to construct MSE walls. The contract unit price for *MSE Retaining Wall No. __* will also be full compensation for reinforcement connected to and aggregate behind end bent caps in the reinforced zone, if required.

No separate payment will be made for temporary shoring for wall construction. Temporary shoring for wall construction will be incidental to the contract unit price for *MSE Retaining Wall No. __*.

The contract unit price for *MSE Retaining Wall No. __* does not include the cost for ditches, fences, handrails, barrier or guardrail associated with MSE walls as these items will be paid for elsewhere in the contract.

Where it is necessary to provide backfill material behind the reinforced zone from sources other than excavated areas or borrow sources used in connection with other work in the contract, payment for furnishing and hauling such backfill material will be paid as extra work in accordance with Article 104-7 of the *Standard Specifications*. Placing and compacting such backfill material is not considered extra work but is incidental to the work being performed.

Payment will be made under:

Pay Item

MSE Retaining Wall No. ____

Pay Unit

Square Foot

R-2633BB

(SPECIAL)

STATIC AXIAL COMPRESSIVE LOAD TEST:**A) GENERAL**

This special provision governs the static axial compressive load testing of the non-production load test pile. The pile shall undergo axial compressive load testing by means of a "Static Axial Compressive Load Test" in accordance with ASTM D1143-07, Procedure A, Quick Test. The axial compressive load test shall be completed before driving of any production piles.

The Contractor shall hire a geotechnical subcontractor who is prequalified with the Department for work code 3080 "Foundation Testing" and has done a minimum of three (3) static axial compressive load tests of similar size and nature to this project. The geotechnical subcontractor shall be at the test site at all times during testing and perform the testing including, but not limited to, test apparatus set-up, loading and unloading, and reading and recording all data.

The Contractor shall also perform pile driving analyzer (PDA) test on the static load test pile at multiple times as listed below in accordance with Section 450 of the Standard Specifications for Roads and Structures:

1. Perform initial PDA test during the test pile driving.
2. Perform a restrike PDA test at 4, 24, and 72 hours after the initial drive.
3. Perform a restrike PDA test as quickly as practically possible, but no later than 12 hours, after completion of the static load test.

The load test pile shall be a 30 inch square voided prestressed concrete pile with steel pile tip and conform to the requirements of the production piles. The load test pile shall be installed with the same type and capacity of equipment that will be used for production piles. Procedures for installing the test pile shall be submitted and accepted by the Engineer.

Drive the load test pile in accordance with Section 450 of the Standard Specifications for Road and Structures. The top of the load test pile shall be at least six (6) feet above the existing ground or water surface, whichever is higher. The tip of load test pile shall be driven to elevation -82 feet.

The Engineer will also use embedded data collectors (EDC) in the test pile. See EDC special provision for details.

Perform the static load test at least seven (7) days after the initial drive of the test pile. Unless failure load (as defined in ASTM D1143-07 "Deep Foundations under Static Axial Compressive Load") is reached first, load the test pile to 830 tons.

Upon completion of the test, completely remove or cut off the test pile three feet below existing ground. The cut-off portion of the pile shall be removed from the site and disposed of by the Contractor.

B) LOCATIONS

The axial compressive load test shall be conducted on *non*-production test pile at the following location, unless otherwise directed by the Engineer:

Sta. 324+00.00±, 60 ft± Right -L- between Bent #5 & #6

C) LOAD TEST APPARATUS SETUP

The axial compressive load test shall include apparatus for measuring the axial movement of the test pile top. This apparatus shall include a primary measurement system and at least one redundant, secondary system, using at least two of the systems described in ASTM D1143-07.

Provide two separate systems for measuring top of pile movements with the method described in ASTM D1143-07 and internal strain gauge instrumentation. Loading procedures shall conform to the Quick Load Test Method.

The loading apparatus, observation platform, and fixed reference frame shall be designed by a North Carolina Registered Professional Engineer. The observation platform shall be separate from the fixed reference frame. The fixed reference frame shall be constructed such that there will be no vertical or horizontal movement. The loading apparatus shall be arranged to permit sufficient access to reading the dials and wire, and constructed for safe ingress and egress.

The entire measuring devices shall be protected from direct sunlight, frost, wet, wind action and other disturbances that might affect its reliability. The reference frame shall not be constructed of wood or any other material subject to moisture changes.

The pile loading apparatus shall be such that loads of known magnitude can be applied to the pile vertically and axially, without impact, and maintained constant at any given loading increment throughout the range of test loads. The top of the test pile may need to be protected or strengthened in order to prevent damage during the axial compressive load test. The reaction frame and anchor piles shall be designed of sufficient size and length to prevent excessive movement and withstand the maximum anticipated loading.

Hydraulic jacks shall be of an approved type and capable of supplying a minimum jacking capacity equal to the maximum test load plus 20%. Provide a load cell, subject to the approval of the Engineer, which is capable of determining load transfer to the test

pile. The load cell shall have a capacity equal to the jack capacity. Provide calibration certificates from a certified testing laboratory for the load cell and hydraulic jack relating pressure gauge reading to jack load. Calibrate pressure gauges no more than six (6) months before the loading test and re-calibrate when directed by the Engineer based on observed performance. All dials and gauges shall be arranged to permit unobstructed observation throughout the loading test. The increase in loading shall be applied at a uniform rate with no sudden load impact. Dial gauges used for measuring the increments of settlement and rebound shall be in units of 0.0001 of an inch. If the load cell and jack gauge readings are not within 10% of each other, the static load test shall be judged to be unsatisfactory, and the test pile shall be retested with re-calibrated load cell and jack at no additional expense to the Department.

D) INSTRUMENTATION AND DATA COLLECTION

The test pile shall be instrumented with waterproof electronic resistance strain gauges. Instrumentation, including resistance strain gauges and telltale rods, shall be installed by the approved geotechnical subcontractor who will perform the static axial load test. Strain gauges shall be placed within the pile at distances from the bottom of the pile equal to 2, 12, 22, 42 and 62 feet. The strain gauges shall be well encapsulated. Enough cable shall be provided to carry the strain data to a data collection device that shall be operated by the geotechnical subcontractor. The cable leads shall be unspliced. Telltale rods shall be installed at distances from the bottom of the pile equal to 2, 12, 22 and 42 feet in accordance with ASTM D1143-07 to measure the relative movement between the pile top and the tip of unstrained telltale rod. Data from strain gauges and telltale shall be collected throughout the load test. All data collection shall be performed by the geotechnical subcontractor.

The cost of all instrumentation shall be included in the cost for static axial load testing. Provide instrumentation pertaining to the testing including the following:

1. Geokon 4911 "Sister Bar" Strain Gauges or approved equal quality product - A total of 10 sister bar resistance strain gauges shall be provided, 5 vertical levels as specified above with two gauges per level for axial compression test.
2. Data Acquisition System - Use a data acquisition system capable of digitizing the data collected from the strain gauges. The data acquisition system shall be a product of the same manufacturer of the strain gauges.
3. Telltale Rods - A total of 4 telltale rods shall be installed at 4 different levels as specified above.

The Contractor should be aware that lead times are required for ordering instrumentation. Take the lead times into account when planning the work.

The geotechnical subcontractor shall mount the instrumentation in the test pile **at the precast facility** before casting the pile. The gauges shall be located as specified in this provision unless otherwise directed by the Engineer. Test the gauges after installation, but before casting, to ensure gauges are functioning properly. Gauges shall also be checked again after casting and after grouting to ensure they are functioning properly. The geotechnical subcontractor shall observe the casting of the concrete and coordinate with the precast facility on any special issues with respect to gauge installation on the pile. The Department's EDC Consultant will also include Embedded Data Collectors (EDC) instrumentation into the pile before casting. For EDC testing, see Embedded Data Collectors special provision for details. The Engineer may inspect the instrumentation.

Damage to the instrumentation or pile during fabrication, shipping, handling, or driving shall be the Contractor's responsibility. Replacement costs of the pile, gauges, and any other embedded instrumentation shall be to the Contractor's responsibility.

E) Load Test Submittals

Two (2) submittals are required for the Engineer's review and approval. These submittals include first submittal: static load test geotechnical subcontractor's experience and second submittal: detailed static load test plans including test apparatus setup and instrumentation, detailed test procedures, proposed schedule, and pile driving equipment data.

Submit documentation that the geotechnical subcontractor has successfully completed at least three (3) static axial compressive load tests of similar size and nature to this project. Documentation should include the General Contractor and Owner's names and current contact information with descriptions of each past project.

Allow ten (10) business days for the review of the geotechnical subcontractor's experience submittal. After the personnel and experience submittal is accepted, submit the second submittal including the following at least 15 business days prior to test pile casting. Do not begin test pile casting until after all of the submittals have been accepted.

1. List and size of proposed pile driving equipment including cranes, barges, driving equipment.
2. Pile Driving Equipment Data Form
3. Proposed schedule for test pile casting, pile driving, PDA testing, and static load testing.
4. Shop drawings and design calculations of load test apparatus including, but not limited to, apparatus for applying and measuring loads, apparatus for measuring movement, observation platform, and fixed reference frames.
5. Shop drawings showing the instrumentation including gauge type, manufacturer, proposed method of gauge and wiring installation and placement, detail of how gauge

cables exit the pile, details of cable protection during pile casting, curing, handling, shipping and driving. The cable exit detail shall account for clearance necessary for support platforms, testing methods, and the Contractor's pile driving equipment.

6. Detailed test procedures including the sequence of loading and unloading, and load increments
7. Calibration certificates for the load cell and the hydraulic jack

Within 15 business days after receipt of the second submittal, the Engineer will notify the Contractor of approval or rejection of the submittal. Any part of the submittals that does not conform to the contract requirements will be rejected, and the Contractor shall submit a revised one for reevaluation. The Engineer will notify the Contractor within ten (10) business days after receipt of the revised submittals of their acceptance or rejection.

F) REPORT

Prepare a static axial load test report containing a minimum of the following information:

- 1) general project information
- 2) test date and time, site location, and elevations of ground and ground water
- 3) description of the test pile including size, length, and top and bottom elevations
- 4) remarks concerning events during pile installation
- 5) description of the test apparatus
- 6) description of the instrumentation used to measure pile movement
- 7) the sequence of loading and unloading, and load increments used
- 8) a copy of the time-movement data collection sheets exactly as filled out in the field and a graphic representation of the test results in the form of load-movement curves including Davisson's criteria for failure and load distribution along pile,
- 9) test pile driving record
- 10) photographs showing the test instrumentation and setup

Submit five (5) hard copies and an electronic copy of the final report within ten (10) business days after the axial load test is complete.

Submit PDA reports in accordance with Section 450-3 of the Standard Specifications for Roads and Structures.

G) ACCEPTANCE CRITERIA

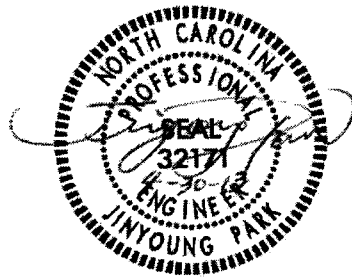
The static axial compressive load test, to be accepted by the Engineer, shall be conducted in accordance with the approved submittals and this provision unless otherwise directed by the Engineer. Any deviation of the test apparatus setup, test methods and procedures, or testing personnel from the approved submittals without the Engineer's prior approval may be ground for the Engineer's rejection of the entire load test results. If it is determined by the Engineer that the load test was not done in compliance with the contract requirements or the test results are invalid due to the Contractor's negligence or

poor workmanship, the Contractor shall install an additional pile with instrumentation and perform the load test as specified in this provision at no additional cost to the Department.

H) Measurement and Payment

The static axial compressive load test, upon acceptance by the Engineer, will be paid for at the contract lump sum price of "Static Axial Compressive Load Test on 30" Square Voided Prestressed Concrete Pile".

The payment shall be considered as a full compensation for all work described in this provision including, but not limited to, furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work. No separate payment will be made for any work item including, but not limited to, the test pile, instrumentation including Embedded Data Collectors, pile driving, static load test apparatus setup and removal, static load testing, test data collection and recording, PDA testing, submittals, reports, and providing access for the CPT testing. No payment will be made if the load test is not accepted by the Engineer based on the acceptance criteria specified in this provision.



EMBEDDED DATA COLLECTORS**(SPECIAL)****1.0 GENERAL**

This special provision governs the use of embedded data collectors (EDC) in accordance with the plans and as directed by the Engineer. EDC consist of strain gauges and accelerometers embedded in prestressed concrete piles to measure force and acceleration.

The EDC Consultant will record dynamic measurements during initial drive, restrikes and redrives on all EDC test piles; and record dynamic measurements during static load test on the Static Axial Compressive Load Test pile.

For more information about EDC, contact the following:

Smart Structures, Inc.
324 Second Street Pike, Unit #13
Southampton, PA 18966
Phone: (267) 983-6106
Website: www.smart-structures-inc.com

A total of five (5) EDC are required for the same prestressed concrete piles tested with the pile driving analyzer (PDA) at the following proposed locations; and its intended purposes.

One (1) EDC on the Static Axial Compressive Load Test pile. The Department will use EDC to monitor pile driving and static load test.

Four (4) EDC on production piles at bents 10, 25, 45 and 52 (one EDC per bent). The Department will use EDC during pile driving.
The final number of EDC test piles and locations will be determined by Engineer.

The Department will retain Smart Structures to supply the EDC and provide an EDC Consultant to perform the EDC testing and analysis.

This is a research pilot project to use the EDC. This research will require a separate consultant to perform the PDA. Therefore, do not use the same consultant for the PDA testing on piles where EDC will also be used.

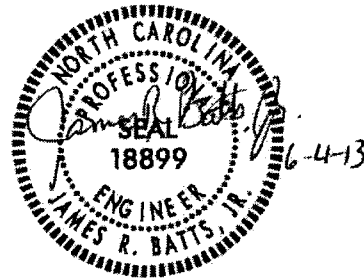
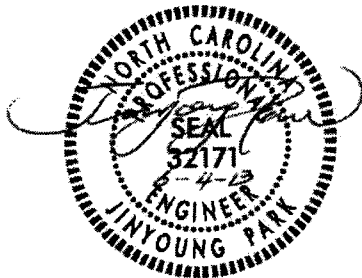
2.0 NOTIFICATIONS

The EDC Consultant will provide and install the EDC during pile fabrication. Notify the Engineer of the pile fabrication schedule a minimum of 14 calendar days in advance. Notify the Engineer of the pile driving schedule in accordance with the Subarticle 450-3(F) of the *Standard Specifications*.

3.0 MEASUREMENT AND PAYMENT

There will be no payment for the EDC. The Department will contract with the EDC Consultant directly to provide the EDC and associated installation, recording, analysis and reporting.

The cost of the piles and the pile installation including driving, restriking and redriving will be paid for separately in accordance with the *Standard Specifications or Static Axial Compressive Load Test* provision.



GEOGRID FOR BRIDGE END SLOPES:**(SPECIAL)****Description**

This work consists of furnishing and installing geogrids at bridge end slopes and the end slopes transition to side slopes from 1.5:1 (H:V) to 2:1 (H:V) for stabilizing the bridge end slopes in accordance with this provision and as directed by the Engineer. The work shall include maintaining the geogrids in the required configuration until completion and acceptance of overlying work items. The geogrids shall be placed at the locations shown in the plans or as directed by the Engineer. Define "geogrids for bridge end slopes" as geogrids as shown in the Geogrids for Bridge End Slopes plan sheet.

Geogrids

Handle and store geogrids in accordance with Article 1056-2 of the *Standard Specifications*. Define "machine direction" (MD) and "cross-machine direction" (CD) for geogrids in accordance with ASTM D4439. Provide Type 1 material certifications for geogrid strengths in the MD and CD in accordance with Article 1056-3 of the *Standard Specifications*. Test geogrids in accordance with ASTM D6637.

Provide geogrids with design strengths in accordance with the plans. Use geogrids with an "approved" status code.

Geogrids are approved for long-term design strengths for a 75-year design life in the MD and CD based on material type. The list of approved geogrids with long-term design strengths is available from: <https://connect.ncdot.gov/resources/Materials/Pages/SoilsLaboratory.aspx>

Construction Methods

Before starting Geogrid for Bridge End Slopes construction, the Engineer may require a preconstruction meeting to discuss the construction and inspection of the geogrids. If required, schedule this meeting after all material certifications have been submitted. The Resident, Roadway Construction Engineer, Geotechnical Operations Engineer, Contractor and Geogrid for Bridge End Slopes Contractor Superintendent will attend this preconstruction meeting.

Control drainage during construction in the vicinity of Geogrid for Bridge End Slopes. Direct run off away from backfill. Contain and maintain backfill material from erosion.

When excavating existing slopes, bench slopes in accordance with Subarticle 235-3(A) of the *Standard Specifications*. Notify the Engineer when excavation is complete. Do not place geogrids until excavation dimensions and in-situ material are approved.

Place geogrids within 3" of locations shown in the plans and in slight tension free of kinks, folds, wrinkles or creases. Hold geogrids in place with wire staples or anchor pins as needed. Install geogrids with the orientation, dimensions and number of layers shown in the plans. Contact the Engineer when existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with geogrids. If necessary, the top geogrid layer may be lowered up to 9" to avoid obstructions. Extend geogrids to slope faces.

Install geogrids with the MD perpendicular to the embankment toe of fill. The MD is the direction of the length or long dimension of the geogrid roll. Do not splice or overlap geogrids in the MD so splices or overlaps are parallel to the slope stake line. Place geogrids as noted in the plans.

Place borrow material in the geogrids zone in 8" to 10" thick lifts and compact material in accordance with Subarticle 235-3(C) of the *Standard Specifications*. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage geogrids when placing and compacting select material. End dumping directly on geogrids is not permitted. Do not operate heavy equipment on geogrids until they are covered with at least 8" of borrow material. To prevent damaging geogrids, minimize turning and avoid sudden braking and sharp turns with compaction equipment. Replace any damaged geogrids to the satisfaction of the Engineer. Construct remaining portions of embankments outside the geogrids zone in accordance with Section 235 of the *Standard Specifications*.

Place concrete slope protection on slope face in accordance with structure plans. If damage occurs, repair geogrids and slope faces before installing bridge concrete slope protection.

Measurement and Payment

Geogrid for Bridge End Slopes will be measured and paid for in square yards of the actual geogrids area placed *Geogrid for Bridge End Slopes*. No payment will be made for repairing or replacing damaged geogrids.

The contract unit price for *Geogrid for Bridge End Slopes* will be full compensation for providing labor, tools, equipment, geogrid materials, placing geogrids, and any incidentals necessary to construct *Geogrid for Bridge End Slopes* as shown in the plans and specification in this provision. Bridge concrete slope protection and borrow material will be paid for separately.

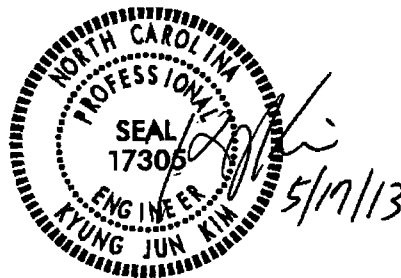
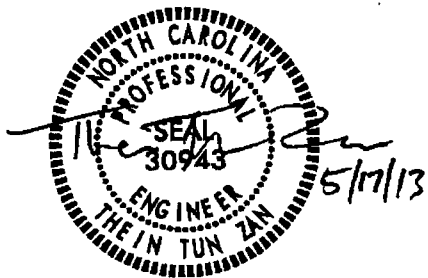
Payment will be made under:

Pay Item

Geogrid for Bridge End Slopes

Pay Unit

Square Yard



**PROJECT SPECIAL PROVISIONS
GEOENVIRONMENTAL**

CONTAMINATED SOIL (5/15/2013)

The Contractor's attention is directed to the fact that soil contaminated with low concentrations of arsenic exists on Parcel R-2633BB_059A within the project area as shown on the plans. Information relating to this contaminated area, sample locations, and investigation reports are available at the following web address by navigating to the correct letting year and month then selecting, "Plans and Proposals", "R-2633BB", "GeoEnvironmental":

<http://dotw-xfer01.dot.state.nc.us/dsplan/>

Arsenic contaminated soil may be encountered during any earthwork activities on the project. The Contractor shall only excavate those soils that the Engineer designates necessary to complete a particular task. Due to the low concentration of arsenic contamination on this parcel, NCDENR has confirmed that stockpiling and sampling of excavated soils is not required during construction activities as documented in the Preliminary Site Assessment Addendum (Sept 15, 2010). Soil excavated from this property may be used as beneficial fill on the project but shall remain within the property boundaries of Parcel 59A.

The Contractor shall develop a Health and Safety Plan and a Hazard Communication Plan in accordance with OSHA 29 Code of Federal Regulations and any other applicable Federal, State, or local regulation with regards to the known arsenic contamination. These plans shall be reviewed by the Engineer, Safety Engineer, and the NCDOT Industrial Hygienist prior to any work being performed on the project. During any earthwork or other dust creating activities in the area defined above, dust suppression shall be strictly enforced.

Measurement and Payment:

Work associated with this project special provision shall be paid under the Grading and Drainage Ditch Excavation bid items. No additional compensation will be made for this work.



May 15, 2013

A handwritten signature in black ink, appearing to read "Cyrus Parker", written over the date.

TRAFFIC CONTROL DEVICES TO REMAIN ON PROJECT:

(02/05/2013)

Description

Furnish, install, maintain during the life of the project, and leave Traffic Control Devices on the project at its completion in accordance with the plans and specifications.

Construction Methods

Install and leave on the project the Traffic Control Devices necessary to accommodate the traffic pattern shown on sheet **TMP-8** of the Traffic Control Plan, unless otherwise directed by the Engineer.

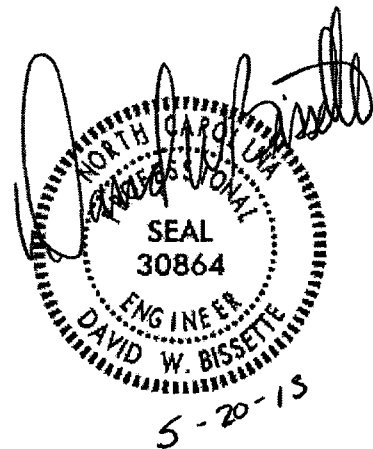
Provide devices to remain on the project, which meet the requirements of their respective specifications in the 2012 Standard Specifications or their respective special provisions.

Provide devices to remain on the project that are in good condition and subject to the approval of the Engineer.

The devices required to remain on the project at its completion will become the property of the Department.

Basis Of Payment

No additional payment will be made specifically for leaving devices on the project. These devices will be paid under their respective pay items in the Contract which will include full compensation for furnishing, installing, maintaining during the life of the project, and leaving the devices on the project at its completion.



TRAFFIC CONTROL DEVICES REMAINING FROM PREVIOUS PROJECT:

(02/06/2013)

Description

Accept ownership, monitor, maintain, replace, and remove the following traffic control devices, which are remaining from the previous project in accordance with the plans and specifications.

- 1- **Stationary Work Zone Signs**
- 2- **Barricade Mounted Work Zone Signs**
- 3- **Drums**
- 4- **Barricades Type III**

Materials

Replace any of the above mentioned devices which do not meet the material requirements of their respective specifications as directed by the Engineer.

Construction Methods

Accept ownership and maintenance responsibilities of the above mentioned devices and retain ownership at the completion of the project.

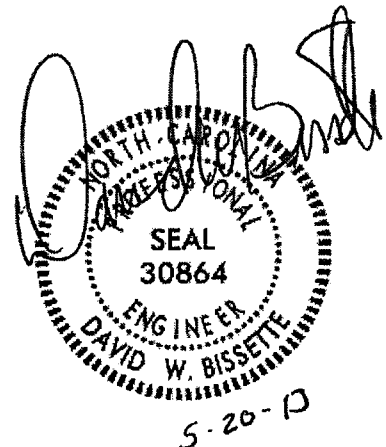
Section 1105-3 of the 2012 Standard Specifications applies to this special provision.

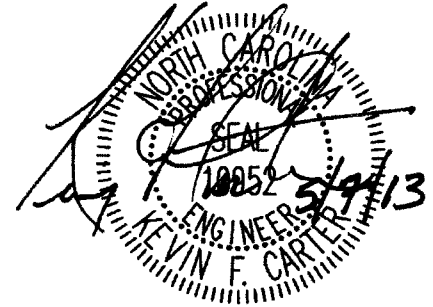
Maintenance

Maintain the above mentioned devices in accordance with Section 1105-4 of the 2012 Standard Specifications.

Basis of Payment

No separate payment will be made for the maintenance, replacement, and removal of the above mentioned devices. Such work will be considered as incidental to the other traffic control items listed in the contract.



PROJECT SPECIAL PROVISIONS
Utility Construction**I. GENERAL CONSTRUCTION REQUIREMENTS**

The proposed utility construction shall meet the applicable requirements of the NC Department of Transportation's "Standard Specifications for Roads and Structures" dated January 2012, and the following Special Provisions:

Utility Owner's Contact Information:

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

The utility owner is Cape Fear Public Utility Authority. The contact person is Gil DuBois and he can be reached by phone at 910-332-6424.

Page 15-6, Sub-article 1510-3 (B), Testing and Sterilization:
change the allowable leakage formula to:

$$W = LD\sqrt{P} \div 148,000$$

Page 15-6, Sub-article 1510-3 (B) Line 32, Testing and Sterilization, seventh paragraph:

delete the words "may be performed concurrently or"
and replace with "shall be performed".

PROJECT SPECIAL PROVISIONS

Utility

UTILITIES BY OTHERS

General:

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

- A) Progress Energy – Power (Distribution)
- B) Progress Energy – Power (Transmission)
- C) AT&T – Telephone (Fiber Optic Cable)
- D) Piedmont Natural Gas – Gas

The conflicting facilities of these concerns will be adjusted prior to the date of availability, unless otherwise noted and are therefore listed in these special provisions for the benefit of the Contractor. All utility work listed herein will be done by the utility owner. All utilities are shown on the plans from the best available information.

The Contractor's attention is directed to Article 105-8 of the Standard Specifications.

Utilities Requiring Adjustment:

- A) Progress Energy – Power (Distribution)
 - 1) See Utilities by Others Plans.
 - 2) Contact person is Mr. Eddie Watkins 919-882-5051
 - 3) Relocation will be completed by 11/1/2013.
- B) Progress Energy – Power (Transmission)
 - 1) See Utilities by Others Plan
 - 2) Contact person is Mr. Jamie Loy 919-546-6034
 - 3) Relocation has been completed.
- C) AT & T – Telephone (Fiber Optic Cable)
 - 1) See Utilities by Others Plans.
 - 2) Mr. Shannon Coston 910-341-1623
 - 3) Relocation will be completed by 9/15/2013 with the exception of the cable adjustment at bridge wing wall Ramp B, Sheet 15 (approx. station SVRD7 23+00, 80' left). Contractor shall give AT&T three day notice and allow the two days to make the adjustment.

D) Piedmont Natural Gas – (Gas)

- 1) See Utilities by Others Plans.
- 2) Contact person is Mr. Dave Vena 704-731-4496
- 3) Relocation will be completed by 12/31/2013 with the exception of the gas main relocation on Parcel 59A (approximately 260' left of Line –L- at Sta. 317+60). Once the multi-story building is removed, Piedmont Natural Gas Company will require 90 days to relocate the gas main.

NOTE: All other utilities will remain in place and will be adjusted as necessary.

**Project Special Provisions
Erosion Control**

STABILIZATION REQUIREMENTS:

Stabilization for this project shall comply with the time frame guidelines as specified by the NCG-010000 general construction permit effective August 3, 2011 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

2 nd Millennium	Duster	Magellan	Rendition
Avenger	Endeavor	Masterpiece	Scorpion
Barlexas	Escalade	Matador	Shelby
Barlexas II	Falcon II, III, IV & V	Matador GT	Signia
Barrera	Fidelity	Millennium	Silverstar
Barrington	Finesse II	Montauk	Southern Choice II
Biltmore	Firebird	Mustang 3	Stetson
Bingo	Focus	Olympic Gold	Tarheel
Bravo	Grande II	Padre	Titan Ltd
Cayenne	Greenkeeper	Paraiso	Titanium
Chapel Hill	Greystone	Picasso	Tomahawk
Chesapeake	Inferno	Piedmont	Tacer
Constitution	Justice	Pure Gold	Trooper
Chipper	Jaguar 3	Prospect	Turbo
Coronado	Kalahari	Quest	Ultimate
Coyote	Kentucky 31	Rebel Exeda	Watchdog
Davinci	Kitty Hawk	Rebel Sentry	Wolfpack
Dynasty	Kitty Hawk 2000	Regiment II	
Dominion	Lexington	Rembrandt	

On cut and fill slopes 2:1 or steeper Centipede shall be applied at the rate of 5 pounds per acre and add 20# of Sericea Lespedeza from January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Native Grass Seeding and Mulching

(East)

Native Grass Seeding and Mulching shall be performed on the disturbed areas of wetlands and riparian areas, and adjacent to Stream Relocation construction within a 50 foot zone on both sides of the stream or depression, measured from top of stream bank or center of depression. The stream bank of the stream relocation shall be seeded by a method that does not alter the typical cross section of the stream bank. Native Grass Seeding and Mulching shall also be performed in the permanent soil reinforcement mat section of preformed scour holes, and in other areas as directed.

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

March 1 - August 31

18# Creeping Red Fescue
 6# Indiangrass
 8# Little Bluestem
 4# Switchgrass
 25# Browntop Millet
 500# Fertilizer
 4000# Limestone

September 1 - February 28

18# Creeping Red Fescue
 6# Indiangrass
 8# Little Bluestem
 4# Switchgrass
 35# Rye Grain
 500# Fertilizer
 4000# Limestone

Approved Creeping Red Fescue Cultivars:

Aberdeen

Boreal

Epic

Cindy Lou

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Native Grass Seeding and Mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

Measurement and Payment

Native Grass *Seeding and Mulching* will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.

All areas seeded and mulched shall be tacked with asphalt. Crimping of straw in lieu of asphalt tack shall not be allowed on this project.

CRIMPING STRAW MULCH:

Crimping shall be required on this project adjacent to any section of roadway where traffic is to be maintained or allowed during construction. In areas within six feet of the edge of pavement, straw is to be applied and then crimped. After the crimping operation is complete, an additional application of straw shall be applied and immediately tacked with a sufficient amount of undiluted emulsified asphalt.

Straw mulch shall be of sufficient length and quality to withstand the crimping operation.

Crimping equipment including power source shall be subject to the approval of the Engineer providing that maximum spacing of crimper blades shall not exceed 8".

TEMPORARY SEEDING:

Fertilizer shall be the same analysis as specified for *Seeding and Mulching* and applied at the rate of 400 pounds and seeded at the rate of 50 pounds per acre. Sweet Sudan Grass, German Millet

or Browntop Millet shall be used in summer months and Rye Grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

FERTILIZER TOPDRESSING:

Fertilizer used for topdressing on all roadway areas except slopes 2:1 and steeper shall be 10-20-20 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 10-20-20 analysis and as directed.

Fertilizer used for topdressing on slopes 2:1 and steeper and waste and borrow areas shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis and as directed.

SUPPLEMENTAL SEEDING:

The kinds of seed and proportions shall be the same as specified for *Seeding and Mulching*, with the exception that no centipede seed will be used in the seed mix for supplemental seeding. The rate of application for supplemental seeding may vary from 25# to 75# per acre. The actual rate per acre will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre, total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a sod seeder shall be used for incorporating seed into the soil as to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

MOWING:

The minimum mowing height on this project shall be 4 inches.

LAWN TYPE APPEARANCE:

All areas adjacent to lawns must be hand finished as directed to give a lawn type appearance. Remove all trash, debris, and stones $\frac{3}{4}$ " and larger in diameter or other obstructions that could interfere with providing a smooth lawn type appearance. These areas shall be reseeded to match their original vegetative conditions, unless directed otherwise by the Field Operations Engineer.

REFORESTATION:

Description

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

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

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

Materials

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

Construction Methods

Reforestation shall be planted as soon as practical following permanent *Seeding 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

Response for Erosion Control

Pay Unit

Each

MINIMIZE REMOVAL OF VEGETATION:

The Contractor shall minimize removal of vegetation at stream banks and disturbed areas within the project limits as directed.

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/ContractorReclamationProcedures.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 1630-4 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. 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)(3)(d) 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
Safety Fence

Pay Unit
Linear Foot

PERMANENT SOIL REINFORCEMENT MAT:

Description

This work consists of furnishing and placing *Permanent Soil Reinforcement Mat*, of the type specified, over previously prepared areas as directed.

Materials

The product shall be a permanent erosion control reinforcement mat and shall be constructed of synthetic or a combination of coconut and synthetic fibers evenly distributed throughout the mat between a bottom UV stabilized netting and a heavy duty UV stabilized top net. The matting shall be stitched together with UV stabilized polypropylene thread to form a permanent three-dimensional structure. The mat shall have the following minimum physical properties:

Property	Test Method	Value	Unit
Light Penetration	ASTM D6567	9	%
Thickness	ASTM D6525	0.40	in
Mass Per Unit Area	ASTM D6566	0.55	lb/sy
Tensile Strength	ASTM D6818	385	lb/ft
Elongation (Maximum)	ASTM D6818	49	%
Resiliency	ASTM D1777	>70	%
UV Stability *	ASTM D4355	≥80	%
Porosity (Permanent Net)	ECTC Guidelines	≥85	%
Maximum Permissible Shear	Performance Bench	≥8.0	lb/ft ²
Stress (Vegetated)	Test		
Maximum Allowable Velocity (Vegetated)	Performance Bench Test	≥16.0	ft/s

*ASTM D1682 Tensile Strength and % strength retention of material after 1000 hours of exposure.

Submit a certification (Type 1, 2, or 3) from the manufacturer showing:

- (A) the chemical and physical properties of the mat used, and
- (B) conformance of the mat with this specification.

Construction Methods

Matting shall be installed in accordance with Subarticle 1631-3(B) of the *Standard Specifications*.

All areas to be protected with the mat shall be brought to final grade and seeded in accordance with Section 1660 of the *Standard Specifications*. The surface of the soil shall be smooth, firm, stable and free of rocks, clods, roots or other obstructions that would prevent the mat from lying in direct contact with the soil surface. Areas where the mat is to be placed will not need to be mulched.

Measurement and Payment

Permanent Soil Reinforcement Mat will be measured and paid for as the actual number of square yards measured along the surface of the ground over which Permanent Soil Reinforcement Mat is installed and accepted. Overlaps will not be included in the measurement, and will be considered as incidental to the work. Such payment shall be full compensation for furnishing and installing the mat, including overlaps, and for all required maintenance.

Payment will be made under:

Pay Item	Pay Unit
Permanent Soil Reinforcement Mat	Square Yard

SKIMMER BASIN WITH BAFFLES:

Description

Provide a skimmer basin to remove sediment from construction site runoff at locations shown in the erosion control plans. See the Skimmer Basin with Baffles Detail sheet provided in the erosion control plans. Work includes constructing sediment basin, installation of temporary slope drain pipe and coir fiber baffles, furnishing, installation and cleanout of Faircloth Skimmers or other approved equivalent device, providing and placing stone pad on bottom of basin underneath skimmer device, providing and placing a geotextile emergency 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 Faircloth skimmer or other approved equivalent 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 Faircloth 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 emergency 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 Faircloth skimmer or other approved equivalent 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 Faircloth skimmer according to manufacturer recommendations. 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 emergency 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 emergency 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 drains, furnishing, installation and cleanout of Faircloth Skimmers or other approved

equivalent device, providing and placing stone pad on bottom of basin underneath skimmer device, providing and placing geotextile emergency spillway liners, providing coir fiber mat stabilization for the skimmer outlet, disposing of excess materials, removing temporary slope drains, 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 Faircloth skimmer or other approved equivalent 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 Faircloth 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 drains and construct the emergency 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 Faircloth skimmer or other approved equivalent 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 Faircloth skimmer according to manufacturer recommendations. 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.

Install a minimum of 2 (two) temporary slope drains to dewater the upper basin to the lower basin. The slope drains shall be installed a minimum of 6 inches, or one radius width of the temporary slope drain pipe, below the base of the emergency spillway section of the upper basin. The outlet of the slope drains shall be placed on the bottom elevation of the lower basin.

Line emergency 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 emergency 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

INFILTRATION BASIN WITH BAFFLES:

Description

Provide an infiltration basin to remove sediment from construction site runoff at locations shown in the erosion control plans. See the Infiltration Basin with Baffles Detail sheet provided in the erosion control plans. Work includes constructing sediment basin, installation of coir fiber baffles, providing and placing geotextile emergency spillway liner, providing coir fiber mat stabilization for the emergency spillway outlet, disposing of excess materials, removing geotextile liner and coir fiber mat, backfilling basin area with suitable material and providing proper drainage when basin area is abandoned.

Materials

Item	Section
Geotextile for Soil Stabilization, Type 4	1056
Staples	1060-8
Coir Fiber Mat	1060-14
Coir Fiber Baffle	1640

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. Excavation into or below the water table shall not occur, and avoid compacting the bottom of the basin with equipment tires, excavation bucket, etc. Construct the coir fiber baffles according to *Roadway Standard Drawings* No. 1640.01 and Section 1640 of the *Standard Specifications*. Construct earth berm around perimeter of infiltration basin as shown in the detail and the earth berm height shall be limited to 3 ft.

Construct the emergency spillway according to the Infiltration Basin with Baffles Detail sheet in the erosion control plans. Line emergency 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. 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 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 Infiltration Basin with Baffles detail.

At the emergency spillway 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.

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*.

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 other items or for over excavation or stockpiling.

Payment will be made under:

Pay Item	Pay Unit
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

BORROW PIT DEWATERING BASIN:

(3-17-09) (Rev 3-2-11)

Description

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

Construct, maintain and remove earth embankments used to reduce turbidity from dewatering borrow sites. Work includes providing porous coir fiber baffle, filtration geotextile, stone and outlet structures; cleaning out, maintaining, removing and disposing of the borrow pit dewatering basin and all components; and reshaping, dressing, seeding and mulching the area.

Materials

Refer to Division 10

Item	Section
Riprap, Class A, B, 1, and 2	1042
Geotextile for Drainage, Type 2	1056
Coir Fiber Baffle	1640-2

Use suitable excavated materials, as specified in Sections 225, 230 and 240 of the *Standard Specifications* in the construction of earth embankments for borrow pit dewatering basins, except where otherwise specified.

Construction Methods

Construct borrow pit dewatering basins according to the detail in the erosion control plans, and at locations shown on Reclamation Plans or in areas as directed.

The volume of the borrow pit dewatering basin will be based on a 2 hour retention time. The pump rate shall not exceed 1,000 GPM. The Contractor, at his option, may use a greater retention time for managing turbidity.

The straight line distance between the inlet and outlet shall be divided to include a forebay chamber in the upper quarter cell. Install one porous coir fiber baffle across the full width of the

basin to delineate the forebay chamber. Do not use earthen or rock baffle. Install filtration geotextile on the interior side slopes and the floor of the forebay.

The water pumped from the borrow pit into the dewatering basin shall be obtained from the top of the water column and shall be discharged into the forebay in a non-erodible manner.

The borrow pit dewatering basin outlet shall be a vertical non-perforated riser pipe or flash board riser attached with a watertight connection to a barrel that carries the water through the embankment.

Maintenance and Removal

Maintain the borrow pit dewatering basin, coir fiber baffle, and remove and dispose of silt accumulations in accordance with Article 1630-3 of the *Standard Specifications*. The Contractor may include a drain device for maintenance and removal at his discretion.

Remove the borrow pit dewatering basin once dewatering operations are completed. Grade, seed, and mulch the area after removal of the borrow pit dewatering basin in accordance with Section 1660 of the *Standard Specifications*. The area shall be stabilized with an approved groundcover before final acceptance of the site.

Measurement and Payment

No direct payment will be made for borrow pit dewatering basins with the exception of the work of silt removal during dewatering basin operation and the work of seeding and mulching after removal of the dewatering basin. All other work and materials required for installation, maintenance and removal of borrow pit dewatering basins shall be incidental to *Borrow Excavation*. Such price and payments will be full compensation for the work of constructing, maintaining and removing the borrow pit dewatering basin including, but not limited to, the construction and removal of the borrow pit dewatering basin; furnishing of the outlet structure, baffle, filtration geotextile, stone and optional drain devices; and removal of all such items once dewatering operations are completed.

Removal and disposal of silt accumulations during dewatering operations will be measured and paid at the contract unit price per cubic yard for *Silt Excavation* in accordance with Article 1630-4 of the *Standard Specifications*.

Grading, seeding, and mulching the area after removal of the borrow pit dewatering basin will be measured and paid at the contract unit price per acre for *Seeding and Mulching* in accordance with Section 1660-8 of the *Standard Specifications*.

FLOATING TURBIDITY CURTAIN:**Description**

This work consists of furnishing a *Floating Turbidity Curtain* to deter silt suspension and movement of silt particles during construction. The floating turbidity curtain shall be constructed at locations as directed.

Materials

The curtain material shall be made of a tightly woven nylon, plastic or other non-deteriorating material meeting the following specifications:

Property	Value
Grab tensile strength	*md-370 lbs *cd-250 lbs
Mullen burst strength	480 psi
Trapezoid tear strength	*md-100 lbs *cd-60 lbs
Apparent opening size	70 US standard sieve
Percent open area	4% permittivity 0.28 sec-1

*md - machine direction

*cd - cross machine direction

In the event that more than one width of fabric is required, a 6" overlap of the material shall also be required.

The curtain material shall be supported by a flotation material having over 29 lbs/ft buoyancy. The floating curtain shall have a 5/16" galvanized chain as ballast and dual 5/16" galvanized wire ropes with a heavy vinyl coating as load lines.

Construction Methods

The Contractor shall maintain the *Floating Turbidity Curtain* in a satisfactory condition until its removal is requested by the Engineer. The curtain shall extend to the bottom of the jurisdictional resource. Anchor the curtain according to manufacturer recommendations.

Measurement and Payment

Floating Turbidity Curtain will be measured and paid for as the actual number of square yards of curtain furnished as specified and accepted. Such price and payment will be full compensation for the work as described in this section including but not limited to furnishing all materials, tools, equipment, and all incidentals necessary to complete the work.

Payment will be made under:

Pay Item

Floating Turbidity Curtain

Pay Unit

Square Yard

COMPOST BLANKET:**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 1" thick Compost Blanket has been applied. 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).

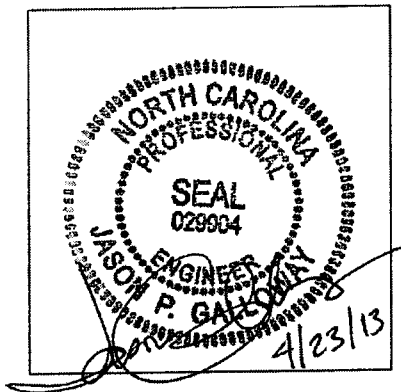
Compost Blanket will be measured and paid for as the actual number of acres measured along the surface of the ground over which the Compost Blanket is installed and accepted.

Payment will be made under:


Pay Item	Pay Unit
Compost Blanket	Acre

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Signals & Intelligent Transportation Systems



Project Special Provisions (Version 12.1) Signals and Intelligent Transportation Systems

Prepared By: 
23-Apr-13

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Fabricate vehicle signal head housings and end caps from die-cast aluminum. Fabricate 12-inch and 16-inch pedestrian signal head housings and end caps from die-cast aluminum. Fabricate 9-inch pedestrian signal head housings, end caps, and visors from virgin polycarbonate material. Provide visor mounting screws, door latches, and hinge pins fabricated from stainless steel. Provide interior screws, fasteners, and metal parts fabricated from stainless steel or corrosion resistant material.

Fabricate tunnel and traditional visors from sheet aluminum.

Paint all surfaces inside and outside of signal housings and doors. Paint outside surfaces of tunnel and traditional visors, messenger cable mounting assemblies, pole and pedestal mounting assemblies, and pedestrian pushbutton housings. Have electrostatically-applied, fused-polyester paint in highway yellow (Federal Standard 595C, Color Chip Number 13538) a minimum of 2.5 to 3.5 mils thick. Do not apply paint to the latching hardware or rigid vehicle signal head mounting brackets for mast-arm attachments.

Have the interior surfaces of tunnel and traditional visors painted an alkyd urea black synthetic baking enamel with a minimum gloss reflectance and meeting the requirements of MIL-E-10169, "Enamel Heat Resisting, Instrument Black."

For pole mounting, provide side of pole mounting assemblies with framework and all other hardware necessary to make complete, watertight connections of the signal heads to the poles and pedestals. Fabricate the mounting assemblies and frames from aluminum with all necessary hardware, screws, washers, etc. to be stainless steel. Provide mounting fittings that match the positive locking device on the signal head with the serrations integrally cast into the brackets. Provide upper and lower pole plates that have a 1 ¼-inch vertical conduit entrance hubs with the hubs capped on the lower plate and 1 ½-inch horizontal hubs. Ensure that the assemblies provide rigid attachments to poles and pedestals so as to allow no twisting or swaying of the signal heads. Ensure that all raceways are free of sharp edges and protrusions, and can accommodate a minimum of ten Number 14 AWG conductors.

For pedestal mounting, provide a post-top slipfitter mounting assembly that matches the positive locking device on the signal head with serrations integrally cast into the slipfitter. Provide stainless steel hardware, screws, washers, etc. Provide a minimum of six 3/8 X 3/4-inch long square head bolts for attachment to pedestal. Provide a center post for multi-way slipfitters.

For light emitting diode (LED) traffic signal modules, provide the following requirements for inclusion on the Department's Qualified Products List for traffic signal equipment.

1. Sample submittal,
2. Third-party independent laboratory testing results for each submitted module with evidence of testing and conformance with all of the Design Qualification Testing specified in section 6.4 of each of the following Institute of Transportation Engineers (ITE) specifications:
 - Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement
 - Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement

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- Pedestrian Traffic Control Signal Indications –Light Emitting Diode (LED) Signal Modules.

(Note: The Department currently recognizes two approved independent testing laboratories. They are Intertek ETL Semko and Light Metrics, Incorporated with Garwood Laboratories. Independent laboratory tests from other laboratories may be considered as part of the QPL submittal at the discretion of the Department,

3. Evidence of conformance with the requirements of these specifications,
4. A manufacturer's warranty statement in accordance with the required warranty, and
5. Submittal of manufacturer's design and production documentation for the model, including but not limited to, electrical schematics, electronic component values, proprietary part numbers, bill of materials, and production electrical and photometric test parameters.
6. Evidence of approval of the product to bear the Intertek ETL Verified product label for LED traffic signal modules.

In addition to meeting the performance requirements for the minimum period of 60 months, provide a written warranty against defects in materials and workmanship for the modules for a period of 60 months after installation of the modules. During the warranty period, the manufacturer must provide new replacement modules within 45 days of receipt of modules that have failed at no cost to the State. Repaired or refurbished modules may not be used to fulfill the manufacturer's warranty obligations. Provide manufacturer's warranty documentation to the Department during evaluation of product for inclusion on Qualified Products List (QPL).

B. Vehicle Signal Heads:

Comply with the ITE standard "Vehicle Traffic Control Signal Heads". Provide housings with provisions for attaching backplates.

Provide visors that are 8 inches in length for 8-inch vehicle signal head sections. Provide visors that are 10 inches in length for 12-inch vehicle signal heads.

Provide a termination block with one empty terminal for field wiring for each indication plus one empty terminal for the neutral conductor. Have all signal sections wired to the termination block. Provide barriers between the terminals that have terminal screws with a minimum Number 8 thread size and that will accommodate and secure spade lugs sized for a Number 10 terminal screw.

Mount termination blocks in the yellow signal head sections on all in-line vehicle signal heads. Mount the termination block in the red section on five-section vehicle signal heads.

Furnish vehicle signal head interconnecting brackets. Provide one-piece aluminum brackets less than 4.5 inches in height and with no threaded pipe connections. Provide hand holes on the bottom of the brackets to aid in installing wires to the signal heads. Lower brackets that carry no wires and are used only for connecting the bottom signal sections together may be flat in construction.

For messenger cable mounting, provide messenger cable hangers, wire outlet bodies, balance adjusters, bottom caps, wire entrance fitting brackets, and all other hardware necessary to make complete, watertight connections of the vehicle signal heads to the messenger cable. Fabricate mounting assemblies from malleable iron or steel and provide serrated rings made of aluminum. Provide messenger cable hangers and balance adjusters that are galvanized before being painted. Fabricate balance adjuster eyebolt and eyebolt nut from stainless steel or galvanized malleable iron. Provide messenger cable hangers with U-bolt clamps. Fabricate washers, screws, bolts, clevis pins, cotter pins, nuts, and U-bolt clamps from stainless steel.

For mast-arm mounting, provide rigid vehicle signal head mounting brackets and all other hardware necessary to make complete, watertight connections of the vehicle signal heads to the mast

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arms and to provide a means for vertically adjusting the vehicle signal heads to proper alignment. Fabricate the mounting assemblies from aluminum, and provide serrated rings made of aluminum. Provide stainless steel cable attachment assemblies to secure the brackets to the mast arms. Ensure all fastening hardware and fasteners are fabricated from stainless steel.

Provide LED vehicular traffic signal modules (hereafter referred to as modules) that consist of an assembly that uses LEDs as the light source in lieu of an incandescent lamp for use in traffic signal sections. Use LEDs that are aluminum indium gallium phosphorus (AlInGaP) technology for red and yellow indications and indium gallium nitride (InGaN) for green indications. Install the ultra bright type LEDs that are rated for 100,000 hours of continuous operation from -40°F to +165°F. Design modules to have a minimum useful life of 60 months and to meet all parameters of this specification during this period of useful life.

For the modules, provide spade terminals crimped to the lead wires and sized for a #10 screw connection to the existing terminal block in a standard signal head. Do not provide other types of crimped terminals with a spade adapter.

Ensure the power supply is integral to the module assembly. On the back of the module, permanently mark the date of manufacture (month & year) or some other method of identifying date of manufacture.

Tint the red, yellow and green lenses to correspond with the wavelength (chromaticity) of the LED. Transparent tinting films are unacceptable. Provide a lens that is integral to the unit with a smooth outer surface.

1. LED Circular Signal Modules:

Provide modules in the following configurations: 12-inch circular sections, and 8-inch circular sections. All makes and models of LED modules purchased for use on the State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

Provide the manufacturer's model number and the product number (assigned by the Department) for each module that appears on the 2012 or most recent Qualified Products List. In addition, provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications*, that each module meets or exceeds the ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement" dated June 27, 2005 (hereafter referred to as VTCSH Circular Supplement) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the VTCSH Circular Supplement:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
12-inch red circular	17	11
8-inch red circular	13	8
12-inch green circular	15	15
8-inch green circular	12	12

For yellow circular signal modules, provide modules tested under the procedures outlined in the VTCSH Circular Supplement to insure power required at 77° F is 22 Watts or less for the 12-inch circular module and 13 Watts or less for the 8-inch circular module.

Note: Use a wattmeter having an accuracy of $\pm 1\%$ to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

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Provide 12-inch omnidirectional arrow signal modules. All makes and models of LED modules purchased for use on the State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

Provide the manufacturer's model number and the product number (assigned by the Department) for each module that appears on the 2012 or most recent Qualified Products List. In addition, provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications*, that each module meets or exceeds the requirements for 12-inch omnidirectional modules specified in the ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement" dated July 1, 2007 (hereafter referred to as VTCSH Arrow Supplement) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the VTCSH Arrow Supplement:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
12-inch red arrow	12	9
12-inch green arrow	11	11

For yellow arrow signal modules, provide modules tested under the procedures outlined in the VTCSH Arrow Supplement to insure power required at 77° F is 12 Watts or less.

Note: Use a wattmeter having an accuracy of $\pm 1\%$ to measure the nominal wattage and maximum wattage of an arrow traffic signal module. Power may also be derived from voltage, current and power factor measurements.

C. Signal Cable:

Furnish 16-4 and 16-7 signal cable that complies with IMSA specification 20-1 except provide the following conductor insulation colors:

- For 16-4 cable: white, yellow, red, and green
- For 16-7 cable: white, yellow, red, green, yellow with black stripe tracer, red with black stripe tracer, and green with black stripe tracer. Apply continuous stripe tracer on conductor insulation with a longitudinal or spiral pattern.

Provide a ripcord to allow the cable jacket to be opened without using a cutter. IMSA specification 19-1 will not be acceptable. Provide a cable jacket labeled with the IMSA specification number and provide conductors constructed of stranded copper.

2. TRAFFIC SIGNAL SUPPORTS**2.1. METAL TRAFFIC SIGNAL SUPPORTS – ALL POLES****A. General:**

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

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

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4th Edition, 2001 (hereafter called 4th Edition AASHTO), including the latest interim specifications. Provide assemblies with a round or near-round (18 sides or more) cross-section, or a multi sided cross section with no less than six sides. The sides may be straight, convex, or concave.

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

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

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

Repair of Galvanizing.....Article 1076-6

Standard Drawings for Metal Poles are available that supplement these project special provisions. These drawings are located on the Department's website:

<http://www.ncdot.gov/doh/preconstruct/traffic/ITSS/ws/mpoles/poles.html>

Comply with article 1098-1B "General Requirements" of the 2012 *STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES*, hereinafter referred to as the *Standard Specifications* for submittal requirements. Furnish shop drawings for approval. Provide the copies of detailed shop drawings for each type of structure as summarized below. Ensure that shop drawings include material specifications for each component and identify welds by type and size on the drawing details, not in table format. Do not release structures for fabrication until shop drawings have been approved by NCDOT. Provide an itemized bill of materials for all structural components and associated connecting hardware on the drawings.

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

Summary of information required for metal pole review submittal:

Item	Hardcopy Submittal	Electronic Submittal	Comments / Special Instructions
Sealed, Approved Signal Plan/Loading Diagram	1	1	All structure design information needs to reflect the latest approved signal plans
Custom Pole Shop Drawings	4 sets	1 set	Submit drawings on 11" x 17" format media Show NCDOT inventory number(s) in or above the title block
Standard Pole Shop Drawings (from the QPL)	4 sets	1 set	Submit drawings on 11" x 17" format media Show NCDOT inventory number(s) in or above the title block
Structure Calculations	1 set	1 set	Not required for Standard QPL Poles

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Standard Pole Foundation Drawings	1 set	1 set	Submit drawings on 11" x 17" format media. Submit a completed Standard Foundation Selection form for each pole using foundation table on Metal Pole Drawing M-8.
Custom Foundation Drawings	4 sets	1 set	Submit drawings on 11" x 17" format media. If QPL Poles are used, include the corresponding QPL pole shop drawings with this submittal.
Foundation Calculations	1	1	Not required for Standard QPL Poles
Soil Boring Logs and Report	1	1	Report should include a location plan and a soil classification report including soil capacity, water level, hammer efficiency, soil bearing pressure, soil density, etc. for each pole.

NOTE – All shop drawings and custom foundation design drawings must be sealed by a professional Engineer licensed in the state of North Carolina. All geotechnical information must be sealed by either a Professional Engineer or geologist licensed in the state of North Carolina. Include a title block and revision block on the shop drawings and foundation designs showing the NCDOT inventory number.

Shop drawings and foundation drawings may be submitted together or separately for approval. However, shop drawings must be approved before foundations can be reviewed. Foundation designs will be returned without review if the associated shop drawing has not been approved. Incomplete submittals will be returned without review.

B. Materials:

Fabricate metal pole and arm shaft from coil or plate steel to meet the requirements of ASTM A 595 Grade A tubes. For structural steel shapes, plates and bars use A572 Gr 50 min or ASTM A709 Gr 50 min.. Provide pole and arm shafts that are round in cross section or multisided tubular shapes and have a uniform linear taper of 0.14 in/ft. Construct shafts from one piece of single ply plate or coil so there are no circumferential weld splices. Galvanize in accordance with AASHTO M 111 and/or ASTM A 123 or an approved equivalent.

Use the submerged arc process or other NCDOT previously approved process suitable for pole shaft and arms to continuously weld pole shafts and arm shafts along their entire length. The longitudinal seam weld will be finished flush to the outside contour of the base metal. Ensure shafts have no circumferential welds except at the lower end joining the shaft to the pole base and arm base. Provide welding that conforms to Article 1072-20 of the *Standard Specifications*, except that no field welding on any part of the pole will be permitted unless approved by a qualified engineer.

Refer to Metal Pole Standard Drawing Sheets M2 through M5 for fabrication details. Fabricate anchor bases from plate steel meeting, as a minimum, the requirements of ASTM A 36M or cast steel meeting the requirements of ASTM A 27M Grade 485-250, AASHTO M270 Gr 36 or an approved equivalent. Conform to the applicable bolt pattern and orientation as shown on Metal Pole Standard Drawing Sheet M2.

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

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

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

Provide a circular anchor bolt lock plate that will be secured to the anchor bolts at the embedded end with 2 washers and 2 nuts. Provide a base plate template that matches the bolt circle diameter of the anchor bolt lock plate. Construct plates and templates from 1/4" minimum thick steel with a minimum width of 4". Galvanizing is not required.

Provide 4 heavy hex nuts and 4 flat washers for each anchor bolt. For nuts, use AASHTO M291 grade 2H, DH, or DH3 or equivalent material. For flat washers, use AASHTO M293 or equivalent material.

C. Construction Methods:

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

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

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

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

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

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

Perform repair of damaged galvanizing that complies with the *Standard Specifications*, Article 1076-6 "Repair of Galvanizing."

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

Install a 1/4" thick plate for concrete foundation tag to include: concrete grade, depth, diameter, and reinforcement sizes of the installed foundation.

2.2. METAL STRAIN POLE**A. Materials:**

Provide either steel or aluminum poles as indicated on the plans.

Comply with the following for Aluminum Poles:

- Have poles fabricated from Aluminum Association Alloy 6061-T6, 6063-T6, or approved equivalent. The structural requirement does not pertain to castings that are decorative only.
- Have shafts tapered by spinning and cold-working a seamless extruded tube of the aluminum alloy.

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- Have shafts with no circumferential welds except at the lower end joining the shaft to the base.
- Ensure aluminum poles are properly protected from damage prior to shipment.
- Have bases of the shaft fabricated in accordance with the Aluminum Association Alloy 356.0-T6, and of adequate strength, shape and size, and capable of withstanding the design load of the shaft.
- Have aluminum surfaces in contact with concrete or dissimilar metal coated with bituminous paint.

Comply with the following for Steel Poles:

- Have shafts of the tapered tubular type and fabricated of steel conforming to ASTM A-595 Grade A or an approved equivalent.
- Have galvanization in accordance with AASHTO M 111 (ASTM A 123).
- Have shafts that are continuously welded for the entire length by the submerged arc process, and with exposed welds ground or rolled smooth and flush with the base metal. Provide welding that conforms to Article 1072-20 per *Standard Specification* except that no field welding on any part of the pole will be permitted.
- Have anchor bases for steel poles fabricated from plate steel meeting as a minimum the requirements of ASTM A 36M or cast steel meeting the requirements of ASTM A 27M Grade 485-250 or an approved equivalent.

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

For strain poles, provide a minimum of three (3) 2 inch (50 mm) holes equipped with an associated coupling and weatherhead on the messenger cable load side of the pole to accommodate passage of signal cables from inside the pole to the suspension. Provide galvanized threaded plugs for all unused couplings at pole entrance points. Refer to Metal Pole Standard Drawing Sheet M3 for fabrication details.

Provide a grounding lug(s) in the approximate vicinity of the messenger cable clamp for bonding and grounding messenger cable. Lugs must accept #4 or #6 AWG wire to bond messenger cables to the pole in order to provide an effective ground fault circuit path. Refer to Metal Pole Standard Drawing Sheet M6 for construction details.

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

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

Fabricate poles from a single piece of steel or aluminum with single line seam weld with no transverse butt welds. Fabrication of two ply pole shafts is unacceptable with the exception of fluted

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shafts. Provide tapers for all shafts that begin at base and that have diameters which decrease uniformly at the rate of not more than 0.14 inch per foot (11.7 millimeters per meter) of length.

Ensure that allowable pole deflection does not exceed that allowed per 4th Edition AASHTO. For messenger cable poles (with primarily transverse loads), ensure that maximum deflection at the top of the pole does not exceed 2.5 percent of the pole height. For mast arm poles (with primarily moment loads), ensure that maximum angular rotation of the top of the pole does not exceed 1° 40'.

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

Provide a terminal compartment with cover and screws in each pole that encompasses the hand hole and contains a 12-terminal barrier type terminal block. Provide two terminal screws with a removable shorting bar between them for each termination. Furnish terminal compartment covers attached to the pole by a sturdy chain or cable approved by the Engineer. Ensure that the chain or cable is long enough to permit the cover to hang clear of the compartment opening when the cover is removed, and is strong enough to prevent vandals from being able to disconnect the cover from the pole. Ensure that the chain or cable will not interfere with service to the cables in the pole base.

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

For each pole, provide a 1/2 inch minimum thread diameter, coarse thread stud and nut for grounding which will accommodate #6 AWG ground wire. Ensure that the lug is electrically bonded to the pole and is conveniently located inside the pole at the hand hole.

Provide a removable pole cap with stainless steel attachment screws for the top of each pole. Ensure that the cap is cast aluminum conforming to Aluminum Association Alloy 356.0F. Furnish cap attached to the pole with a sturdy chain or cable approved by the Engineer. Ensure that the chain or cable is long enough to permit the cap to hang clear of the pole-top opening when the cap is removed.

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

B. Construction Methods:

Install metal poles, hardware, and fittings as shown on the manufacturer's installation drawings. Install metal poles so that when the pole is fully loaded it is within 2 degrees of vertical. Install poles with the manufacturer's recommended "rake." Use threaded leveling nuts to establish rake if required.

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Provide signal support mast arm assemblies. Comply with the previous Section – Metal Strain Pole – except as noted herein.

Provide pole plates and associated gussets and fittings for attachment of required mast arms. As part of each mast arm attachment, provide a cable passage hole in the pole to allow passage of signal cables from the pole to the arm.

Ensure that allowable mast arm deflection does not exceed that allowed per 4th Edition AASHTO. Also when arm is fully loaded, tip of the arm shall not go below the arm attachment point with the pole for all load conditions per 4th Edition AASHTO.

Furnish all arm plates and necessary attachment hardware, including bolts and brackets.

Provide two extra bolts for each arm.

Provide grommet holes on the arms to accommodate cables for the signals.

Provide arms with weatherproof connections for attaching to the shaft of the pole.

Provide hardware that is galvanized steel, stainless steel, or corrosive-resistant aluminum.

Provide a removable end cap with stainless steel attachment screws for the end of each mast arm. Ensure that the cap is cast aluminum conforming to Aluminum Association Alloy 356.0F. Furnish cap attached to the arm with a sturdy chain or cable approved by the Engineer. Ensure that the chain or cable is long enough to permit the cap to hang clear of the arm end opening when the cap is removed.

Comply with the following for Aluminum Arms:

- Conform to Aluminum Association Alloy 6061-T6, 6063-T6 or approved equivalent.
- Conform to the welding requirements of the aluminum poles.
- Have satin brush finished and furnish individually wrapped.

Comply with the following for Steel Luminaire Arms:

- In addition to tapered tube, luminaire arms may be standard weight black steel pipe conforming to ASTM A 53-90a, Type E or Type S, Grade B or an approved equivalent.
- Conform to the welding requirements of the steel poles.
- After all fabricating, cutting, punching, and welding are completed, luminaire arms should be hot-dipped galvanized inside and outside.
- In accordance with the National Electrical Code (NEC) Article 230.2(E), provide identification of the electrical source provider for the luminaire feeder circuit with contact information on a permanent label located in the pole hand hole in the vicinity of the feeder circuit raceway.

A. Materials:

Fabrication of two ply pole shafts and arms is unacceptable with the exception of fluted members.

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After all fabricating, cutting, punching, and welding are completed, hot-dip galvanize the structure in accordance with the AASHTO M 111 or equivalent.

B. Construction Methods:

Install horizontal-type arms with sufficient manufactured rise to keep arm from deflecting below the arm attachment height.

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

For mast arm poles, use full penetration welds with back-up ring at the pole base and at the arm base connection.

2.4. DRILLED PIER FOUNDATIONS FOR METAL TRAFFIC SIGNAL POLES

Analysis procedures and formulas shall be based on AASHTO, ACI code and per FHWA manuals. Design methods based on engineering publications or research papers needs to have prior approval from NCDOT. The Department reserves the right to accept or disapprove any method used for the analysis.

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

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

Design all custom foundations to carry the maximum capacity of each metal pole. For standard case strain poles only, if a custom foundation is designed, use the actual moment reactions from the Standard Foundation Selection Table shown on Standard Drawing No. M8.

When poor soil conditions are encountered which could create an excessively large foundation design, consideration may be given to allowing an exemption to the maximum capacity design. The contractor must gain approval from the engineer before reducing a foundation's capacity. On projects where poor soil is known to be present, it is advisable that the contractor consider getting foundations approved before releasing poles for fabrication.

A. Description:

Furnish and install foundations for NCDOT metal poles with all necessary hardware in accordance with the plans and specifications.

Metal Pole Standards have been developed and implemented by NCDOT for use at signalized intersections in North Carolina. If the plans call for a standard pole, then a standard foundation may be selected from the plans. However, the Contractor is not required to use a standard foundation. If the Contractor chooses to design a non-standard site-specific foundation for a standard pole or if the plans call for a non-standard site-specific pole, design the foundation to conform to the applicable provisions in the NCDOT Metal Pole Standards and Section B4 (Non-Standard Foundation Design) below. If non-standard site specific foundations are designed for standard QPL approved strain poles, the foundation designer must use the design moment specified by load case on Metal Pole Standard Drawing Sheet M8. Failure to conform to this requirement will be grounds for rejection of the design.

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If the Contractor chooses to design a non-standard foundation for a standard pole and the soil test results indicate a standard foundation is feasible for the site, the Contractor will be paid the cost of the standard foundation (drilled pier and wing wall, if applicable). Any additional costs associated with a non-standard site-specific foundation including additional materials, labor and equipment will be considered incidental to the cost of the standard foundation. All costs for the non-standard foundation design will also be considered incidental to the cost of the standard foundation.

B. Soil Test and Foundation Determination:**1. General:**

Drilled piers are reinforced concrete sections, cast-in-place against in situ, undisturbed material. Drilled piers are of straight shaft type and vertical.

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

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

2. Soil Test:

Perform a soil test at each proposed metal pole location. Complete all required fill placement and excavation at each signal pole location to finished grade before drilling each boring. Soil tests performed that are not in compliance with this requirement may be rejected and will not be paid. Drill one boring to a depth of 26 feet within a 25 foot radius of each proposed foundation.

Perform standard penetration tests (SPT) in accordance with ASTM D 1586 at depths of 1, 2.5, 5, 7.5, 10, 15, 20 and 26 feet. Discontinue the boring if one of the following occurs:

- A total of 100 blows have been applied in any 2 consecutive 6-in. intervals.
- A total of 50 blows have been applied with < 3-in. penetration.

Describe each intersection as the "Intersection of (Route or SR #), (Street Name) and (Route or SR #), (Street Name), _____ County, Signal Inventory No. _____". Label borings with "B- N, S, E, W, NE, NW, SE or SW" corresponding to the quadrant location within the intersection. Pole numbers should be made available to the Drill Contractor. Include pole numbers in the boring label if they are available. If they are not available, ensure the boring labels can be cross-referenced to corresponding pole numbers. For each boring, submit a legible (hand written or typed) boring log signed and sealed by a licensed Geologist or Professional Engineer registered in North Carolina. Include on each boring the SPT blow counts and N-values at each depth, depth of the boring, and a general description of the soil types encountered.

3. Standard Foundation Determination:

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

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

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

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

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

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

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

Or

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

Note: If less than 4 N-values are obtained because of criteria listed in Section 2 above, use average of N-values collected for second condition. Do not include the N-value at the deepest boring depth for above calculations if the boring is discontinued at or before the required boring depth because of criteria listed in Section 2 above. Use N-value of zero for weight of hammer or weight of rod. If N-value is greater than 50, reduce N-value to 50 for calculations.

If standard NCDOT strain poles are shown on the plans and the Contractor chooses to use standard foundations, determine a drilled pier length, "L," for each signal pole from the Standard Foundations Chart (sheet M 8) based on the Design N-value and the predominant soil type. For each standard pole location, submit a completed "Metal Pole Standard Foundation Selection Form" signed by the Contractor's representative. Signature on form is for verification purposes only. Include the Design N-value calculation and resulting drilled pier length, "L," on each form.

If non-standard site-specific poles are shown on the plans, submit completed boring logs collected in accordance with Section 2 (Soil Test) above along with pole loading diagrams from the plans to the contractor-selected pole fabricator to assist in the pole and foundation design.

If one of the following occurs, the Standard Foundations Chart shown on the plans may not be used and a non-standard foundation may be required. In such case, contact the Engineer.

- The Design N-value is less than 4.
- The drilled pier length, "L", determined from the Standard Foundations Chart, is greater than the depth of the corresponding boring.

In the case where a standard foundation cannot be used, the Department will be responsible for the additional cost of the non-standard foundation.

Foundation designs are based on level ground around the traffic signal pole. If the slope around the edge of the drilled pier is steeper than 8:1 (H:V) or the proposed foundation will be less than 10 feet from the top of an embankment slope, the Contractor is responsible for providing slope information to the foundation designer and to the Engineer so it can be considered in the design.

The "Metal Pole Standard Foundation Selection Form" may be found at:

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

If assistance is needed, contact the Engineer.

4. Non-Standard Foundation Design:

Design non-standard foundations based upon site-specific soil test information collected in accordance with Section 2 (Soil Test) above. Design drilled piers for side resistance only in accordance with Section 4.6 of the *AASHTO Standard Specifications for Highway Bridges*. Use the computer software LPILE version 5.0 or later manufactured by Ensoft, Inc. to analyze drilled piers. Use the computer software gINT version 8.0 or later manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs. Provide a drilled pier foundation for each pole with a length and diameter that result in a horizontal lateral movement of less than 1 inch at the top of the pier and a horizontal rotational movement of less than 1 inch at the edge of the pier. Contact the Engineer for pole loading diagrams for standard poles to be used for

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non-standard foundation designs. Submit any non-standard foundation designs including drawings, calculations, and soil boring logs to the Engineer for review and approval before construction.

C. Drilled Pier Construction:

Construct drilled pier foundations in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

2.5. CUSTOM DESIGN OF TRAFFIC SIGNAL SUPPORTS**A. General:**

Design traffic signal supports with foundations consisting of metal strain poles or metal poles with mast arms.

The lengths of the metal signal poles shown on the plans are estimated from available data for bid purposes. Determine the actual length of each pole from field measurements and adjusted cross-sections. Furnish the revised pole heights to the Engineer. Use all other dimensional requirements shown on the plans.

Ensure each pole includes an identification tag with information and location positions as defined on Metal Pole Standard Drawing Sheets M2, M3 and M4. All pole shaft tags must include the NCDOT Inventory number followed by the pole number shown on the traffic signal or ITS (non-signalized locations) plan.

Design all traffic signal support structures using the following 4th Edition AASHTO specifications:

- Design for a 50 year service life as recommended by Table 3-3.
- Use the wind pressure map developed from 3-second gust speeds, as provided in Article 3.8.
- Ensure signal support structures include natural wind gust loading and truck-induced gust loading in the fatigue design, as provided for in Articles 11.7.3 and 11.7.4, respectively. Designs need not consider periodic galloping forces.
- Assume the natural wind gust speed in North Carolina is 11.2 mph. For natural wind fatigue stress calculations, utilize a drag coefficient (C_d) computed for 11.2 mph wind velocity and not the basic wind speed velocity.
- Design for Category II fatigue, as provided for in Article 11.6, unless otherwise specified.
- Calculate all stresses using applicable equations from Section 5. The Maximum allowable stress ratios for all signal support designs are 0.9.
- Conform to article 10.4.2 and 11.8 for all deflection requirements.

Ensure that the design permits cables to be installed inside poles and mast arms.

Unless otherwise specified by special loading criteria, the computed surface area for ice load on signal heads is:

- 3-section, 12-inch, Surface area: 26.0 ft² (17.0 ft² without back plate)
- 4-section, 12-inch, Surface area: 32.0 ft² (21.0 ft² without back plate)
- 5-section, 12-inch, Surface area: 42.0 ft² (29.0 ft² without back plate)

The ice loading for signal heads defined above includes the additional surface area that back plates will induce. Special loading criteria may be specified in instances where back plates will not be installed on signal heads. Refer to the Loading Schedule on each Metal Pole Loading Diagram for revised signal head surface areas. The pole designer should revise ice loads accordingly in this instance. Careful examination of the plans when this is specified is important as this may impact sizing of the metal support structure and foundation design which could affect proposed bid quotes. All maximum stress ratios of 0.9 still apply.

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Assume the combined minimum weight of a messenger cable bundle (including messenger cable, signal cable and detector lead-in cables) is 1.3 lbs/ft. Assume the combined minimum diameter of this cable bundle is 1.3 inches.

Ensure that designs provide a removable pole cap with stainless steel attachment screws for each pole top and mast arm end.

B. Metal Poles:

Submit design drawings for approval including pre-approved QPL pole drawings. Show all the necessary details and calculations for the metal poles including the foundation and connections. Include signal inventory number on design drawings. Include as part of the design calculations the ASTM specification numbers for the materials to be used. Provide the types and sizes of welds on the design drawings. Include a Bill of Materials on design drawings. Ensure design drawings and calculations are signed, dated, and sealed by the responsible professional engineer licensed in the state of North Carolina. Immediately bring to the attention of the Engineer any structural deficiency that becomes apparent in any assembly or member of any assembly as a result of the design requirements imposed by these specifications, the plans, or the typical drawings. Said Professional Engineer is wholly responsible for the design of all poles and arms. Review and acceptance of these designs by the Department does not relieve the said Professional Engineer of his responsibility. Do not fabricate the assemblies until receipt of the Department's approval of the design drawings.

For mast arm poles, provide designs with provisions for pole plates and associated gussets and fittings for mast arm attachment. As part of each mast arm attachment, provide a grommeted 2" diameter hole on the shaft side of the connection to allow passage of the signal cables from the pole to the arm.

Where ice is present, assume wind loads as shown in Figure 3-5 of the 4th Edition AASHTO Specification for Group III loading.

For each strain pole, provide two messenger cable clamps and associated hardware to attach the messenger support cable. Ensure that the diameter of the clamps is appropriately designed to be adjustable from 18 inches below the top, down to 6'-6" below the top of the pole. Do not attach more than one messenger support cable to a messenger cable clamp.

Provide a grounding lug(s) in the approximate vicinity of the messenger cable clamp for bonding and grounding messenger cable. Lugs must accept #4 or #6 AWG wire to bond messenger cables to the pole in order to provide an effective ground fault circuit path. Refer to Metal Pole Standard Drawing Sheet M6 for construction details.

Design tapers for all pole shafts that begin at the base with diameters that decrease uniformly at the rate of 0.14 inch per foot of length.

Design a base plate on each pole. The minimum base plate thickness for all poles is determined by the following criteria:

Case 1 Circular or rectangular solid base plate with the upright pole welded to the top surface of 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 1/3 of the upright diameter, and located concentrically with the upright pole, may be considered as a solid base plate.

The magnitude of bending moment in the base plate, induced by the anchoring force of each anchor bolt is $M = (P \times D_1) / 2$, where

M = bending moment at the critical section of the base plate induced by one anchor bolt

P = anchoring force of each anchor bolt

D_1 = horizontal distance between the anchor bolt center and the outer face of the upright, or the difference between the bolt circle radius and the outside radius of the upright

Locate the critical section at the face of the anchor bolt and perpendicular to the bolt circle radius. The overlapped part of two adjacent critical sections is considered ineffective.

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 1/3 of the upright diameter.

The magnitude of bending moment induced by the anchoring force of each anchor bolt is $M = P \times D_2$,

where P = anchoring force of each anchor bolt

D_2 = horizontal distance between the face of the upright and the face of the anchor bolt nut

Locate the critical section at the face of the anchor bolt top nut and perpendicular to the radius of the bolt circle. The overlapped part of two adjacent critical sections is considered ineffective.

If the base plate thickness calculated for Case 2 is less than Case 1, use the thickness calculated for Case 1.

The following additional owner requirements apply concerning pole base plates.

- Ensure that whichever case governs as defined above, the anchor bolt diameter is set to match the base plate thickness. If the minimum diameter required for the anchor bolt exceeds the thickness required for the base plate, set the base plate thickness equal to the required bolt diameter.
- For dual mast arm supports, or for single mast arm supports 50' or greater, use a minimum 8 bolt orientation with 2" diameter anchor bolts, and a 2" thick base plate.
- For all metal poles with mast arms, use a full penetration groove weld with a backing ring to connect the pole upright component to the base. Refer to Metal Pole Standard Drawing Sheet M4.

Ensure that designs have anchor bolt holes with a diameter 1/4 inch larger than the anchor bolt diameters in the base plate.

Ensure that the anchor bolts have the required diameters, lengths, and positions, and will develop strengths comparable to their respective poles.

Provide designs with a 6 x 12-inch hand hole with a reinforcing frame for each pole.

Provide designs with a terminal compartment with cover and screws in each pole that encompasses the hand hole and contains provisions for a 12-terminal barrier type terminal block.

For each pole, provide designs with provisions for a 1/2 inch minimum thread diameter, coarse thread stud and nut for grounding which will accommodate a #6 AWG ground wire. Ensure the lug is electrically bonded to the pole and is conveniently located inside the pole at the hand hole.

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

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Design all arm plates and necessary attachment hardware, including bolts and brackets as required by the plans.

Design for grommets holes on the arms to accommodate the cables for the signals if specified.

Design arms with weatherproof connections for attaching to the shaft of the pole.

Always use a full penetration groove weld with a backing ring to connect the mast arm to the pole. Refer to Metal Pole Standard Drawing Sheet M5.

Capacity of tapped flange plate must be sufficient to develop the full capacity of the connecting bolts. In all cases the flange plate of both arm and shaft must be at least as thick as the arm connecting bolts are in diameter.

2.6. POLE NUMBERING SYSTEM**A. New Poles**

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

2.7. MEASUREMENT AND PAYMENT

Actual number of metal poles with single mast arms furnished, installed, and accepted.

Actual number of metal poles with dual mast arms 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 mast arms with metal poles furnished and accepted.

No measurement will be made for foundation designs prepared with metal pole designs, as these will be considered incidental to designing signal support structures.

Payment will be made under:

Metal Pole with Single Mast Arm	Each
Metal Pole with Dual Mast Arm.....	Each
Soil Test	Each
Drilled Pier Foundation.....	Cubic Yard
Mast Arm with Metal Pole Design	Each

3. CONTROLLERS WITH CABINETS**3.1. MATERIALS – TYPE 2070L CONTROLLERS**

Conform to CALTRANS *Transportation Electrical Equipment Specifications* (TEES) (dated August 16, 2002, plus Errata 1 dated October 27, 2003 and Errata 2 dated June 08, 2004) except as required herein.

Furnish Model 2070L controllers. Ensure that removal of the CPU module from the controller will place the intersection into flash.

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The Department will provide software at the beginning of the burning-in period. Contractor shall give 5 working days notice before needing software. Program software provided by the Department.

Provide model 2070L controllers with the latest version of OS9 operating software and device drivers, composed of the unit chassis and at a minimum the following modules and assemblies:

- MODEL 2070 1B, CPU Module, Single Board
- MODEL 2070-2A, Field I/O Module (FI/O)
- MODEL 2070-3B, Front Panel Module (FP), Display B (8x40)
- MODEL 2070-4A, Power Supply Module, 10 AMP
- MODEL 2070-7A, Async Serial Com Module (9-pin RS-232)

Furnish one additional MODEL 2070-7A, Async Serial Com Module (9-pin RS-232) for all master controller locations.

For each master location and central control center, furnish a U.S. Robotics V.92 or approved equivalent auto-dial/auto-answer external modem to accomplish the interface to the Department-furnished microcomputers. Include all necessary hardware to ensure telecommunications.

3.2.MATERIALS – GENERAL CABINETS

Provide a moisture resistant coating on all circuit boards.

Provide one 20 mm diameter radial lead UL-recognized metal oxide varistor (MOV) between each load switch field terminal and equipment ground. Electrical performance is outlined below.

PROPERTIES OF MOV SURGE PROTECTOR	
Maximum Continuous Applied Voltage at 185° F	150 VAC (RMS) 200 VDC
Maximum Peak 8x20µs Current at 185° F	6500 A
Maximum Energy Rating at 185° F	80 J
Voltage Range 1 mA DC Test at 77° F	212-268 V
Max. Clamping Voltage 8x20µs, 100A at 77° F	395 V
Typical Capacitance (1 MHz) at 77° F	1600 pF

Provide a power line surge protector that is a two-stage device that will allow connection of the radio frequency interference filter between the stages of the device. Ensure that a maximum continuous current is at least 10A at 120V. Ensure that the device can withstand a minimum of 20 peak surge current occurrences at 20,000A for an 8x20 microsecond waveform. Provide a maximum clamp voltage of 395V at 20,000A with a nominal series inductance of 200µh. Ensure that the voltage does not exceed 395V. Provide devices that comply with the following:

Frequency (Hz)	Minimum Insertion Loss (dB)
60	0
10,000	30
50,000	55
100,000	50
500,000	50
2,000,000	60
5,000,000	40
10,000,000	20
20,000,000	25

3.3. MATERIALS – TYPE 170E CABINETS

A. Type 170 E Cabinets General:

Conform to the city of Los Angeles' Specification No. 54-053-08, *Traffic Signal Cabinet Assembly Specification* (dated July 2008), except as required herein.

Furnish model 336S pole mounted cabinets configured for 8 vehicle phases, 4 pedestrian phases, and 6 overlaps. When overlaps are required, provide auxiliary output files for the overlaps. Do not reassign load switches to accommodate overlaps unless shown on electrical details. Provide 336S pole mounted cabinets that are 46" high with 40" high internal rack assemblies.

Furnish model 332 base mounted cabinets configured for 8 vehicle phases, 4 pedestrian phases, and 6 overlaps. When overlaps are required, provide auxiliary output files for the overlaps. Do not reassign load switches to accommodate overlaps unless shown on electrical details.

Provide model 200 load switches, model 222 loop detector sensors, model 252 AC isolators, and model 242 DC isolators according to the electrical details. As a minimum, provide one (1) model 2018 conflict monitor, one (1) model 206L power supply unit, two (2) model 204 flashers, one (1) DC isolator (located in slot I14), and four (4) model 430 flash transfer relays (provide seven (7) model 430 flash transfer relays if auxiliary output file is installed) with each cabinet.

B. Type 170 E Cabinet Electrical Requirements:

Provide a cabinet assembly designed to ensure that upon leaving any cabinet switch or conflict monitor initiated flashing operation, the controller starts up in the programmed start up phases and start up interval.

Furnish two sets of non-fading cabinet wiring diagrams and schematics in a paper envelope or container and placed in the cabinet drawer.

All AC+ power is subject to radio frequency signal suppression.

Provide surge suppression in the cabinet for each type of cabinet device. Provide surge protection for the full capacity of the cabinet input file. Provide surge suppression devices that operate properly over a temperature range of -40° F to +185° F. Ensure the surge suppression devices provide both common and differential modes of protection.

Provide a pluggable power line surge protector that is installed on the back of the PDA (power distribution assembly) chassis to filter and absorb power line noise and switching transients. Ensure the device incorporates LEDs for failure indication and provides a dry relay contact closure for the purpose of remote sensing. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20μs).....20,000A

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Occurrences (8x20µs waveform).....	10 minimum @ 20,000A
Maximum Clamp Voltage.....	395VAC
Operating Current.....	15 amps
Response Time.....	< 5 nanoseconds

Provide a loop surge suppressor for each set of loop terminals in the cabinet. Ensure the device meets the following specifications:

Peak Surge Current (6 times, 8x20µs)	
(Differential Mode).....	400A
(Common Mode).....	1,000A
Occurrences (8x20µs waveform).....	500 min @ 200A
Maximum Clamp Voltage	
(Differential Mode @400A).....	35V
(Common Mode @1,000A).....	35V
Response Time.....	< 5 nanoseconds
Maximum Capacitance.....	35 pF

Provide a data communications surge suppressor for each communications line entering or leaving the cabinet. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20µs).....	10,000A
Occurrences (8x20µs waveform).....	100 min @ 2,000A
Maximum Clamp Voltage.....	Rated for equipment protected
Response Time.....	< 1 nanosecond
Maximum Capacitance.....	1,500 pF
Maximum Series Resistance.....	15Ω

Provide a DC signal surge suppressor for each DC input channel in the cabinet. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20µs).....	10,000A
Occurrences (8x20µs waveform).....	100 @ 2,000A
Maximum Clamp Voltage.....	30V
Response Time.....	< 1 nanosecond

Provide a 120 VAC signal surge suppressor for each AC+ interconnect signal input. Ensure the device meets the following specifications:

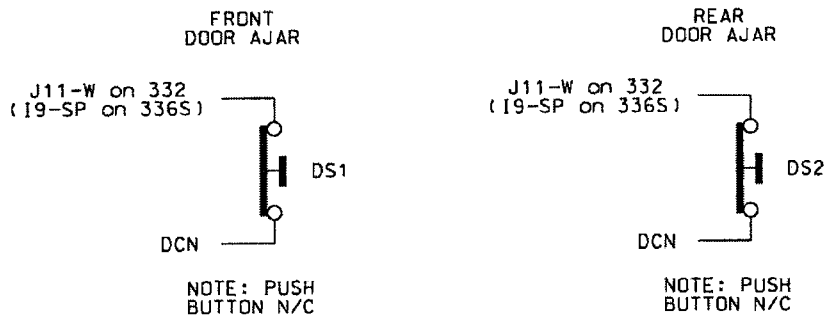
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Peak Surge Current (Single pulse, 8x20μs).....	20,000A
Maximum Clamp Voltage.....	350VAC
Response Time.....	< 200 nanoseconds
Discharge Voltage.....	<200 Volts @ 1,000A
Insulation Resistance.....	≥100 MΩ

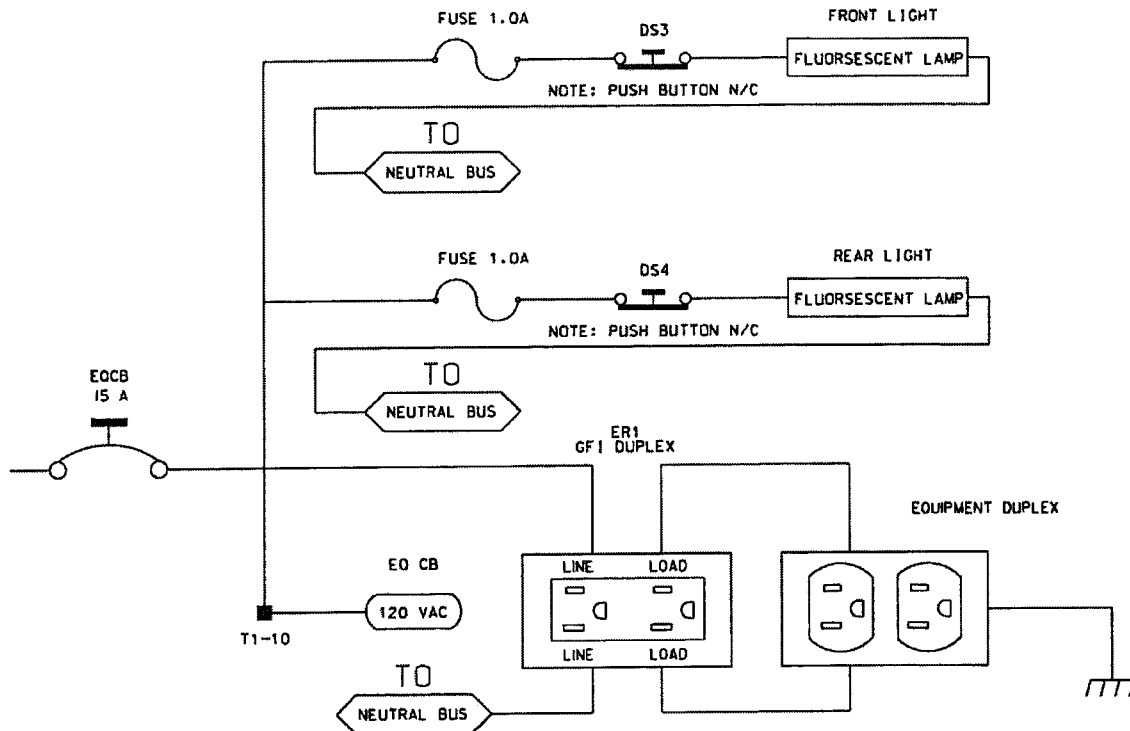
Provide conductors for surge protection wiring that are of sufficient size (ampacity) to withstand maximum overcurrents which could occur before protective device thresholds are attained and current flow is interrupted.

If additional surge protected power outlets are needed to accommodate fiber transceivers, modems, etc., install a UL listed, industrial, heavy-duty type power outlet strip with a minimum rating of 15 A / 125 VAC, 60 Hz. Provide a strip that has a minimum of 3 grounded outlets. Ensure the power outlet strip plugs into one of the controller unit receptacles located on the rear of the PDA. Ensure power outlet strip is mounted securely; provide strain relief if necessary.

Provide a door switch in the front and a door switch in the rear of the cabinet that will provide the controller unit with a Door Ajar alarm when either the front or the rear door is open. Ensure the door switches apply DC ground to the Input File when either the front door or the rear door is open.



Furnish a fluorescent fixture in the rear across the top of the cabinet and another fluorescent fixture in the front across the top of the cabinet at a minimum. Ensure that the fixtures provide sufficient light to illuminate all terminals, labels, switches, and devices in the cabinet. Conveniently locate the fixtures so as not to interfere with a technician's ability to perform work on any devices or terminals in the cabinet. Provide a protective diffuser to cover exposed bulbs. Install 16 watt T-4 lamps in the fluorescent fixtures. Provide a door switch to provide power to each fixture when the respective door is open. Wire the fluorescent fixtures to the 15 amp ECB (equipment circuit breaker).

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Furnish a police panel with a police panel door. For model 336S cabinets, mount the police panel on the rear door. Ensure that the police panel door permits access to the police panel when the main door is closed. Ensure that no rainwater can enter the cabinet even with the police panel door open. Provide a police panel door hinged on the right side as viewed from the front. Provide a police panel door lock that is keyed to a standard police/fire call box key. In addition to the requirements of LA Specification No. 54-053-08, provide the police panel with a toggle switch connected to switch the intersection operation between normal stop-and-go operation (AUTO) and manual operation (MANUAL). Ensure that manual control can be implemented using inputs and software such that the controller provides full programmed clearance times for the yellow clearance and red clearance for each phase while under manual control.

Provide a 1/4-inch locking phone jack in the police panel for a hand control to manually control the intersection. Provide sufficient room in the police panel for storage of a hand control and cord.

Ensure the 336S cabinet Input File is wired as follows:

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336S Cabinet														
Port-Bit/C-1 Pin Assignment														
Slot #	1	2	3	4	5	6	7	8	9	10	11	12	13	14
C-1 (Spares)	59	60	61	62	63	64	65	66	75	76	77	78	79	80
Port	3-2	1-1	3-4	1-3	3-1	1-2	3-3	1-4	2-5	5-5	5-6	5-1	5-2	6-7
C-1	56	39	58	41	55	40	57	42	51	71	72	67	68	81
Port	2-1	1-5	2-3	1-7	2-2	1-6	2-4	1-8	2-6	5-7	5-8	5-3	5-4	6-8
C-1	47	43	49	45	48	44	50	46	52	73	74	69	70	82

For model 332 base mounted cabinets, ensure terminals J14-E and J14-K are wired together on the rear of the Input File. Connect TB9-12 (J14 Common) on the Input Panel to T1-2 (AC-) on the rear of the PDA.

Provide detector test switches mounted at the top of the cabinet rack or other convenient location which may be used to place a call on each of eight phases based on the chart below. Provide three positions for each switch: On (place call), Off (normal detector operation), and Momentary On (place momentary call and return to normal detector operation after switch is released). Ensure that the switches are located such that the technician can read the controller display and observe the intersection.

Connect detector test switches for cabinets as follows:

336S Cabinet		332 Cabinet	
Detector Call Switches	Terminals	Detector Call Switches	Terminals
Phase 1	I1-F	Phase 1	I1-W
Phase 2	I2-F	Phase 2	I4-W
Phase 3	I3-F	Phase 3	I5-W
Phase 4	I4-F	Phase 4	I8-W
Phase 5	I5-F	Phase 5	J1-W
Phase 6	I6-F	Phase 6	J4-W
Phase 7	I7-F	Phase 7	J5-W
Phase 8	I8-F	Phase 8	J8-W

Provide the PCB 28/56 connector for the conflict monitor unit (CMU) with 28 independent contacts per side, dual-sided with 0.156 inch contact centers. Provide the PCB 28/56 connector contacts with solder eyelet terminations. Ensure all connections to the PCB 28/56 connector are soldered to the solder eyelet terminations.

Ensure that all cabinets have the CMU connector wired according to the 332 cabinet connector pin assignments (include all wires for auxiliary output file connection). Wire pins 13, 16, R, and U of the CMU connector to a separate 4 pin plug, P1, as shown below. Provide a second plug, P2, which will mate with P1 and is wired to the auxiliary output file as shown below. Provide an additional plug, P3, which will mate with P1 and is wired to the pedestrian yellow circuits as shown below. When no auxiliary output file is installed in the cabinet, provide wires for the green and yellow inputs for channels 11, 12, 17, and 18, the red inputs for channels 17 and 18, and the wires for the P2 plug. Terminate the two-foot wires with ring type lugs, insulated, and bundled for optional use.

P1			P2		P3	
PIN	FUNCTION	CONN TO	FUNCTION	CONN TO	FUNCTION	CONN TO
1	CH-9G	CMU-13	OLA-GRN	A123	2P-YEL	114
2	CH-9Y	CMU-16	OLA-YEL	A122	4P-YEL	105
3	CH-10G	CMU-R	OLB-GRN	A126	6P-YEL	120
4	CH-10Y	CMU-U	OLB-YEL	A125	8P-YEL	111

Connect the P20 terminal assembly (red monitor board) to a connector installed on the front of the type 2018 enhanced conflict monitor through a 3-1/2 foot 20-wire ribbon cable. Ensure that the ribbon cable connector and the connector on the conflict monitor are keyed to ensure proper connection. Ensure that removal of the P20 ribbon cable will cause the conflict monitor to recognize a latching fault condition and place the cabinet into flashing operation.

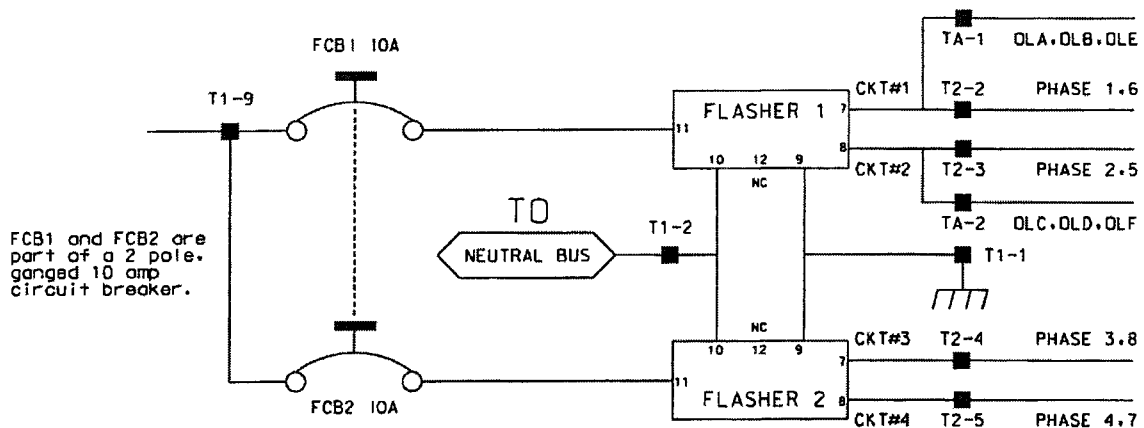
Wire the P20 connector to the traffic signal red displays to provide inputs to the conflict monitor as shown below. Ensure the pedestrian Don't Walk circuits are wired to channels 13 through 16 of the P20 connector. When no auxiliary output file is installed in the cabinet, provide wires for channels 9 through 12 reds. Terminate the two-foot wires with ring type lugs, insulated, and bundled for optional use.

Pin #	Function	Pin #	Function
1	Channel 15 Red	11	Channel 9 Red
2	Channel 16 Red	12	Channel 8 Red
3	Channel 14 Red	13	Channel 7 Red
4	GND	14	Channel 6 Red
5	Channel 13 Red	15	Channel 5 Red
6	Special Function 2	16	Channel 4 Red
7	Channel 12 Red	17	Channel 3 Red
8	Special Function 1	18	Channel 2 Red
9	Channel 10 Red	19	Channel 1 Red
10	Channel 11 Red	20	Red Enable

Ensure the controller unit outputs to the auxiliary output file are pre-wired to the C5 connector. When no auxiliary output file is installed in the cabinet, connect the C5 connector to a storage socket located on the Input Panel or on the rear of the PDA.

In addition to the requirements of LA Specification No. 54-053-08, ensure relay K1 on the Power Distribution Assembly (PDA) is a four pole relay and K2 on the PDA is a two pole relay.

Provide a two pole, ganged circuit breaker for the flash bus circuit. Ensure the flash bus circuit breaker is an inverse time circuit breaker rated for 10 amps at 120 VAC with a minimum of 10,000 RMS symmetrical amperes short circuit current rating. Do not provide the auxiliary switch feature on the flash bus circuit breaker. Ensure the ganged flash bus circuit breaker is certified by the circuit breaker manufacturer to provide gang tripping operation.



Ensure auxiliary output files are wired as follows:

AUXILIARY OUTPUT FILE TERMINAL BLOCK TA ASSIGNMENTS	
POSITION	FUNCTION
1	Flasher Unit #1, Circuit 1/FTR1 (OLA, OLB)/FTR3 (OLE)
2	Flasher Unit #1, Circuit 2/FTR2 (OLC, OLD)/FTR3 (OLF)
3	Flash Transfer Relay Coils
4	AC -
5	Power Circuit 5
6	Power Circuit 5
7	Equipment Ground Bus
8	NC

· Provide four spare load resistors mounted in each cabinet. Ensure each load resistor is rated as shown in the table below. Wire one side of each load resistor to AC-. Connect the other side of each resistor to a separate terminal on a four (4) position terminal block. Mount the load resistors and terminal block either inside the back of Output File No. 1 or on the upper area of the Service Panel.

ACCEPTABLE LOAD RESISTOR VALUES	
VALUE (ohms)	WATTAGE
1.5K – 1.9 K	25W (min)
2.0K – 3.0K	10W (min)

Provide Model 200 load switches, Model 204 flashers, Model 242 DC isolators, Model 252 AC isolators, and Model 206L power supply units that conform to CALTRANS' "Transportation Electrical Equipment Specifications" dated March 12, 2009 with Erratum 1.

C. Type 170 E Cabinet Physical Requirements:

Do not mold, cast, or scribe the name "City of Los Angeles" on the outside of the cabinet door as specified in LA Specification No. 54-053-08. Do not provide a Communications Terminal Panel as specified in LA Specification No. 54-053-08. Do not provide terminal block TBB on the Service

Panel. Do not provide Cabinet Verification Test Program software or associated test jigs as specified in LA Specification No. 54-053-08.

Furnish unpainted, natural, aluminum cabinet shells. Ensure that all non-aluminum hardware on the cabinet is stainless steel or a Department approved non-corrosive alternate.

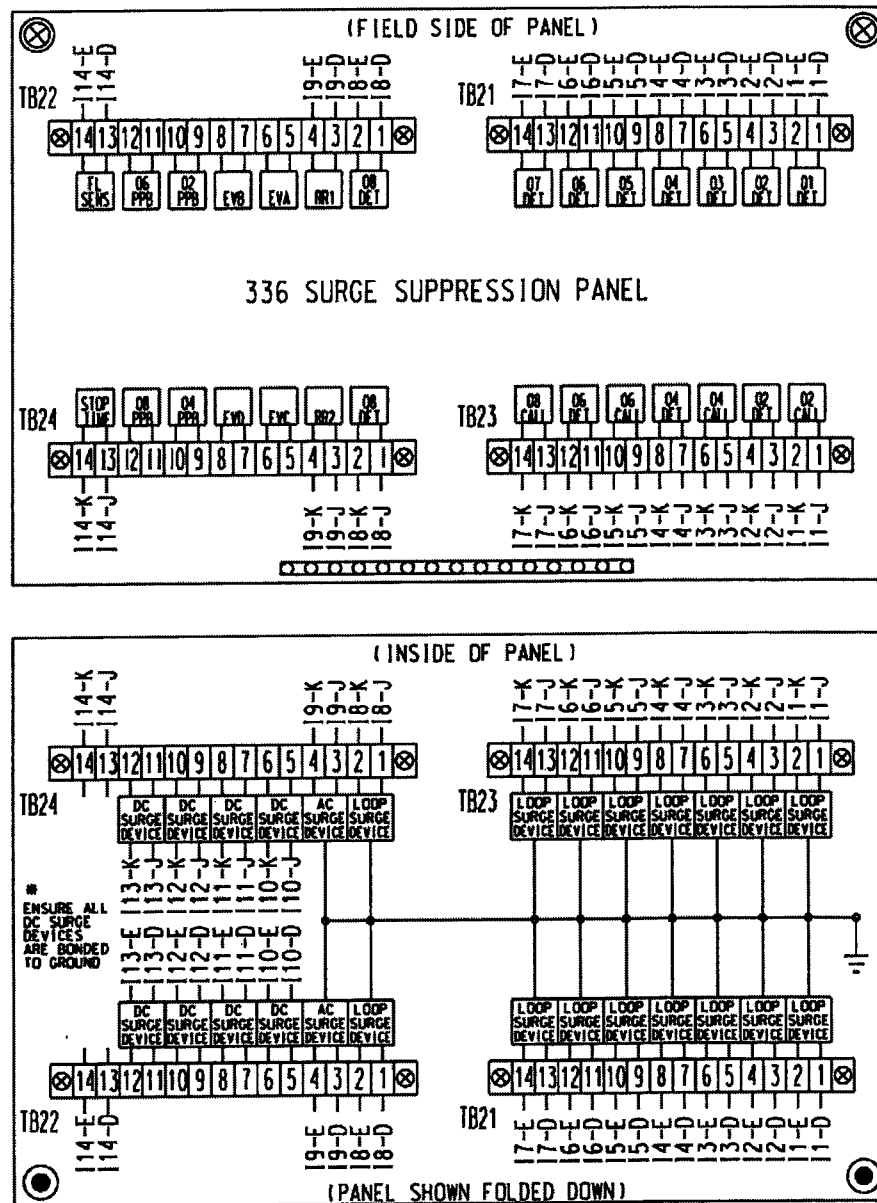
Ensure the lifting eyes, gasket channels, police panel, and all supports welded to the enclosure and doors are fabricated from 0.125 inch minimum thickness aluminum sheet and meet the same standards as the cabinet and doors.

Provide front and rear doors with latching handles that allow padlocking in the closed position. Furnish 0.75 inch minimum diameter stainless steel handles with a minimum 0.5 inch shank. Place the padlocking attachment at 4.0 inches from the handle shank center to clear the lock and key. Provide an additional 4.0 inches minimum gripping length.

Provide Corbin #2 locks on the front and rear doors. Provide one (1) Corbin #2 and one (1) police master key with each cabinet. Ensure main door locks allow removal of keys in the locked position only.

Provide a surge protection panel with 16 loop surge protection devices and designed to allow sufficient free space for wire connection/disconnection and surge protection device replacement. For model 332 cabinets, provide an additional 20 loop surge protection devices. Provide an additional two AC+ interconnect surge devices to protect one slot and eight DC surge protection devices to protect four slots. Provide no protection devices on slot I14.

For pole mounted cabinets, mount surge protection devices for the AC+ interconnect inputs, inductive loop detector inputs, and low voltage DC inputs on a swing down panel assembly fabricated from sturdy aluminum. Attach the swing down panel to the bottom rear cabinet rack assembly using thumb screws. Ensure the swing down panel allows for easy removal of the input file without removing the surge protection panel assembly or its parts. Have the surge protection devices mounted horizontally on the panel and soldered to the feed through terminals of four 14 position terminal blocks with #8 screws mounted on the other side. Ensure the top row of terminals is connected to the upper slots and the bottom row of terminals is connected to the bottom slots. Provide a 15 position copper equipment ground bus attached to the field terminal side (outside) of the swing down panel for termination of loop lead-in shield grounds. Ensure that a Number 4 AWG green wire connects the surge protection panel assembly ground bus to the main cabinet equipment ground.



For base mounted cabinets, mount surge protection panels on the left side of the cabinet as viewed from the rear. Attach each panel to the cabinet rack assembly using bolts and make it easily removable. Mount the surge protection devices in vertical rows on each panel and connect the devices to one side of 12 position, double row terminal blocks with #8 screws. For each surge protection panel, terminate all grounds from the surge protection devices on a copper equipment ground bus attached to the surge protection panel. Wire the terminals to the rear of a standard input file using spade lugs for input file protection.

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Provide permanent labels that indicate the slot and the pins connected to each terminal that may be viewed from the rear cabinet door. Label and orient terminals so that each pair of inputs is next to each other. Indicate on the labeling the input file (I or J), the slot number (1-14) and the terminal pins of the input slots (either D & E for upper or J & K for lower).

Provide a minimum 14 x 16 inch pull out, hinged top shelf located immediately below controller mounting section of the cabinet. Ensure the shelf is designed to fully expose the table surface outside the controller at a height approximately even with the bottom of the controller. Ensure the shelf has a storage bin interior which is a minimum of 1 inch deep and approximately the same dimensions as the shelf. Provide an access to the storage area by lifting the hinged top of the shelf. Fabricate the shelf and slide from aluminum or stainless steel and ensure the assembly can support the 2070L controller plus 15 pounds of additional weight. Ensure shelf has a locking mechanism to secure it in the fully extended position and does not inhibit the removal of the 2070L controller or removal of cards inside the controller when fully extended. Provide a locking mechanism that is easily released when the shelf is to be returned to its non-use position directly under the controller.

D. Model 2018 Enhanced Conflict Monitor:

Furnish Model 2018 Enhanced Conflict Monitors that provide monitoring of 18 channels. Ensure each channel consists of a green, yellow, and red field signal input. Ensure that the conflict monitor meets or exceeds CALTRANS' Transportation Electrical Equipment Specifications dated March 12, 2009 with Erratum 1 (hereafter referred to as CALTRANS' 2009 TEES) for a model 210 monitor unit and other requirements stated in this specification.

Ensure the conflict monitor is provided with an 18 channel conflict programming card. Pin EE and Pin T of the conflict programming card shall be connected together. Pin 16 of the conflict programming card shall be floating. Ensure that the absence of the conflict programming card will cause the conflict monitor to trigger (enter into fault mode), and remain in the triggered state until the programming card is properly inserted and the conflict monitor is reset.

Provide a conflict monitor that incorporates LED indicators into the front panel to dynamically display the status of the monitor under normal conditions and to provide a comprehensive review of field inputs with monitor status under fault conditions. Ensure that the monitor indicates the channels that were active during a conflict condition and the channels that experienced a failure for all other per channel fault conditions detected. Ensure that these indications and the status of each channel are retained until the Conflict Monitor is reset. Furnish LED indicators for the following:

- AC Power (Green LED indicator)
- VDC Failed (Red LED indicator)
- WDT Error (Red LED indicator)
- Conflict (Red LED indicator)
- Red Fail (Red LED indicator)
- Dual Indication (Red LED indicator)
- Yellow/Clearance Failure (Red LED indicator)
- PCA/PC Ajar (Red LED indicator)
- Monitor Fail/Diagnostic Failure (Red LED indicator)
- 54 Channel Status Indicators (1 Red, 1 Yellow, and 1 Green LED indicator for each of the 18 channels)

Provide a switch to set the Red Fail fault timing. Ensure that when the switch is in the ON position the Red Fail fault timing value is set to 1350 +/- 150ms (2018 mode). Ensure that when the switch is in the OFF position the Red Fail fault timing value is set to 850 +/- 150ms (210 mode).

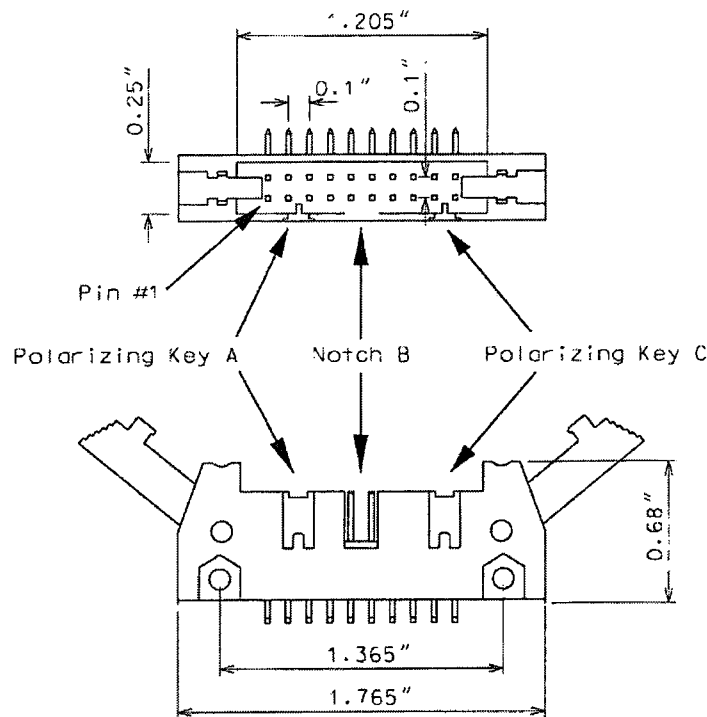
Provide a switch to set the Watchdog fault timing. Ensure that when the switch is in the ON position the Watchdog fault timing value is set to 1.0 +/- 0.1s (2018 mode). Ensure that when the switch is in the OFF position the Watchdog fault timing value is set to 1.5 +/- 0.1s (210 mode).

Provide a jumper or switch to set the AC line brown-out levels. Ensure that when the jumper is present or the switch is in the ON position the AC line dropout voltage threshold is 98 +/- 2 Vrms, the AC line restore voltage threshold is 103 +/- 2 Vrms, and the AC line brown-out timing value is set to 400 +/- 50ms (2018 mode). Ensure that when the jumper is not present or the switch is in the OFF position the AC line dropout voltage threshold is 92 +/- 2 Vrms, the AC line restore voltage threshold is 98 +/- 2 Vrms, and the AC line brown-out timing value is set to 80 +/- 17ms (210 mode).

Provide a jumper or switch that will enable and disable the Watchdog Latch function. Ensure that when the jumper is not present or the switch is in the OFF position the Watchdog Latch function is disabled. In this mode of operation, a Watchdog fault will be reset following a power loss, brownout, or power interruption. Ensure that when the jumper is present or the switch is in the ON position the Watchdog Latch function is enabled. In this mode of operation, a Watchdog fault will be retained until a Reset command is issued.

Provide a jumper that will reverse the active polarity for pin #EE (output relay common). Ensure that when the jumper is not present pin #EE (output relay common) will be considered 'Active' at a voltage greater than 70 Vrms and 'Not Active' at a voltage less than 50 Vrms (Caltrans mode). Ensure that when the jumper is present pin #EE (output relay common) will be considered 'Active' at a voltage less than 50 Vrms and 'Not Active' at a voltage greater than 70 Vrms (Failsafe mode).

In addition to the connectors required by CALTRANS' 2009 TEES, provide the conflict monitor with a red interface connector mounted on the front of the monitor. Ensure the connector is a 20 pin, right angle, male connector with latching clip locks and polarizing keys. Ensure the right angle solder tails are designed for a 0.062" thick printed circuit board. Keying of the connector shall be between pins 3 and 5, and between 17 and 19. Ensure the connector has two rows of pins with the odd numbered pins on one row and the even pins on the other row. Ensure the connector pin row spacing is 0.10" and pitch is 0.10". Ensure the mating length of the connector pins is 0.24". Ensure the pins are finished with gold plating 30μ" thick.

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

Pin #	Function	Pin #	Function
1	Channel 15 Red	2	Channel 16 Red
3	Channel 14 Red	4	Chassis Ground
5	Channel 13 Red	6	Special Function 2
7	Channel 12 Red	8	Special Function 1
9	Channel 10 Red	10	Channel 11 Red
11	Channel 9 Red	12	Channel 8 Red
13	Channel 7 Red	14	Channel 6 Red
15	Channel 5 Red	16	Channel 4 Red
17	Channel 3 Red	18	Channel 2 Red
19	Channel 1 Red	20	Red Enable

Ensure that the removal of the P-20 red interface ribbon cable will cause the monitor to recognize a latching fault condition and place the cabinet into flashing operation.

Provide Special Function 1 and Special Function 2 inputs to the unit which shall disable only Red Fail Monitoring when either input is sensed active. A Special Function input shall be sensed active when the input voltage exceeds 70 Vrms with a minimum duration of 550 ms. A Special Function input shall be sensed not active when the input voltage is less than 50 Vrms or the duration is less than 250 ms. A Special Function input is undefined by these specifications and may or may not be sensed active when the input voltage is between 50 Vrms and 70 Vrms or the duration is between 250 ms and 550 ms.

Ensure the conflict monitor recognizes field signal inputs for each channel that meet the following requirements:

- consider a Red input greater than 70 Vrms and with a duration of at least 500 ms as an “on” condition;
- consider a Red input less than 50 Vrms or with a duration of less than 200 ms as an “off” condition (no valid signal);
- consider a Red input between 50 Vrms and 70 Vrms or with a duration between 200 ms and 500 ms to be undefined by these specifications;
- consider a Green or Yellow input greater than 25 Vrms and with a duration of at least 500 ms as an “on” condition;
- consider a Green or Yellow input less than 15 Vrms or with a duration of less than 200 ms as an “off” condition; and
- consider a Green or Yellow input between 15 Vrms and 25 Vrms or with a duration between 200 ms and 500 ms to be undefined by these specifications.

Provide a conflict monitor that recognizes the faults specified by CALTRANS’ 2009 TEES and the following additional faults. Ensure the conflict monitor will trigger upon detection of a fault and will remain in the triggered (in fault mode) state until the unit is reset at the front panel or through the external remote reset input for the following failures:

1. **Red Monitoring or Absence of Any Indication (Red Failure):** A condition in which no “on” voltage signal is detected on any of the green, yellow, or red inputs to a given monitor channel. If a signal is not detected on at least one input (R, Y, or G) of a conflict monitor channel for a period greater than 1000 ms when used with a 170 controller and 1500 ms when used with a 2070L controller, ensure monitor will trigger and put the intersection into flash. If the absence of any indication condition lasts less than 750 ms when used with a 170 controller and 1200 ms when used with a 2070L controller, ensure conflict monitor will not trigger. Red fail monitoring shall be enabled on a per channel basis by the use of switches located on the conflict monitor. Have red monitoring occur when all of the following input conditions are in effect:
 - a) Red Enable input to monitor is active (Red Enable voltages are “on” at greater than 70 Vrms, off at less than 50 Vrms, undefined between 50 and 70 Vrms), and
 - b) Neither Special Function 1 nor Special Function 2 inputs are active.
 - c) Pin #EE (output relay common) is not active
2. **Short/Missing Yellow Indication Fault (Clearance Error):** Yellow indication following a green is missing or shorter than 2.7 seconds (with ± 0.1 -second accuracy). If a channel fails to detect an “on” signal at the Yellow input for a minimum of 2.7 seconds (± 0.1 second) following the detection of an “on” signal at a Green input for that channel, ensure that the monitor triggers and generates a clearance/short yellow error fault indication. Short/missing yellow (clearance) monitoring shall be enabled on a per channel basis by the use of switches located on the conflict monitor. This fault shall not occur when the channel is programmed for Yellow Inhibit, when the Red Enable signal is inactive or pin #EE (output relay common) is active.
3. **Dual Indications on the Same Channel:** In this condition, more than one indication (R,Y,G) is detected as “on” at the same time on the same channel. If dual indications are detected for a period greater than 500 ms, ensure that the conflict monitor triggers and displays the proper failure indication (Dual Ind fault). If this condition is detected for less

than 200 ms, ensure that the monitor does not trigger. G-Y-R dual indication monitoring shall be enabled on a per channel basis by the use of switches located on the conflict monitor. G-Y dual indication monitoring shall be enabled for all channels by use of a switch located on the conflict monitor. This fault shall not occur when the Red Enable signal is inactive or pin #EE (output relay common) is active.

4. **Configuration Settings Change:** The configuration settings are comprised of (as a minimum) the permissive diode matrix, dual indication switches, yellow disable jumpers, any option switches, any option jumpers, and the Watchdog Enable switch. Ensure the conflict monitor compares the current configuration settings with the previous stored configuration settings on power-up, on reset, and periodically during operation. If any of the configuration settings are changed, ensure that the conflict monitor triggers and causes the program card indicator to flash. Ensure that configuration change faults are only reset by depressing and holding the front panel reset button for a minimum of three seconds. Ensure the external remote reset input does not reset configuration change faults.

Ensure the conflict monitor will trigger and the AC Power indicator will flash at a rate of 2 Hz \pm 20% with a 50% duty cycle when the AC Line voltage falls below the “drop-out” level. Ensure the conflict monitor will resume normal operation when the AC Line voltage returns above the “restore” level. Ensure the AC Power indicator will remain illuminated when the AC voltage returns above the “restore” level. Should an AC Line power interruption occur while the monitor is in the fault mode, then upon restoration of AC Line power, the monitor will remain in the fault mode and the correct fault and channel indicators will be displayed.

Provide a flash interval of at least 6 seconds and at most 10 seconds in duration following a power-up, an AC Line interruption, or a brownout restore. Ensure the conflict monitor will suspend all fault monitoring functions, close the Output relay contacts, and flash the AC indicator at a rate of 4 Hz \pm 20% with a 50% duty cycle during this interval. Ensure the termination of the flash interval after at least 6 seconds if the Watchdog input has made 5 transitions between the True and False state and the AC Line voltage is greater than the “restore” level. If the watchdog input has not made 5 transitions between the True and False state within 10 \pm 0.5 seconds, the monitor shall enter a WDT error fault condition.

Ensure the conflict monitor will monitor an intersection with a minimum of four approaches using the four-section Flashing Yellow Arrow (FYA) vehicle traffic signal as outlined by the NCHRP 3-54 research project for protected-permissive left turn signal displays. Ensure the conflict monitor will operate in the FYA mode and FYAc (Compact) mode as specified below to monitor each channel for the following fault conditions: Conflict, Red Fail, Dual Indication, and Clearance. Provide a switch to select between the FYA mode and FYAc mode. Provide a switch to select each FYA phase movement for monitoring.

FYA mode

FYA Signal Head	Phase 1	Phase 3	Phase 5	Phase 7
Red Arrow	Channel 9 Red	Channel 10 Red	Channel 11 Red	Channel 12 Red
Yellow Arrow	Channel 9 Yellow	Channel 10 Yellow	Channel 11 Yellow	Channel 12 Yellow

Flashing Yellow Arrow	Channel 9 Green	Channel 10 Green	Channel 11 Green	Channel 12 Green
Green Arrow	Channel 1 Green	Channel 3 Green	Channel 5 Green	Channel 7 Green

FYAc mode

FYA Signal Head	Phase 1	Phase 3	Phase 5	Phase 7
Red Arrow	Channel 1 Red	Channel 3 Red	Channel 5 Red	Channel 7 Red
Yellow Arrow	Channel 1 Yellow	Channel 3 Yellow	Channel 5 Yellow	Channel 7 Yellow
Flashing Yellow Arrow	Channel 1 Green	Channel 3 Green	Channel 5 Green	Channel 7 Green
Green Arrow	Channel 9 Green	Channel 9 Yellow	Channel 10 Green	Channel 10 Yellow

Ensure that the conflict monitor will log at least nine of the most recent events detected by the monitor in non-volatile EEPROM memory (or equivalent). For each event, record at a minimum the time, date, type of event, status of each field signal indication with RMS voltage, and specific channels involved with the event. Ensure the conflict monitor will log the following events: monitor reset, configuration, previous fault, and AC line. Furnish the signal sequence log that shows all channel states (Greens, Yellows, and Reds) and the Red Enable State for a minimum of 2 seconds prior to the current fault trigger point. Ensure the display resolution of the inputs for the signal sequence log is not greater than 50 ms.

Provide a RS-232C/D compliant port (DB-9 female connector) on the front panel of the conflict monitor in order to provide communications from the conflict monitor to the 170/2070L controller or to a Department-furnished laptop computer. Electrically isolate the port interface electronics from all monitor electronics, excluding Chassis Ground. Ensure that the controller can receive all event log information through a controller Asynchronous Communications Interface Adapter (Type 170E) or Async Serial Comm Module (2070L). Provide a Windows based graphic user interface software to communicate directly through the same monitor RS-232C/D compliant port to retrieve and view all event log information to a Department-furnished laptop computer. The RS-232C/D compliant port on the monitor shall allow the monitor to function as a DCE device with pin connections as follows:

Conflict Monitor RS-232C/D (DB-9 Female) Pinout		
Pin Number	Function	I/O
1	DCD	O
2	TX Data	O
3	RX Data	I
4	DTR	I
5	Ground	-
6	DSR	O
7	CTS	I
8	RTS	O
9	NC	-

MONITOR BOARD EDGE CONNECTOR

Pin #	Function (Back Side)	Pin #	Function (Component Side)
1	Channel 2 Green	A	Channel 2 Yellow
2	Channel 13 Green	B	Channel 6 Green
3	Channel 6 Yellow	C	Channel 15 Green
4	Channel 4 Green	D	Channel 4 Yellow
5	Channel 14 Green	E	Channel 8 Green
6	Channel 8 Yellow	F	Channel 16 Green
7	Channel 5 Green	H	Channel 5 Yellow
8	Channel 13 Yellow	J	Channel 1 Green
9	Channel 1 Yellow	K	Channel 15 Yellow
10	Channel 7 Green	L	Channel 7 Yellow
11	Channel 14 Yellow	M	Channel 3 Green
12	Channel 3 Yellow	N	Channel 16 Yellow
13	Channel 9 Green	P	Channel 17 Yellow
14	Channel 17 Green	R	Channel 10 Green
15	Channel 11 Yellow	S	Channel 11 Green
16	Channel 9 Yellow	T	Channel 18 Yellow
17	Channel 18 Green	U	Channel 10 Yellow
--		--	
18	Channel 12 Yellow	V	Channel 12 Green
19	Channel 17 Red	W	Channel 18 Red
20	Chassis Ground	X	Not Assigned
21	AC-	Y	DC Common
22	Watchdog Timer	Z	External Test Reset
23	+24VDC	AA	+24VDC
24	Tied to Pin 25	BB	Stop Time (Output)
25	Tied to Pin 24	CC	Not Assigned
26	Not Assigned	DD	Not Assigned
27	Relay Output, Side #3, N.O.	EE	Relay Output, Side #2, Common
28	Relay Output, Side #1, N.C.	FF	AC+

-- Slotted for keying between Pins 17/U and 18/V

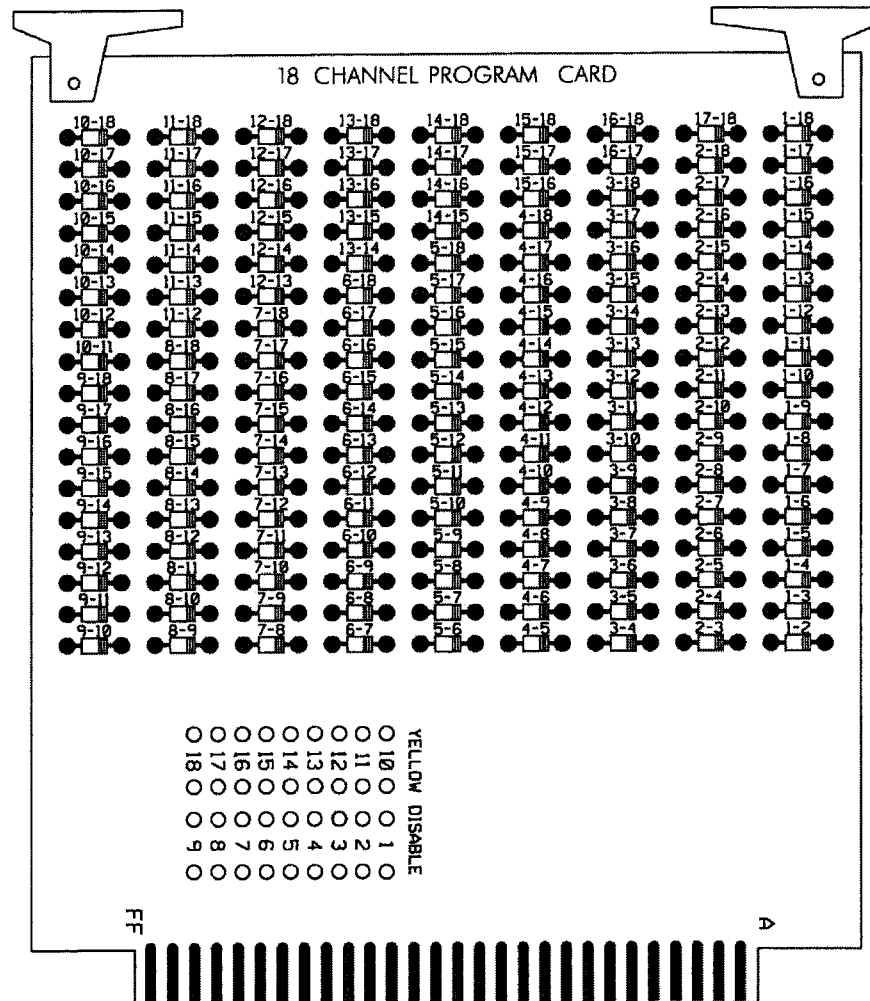
CONFLICT PROGRAM CARD PIN ASSIGNMENTS

Pin #	Function (Back Side)	Pin #	Function (Component Side)
1	Channel 2 Green	A	Channel 1 Green
2	Channel 3 Green	B	Channel 2 Green
3	Channel 4 Green	C	Channel 3 Green
4	Channel 5 Green	D	Channel 4 Green
5	Channel 6 Green	E	Channel 5 Green
6	Channel 7 Green	F	Channel 6 Green
7	Channel 8 Green	H	Channel 7 Green
8	Channel 9 Green	J	Channel 8 Green
9	Channel 10 Green	K	Channel 9 Green
10	Channel 11 Green	L	Channel 10 Green
11	Channel 12 Green	M	Channel 11 Green
12	Channel 13 Green	N	Channel 12 Green
13	Channel 14 Green	P	Channel 13 Green
14	Channel 15 Green	R	Channel 14 Green
15	Channel 16 Green	S	Channel 15 Green
16	N/C	T	PC AJAR
17	Channel 1 Yellow	U	Channel 9 Yellow
18	Channel 2 Yellow	V	Channel 10 Yellow
19	Channel 3 Yellow	W	Channel 11 Yellow
20	Channel 4 Yellow	X	Channel 12 Yellow
21	Channel 5 Yellow	Y	Channel 13 Yellow
22	Channel 6 Yellow	Z	Channel 14 Yellow
23	Channel 7 Yellow	AA	Channel 15 Yellow
24	Channel 8 Yellow	BB	Channel 16 Yellow
--		--	
25	Channel 17 Green	CC	Channel 17 Yellow
26	Channel 18 Green	DD	Channel 18 Yellow
27	Channel 16 Green	EE	PC AJAR (Program Card)
28	Yellow Inhibit Common	FF	Channel 17 Green

-- Slotted for keying between Pins 24/BB and 25/CC

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Signals & Intelligent Transportation Systems

**3.4. MATERIALS – TYPE 170 DETECTOR SENSOR UNITS**

Furnish detector sensor units that comply with Chapter 5 Section 1, “General Requirements,” and Chapter 5 Section 2, “Model 222 & 224 Loop Detector Sensor Unit Requirements,” of the CALTRANS “Transportation Electrical Equipment Specifications” dated March 12, 2009 with Erratum 1.

Project R-2633BB

**Brunswick /
New Hanover
Counties**

**Project Special Provisions
Structures and Walls**

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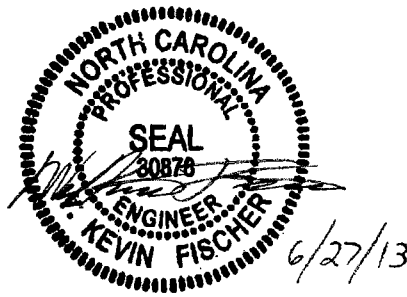
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For MSE Retaining Walls, see Geotechnical special provisions.

For Static Axial Compressive Load Tests, see Geotechnical special provisions.

For Embedded Data Collectors, see Geotechnical special provisions.



PROJECT SPECIAL PROVISIONS
STRUCTURES

PROJECT R-2633BB

BRUNSWICK/NEW HANOVER COUNTY

MAINTENANCE AND PROTECTION OF TRAFFIC
BENEATH PROPOSED STRUCTURE AT STATION 425+60.75 -L-

(8-13-04)

1.0 GENERAL

Maintain traffic on SR 1394 (Sutton Steam Plant Rd.) as shown in Traffic Control Plans and as directed by the Engineer.

Provide a minimum temporary vertical clearance of 15'-6" at all times during construction.

Submit plans and calculations for review and approval for protecting traffic and bracing girders, as described herein, at the above station before beginning work at this location. Have the drawings and design calculations prepared, signed, and sealed by a North Carolina Registered Professional Engineer. The approval of the Engineer will not relieve the Contractor of the responsibility for the safety of the method or equipment.

2.0 PROTECTION OF TRAFFIC

Protect traffic from any operation that affords the opportunity for construction materials, equipment, tools, etc. to be dropped into the path of traffic beneath the structure. Based on Contractor means and methods determine and clearly define all dead and live loads for this system, which, at a minimum, shall be installed between beams or girders over any travelway or shoulder area where traffic is maintained. Install the protective system before beginning any construction operations over traffic. In addition, for these same areas, keep the overhang falsework in place until after the rails have been poured.

3.0 BRACING GIRDERS

Brace girders to resist wind forces, weight of forms and other temporary loads, especially those eccentric to the vertical axis of the member during all stages of erection and construction. Before casting of intermediate diaphragms, decks, or connecting steel diaphragms do not allow the horizontal movement of girders to exceed ½ inch.

4.0 BASIS OF PAYMENT

Payment at the contract unit prices for the various pay items will be full compensation for the above work.

R-2633BB

**CONSTRUCTION, MAINTENANCE AND REMOVAL
OF TEMPORARY ACCESS AT STATION 353+32.50 -L-**

(SPECIAL)

GENERAL

Construct, maintain, and remove the temporary access required to provide the working area necessary for construction of the new bridge, construction of the temporary detour structure, or for the removal of an existing bridge, as applicable. Temporary access may include other methods than those outlined in this Special Provision; however, all types of temporary access are required to meet the requirements of all permits, the Standard Specifications, and this Special Provision.

The cost of the temporary supports and strong-backs shall be included in this pay item.

1.0 TEMPORARY WORK BRIDGE

Construction of a temporary work bridge is permitted as shown on the plans. The temporary work bridge shall have a minimum span length of 20 feet. Piles for the temporary work bridge shall not be located within 5 diameters (center to center) of the proposed permanent bridge piles. Submit details of the temporary work bridge to the Engineer prior to constructing the work bridge to ensure conformance with the plans and all permits. Completely remove the temporary bridge including the temporary piles prior to final acceptance or as otherwise required by the permits.

2.0 BASIS OF PAYMENT

The lump sum price bid for "Construction, Maintenance and Removal of Temporary Access at Station 353+32.50-L-" will be full compensation for the above work, or other methods of access, including all material, work bridge components, equipment, tools, labor, disposal, and incidentals necessary to complete the work required to construct both the proposed right and left lane bridges.

TEMPORARY BENTS

(9-30-11)

When girder erection requires the use of temporary bents, design, construct, maintain and afterwards remove the temporary bents in accordance with the Standard Specifications and this Special Provision. For the purpose of this Special Provision, the term "temporary bents" includes girder erection temporary bents, vertical shoring and proprietary shoring systems.

Temporary bents for structures over railroads shall maintain a minimum horizontal clearance of 25' from center of track.

Design temporary bents in accordance with the 1995 AASHTO Guide Design Specification for Bridge Temporary Works (including the 2008 Interim Revisions) and the Project Special Provision entitled "Falsework and Formwork". The design calculations and detailed drawings of the structural components shall be signed and sealed by a North Carolina Registered Professional Engineer.

Submit design calculations and detailed drawings of temporary bents to the Engineer for review and approval. The detailed drawings shall show the position of the temporary bents in relationship to the existing travel way, the location of the temporary bents with respect to the ends of the girders, the top of support elevations for setting girders in the cambered position, and a girder erection procedure. For stream crossings, determine the bent stability assuming a scour depth equal to 250% of the pile diameter or width below the existing bed elevation. The Engineer may require a more detailed analysis of scour depth for temporary bents containing more than a single row of piles.

Include all material specifications for new and used materials in the detail drawings. In addition, show the location of the used materials indicating condition of the material, the location and geometry of existing but unused holes, attachments left over from previous use and any other irregularities in the material. Account for the condition of all used materials in the design calculations.

For all manufactured components, provide engineering data supplied by the manufacturer. For proprietary shoring systems, evaluate differential leg loading.

Provide access to all new and used materials for inspection prior to assembly.

Before the temporary bent is loaded, the contractor shall inspect the bent in the presence of the Engineer, and submit a written statement certifying that the erected bent complies with the approved detailed drawings. Any condition or material that does not comply with the accepted drawings, or any other condition deemed unsatisfactory by the Engineer, is cause for rejection until corrections are made.

Remove temporary bents in such a manner as to permit the structure to uniformly and gradually take the stresses due to its own weight. During removal do not disturb or otherwise damage the finished work.

Unless otherwise specified, temporary bents will not be directly measured. Payment will be full compensation at the contract unit prices for the various pay items requiring temporary bents.

**BRIDGE DECK RIDEABILITY AND GROOVING AT
STATION 353+32.50 -L-**

(9-30-11)

1.0 GENERAL

This Special Provision shall govern the testing, diamond grinding, transverse grooving and all other related work associated with obtaining satisfactory rideability and surface texture of the bridge deck surface. Provide a surface finish in accordance with Article 420-14(B) of the Standard Specifications.

2.0 TESTING REQUIREMENTS

Perform acceptance testing of the longitudinal profile of the finished bridge deck in each wheel path of each lane in the presence of the Engineer. It is the Contractor's responsibility

to submit a proposed plan of action and schedule for profilograph testing. Use a certified independent provider, approved by the Engineer, to perform the profilograph test.

Prior to profilograph testing, placement of the bridge deck and barrier rail within the section to be tested shall be complete, with the exception of blockouts required for the installation of joints. Do not install joints until the Engineer determines that the rideability requirements herein have been met. Joint locations should be temporarily bridged sufficiently to facilitate operation of the profilograph and corrective equipment across the joint. Remove all obstructions from the bridge deck and sweep the surface clean of debris prior to testing. If automated profilograph equipment is used, there shall be no radio transmissions or other activities that might disrupt the automated profilograph equipment during the testing.

Ensure that the profilograph is in good operating condition per the manufacturer's recommendations. Maintain tires free of debris and buildup during each test run. Operate the profilograph at a maximum speed of 2 miles per hour. If a propulsion vehicle is used, it shall be approved, and the gross vehicle weight shall not exceed 1,000 pounds.

At the beginning and end of each day's testing, and at other times determined to be necessary by the Engineer, operate the profilograph over a calibration strip so the Engineer can verify correct operation of the profilograph. The calibration strip shall be a 100 foot section of pavement that is reasonably level and smooth. Submit each day's calibration graphs with that day's test section graphs to the Engineer. Calibrate the profilograph in accordance with the current NCDOT procedure entitled "Determination of Profile Index". Copies of this procedure may be obtained from the NCDOT Construction Unit.

Plot each profilogram on a continuous graph at a horizontal scale of 25 feet per inch with the vertical scale plotted at a true scale. Station numbers shall be recorded on the profilogram at distances not to exceed 200 feet. Note joint locations on the profilogram.

Take profiles with the recording wheel in each wheel path of each lane. The wheel paths of a lane are considered parallel to and approximately 3.5 feet inside both edges of the travel lane. Take profiles over the entire length of the travel lanes on the bridge deck including approach slabs. Upon completion of testing, submit the profilograms for each wheelpath to the Engineer for analysis. The Engineer will retain the profilograms.

The Engineer will determine the Profile Index for each wheel path in accordance with the procedure entitled "Determination of Profile Index".

A test section is defined as a 600 foot length of each travel lane. The maximum allowable Profile Index per lane shall not exceed 25" per mile as determined with a 0.0" blanking band over any 600 foot test section. The Contractor will correct individual deviations in excess of 0.3" over any 25 foot length on the line tested by diamond grinding. Additionally, the entire deck surface shall meet a 0.125" in 10 feet straightedge check made atop the deck either transversely or longitudinally as deemed necessary by the Engineer.

3.0 DIAMOND GRINDING

If the deck does not meet the testing requirements, diamond grinding is required to make corrections. Diamond grind the full width of all lanes and shoulders in the direction of travel.

Diamond grinding shall be performed using a Boart Longyear PC 5000, a Target 3804 or an approved equal. Submit grinding equipment specifications to the Engineer for approval before any grinding is performed. Use a grinding machine capable of removing a minimum of 3 feet of width with each pass. Multiple passes may be needed to achieve the required depth of removal. In addition, hand grinding may be required to remove vertical steps between passes.

The ground surface shall consist of between 50 and 60 grooves per foot of width. The grooves shall be between 0.09" and 0.15" in width and 0.0625" in depth. The area between the grooves shall be between 0.06" and 0.13" in width. The final concrete texture shall be uniform.

Construct and operate the grinding machine such that it will not cause strain or damage to the deck surface, excessive ravels, aggregate fractures, spalls, or disturbance of transverse joints. Longitudinally grind the deck parallel to the roadway centerline.

Continuously remove all slurry or other debris resulting from the grinding operations by vacuum pick-up or other approved methods. Prevent the slurry from flowing into floor drains, onto the ground or into the body of water under the bridge. Dispose of all residues off the project.

In completing all corrective work on the deck surface to satisfy the rideability criteria stated herein, limit grinding such that the final reinforcement cover is not less than the plan cover minus ½ inch. In cases where this cannot be achieved, other corrective work may be required as directed by the Engineer.

Provide additional profilograph testing as necessary following grinding until the rideability requirements above are satisfied.

4.0 GROOVING BRIDGE FLOORS

After the concrete surface profile has been accepted by the Engineer, the concrete blockouts poured, and the joints installed, groove the bridge deck in accordance with Article 420-14(B) of the Standard Specifications. If a substantial amount of bridge deck surface has been diamond ground and/or the concrete cover over the slab reinforcement has been reduced to the minimum, the Engineer may delete all or a portion of the requirement of grooving in that area. In this instance, no additional compensation shall be made for underruns in grooving.

5.0 BASIS OF PAYMENT

No separate payment will be made for profilograph testing or diamond grinding of the bridge deck. The cost of the testing procedure, equipment, grinding operation, and removal and disposal of slurry resulting from the grinding operation is considered incidental to the contract bid price for "Reinforced Concrete Deck Slab".

PLACING LOAD ON STRUCTURE MEMBERS**(11-27-12)**

The 2012 Standard Specifications shall be revised as follows:

In **Section 420-20 – Placing Load on Structure Members** replace the first sentence of the fifth paragraph with the following:

Do not place vehicles or construction equipment on a bridge deck until the deck concrete develops the minimum specified 28 day compressive strength and attains an age of at least 7 curing days.

STEEL REINFORCED ELASTOMERIC BEARINGS**(11-27-12)**

The 2012 Standard Specifications shall be revised as follows:

In **Section 1079-1 – Preformed Bearing Pads** add the following after the second paragraph:

Internal holding pins are required for all shim plates when the contract plans indicate the structure contains the necessary corrosion protection for a corrosive site.

Repair laminated (reinforced) bearing pads utilizing external holding pins via vulcanization. Submit product data for repair material and a detailed application procedure to the Materials and Tests Unit for approval before use and annually thereafter.

THERMAL SPRAYED COATINGS (METALLIZATION)**(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.

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 ft² measure 2 spots/surface per piece and for pieces greater than 200 ft² add 1 additional spots/surface for each 500 ft²).

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.

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.
2. Minor areas less than or equal to 0.1 ft² 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 ft² 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.

SAND LIGHTWEIGHT CONCRETE

(9-30-11)

Use sand lightweight concrete, as noted on the plans, that meets the requirements of this Special Provision.

Sand lightweight concrete is composed of portland cement, fine aggregate, lightweight coarse aggregate, water, and admixtures. Provide sand lightweight concrete that complies with the applicable requirements of Sections 420, 1000, and 1024 of the Standard Specifications and the additional requirements herein.

Submit a mix design from a testing laboratory approved by the NC Division of Highways for approval at least 35 days prior to the proposed use. Provide a mix meeting Table 1000-1 of the Standard Specifications and the following design criteria:

TEST	TEST METHOD	REQUIREMENT
Max. Unit Weight, plastic, lbs/ft ³	AASHTO T121	120
Max. Unit Weight, dry, lbs/ft ³	ASTM C567 using equilibrium air dried unit weight	115
Min. Relative Dynamic Modulus, (percent)	AASHTO T161 Procedure A	80

When submitting the mix design, include the source of the aggregates, cement, and admixtures and the gradation, specific gravity and fineness modulus (fine aggregate only) of the aggregates. Submit test results showing the mix design conforms to the criteria, including the 28 day compressive strength of a minimum of six cylinders. Provide a mix design that produces an

average compressive strength sufficient to ensure that a minimum strength of 4500 psi is achieved in the field.

Produce an additional mix in accordance with AASHTO M195 to determine the drying shrinkage. The maximum drying shrinkage for this mix is 0.07%.

For lightweight aggregate, use expanded shale or slate that meets the requirements of AASHTO M195. Grade the lightweight aggregate in accordance with 1014-2(E)(6).

Determine the soundness in accordance with AASHTO T104. Loss of more than 10% of the lightweight aggregate in five cycles of the accelerated soundness test using sodium sulfate is not permitted.

Ensure the lightweight aggregate is in a saturated surface-dry condition when it is proportioned and incorporated into the mix.

EXPANSION JOINT SEALS

(9-30-11)

1.0 GENERAL

The work covered by this Special Provision consists of furnishing and installing the expansion joint seals as shown on the contract drawings. All materials, labor, equipment and incidentals necessary for the proper installation of the expansion joint seals are included.

2.0 MATERIAL

Provide expansion joint seals capable of accommodating a total movement measured parallel to the centerline of the roadway as shown on plans.

Provide an elastomeric component for each expansion joint seal that is a continuous unit for the entire length of the joint. Do not field splice the elastomeric component. Only vulcanized shop splicing of the elastomeric component is permitted. The minimum length of an elastomeric component before shop splicing is 20 feet. However, one piece shorter than 20 feet is permitted. Provide an elastomeric component that is clearly shop marked to indicate the top side and joint location of the elastomeric component. On skewed bridges, or under unsymmetrical conditions, clearly mark the left side of the elastomeric component. Left is defined as being on the left when facing in the direction of increasing station. Inspect the seals upon receipt to ensure that the marks are clearly visible upon installation.

Make sure the convolution of the gland does not project above the top of the hold-down plates when the joint opening is in the most compressed condition. Use either elastic polychloroprene (neoprene) or ethyl propylene diene monomer (EPDM) for the elastomer that meets the following minimum properties:

	ASTM TEST METHOD	REQUIREMENTS
Hardness, Durometer - Shore A	D2240	60 \pm 5, Neoprene (upward corrugated shape - fabric reinforced) 75 \pm 5, EPDM and Neoprene (upward non-corrugated shape) 80 \pm 5, EPDM (upward corrugated shape-fabric reinforced)
Tensile Strength	D412	2000 psi (min.)
Elongation at Break	D412	250% (min.)
Width of Gland in Relaxed Condition	N/A	10" \pm 0.25"
Thickness of Upturned portion of gland	N/A	0.25" non-corrugated shape, -0.032" to +0.032"
Thickness of Upturned portion of gland	N/A	0.1875" corrugated shape, -0.032" to +0.032"
Thickness of Flat portion of gland	N/A	0.1563", -0.032" to +0.032"

For fabric reinforced glands, submit one unreinforced sample per lot number, up to 500 feet of Expansion Joint Seal, to the Engineer for testing.

Only field splice hold-down plates at crown points, at abrupt changes in the deck slab cross slope, and on lane lines. Splicing within travel lanes is not permitted and splicing on edge lines is not required. Field splice hold-down plates between the edge line and gutter upturn and where necessary for proper installation and alignment is permitted. Show all splice locations on the working drawings for approval. For the location of lane markings at the expansion joint seal, see the Structure plans. At the splice locations, locate the hold-down bolts 3 inches from the end of the hold-down plate. At splice locations where changes in deck slab cross slope occur, cut the ends of hold-down plates parallel to the bridge centerline for skews less than 80° and greater than 100°.

Do not use welded shop splices in hold-down plates.

3.0 SHOP DRAWINGS

Submit nine sets of working drawings to the Engineer for review, comments and acceptance. Show complete details drawn to scale and include:

The proposed template details including the makeup of the template

The proposed method of holding the base angle assembly in place while concrete is cast around it

The proposed procedure to correct for the effects of beam movement and rotation when setting width of joint opening

The proposed chronology of installation including the sequence and direction of the concrete casting

The details of cross connectors between base angles, such as steel bars with slots bolted to angles, to maintain evenness between the adjacent base angles while accommodating movement that occurs when concrete is cast. Indicate when bolts are loosened to allow movement.

The proposed method for removing the hold-down plate

A section detail through the joint showing horizontal offset dimensions of the base angles from the centerline joint. This detail is required when the vertical face of the joint opening is not perpendicular to the roadway surface (e.g. when the roadway grade is significant).

Have someone other than the one who prepares the drawing check all detailed drawings and include the signatures of both the drafter and checker on each sheet of the drawings. The Engineer returns unchecked drawings to the Contractor. Provide all completed drawings well in advance of the scheduled installation time for the expansion joint seal.

4.0 INSTALLATION

Provide supports for the base angle assembly at a maximum spacing of 9 feet. Place supports near field splices of base angles to ensure that field splices are straight and even. Provide base angles with ½" diameter weep holes at 12 inch centers to allow bleeding of trapped air and/or water. Do not obstruct the weep holes with falsework. Make the bottom of the trough parallel to grade and the sides parallel to the sides of the expansion joint seal.

For damaged areas, depressions, spalls, cracks, or irregularities of curbs or decks adjacent to the expansion joint, submit a proposed method of repair and repair material specifications for approval.

If the Engineer deems any aspects of the expansion joint seals unacceptable, make necessary corrections.

5.0 INSPECTION

When concrete is cast, use a non-aluminum, 10 foot, true to line straight edge to check and grade the top of the slab on each side of the joint to ensure smooth transition between spans.

Watertight Integrity Test

- Upon completion of an expansion joint seal, perform a water test on the top surface to detect any leakage. Cover the roadway section of the joint from curb to curb, or barrier rail to barrier rail, with water, either ponded or flowing, not less than 1 inch above the roadway surface at all points. Block sidewalk sections and secure an unnozzled water hose delivering approximately 1 gallon of water per minute to the inside face of the bridge railing, trained in a downward position about 6 inches above the sidewalks, such that there is continuous flow of water across the sidewalk and down the curb face of the joint.
- Maintain the ponding or flowing of water on the roadway and continuous flow across sidewalks and curbs for a period of 5 hours. At the conclusion of the test, the underside of the joint is closely examined for leakage. The expansion joint seal is considered watertight if no obvious wetness is visible on the Engineer's finger after touching a number of underdeck areas. Damp concrete that does not impart wetness to the finger is not a sign of leakage.
- If the joint system leaks, locate the place(s) of leakage and take any repair measures necessary to stop the leakage at no additional cost to the Department. Use repair measures recommended by the manufacturer and approved by the Engineer prior to beginning corrective work.
- If measures to eliminate leakage are taken, perform a subsequent water integrity test subject to the same conditions as the original test. Subsequent tests carry the same responsibility as the original test and are performed at no extra cost to the Department.

6.0 BASIS OF PAYMENT

Basis of payment for all expansion joint seals will be at the lump sum contract price for "Expansion Joint Seals" which price and payment will be full compensation for furnishing all material, including any steel accessory plates for sidewalks, medians and rails, labor, tools, and incidentals necessary for installing the expansion joint seal in place and including all materials, labor, tools and incidentals for performing the original watertight integrity test.

MODULAR EXPANSION JOINT SEALS

(9-30-11)

1.0 GENERAL

Furnish and install modular expansion joint seals within the limits indicated on the plans.

Obtain modular expansion joint seals from Fabricators that are AISC certified in Category I.

Use a modular expansion joint seal that is a waterproof system such as WABOMODULAR as manufactured by Watson Bowman and Acme Corporation of Amherst New York, BROWN/MAURER as manufactured by the D. S. Brown Company of North Baltimore,

Ohio or an approved equal. Do not use aluminum components in the modular expansion joint. Use a modular expansion joint seal consisting of three or more transverse rails holding two or more elastomeric seals in place and a support mechanism that ensures the rails maintain parallel and equidistant spacing. Do not use bolts to connect the rails to the support mechanism.

Provide an elastomeric component for each modular expansion joint seal that is one continuous unit for the entire length of the joint. Do not field splice the elastomeric component. Only vulcanized shop splicing of the elastomeric component is permitted. Provide an elastomeric component that is clearly shop marked to indicate the top side and joint location of the elastomeric component. On skewed bridges, or under unsymmetrical conditions, clearly mark the left side of the elastomeric component also. Left is defined as being on the left when facing in the direction of increasing station. Inspect the seals upon receipt to ensure that the marks are clearly visible upon installation.

Provide modular expansion joint seals capable of handling a total movement measured parallel to the centerline of the roadway as shown on plans. Limit clear distance between centerbeams, and edgebeams and centerbeams, to 3½". Limit centerbeam spans to approximately 48".

2.0 DRAWING AND SPECIFICATION SUBMITTAL

Submit Shop Drawings for Fabrication and Installation Procedure and Revised Contract Plan Sheets, showing revised details of the Structure contract plans.

A. Shop Fabrication and Installation Procedure Drawings

The deck slab is detailed in the contract plans with a required full depth transverse construction joint separating the main slab pour from the blockout area for the modular joint assembly. Position the modular joint assembly in the blockout area only after the main slab pours adjacent to the blockout area have been made and the girder rotation, deflection, and longitudinal movement due to slab pours have occurred.

Detail the method of positioning and securing the modular assembly in the blockout prior to the closure pour on the working drawings.

Submit two complete sets of working drawings for review. Submit these drawings well in advance of the scheduled installation time for the modular expansion joint seals. Include material requirements and installation procedures and specifications in the drawings.

After the drawings have been reviewed and, if necessary, corrections have been made, submit nine additional sets of the working drawings.

B. Revised Contract Plan Sheets

Concurrent with the submission of the working drawings, submit two sets of revised Structure plans for review. In the revised plans, include necessary changes in

dimensions, reinforcing steel, and concrete blockouts to accommodate modular expansion joint seals. Have a North Carolina Registered Professional Engineer prepare and seal the revised plans. No adjustment will be made in the contract price for any bid item due to revisions necessary to accommodate the modular expansion joint seals. This cost is included in the lump sum price bid for furnishing and installing the modular expansion joint seal.

After the revised plans have been reviewed and, if necessary, corrections have been made, submit one 22" x 34" reproducible set of revised structure contract plans.

3.0 FABRICATION AND INSTALLATION

Protect the components of the modular expansion joint seal in the following manner. Upon completion of any shop fabrication, commercially blast clean (SP-6) all steel components, excluding stainless steel parts. Metallize to a minimum thickness of 8 mils on these surfaces. Metallize in accordance with the Special Provision for "Thermal Sprayed Coatings (Metallization)". Repair abraded or damaged coated surfaces anytime after applying the coating as specified for repair of galvanizing in the Standard Specifications. As an alternative to Metallizing, galvanizing in accordance with the Standard Specifications is permitted.

Install the modular expansion joint seals according to the procedures and recommendations of the manufacturer, except as amended in the next paragraph.

Limit modular expansion joint seal splices to crown points, abrupt changes in deck slab cross slope, lane lines, or as necessary for proper installation and alignment. All splice locations and details must be shown on the submitted working drawings and are subject to the Engineer's approval. For shop splices, full penetration welds are required for centerbeam splices. For shop splices, partial penetration welds are not allowed for centerbeam splices, except at barrier rail upturns or sidewalk upturns. For field splices, partial penetration welds are not allowed for centerbeam splices. Show and submit for approval all splice locations on the working drawings. For location of lane markings at the modular expansion joint seals, see the Structure plans.

When indicated on the plans, provide special snowplow protection, such as a snowplow blade guide or steel ribs, to prevent the blade from entering the joint recess.

If the Engineer deems any aspects of the modular expansion joint seals unacceptable, make necessary corrections.

Watertight Integrity Test

Upon completion of each modular expansion joint seal, perform a water test on the top surface to detect any leakage. Cover the roadway section of the joint from curb to curb, or barrier rail to barrier rail, with water, either ponded or flowing, not less than 1 inch above the roadway surface at all points. Block sidewalk sections and secure an unnozzled water hose delivering approximately 1 gallon of water per minute to the inside face of the bridge railing, trained in a downward position about

6 inches above the sidewalk, such that there is continuous flow of water across the sidewalk and down the curb face of the joint.

Maintain the ponding or flowing of water on the roadway and continuous flow across sidewalks and curbs for a period of 5 hours. At the conclusion of the test, the underside of the joint is closely examined for leakage. The modular expansion joint seal is considered watertight if no obvious wetness is visible on the Engineer's finger after touching a number of underdeck areas. Damp concrete that does not impart wetness to the finger is not considered a sign of leakage.

If the joint system leaks, locate the place(s) of leakage and take any repair measures necessary to stop the leakage at no additional cost to the Department. Use repair measures recommended by the manufacturer and approved by the Engineer prior to beginning corrective work.

If measures to eliminate leakage are taken, perform a subsequent water integrity test subject to the same conditions as the original test. Subsequent tests carry the same responsibility as the original test and are performed at no additional cost to the Department.

4.0 BASIS OF PAYMENT

Basis of payment for all modular expansion joint seals will be at the lump sum contract price for "Modular Expansion Joint Seals" which price and payment will be full compensation for furnishing all material, including steel accessory plates for sidewalks, medians and rails, labor, tools, and incidentals necessary for installing the modular expansion joint seals in place and including all materials, labor, tools and incidentals for performing the original watertight integrity test.

SECURING OF VESSELS

(10-12-01)

Secure vessels in accordance with Section 107 of the Standard Specifications and the following provision.

When utilizing barges, tugboats or other vessels, take all necessary precautions to ensure that such vessels are securely anchored or moored when not in active operation. Take all necessary measures to ensure that the vessels are operated in a manner that avoids damage to or unnecessary contact with bridges and other highway structures and attachments. If severe weather conditions are anticipated, or should be anticipated through reasonable monitoring of weather forecasts, take additional measures to protect bridges and other highway structures and attachments from extreme conditions. The Contractor is strictly liable for damages to any bridge or other highway structure or attachment caused by a vessel owned or controlled by the Contractor. The Contractor is also liable to third parties for property damages and loss of revenue caused by vessels under the Contractor's control.

FALSEWORK AND FORMWORK**(4-5-12)****1.0 DESCRIPTION**

Use this Special Provision as a guide to develop temporary works submittals required by the Standard Specifications or other provisions; no additional submittals are required herein. Such temporary works include, but are not limited to, falsework and formwork.

Falsework is any temporary construction used to support the permanent structure until it becomes self-supporting. Formwork is the temporary structure or mold used to retain plastic or fluid concrete in its designated shape until it hardens. Access scaffolding is a temporary structure that functions as a work platform that supports construction personnel, materials, and tools, but is not intended to support the structure. Scaffolding systems that are used to temporarily support permanent structures (as opposed to functioning as work platforms) are considered to be falsework under the definitions given. Shoring is a component of falsework such as horizontal, vertical, or inclined support members. Where the term "temporary works" is used, it includes all of the temporary facilities used in bridge construction that do not become part of the permanent structure.

Design and construct safe and adequate temporary works that will support all loads imposed and provide the necessary rigidity to achieve the lines and grades shown on the plans in the final structure.

2.0 MATERIALS

Select materials suitable for temporary works; however, select materials that also ensure the safety and quality required by the design assumptions. The Engineer has authority to reject material on the basis of its condition, inappropriate use, safety, or nonconformance with the plans. Clearly identify allowable loads or stresses for all materials or manufactured devices on the plans. Revise the plan and notify the Engineer if any change to materials or material strengths is required.

3.0 DESIGN REQUIREMENTS**A. Working Drawings**

Provide working drawings for items as specified in the contract, or as required by the Engineer, with design calculations and supporting data in sufficient detail to permit a structural and safety review of the proposed design of the temporary work.

On the drawings, show all information necessary to allow the design of any component to be checked independently as determined by the Engineer.

When concrete placement is involved, include data such as the drawings of proposed sequence, rate of placement, direction of placement, and location of all construction joints. Submit the number of copies as called for by the contract.

When required, have the drawings and calculations prepared under the guidance of, and sealed by, a North Carolina Registered Professional Engineer who is knowledgeable in temporary works design.

If requested by the Engineer, submit with the working drawings manufacturer's catalog data listing the weight of all construction equipment that will be supported on the temporary work. Show anticipated total settlements and/or deflections of falsework and forms on the working drawings. Include falsework footing settlements, joint take-up, and deflection of beams or girders.

As an option for the Contractor, overhang falsework hangers may be uniformly spaced, at a maximum of 36 inches, provided the following conditions are met:

Member Type (PCG)	Member Depth, (inches)	Max. Overhang Width, (inches)	Max. Slab Edge Thickness, (inches)	Max. Screed Wheel Weight, (lbs.)	Bracket Min. Vertical Leg Extension, (inches)
II	36	39	14	2000	26
III	45	42	14	2000	35
IV	54	45	14	2000	44
MBT	63	51	12	2000	50
MBT	72	55	12	1700	48

Overhang width is measured from the centerline of the girder to the edge of the deck slab.

For Type II, III & IV prestressed concrete girders (PCG), 45-degree cast-in-place half hangers and rods must have a minimum safe working load of 6,000 lbs.

For MBT prestressed concrete girders, 45-degree angle holes for falsework hanger rods shall be cast through the girder top flange and located, measuring along the top of the member, 1'-2 1/2" 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 $\frac{3}{4}$ ".

Note on the working drawings any anchorages, connectors, inserts, steel sleeves or other such devices used as part of the falsework or formwork that remains in the permanent structure. If the plan notes indicate that the structure contains the necessary corrosion protection required for a Corrosive Site, epoxy coat, galvanize or metalize these devices. Electroplating will not be allowed. Any coating required by the Engineer will be considered incidental to the various pay items requiring temporary works.

Design falsework and formwork requiring submittals in accordance with the 1995 AASHTO *Guide Design Specifications for Bridge Temporary Works* except as noted herein.

1. Wind Loads

Table 2.2 of Article 2.2.5.1 is modified to include wind velocities up to 110 mph. In addition, Table 2.2A is included to provide the maximum wind speeds by county in North Carolina.

Table 2.2 - Wind Pressure Values

Height Zone feet above ground	Pressure, lb/ft ² for Indicated Wind Velocity, mph				
	70	80	90	100	110
0 to 30	15	20	25	30	35
30 to 50	20	25	30	35	40
50 to 100	25	30	35	40	45
over 100	30	35	40	45	50

2. Time of Removal

The following requirements replace those of Article 3.4.8.2.

Do not remove forms until the concrete has attained strengths required in Article 420-16 of the Standard Specifications and these Special Provisions. Do not remove forms until the concrete has sufficient strength to prevent damage to the surface.

Table 2.2A - Steady State Maximum Wind Speeds by Counties in North Carolina

COUNTY	25 YR (mph)	COUNTY	25 YR (mph)	COUNTY	25 YR (mph)
Alamance	70	Franklin	70	Pamlico	100
Alexander	70	Gaston	70	Pasquotank	100
Alleghany	70	Gates	90	Pender	100
Anson	70	Graham	80	Perquimans	100
Ashe	70	Granville	70	Person	70
Avery	70	Greene	80	Pitt	90
Beaufort	100	Guilford	70	Polk	80
Bertie	90	Halifax	80	Randolph	70
Bladen	90	Harnett	70	Richmond	70
Brunswick	100	Haywood	80	Robeson	80
Buncombe	80	Henderson	80	Rockingham	70
Burke	70	Hertford	90	Rowan	70
Cabarrus	70	Hoke	70	Rutherford	70
Caldwell	70	Hyde	110	Sampson	90
Camden	100	Iredell	70	Scotland	70
Carteret	110	Jackson	80	Stanley	70
Caswell	70	Johnston	80	Stokes	70
Catawba	70	Jones	100	Surry	70
Cherokee	80	Lee	70	Swain	80
Chatham	70	Lenoir	90	Transylvania	80
Chowan	90	Lincoln	70	Tyrell	100
Clay	80	Macon	80	Union	70
Cleveland	70	Madison	80	Vance	70
Columbus	90	Martin	90	Wake	70
Craven	100	McDowell	70	Warren	70
Cumberland	80	Mecklenburg	70	Washington	100
Currituck	100	Mitchell	70	Watauga	70
Dare	110	Montgomery	70	Wayne	80
Davidson	70	Moore	70	Wilkes	70
Davie	70	Nash	80	Wilson	80
Duplin	90	New Hanover	100	Yadkin	70
Durham	70	Northampton	80	Yancey	70
Edgecombe	80	Onslow	100		
Forsyth	70	Orange	70		

B. Review and Approval

The Engineer is responsible for the review and approval of temporary works' drawings.

Submit the working drawings sufficiently in advance of proposed use to allow for their review, revision (if needed), and approval without delay to the work.

The time period for review of the working drawings does not begin until complete drawings and design calculations, when required, are received by the Engineer.

Do not start construction of any temporary work for which working drawings are required until the drawings have been approved. Such approval does not relieve the Contractor of the responsibility for the accuracy and adequacy of the working drawings.

4.0 CONSTRUCTION REQUIREMENTS

All requirements of Section 420 of the Standard Specifications apply.

Construct temporary works in conformance with the approved working drawings. Ensure that the quality of materials and workmanship employed is consistent with that assumed in the design of the temporary works. Do not weld falsework members to any portion of the permanent structure unless approved. Show any welding to the permanent structure on the approved construction drawings.

Provide tell-tales attached to the forms and extending to the ground, or other means, for accurate measurement of falsework settlement. Make sure that the anticipated compressive settlement and/or deflection of falsework does not exceed 1 inch. For cast-in-place concrete structures, make sure that the calculated deflection of falsework flexural members does not exceed 1/240 of their span regardless of whether or not the deflection is compensated by camber strips.

A. Maintenance and Inspection

Inspect and maintain the temporary work in an acceptable condition throughout the period of its use. Certify that the manufactured devices have been maintained in a condition to allow them to safely carry their rated loads. Clearly mark each piece so that its capacity can be readily determined at the job site.

Perform an in-depth inspection of an applicable portion(s) of the temporary works, in the presence of the Engineer, not more than 24 hours prior to the beginning of each concrete placement. Inspect other temporary works at least once a month to ensure that they are functioning properly. Have a North Carolina Registered Professional Engineer inspect the cofferdams, shoring, sheathing, support of excavation structures, and support systems for load tests prior to loading.

B. Foundations

Determine the safe bearing capacity of the foundation material on which the supports for temporary works rest. If required by the Engineer, conduct load tests to verify proposed bearing capacity values that are marginal or in other high-risk situations.

The use of the foundation support values shown on the contract plans of the permanent structure is permitted if the foundations are on the same level and on the same soil as those of the permanent structure.

Allow for adequate site drainage or soil protection to prevent soil saturation and washout of the soil supporting the temporary works supports.

If piles are used, the estimation of capacities and later confirmation during construction using standard procedures based on the driving characteristics of the pile is permitted. If preferred, use load tests to confirm the estimated capacities; or, if required by the Engineer conduct load tests to verify bearing capacity values that are marginal or in other high risk situations.

The Engineer reviews and approves the proposed pile and soil bearing capacities.

5.0 REMOVAL

Unless otherwise permitted, remove and keep all temporary works upon completion of the work. Do not disturb or otherwise damage the finished work.

Remove temporary works in conformance with the contract documents. Remove them in such a manner as to permit the structure to uniformly and gradually take the stresses due to its own weight.

6.0 METHOD OF MEASUREMENT

Unless otherwise specified, temporary works will not be directly measured.

7.0 BASIS OF PAYMENT

Payment at the contract unit prices for the various pay items requiring temporary works will be full compensation for the above falsework and formwork.

SUBMITTAL OF WORKING DRAWINGS

(2-10-12)

1.0 General

Submit working drawings in accordance with Article 105-2 of the *Standard Specifications* and this provision. For this provision, "submittals" refers to only those listed in this provision. The list of submittals contained herein does not represent a list of required submittals for the project. Submittals are only necessary for those items as required by the contract. Make submittals that are not specifically noted in this provision directly to the

Resident Engineer. Either the Structure Design 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 Resident 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 Resident Engineer, Structure Design Unit contacts or the Geotechnical Engineering Unit contacts noted below.

In order to facilitate in-plant inspection by NCDOT and approval of working drawings, provide the name, address and telephone number of the facility where fabrication will actually be done if different than shown on the title block of the submitted working drawings. This includes, but is not limited to, precast concrete items, prestressed concrete items and fabricated steel or aluminum items.

2.0 Addresses and Contacts

For submittals to the Structure Design Unit, use the following addresses:

Via US mail:

Mr. G. R. Perfetti, P. E.
State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1581 Mail Service Center
Raleigh, NC 27699-1581

Attention: Mr. P. D. Lambert, P. E.

Via other delivery service:

Mr. G. R. Perfetti, P. E.
State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1000 Birch Ridge Drive
Raleigh, NC 27610

Attention: Mr. P. D. Lambert, P. E.

Submittals may also be made via email.

Send submittals to:

plambert@ncdot.gov (Paul Lambert)

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

jgaither@ncdot.gov (James Gaither)

jlbolden@ncdot.gov (James Bolden)

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. K. J. Kim, Ph. D., P. E.
Eastern Regional Geotechnical

Via other delivery service:

Mr. K. J. Kim, Ph. D., 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

Manager
 North Carolina Department
 of Transportation
 Geotechnical Engineering Unit
 Eastern Regional Office
 3301 Jones Sausage Road, Suite 100
 Garner, NC 27529

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

Via US mail:

Mr. John Pilipchuk, L. G., 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 other delivery service:

Mr. John Pilipchuk, L. G., P. E.
 Western Region Geotechnical
 Manager
 North Carolina Department
 of Transportation
 Geotechnical Engineering Unit
 Western Regional Office
 5253 Z Max Boulevard
 Harrisburg, NC 28075

The status of the review of structure-related submittals sent to the Structure Design Unit can be viewed from the Unit's web site, via the "Contractor Submittal" link.

Direct any questions concerning submittal review status, review comments or drawing markups to the following contacts:

Primary Structures Contact: Paul Lambert (919) 707 – 6407
 (919) 250 – 4082 facsimile
plambert@ncdot.gov

Secondary Structures Contacts: James Gaither (919) 707 – 6409
 James Bolden (919) 707 – 6408

Eastern Regional Geotechnical Contact (Divisions 1-7):
 K. J. Kim (919) 662 – 4710
 (919) 662 – 3095 facsimile
kkim@ncdot.gov

Western Regional Geotechnical Contact (Divisions 8-14):
 John Pilipchuk (704) 455 – 8902
 (704) 455 – 8912 facsimile
jpilipchuk@ncdot.gov

3.0 Submittal Copies

Furnish one complete copy of each submittal, including all attachments, to the Resident Engineer. At the same time, submit the number of hard copies shown below of the same complete submittal directly to the Structure Design Unit and/or the Geotechnical Engineering Unit.

The first table below covers "Structure Submittals". The Resident Engineer will receive review comments and drawing markups for these submittals from the Structure Design Unit. The second table in this section covers "Geotechnical Submittals". The Resident 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 Structure Design 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 Structure Design Unit	Copies Required by Geotechnical Engineering Unit	Contract Reference Requiring Submittal ¹
Arch Culvert Falsework	5	0	Plan Note, SN Sheet & "Falsework and Formwork"
Box Culvert Falsework ⁷	5	0	Plan Note, SN Sheet & "Falsework and Formwork"
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	8	0	Article 420-3 & "Falsework and Formwork"

(substructure)			
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
Optional Disc Bearings ⁴	8	0	"Optional Disc Bearings"
Overhead and Digital Message Signs (DMS) (metalwork and foundations)	13	0	Applicable Provisions
Placement of Equipment on Structures (cranes, etc.)	7	0	Article 420-20
Pot Bearings ⁴	8	0	"Pot Bearings"
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	2, then	0	"Modular Expansion Joint

(adaptation to modular expansion joint seals)	1 reproducible		Seals"
Sound Barrier Wall (precast items)	10	0	Article 1077-2 & "Sound Barrier Wall"
Sound Barrier Wall Steel Fabrication Plans ⁵	7	0	Article 1072-8 & "Sound Barrier Wall"
Structural Steel ⁴	2, then 7	0	Article 1072-8
Temporary Detour Structures	10	2	Article 400-3 & "Construction, Maintenance and Removal of Temporary Structure at Station ____"
TFE Expansion Bearings ⁴	8	0	Article 1072-8

FOOTNOTES

1. References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Articles refer to the *Standard Specifications*.
2. Submittals for these items are necessary only when required by a note on plans.
3. Submittals for these items may not be required. A list of pre-approved sequences is available from the producer or the Materials & Tests Unit.
4. The fabricator may submit these items directly to the Structure Design 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 Structure Design 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	8 drawings, 2 calculations	2 drawings	Applicable Provisions
Temporary Shoring ⁴	5 drawings, 2 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 Resident or Bridge Maintenance Engineer. Submit a second copy of submittal electronically (PDF via email) or by facsimile, 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:
www.ncdot.org/doh/preconstruct/highway/geotech/formdet/
See second page of form for submittal instructions.
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. **Rigger s:** 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.

EPOXY RESIN INJECTION

(SPECIAL)

1.0 GENERAL

For repairing cracks, an approved applicator is required to perform the epoxy resin injection. Make certain the supervisor and the workmen have completed an instruction program in the methods of restoring concrete structures utilizing the epoxy injection process and have a record of satisfactory performance on similar projects.

The applicator furnishes all materials, tools, equipment, appliances, labor and supervision required when repairing cracks with the injection of an epoxy resin adhesive.

2.0 SCOPE OF WORK

Using Epoxy Resin Injection, repair all cracks 5 mils (125 μm) wide or greater in the cast-in-place substructure units within 30 days of Engineer's notification.

Make the underwater repairs when water surface elevation is low and the water is still. For underwater repairs, use manufacturer recommended materials.

3.0 COOPERATION

Cooperate and coordinate with the Technical Representative of the epoxy resin manufacturer for satisfactory performance of the work.

Have the Technical Representative present when the job begins and until the Engineer is assured that his service is no longer needed.

The expense of having this representative on the job is the Contractor's responsibility and no direct payment will be made for this expense.

4.0 TESTING

The North Carolina Department of Transportation Material and Tests Unit obtains test cores from the repaired concrete. If the failure plane is located at the repaired crack, a minimum compressive strength of 3000 psi (20.7 MPa) is required of these cores.

5.0 MATERIAL PROPERTIES OF EPOXY RESIN

Provide a two-component structural epoxy adhesive for injection into cracks or other voids. Provide modified epoxy resin (Component "A") that conforms to the following requirements:

	Test Method	Specification Requirements
Viscosity @ $40 \pm 3^\circ\text{F}$ ($4 \pm 1^\circ\text{C}$), cps	Brookfield RVT Spindle No. 4 @ 20 rpm	6000 - 8000
Viscosity @ $77 \pm 3^\circ\text{F}$ ($25 \pm 1^\circ\text{C}$), cps	Brookfield RVT Spindle No. 2 @ 20 rpm	400 - 700
Epoxide Equivalent Weight	ASTM D1652	152 - 168
Ash Content, %	ASTM D482	1 max.

Provide the amine curing agent (Component "B") used with the epoxy resin that meets the following requirements:

	Test Method	Specification Requirements
Viscosity @ $40 \pm 3^\circ\text{F}$ ($4 \pm 1^\circ\text{C}$), cps	Brookfield RVT Spindle No. 2 @ 20 rpm	700 - 1400
Viscosity @ $77 \pm 3^\circ\text{F}$ ($25 \pm 1^\circ\text{C}$), cps	Brookfield RVT Spindle No. 2 @ 20 rpm	105 - 240
Amine Value, mg KOH/g	ASTM D664*	490 - 560
Ash Content, %	ASTM D482	1 max.
* Method modified to use perchloric acid in acetic acid.		

Certify that the Uncured Adhesive, when mixed in the mix ratio that the material supplier specifies, has the following properties:

Pot Life (60 gram mass)

@ $77 \pm 3^\circ\text{F}$ ($25 \pm 1^\circ\text{C}$) 15 minutes minimum

@ $100 \pm 3^\circ\text{F}$ ($38 \pm 1^\circ\text{C}$) 5 minutes minimum

Certify that the Adhesive, when cured for 7 days at $77 \pm 3^\circ\text{F}$ ($25 \pm 1^\circ\text{C}$) unless otherwise specified, has the following properties:

	Test Method	Specification Requirements
Ultimate Tensile Strength	ASTM D638	7000 psi (48.3 MPa) min.
Tensile Elongation at Break	ASTM D638	4% max.
Flexural Strength	ASTM D790	10,000 psi (69.0 MPa) min.
Flexural Modulus	ASTM D790	3.5×10^5 psi (2413.2 MPa)
Compressive Yield Strength	ASTM D695	11,000 psi (75.8 MPa) min.
Compressive Modulus	ASTM D695	$2.0 - 3.5 \times 10^5$ psi (1379.0 - 2413.2 MPa)
Heat Deflection Temperature Cured 28 days @ $77 \pm 3^\circ\text{F}$ ($25 \pm 1^\circ\text{C}$)	ASTM D648*	125°F (52°C) min. 135°F (57°C) min.
Slant Shear Strength, 5000 psi (34.5 MPa) compressive strength concrete Cured 3 days @ 40°F (4°C) wet concrete Cured 7 days @ 40°F (4°C) wet concrete Cured 1 day @ 77°F (25°C) dry concrete	AASHTO T237	3500 psi (24.1 MPa) min. 4000 psi (27.6 MPa) min. 5000 psi (34.5 MPa) min.
* Cure test specimens so that the peak exothermic temperature of the adhesive does not exceed 77°F (25°C).		

Use an epoxy bonding agent, as specified below, as the surface seal (used to confine the epoxy resin during injection).

6.0 MATERIAL PROPERTIES OF SURFACE SEAL

Use a two-component paste epoxy bonding agent for the epoxy resin conforming to the following requirements:

Density, lbs/gal (kg/liter)	10.5 (1.25)
Specific Gravity	1.3
Minimum Application Temperature, °F (°C)	50 (10)
Application Temperature Range, °F (°C)	60 to 105 (16 to 41)
Shelf Life	1 year (min.)

	@ 60°F (16°C)	@ 85°F (29°C)	@ 105°F (41°C)
Potlife, hr., 1 gallon (3.8 liters)	2½	1	½
Open Time ¹ , minimum: hr.	4	1¾	¾
Non-sag Thickness, inches (mm) (ASTM D2730)	1 (25)	¾ (19)	½ (13)
Initial Cure ² , days (AASHTO T237)	10	6	3
Cure Time ³ , days (ASTM D695)	20	10	7

Typical Mechanical Properties ⁴	
Tensile Strength, psi (MPa) Elongation at Break (ASTM D638)	1,500 (10.3) 4%
Compressive Yield Strength, psi (MPa) Compressive Modulus, psi (MPa) (ASTM D695)	8,000 (55.2) 4.0 x 10 ⁵ (2757.9)
Heat Deflection Temperature ⁵ , °F (°C) (ASTM D648)	105 (41)
Slant Shear Strength, psi (MPa) Damp to Damp Concrete (AASHTO T237)	5,000 (34.5) 100% Concrete Failure

1. From start of mixing to completion of repair
2. 5,000 psi (34.5 MPa) minimum
3. Isothermal cure to eliminate effect of exotherm
4. Cure schedule 7 days @ 77°F (25°C), test temperature 77°F (25°C)
5. 128°F (53°C) after 28 day cure

7.0 EQUIPMENT FOR INJECTION

Use portable positive displacement type pumps with interlock to provide positive ratio control of exact proportions of the two components at the nozzle to meter and mix the two injection adhesive components and inject the mixed adhesive into the crack. Use electric or air powered pumps that provide in-line metering and mixing.

Use injection equipment with automatic pressure control capable of discharging the mixed adhesive at any pre-set pressure up to 200 ± 5 psi (1380 ± 35 kPa) and equipped with a manual pressure control override.

Use equipment capable of maintaining the volume ratio for the injection adhesive as prescribed by the manufacturer. A tolerance of $\pm 5\%$ by volume at any discharge pressure up to 200 psi (1380 kPa) is permitted.

Provide injection equipment with sensors on both the Component A and B reservoirs that automatically stop the machine when only one component is being pumped to the mixing head.

8.0 PREPARATION

Follow these steps prior to injecting the epoxy resin:

- Remove all dirt, dust, grease, oil, efflorescence and other foreign matter detrimental to the bond of the epoxy injection surface seal system from the surfaces adjacent to the cracks or other areas of application. Acids and corrosives are not permitted.
- Provide entry ports along the crack at intervals not less than the thickness of the concrete at that location.
- Apply surface seal material to the face of the crack between the entry ports. For through cracks, apply surface seal to both faces.
- Allow enough time for the surface seal material to gain adequate strength before proceeding with the injection.

9.0 EPOXY INJECTION

Begin epoxy adhesive injection in vertical cracks at the lower entry port and continue until the epoxy adhesive appears at the next higher entry port adjacent to the entry port being pumped.

Begin epoxy adhesive injection in horizontal cracks at one end of the crack and continue as long as the injection equipment meter indicates adhesive is being dispensed or until adhesive shows at the next entry port.

When epoxy adhesive appears at the next adjacent port, stop the current injection and transfer the epoxy injection to the next adjacent port where epoxy adhesive appeared.

Perform epoxy adhesive injection continuously until cracks are completely filled.

If port to port travel of epoxy adhesive is not indicated, immediately stop the work and notify the Engineer.

10.0 FINISHING

When cracks are completely filled, allow the epoxy adhesive to cure for sufficient time to allow the removal of the surface seal without any draining or runback of epoxy material from the cracks.

Remove the surface seal material and injection adhesive runs or spills from concrete surfaces.

Finish the face of the crack flush to the adjacent concrete, removing any indentations or protrusions caused by the placement of entry ports.

11.0 BASIS OF PAYMENT

No separate payment will be made for epoxy resin injection. The cost of this work shall be considered incidental to the construction of the cast-in-place substructure units.

GROUT FOR STRUCTURES

(SPECIAL)

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.

See "Post-Tensioning Tendons" special provision for grout requirements for the post-tensioned girders.

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.

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.

MAINTENANCE OF WATER TRAFFIC**(SPECIAL)****1.0 DESCRIPTION**

The Contractor will be required to maintain water traffic in a manner satisfactory to both the Engineer and the U.S. Coast Guard and in conformance with the conditions of the Bridge Permit issued by the U.S. Coast Guard. The Contractor shall provide and maintain navigational lights in conformance with the requirements of the U.S. Coast Guard on both temporary and permanent work and shall carry on all operations in connection with the construction of the project in such a manner as to avoid damage or delay to water traffic.

2.0 BASIS OF PAYMENT

No direct payment will be made for work under this section. All costs shall be considered incidental to items for which direct payment is made.

WORK IN, OVER OR ADJACENT TO NAVIGABLE WATERS**(SPECIAL)**

All work in, over, or adjacent to navigable waters shall be in accordance with the special provisions and conditions contained in the permits obtained by the Department from the U.S. Coast Guard, U.S. Army Corps of Engineers, or other authority having jurisdiction. The work shall have no adverse effect on navigation of the waterway including traffic flow, navigational depths, and horizontal and vertical clearances without approval from the authorities granting the permits.

The Contractor shall prepare drawings necessary to obtain any permits which may be required for his operations which are not included in the Department's permit including but not limited to excavation and dumping, constructing wharves, piers, ramps, and other structures connecting to bank or shore, and drawings for constructing falsework, cofferdams, sheeting, temporary bridges, and any other construction within the waterway. Submittals shall show locations of such work with respect to the navigational opening. The Contractor shall coordinate the submittal of drawings with the Engineer.

All construction shall progress and be maintained in a safe and timely manner. Temporary construction facilities shall be removed completely and promptly upon discontinuation of their useful purpose. Navigational lights, signals, or facilities shall be provided and maintained by the Contractor on temporary or permanent construction or vessels until such facilities are no longer needed as determined by the Engineer or permitting agency.

The Contractor shall immediately notify the appropriate authorities and take corrective measures as needed when any situation occurs that imposes a threat to the public. He shall also immediately correct any acts or occurrences that contradict or violate any requirements in the plans, special provisions, or permits when corrective measures can be performed in a safe manner. The Contractor shall notify the appropriate authorities when such corrective measures cannot be performed in a safe manner.

All costs incurred by the Contractor in complying with the above requirements shall be included in the prices bid for the various pay items and no additional payment will be made.

NAVIGATIONAL LIGHTING SYSTEM

(SPECIAL)

1.0 GENERAL

The Contractor shall furnish and install the 1¼" conduit across the deck as shown on the plans. The Contractor shall also furnish, install, maintain, and later remove the required temporary navigational lighting. The North Carolina Department of Transportation (NCDOT) shall furnish and install the solar powered system, permanent navigational lighting, and related junction box and interconnecting wiring.

2.0 TEMPORARY LIGHTS

Prior to any work commencing in the waterway, temporary navigational lighting will be required by the Coast Guard. Additional lighting or obstruction lighting may also be required. All temporary navigational lighting should be coordinated with the District Commander of the Coast Guard.

3.0 NAVIGATIONAL LIGHTING SYSTEM INSTALLATION

Upon completion of the superstructure, deck conduit installation, solar array support platform, and rails across the navigational channel, and 30 days prior to placing traffic on the new structure, the Contractor shall coordinate and allow NCDOT forces to install the solar powered navigational lighting. The NCDOT will inspect and maintain the solar powered navigational lighting system after installation.

4.0 PAYMENT

No separate payment will be made for the Navigational Lighting System. The cost for furnishing and installing the 1" conduit shall be included in the pay item "Reinforced Concrete Deck Slab (Sand Lightweight Concrete)". The cost for furnishing, installing, and maintaining the temporary navigational lighting will be included in the several pay items.

SOLAR ARRAY SUPPORT PLATFORM:**(SPECIAL)****1.0 GENERAL**

Materials, fabrication, corrosion protection, and erection of the Solar Array Support Platform shall be in accordance with this special provision, applicable parts of the Standard Specifications and the details shown on the plans.

2.0 CORROSION PROTECTION

All structural members (including the open grid floor and excluding stainless steel nuts, bolts and washers) shall be hot dipped galvanized after fabrication in accordance with Section 1076 of the Standard Specifications. The galvanized surface shall then be cleaned as indicated below and painted in accordance with Sections 1080 and 442 of the Standard Specifications using System 3 as modified herein.

System 3 (Modified)
Acrylic Primer and Top Coats

Coat	Material	Mils Dry/Wet Film	Mils Dry/Wet Film
		Thickness	Thickness
		Minimum	Maximum
Primer	1080-12 White	2.0 DFT	4.0 DFT
Stripe	1080-12 Brown	4.0 WFT	7.0 WFT
Topcoat	1080-12 Gray	2.0 DFT	4.0 DFT
Total		4.0 DFT	8.0 DFT

(A) *Preparation of Galvanized Surface for painting:*

Perform surface smoothing by removing or cleaning all zinc high spots, such as metal drip line, by hand or power tools in accordance with SSPC SP 2 or 3. Level zinc material flush with the surrounding plane without removing the base coating.

Abrasive sweep blasting shall be performed in accordance with Section 5.4.1 of ASTM D 6386. This section also provides a description of the abrasive blast material to be used. The material and technique used will provide a stripping action to remove corrosion products and to provide a rough surface profile while leaving base zinc layers intact.

All surfaces of the blasted beams and hardware shall be blown down with clean compressed air to provide a clean, dry surface for additional coating to be applied.

All surfaces shall be free of visible zinc oxides or zinc hydroxides.

(B) Application of Paint:

Apply all paint in the shop with an SSPC QP-3 certified Contractor.

Apply the primer coat within 8 hours after surface preparation is completed.

(C) *Repair of Damaged Coating:*

Repair damage occurring to the galvanized portion of the coating during shipment or installation in accordance with Section 1076-6 of the *Standard Specifications*. Repair damage occurring to the painted portion of the coating during shipment or installation by applying 4.0-7.0 wet mils of topcoat with a brush or roller and feather or taper this to be level with the surrounding areas.

In lieu of galvanizing and painting, the Contractor may at his option upon completion of shop fabrication blast clean and metallize the structural steel (excluding stainless steel nuts, bolts and washers) to a minimum thickness of 8 mils. See special provision for thermal sprayed coatings (metallization).

If the Contractor chooses to metallize, apply an 8 mil thick 1350 aluminum (W-Al-1350) thermal sprayed coating with a 0.5 mil thick seal coat to all structural members, including the open grid floor. Then apply 1 coat each of 1080-12 brown and 1080-12 gray paint on the web face of the b11 member which comes in contact with the concrete girder in accordance with section 442 of the standard specifications.

3.0 PAYMENT

The entire cost of furnishing and erecting the Solar Array Support Platform including but not limited to materials, corrosion protection, equipment, tools, labor, inserts and incidentals necessary to complete the work shall be included in the lump sum price bid for the "Solar Array Support Platform".

VERTICAL CLEARANCE GAGES

(SPECIAL)

1.0 GENERAL

Vertical clearance gages will be required over the navigational channel. Gages will be furnished and installed by Division Bridge Maintenance forces within thirty days prior to completion of the bridge crossing the channel.

The Contractor shall be responsible for notifying, coordinating, and arranging access for Division Bridge Maintenance personnel to complete the work.

2.0 MEASUREMENT AND PAYMENT

No separate measurement will be made for the above work. Payment will be considered as incidental to the construction of the project.

CORROSION PROTECTION OF BRIDGE
@ STATION 353+32.50 -L-

(SPECIAL)

1.0 GENERAL

Corrosion protection for the bridge shall be in accordance with the plans, the applicable sections of the Standard Specifications and this special provision.

2.0 PORTLAND CEMENT CONCRETE COMPOSITION AND DESIGN

Use calcium nitrite [$\text{Ca}(\text{NO}_2)_2$] corrosion inhibitor and substitute fly ash and microsilica for a portion of the portland cement. Apply the following rates of pozzolans at the locations shown:

	$\text{Ca}(\text{NO}_2)_2$ (gal/yd ³)	Microsilica	Fly Ash
Deck Slab	3.0	-	20% ¹
End Diaphragms	3.0	-	20% ¹
Bent Diaphragms	3.0	-	20% ¹
Closure Splice Diaphragms	3.0	-	20% ¹
Median and Parapets	3.0	-	20% ¹
78" Prestressed Concrete Girders	3.0	-	-
78" Post-Tensioned Concrete Girders	3.0	-	-
Interior Bent Caps	3.0	-	20% ¹
Bent 1-5 & 9-43 Columns	3.0	-	20% ¹
Bent 1-5 & 9-43 Footings	3.0	-	20% ¹
Bent 6, 7 & 8 Columns	3.0	5% ²	20% ²
Bent 6, 7 & 8 Footings	3.0	5% ²	30% ²

¹ The rate of substitution shall be 1.2 lb. of pozzolan per 1.0 lb. of cement.

² The rate of substitution shall be 1.0 lb. of pozzolan per 1.0 lb. of cement.

3.0 PAYMENT

No separate payment will be made for corrosion protection of the bridge. The cost of furnishing and incorporating the corrosion protection of the bridge is considered incidental to the various pay items.

MASS CONCRETE

(SPECIAL)

This special provision applies to the footings of Bents 5, 6, 7 & 8 of the dual bridges at station 353+32.50 -L-.

The Contractor shall provide an analysis of the anticipated thermal developments in the mass concrete elements using his proposed mix design, casting procedures, and materials.

Additionally, the Contractor shall describe the measures and procedures he intends to use to limit the temperature differential to 35°F or less between the interior and exterior of the designated mass concrete elements during curing. The proposed plan to control the temperature differential shall be submitted to the Department for review and comments at the time approval is requested for the mass concrete mix design.

Maintenance of the specified thermal differential may be accomplished through a combination of the following:

- A. Selection of concrete ingredients to minimize the heat generated by hydration of the cement.
- B. Cooling component materials to reduce the temperature of the concrete while in its plastic state.
- C. Controlling the rate of placing the concrete.
- D. Insulating the surface of the concrete to prevent heat loss.
- E. Providing supplemental heat at the surface of the concrete to prevent heat loss.
- F. Other acceptable methods which may be developed by the Contractor.

Mass concrete shall be Class AA, vibrated, air-entrained, and shall contain an approved set-retarding, water-reducing admixture, and 30% flyash and 5% microsilica by weight of the total cementitious material. The total cementitious material shall not exceed 690 lbs. per cubic yard of concrete. The maximum water-cementitious material ratio shall be 0.366 for rounded aggregate and 0.410 for angular aggregate. The slump of the concrete shall not exceed three inches. The Contractor shall submit compressive strength results, the average of at least three cylinders made in the laboratory, of his proposed mix design. These cylinders shall show a minimum strength of 5000 psi at 28 days.

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Minimum compressive strength at 28 days of field placed concrete shall be 4500 psi.

The Contractor shall meet the temperature monitoring requirements listed below for all footings on the plans which are six feet thick or greater. At the discretion of the Engineer, all temperature monitoring requirements may be waived provided the Contractor has proven to the satisfaction of the Engineer that he can limit the temperature differential to 35° F or less between the interior and exterior of the footing.

The Contractor shall provide and install a minimum of six temperature sensing devices in each mass concrete pour to monitor temperature differentials between the interior and exterior of the pour unless otherwise directed by the Engineer. These devices shall be accurate within $\pm 2^{\circ}\text{F}$ within the temperature range of 40°F to 180°F. One temperature sensing probe shall be placed near the center of mass of the pour, and another temperature sensing probe shall be placed at approximately two inches clear from the surface of the concrete furthest from the center of mass. The Engineer shall approve the locations of the other temperature sensing probes.

The monitoring devices shall be read and readings recorded at one-hour intervals, beginning when casting is complete and continuing until the maximum temperature is reached and two consecutive readings indicate a temperature differential decrease between the interior and exterior of the element. At the option of the Contractor, an approved strip-chart recorder furnished by the Contractor may record the temperature. If monitoring indicates the 35°F differential has been exceeded, the Contractor shall make the necessary revisions to the approved plan to reduce the differential on any remaining placements to 35°F or less. The Department must approve any revisions to the plan prior to implementation.

Flyash and microsilica used in the mass concrete mix shall meet the requirements of Articles 1024-5 and 1024-7 of the Standard Specifications. Portland Cement shall meet the requirements of AASHTO M85 for Portland Cement Type II. The temperature of mass concrete at the time of placement shall not be less than 40°F nor more than 75°F.

The placement of the mass concrete shall be continuous until the work is completed and the resulting structures shall be monolithic and homogeneous.

The entire cost of this work shall be included in the unit contract price bid for Class AA Concrete.

78" PRESTRESSED CONCRETE GIRDERS**(SPECIAL)**

The Contractor shall provide girders in accordance with the plans and standard specifications.

Measurement and Payment will be for the actual number of linear feet of prestressed concrete girders.

Payment will be made under:

78" Prestressed Concrete Girders.....Linear Feet

78" POST-TENSIONED PRESTRESSED CONCRETE GIRDERS**(SPECIAL)**

The Contractor shall provide girders in accordance with the plans and standard specifications.

Measurement and Payment will be for the actual number of linear feet of post-tensioned prestressed concrete girders.

Payment will be made under:

78" Post – Tensioned Prestressed Concrete Girders.....Linear Feet

POST-TENSIONING TENDONS**(SPECIAL)****1.0 DESCRIPTION**

Post-Tensioning consists of furnishing, installing, stressing and grouting all post-tensioning systems. In this process, prestressing steel, which may be strands or wires, is installed through ducts in the concrete, stressed to a predetermined load, and anchored directly against the hardened concrete. Grout is then injected into the ducts to completely fill all remaining voids, and to seal the permanently stressed tendons.

Post-Tensioning Tendons also includes furnishing and installing all the hardware and any other appurtenant items necessary for the particular prestressing system used, including but not limited to ducts, anchorage assemblies, supplementary steel reinforcing bars, local zone reinforcement, and grout used for pressure grouting ducts and all associated operations.

2.0 TERMINOLOGY

Anchorage: An assembly of various hardware components which secures a tendon at its ends after it has been stressed, and imparts the tendon force into the concrete.

Anchor Plate or Bearing Plate: That part of the anchorage which transfers the tendon force directly into the structure.

Anticipated Set: The wedge set assumed to occur in the design calculation of the post-tensioning forces at the time of load transfer.

Bleed: The autogenous flow of mixing water within or its emergence from, newly placed grout, caused by the settlement of the solid materials within the mass.

Coupler: A device used to transfer the prestressing force from one partial length prestressing tendon to another. (Strand couplers are not permitted.)

Duct: Material forming a conduit to accommodate prestressing steel installation and provide an annular space for the grout which protects the prestressing steel.

Fluidity: A measure of time, expressed in seconds necessary for a stated quantity of grout to pass through the orifice of a flow cone.

Grout: A mixture of cementitious materials and water with or without mineral additives or admixtures, proportioned to produce a pumpable consistency without segregation of the constituents, when injected into the duct to fill the space around the prestressing steel.

Grout Cap: A device that contains the grout and forms a protective cover sealing the post-tensioning steel at the anchorage.

Inlet: Tubing or duct used for injection of the grout into the duct.

Outlet: Tubing or duct to allow the escape of air, water, grout and bleed water from the duct.

Post-Tensioning: A method of prestressing where tensioning of the tendons occurs after the concrete has been cast and cured. The force in the stressed tendons is transferred to the concrete by means of anchorages.

Post-Tensioning Scheme or Layout: The pattern, size and locations of post-tensioning tendons provided by the Designer on the Contract Plans.

Post-Tensioning System: An assembly of proprietary hardware, including but not limited to anchorage assembly, local zone reinforcement, wedge plate, wedges, inlet, outlet, couplers, duct, duct connections, and grout cap, used to install a tendon of a particular size and type, and supplied by a particular manufacturer or manufacturers of post-tensioning components.

Pressure Rating: The estimated maximum pressure that water in a duct or in a duct component can exert continuously with a high degree of certainty that failure of the duct or duct component will not occur (commonly referred to as working pressure).

Set (Also Anchor Set or Wedge Set): Set is the total movement of a point on the strand just behind the anchoring wedges during load transfer from the jack to the permanent anchorages. Set movement is the sum of slippage of the wedges with respect to the anchorage head and the elastic deformation of the anchor components.

Strand: An assembly of several high strength steel wires wound together. Strands usually have six outer wires helically wound around a single straight wire of a similar diameter.

Tendon: A single or group of prestressing steel elements and their anchorage assemblies imparting prestress forces to a structural member or the ground. Also, included are ducts, grouting attachments, grout and corrosion protection filler materials or coatings.

Tendon Size: The number of individual strands or wires of a certain diameter in a tendon, or the diameter of a bar.

Tendon Type: The relative location of the tendon to the concrete shape, internal or external.

Thixotropic: The property of a material that enables it to stiffen in a short time while at rest, but to acquire a lower viscosity when mechanically agitated.

Wedge Plate: The hardware that holds the wedges of a multi-strand tendon and transfers the tendon force to the anchorage assembly. (Commonly referred to as anchor head)

Wedge: A conically shaped device that anchors the strand in the wedge plate.

3.0 ALTERNATE POST-TENSIONING DESIGNS

Alternative designs using a post-tensioning scheme other than that shown on the plans may be submitted by the Contractor for the Engineer's approval provided that the proposed alternative scheme fulfills the following requirements:

- (1) The prestress system is a type described in Section 4 of this Special Provision.
- (2) The net compressive stress in the concrete after all losses is at least as large as that provided by the post-tensioning scheme shown on the Plans.
- (3) The distribution of individual tendons at each cross section generally conforms to the distribution shown on the Plans.
- (4) The ultimate strength of the structure with the proposed post-tensioning scheme meets the requirements of Section 5 of the "AASHTO LRFD Bridge Design Specifications, Sixth Edition" and shall be equivalent to or greater than the ultimate strength provided by the original design.
- (5) Stresses in the concrete and prestressing steel at all sections and at all stages of construction meet the requirements of the Design Criteria noted on the Plans.
- (6) All provisions of the Design Criteria noted on the Plans shall be satisfied.
- (7) The Contractor fully redesigns and details, as required, the elements where the alternate post-tensioning scheme is proposed to be used.
- (8) The Contractor submits complete shop drawings, including post-tensioning scheme and system, reinforcing steel and concrete cover, for the Engineer's approval.
- (9) The Contractor submits design calculations, including short and long term prestress losses, for the Engineer's approval.
- (10) Any alternate post-tensioning scheme or system approved by the Engineer will result in no additional costs to the Department.

- (11) Any alternative post-tensioning scheme or system shall be designed and sealed by a responsible Specialty Engineer, licensed in the State of North Carolina.

4.0 MATERIALS

4.1 Prestressing Material:

4.1.1 Prestressing Steel:

- a) Strand: Unless otherwise noted on the plans, strand shall be uncoated, Grade 270, low relaxation 7-wire strand conforming to the requirements of ASTM A 416.
- b) Wires: Unless otherwise noted on the plans, wire shall be uncoated, low relaxation wire conforming to the requirements of ASTM A 421.

The proper use of strand and wires is predicated upon the use of suitable accessory materials. Details for the use of these materials shall be furnished by the manufacturer in connection with shop and working drawing submittals.

4.1.2 Post-Tensioning System: All post-tensioning systems are subject to the approval of the Engineer. All components of a post-tensioning system shall be from a single supplier. Prestressing steel meeting the above requirements may be obtained from another supplier.

4.1.3 Prestress Anchorages: All prestressing steel shall be secured at the ends by anchoring devices meeting the approval of the Engineer. The anchorages shall develop at least 100% of the minimum specified ultimate tensile strength of the prestressing steel, tested in an unbonded state without exceeding the anticipated set. Certified copies of test results for the anchorage system shall be supplied to the Engineer at no additional cost. The anchorage shall be so arranged that the prestressing force in the tendon may be verified prior to the removal of the stressing equipment.

Galvanize the embedded body of the anchorage in accordance with ASTM 123. Other components of the anchorage including wedges, wedge plate and local zone reinforcement are not required to be galvanized. Construct the bearing plate and wedge plate from ferrous metal. Equip all anchorages with a permanent grout cap that is vented and bolted to the anchorage.

Cast anchorages with grout outlets suitable for inspection from either the top or front of the anchorage. The grout outlet will serve a dual function of grout outlet and postgrouting inspection access. The geometry of the grout outlets must facilitate being drilled using a 3/8" diameter straight bit to facilitate endoscope inspection directly behind the anchor plate. Anchorages may be fabricated to facilitate both inspection locations or may be two separate anchorages of the same type each providing singular inspection entry locations.

Two part wedges shall not be used. The Contractor shall furnish and use acceptable three part wedges with appropriate anchorage discs for anchoring post-tensioning strands. Provide wedge plates with centering lugs or shoulders to facilitate alignment with the bearing plate.

The anchoring devices shall effectively distribute tendon forces to the concrete. Such devices shall conform to the following requirements:

- a) Article 5.10.9.7.2 of the AASHTO LRFD Bridge Design Specifications. The nominal concrete compressive strength at time of application of the post-tensioning tendon force used to determine bearing resistance shall be limited to 8,500 psi as the absolute maximum value, even if the actual concrete strength determined through testing is in excess of 8,500 psi at the time of transfer (load application).
- b) Bending stresses in the plates or assemblies induced by the pull of the prestressing steel shall not exceed the yield point of the material or cause visible distortion of the anchorage plate when 100% of the ultimate strength of the tendon is applied. Certified test reports from an approved independent testing laboratory, verifying compliance with this requirement, shall be provided to the Engineer for each type and/or size of anchoring device.

Alternatively, anchorage devices which do not meet with either or both of the above requirements [(a) and (b)] may be accepted based upon previously approved usage in the State of North Carolina or on the basis of new or previous test performed in accordance with and meeting the requirements of articles 10.3.2 and 10.3.2.3.10 of the AASHTO LRFD Bridge Construction Specifications, all at no cost to the Department. Also, in such cases, any additional confinement reinforcement or modification to existing reinforcement required for satisfactory performance of the anchorage devices shall be incorporated in the structure at no additional cost.

4.1.4 Inlets, Outlets, Valves and Plugs: Provide permanent grout inlets, outlets, and threaded plugs made of ASTM A 240 Type 316 stainless steel, nylon or polyolefin materials. For products made from nylon, the cell class of the nylon according to ASTM D5989 shall be S-PA0141 (weather resistant), S-PA0231 or S-PA0401 (ultimate strength not less than 10,000 psi with UV stabilizer added). Products made from polyolefin shall contain antioxidant(s) with a minimum Oxidation Induction Time (OIT) according to ASTM D 3895 of not less than 20 minutes. Perform OIT test on samples taken from the finished product. Test the remolded finished polyolefin material for stress crack resistance using ASTM F 2136 at an applied stress of 348 psi resulting in a minimum failure time of 3 hours.

All inlets and outlets will be equipped with pressure rated mechanical shut-off valves or plugs. Inlets, outlets, valves and plugs will be rated for a minimum pressure rating of 150 psi. Use inlets and outlets with a minimum inside diameter of 3/4 inch for strand and 3/8 inch for single bar tendons and four-strand duct.

4.1.5 Permanent Grout Caps: Use permanent grout caps made from ASTM A 240 Type 316L stainless steel. Seal the cap with “O” ring seals or precision fitted flat gaskets placed against the bearing plate. Place a grout vent on the top of the cap. Grout caps must be rated for a minimum pressure rating of 150 psi. Use ASTM A 240 Type 316L stainless steel bolts to attach the cap to the anchorage. Provide certified test reports documenting the chemical analysis of the steel.

4.1.6 Ducts:

- a) **General:** Unless specifically noted on the Plans or otherwise approved by the Engineer, ducts for post-tensioning shall conform to the requirements of this specification. Ducts embedded in the concrete for prestressing steel shall be galvanized ferrous metal.
- b) **Size of Ducts:** Ducts for multi-strand tendons shall have a minimum size which provides an inside area at least 2.5 times the net area of the prestressing steel.
- c) **Corrugated Metal Ducts:** Corrugated metal ducts shall be galvanized. Rigid metal ducts may be fabricated with either welded or interlocked seams. Ducts shall bend without crimping or flattening and shall have sufficient strength to maintain their correct alignment during placing of concrete. Joints between sections of ducts shall have positive metallic connections, which do not result in angle changes at the joints.
- d) **Epoxy Coated Metal Ducts:** Epoxy Coated Metal Ducts shall not be used.
- e) **Polyethylene (P.E.) Ducts and Pipes:** Polyethylene (P.E.) Ducts and Pipes shall not be used.

4.1.7 Grout:

- a) **General:** The Contractor shall use a Department approved pre-packaged grout in lieu of an on site batch mix. It is the Contractor's responsibility to consult the manufacturer to determine if the pre-packaged grout selected is suitable for grouting post-tensioning ducts.
- b) **Materials:** Contractor shall contact the Materials and Test Unit for a list of approved pre-packaged grouts.

Water shall comply with Section 1024 of the Standard Specifications and shall be potable, clean, and free of injurious quantities of substances known to be harmful to the prestressing steel or pre-packaged grout.

Admixtures, if approved by the Department, shall impart the properties of low water content, good flowability, minimum bleed and expansion if desired. Its formulation shall contain no chemicals in quantities that may have harmful effects on the prestressing steel or grout. Admixtures containing chlorides in excess of 0.5% by weight of admixture

(assuming 1.0 lb. of admixture per sack (95 lb.) of grout), fluorides, sulfites and nitrates shall not be used.

Aluminum powder of proper fineness and quantity or other approved gas evolving material that is well dispersed through the mixture may be used to obtain expansion of the grout.

All admixtures shall be used in accordance with the instructions of the manufacturer. The date of manufacture shall be clearly stamped on each container. No admixture for which the shelf life recommended by the manufacturer has expired shall be used.

- c) Requirements: If no compressive strength or volume change is specified on the plans or in the applicable section of the Standard Specifications or special provision for the structure, provide non-metallic, non-shrink grout with minimum compressive strengths and volume changes as follows:

Property	Requirement
Compressive Strength @ 7 days	3000 psi
Compressive Strength @ 28 days	5000 psi
Volume Change @ 24 hours	0.0% to < 0.10%
Volume Change @ 28 days	< or = to +0.20%

A testing laboratory approved by the Department shall be used to test pre-packaged grout. Provide laboratory test results for setting time, volume change, compressive strength and fluidity with the grouting of each post-tensioning duct. Submit compressive strength for at least two 2 in. cube specimens at the age of 3, 7, 14, and 28 days for a total of at least eight cube specimens tested. Perform laboratory tests in accordance with the following:

Property	Test Method
Setting Time	ASTM C953
Volume Change	ASTM C1090
Compressive Strength	ASTM C942
Fluidity	ASTM C939

The Contractor shall not use the pre-packaged grout until written acceptance has been received. Acceptance of approved pre-packaged grout does not relieve the Contractor of the responsibility to furnish a product that meets the Contract requirements.

- d) Sampling and Placement: The applicable section of the Standard Specifications or special provision for the structure and 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 two cube specimens at 28 days.

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Contractor is responsible for the placement of grout in accordance with the manufacturer's recommendations unless directed otherwise by the Engineer.

Grout samples for testing shall be furnished by the Contractor at no cost to the Department.

4.2 Samples for Testing:

4.2.1 General: Testing shall conform to the applicable ASTM Specifications for the prestressing material used.

All material samples for testing shall be furnished by the Contractor at no cost to the Department.

Job site or site referred to herein shall be considered the location where the prestressing steel is to be installed whether at the bridge site or a removed casting yard.

4.2.2 Prestressing Steel and Components: Samples for testing shall be furnished as described below for each manufacturer of prestressing strand, wire, and anchorage assemblies to be used on the project.

A certification stating the manufacturer's minimum guaranteed ultimate tensile strength shall be submitted for each sample of prestressing steel strand or wires furnished for testing.

The following samples of materials selected by the Engineer at the plant or job site from the prestressing steel used for post-tensioning operations shall be furnished by the Contractor to the Engineer well in advance of anticipated use:

- a) For strand: three randomly selected samples, 5 feet long, per manufacturer, per size of stand, per shipment, with a minimum of one sample for every ten reels delivered.
- b) For wire: three randomly selected samples, 5 feet long, per manufacturer per size of wire per heat of steel, per shipment, with a minimum of one sample for every ten coils delivered.
- c) For anchorage assemblies: two samples of each size, per manufacturer, per heat of steel.

One of each of the samples furnished to represent a lot shall be tested. The remaining sample(s), properly identified and tagged, shall be stored by the Engineer for future testing in the event of loss or failure of the component represented to meet minimum strength requirements. For acceptance of the lot represented, test results shall show that 100% of the minimum guaranteed ultimate tensile strength has been met.

4.2.3 Lots and Identification: A lot is that parcel of components as described herein. All anchorage assemblies of each size from each mill heat of steel, all wire from each manufactured coil and all strand from each manufactured reel to be shipped to at the site shall be assigned an individual lot number and shall be tagged in such a manner that each such lot can be accurately identified at the job site. Records shall be submitted to the Engineer identifying assigned lot numbers with the heat, coil or reel of material represented. All unidentified prestressing steel or anchorage assemblies received at the site will be rejected. Also, loss of positive identification of these items at any time will be cause for rejection.

4.3 Approval of Materials: The approval of any material by the Engineer shall not preclude subsequent rejection if the material is damaged in transit or later damaged or found to be defective.

5.0 TESTING BY THE CONTRACTOR

5.1 Tendon Modulus of Elasticity: This test will not be required if the Contractor can demonstrate to the satisfaction of the Engineer, valid results for the tendon modulus of elasticity from previous projects. Such results must be for the same type of strand, size, material and complement of strands per tendon as required for this project and must have been performed under test conditions equal to or better than those described below.

For the purpose of accurately determining the tendon elongations while stressing, the Contractor shall bench test two samples of each size and type of tendon to determine the modulus of elasticity prior to stressing the initial tendon.

For the purpose of this test, the bench length between anchorages shall be at least 40 feet and the tendon duct shall be at least 2 inch clear of the tendon all around. The test procedure shall consist of stressing the tendon at an anchor assembly with a load cell at the dead end. The test specimen shall be tensioned to 80% of ultimate in ten increments and then detensioned from 80% of ultimate to zero in ten decrements. For each increment and decrement, the gauge pressure, elongations and load cell force shall be recorded. Elongations of the tendon shall be noted for both ends and the central 30 feet, and shall be measured to an accuracy of 1/32 inch. The elongations shall be corrected for the actual anchorage set of the dead end.

The modulus shall be calculated as follows:

$$E = \frac{PL}{A\Delta l}$$

Where;

P = force in tendon.

L = distance between pulling wedges and dead end wedges or exact length in center 30 feet of the tendon.

A = cross sectional area of the tendon based on nominal area.

dl = strand elongation for load P .

The theoretical elongation shown on the post-tensioning shop or working drawings shall be reevaluated by the Contractor using the results of the test. When the modulus of elasticity from the bench test varies from the modulus of elasticity used for shop or working drawings by more than 1%, the Contractor shall submit revisions to the theoretical elongations, using the Modulus of Elasticity determined through testing, to the Engineer for approval.

When the observed elongations of the tendons in the erected structure fall outside the acceptable tolerances or to otherwise settle disputes, additional Tendon Modulus of Elasticity Tests may be required to the satisfaction of the Engineer.

If the source of prestressing steel changes during the project, additional test series or substantiation from previous projects, not to exceed two per source shall be required.

The apparatus and methods used to perform the test shall be proposed by the Contractor and be subject to the approval of the Engineer. Furthermore, this test shall be conducted by the Contractor in the presence of the Engineer.

5.2 In Place Friction Test: This test is intended to demonstrate that the friction characteristics, losses and resulting tendon forces are in agreement with the design assumptions.

For tendons in excess of 100 feet long, the Contractor shall test in place a minimum of one tendon in each tendon group performing the same function. Functional tendon groups are cantilever tendons, continuity tendons, draped external tendons or continuous profiled tendons passing through one or more spans. The selected tendon shall be representative of the size and length of the group of tendons being tested. In this respect, the function of two or more tendons may be the same even though their actual profiles and lengths differ.

The test procedure shall consist of stressing the tendon at an anchor assembly with a load cell or a second certified jack at the dead end. The test specimen shall be tensioned to 80% of ultimate tendon strength in eight equal increments, and detensioned in eight equal decrements. For each increment and decrement, the gauge pressure, elongations and load cell force shall be recorded. Account shall be taken of any wedge seating in both the live end (i.e., back of jack) and the dead end (i.e., back of load cell), and of any friction within the anchorages, wedge plates and jack as a result of slight deviations of the strands through these assemblies. For long tendons requiring multiple jack pulls with intermediate temporary anchoring, care shall be taken to keep an accurate account of the elongation at the jacking end allowing for intermediate wedge seating and slip of the jacks' wedges.

The test shall be conducted using Engineer approved lubricants, if required, to meet the expected friction coefficient.

If the elongations fall outside the $\pm 5\%$ range when compared to the anticipated elongations, the Contractor will be required to investigate the reason, and make revisions to his post-tensioning operations or provide detailed calculations confirming the final tendon forces are in agreement with the Plans.

In reconciling theoretical and actual elongations, the value of the expected friction and wobble coefficients shall not be varied by more than $\pm 10\%$. Significant shortfall in elongations is indicative of poor duct alignments and/or obstructions. The Contractor shall be required to correct or compensate for such elongations in a manner to be proposed by the Contractor and reviewed and approved by the Engineer at no additional cost to the Department.

One successful friction test for each type and size of tendon (tendon group) will be required for the project.

If, during the course of routine stressing operations, there are irreconcilable differences between forces and elongations, or other difficulties, the Engineer reserves the right to require additional in place friction testing at no additional cost to the Department.

The apparatus and methods used to perform the test shall be proposed by the Contractor and be submitted to the Engineer for approval. Furthermore, this test shall be conducted by the Contractor in the presence of the Engineer.

Correction or adjustment of elongations as a consequence of the results of the friction test is the responsibility of the originator of the stressing and elongation calculations.

5.3 Test Reports Required: Two test reports of the "Tendon Modulus of Elasticity Test" shall be submitted to the Engineer at least 30 days prior to installing the tendon.

Two test reports of the "In Place Friction Test" shall be submitted to the Engineer within two weeks after successful installation of the test tendon.

5.4 Payment for Testing: Testing by the Contractor will not be paid for separately but shall be incidental to the price paid for the post-tensioning tendons.

5.5 Application of Test Results: The theoretical elongations shown on the post-tensioning shop or working drawings shall be reevaluated by the Contractor using the results of the tests for Tendon Modulus of Elasticity and In Place Friction as appropriate and corrected as necessary. Revisions to the theoretical elongations shall be submitted to the Engineer for approval.

6.0 PROTECTION OF PRESTRESSING STEEL

6.1 Shipping, Handling and Storage: All prestressing steel shall be protected against physical damage and corrosion at all times from manufacturer to final grouting or encasing in the concrete. Prestressing steel that has sustained physical damage at any time shall be

rejected. Any reel that is found to contain broken wires shall be carefully inspected during use and lengths of strand containing broken wires shall be removed and discarded. The wire shall be bright and uniformly colored, having no foreign matter or pitting on its surface.

Prestressing steel shall be packaged in containers or shipping forms for protection of the steel against physical damage and corrosion during shipping and storage. A corrosion inhibitor which prevents rust or other results of corrosion shall be placed in the package or form, or shall be incorporated in a corrosion inhibitor carrier type packaging material, or when permitted by the Engineer, may be applied directly to the steel. The corrosion inhibitor shall have no deleterious effect on the steel or the concrete or bond strength of steel to concrete. Inhibitor carrier type packaging material shall conform to the provisions of Federal Specification MIL-P-3420. Packaging or forms damaged from any cause shall be immediately replaced or restored to the original condition.

The shipping package or form shall be clearly marked with a statement that the package contains high-strength prestressing steel, the care to be used in handling, and the type, kind and amount of corrosion inhibitor used, including the date when placed, safety orders and instructions for use. Low relaxation (stabilized) strand shall be specifically designated per requirements of ASTM A 416. All strands not so designated shall be rejected.

6.2 During Installation in the Structure: When acceptable prestressing steel for post-tensioning is installed in the ducts after completion of concrete curing and if stressing and grouting are completed within 7 calendar days after the installation of the prestressing steel, rust which may form during these 7 days will not be cause for rejection of the steel. Post-tensioning steel installed, tensioned and grouted in this manner, all within 7 calendar days, will not require the use of a corrosion inhibitor in the duct following installation of the prestressing steel.

Post-tensioning steel installed as above but not grouted within 7 calendar days shall be protected from corrosion. The method of protection shall be determined by the Contractor and shall be approved by the Engineer. Water soluble oil shall not be allowed as a corrosion inhibitor or friction reducer.

Within 30 calendar days after installation of the post-tensioning steel, ducts shall be grouted in accordance with these specifications. Except when approved by the Engineer in writing, failure to grout tendons within the 30 calendar days specified shall result in stoppage of the affected work and no invoices shall be processed for payment of that affected work.

7.0 FABRICATION

7.1 General: All post-tensioning anchorages, ducts, vent pipes, miscellaneous hardware, reinforcing bars, and other embedments shall be accurately and securely fastened at the

locations shown on the Plans or on the approved Shop or Working Drawings or as otherwise approved by the Engineer.

7.2 Ducts: Ducts shall be accurately aligned and positioned at the locations shown on the Plans or according to the approved Shop or Working Drawings or as otherwise approved by the Engineer. All internal ducts shall be securely fastened in position at regular intervals not exceeding 1'-6" to prevent movement, displacement or damage from concrete placement and consolidation operations. The method and spacing of duct supports shall be shown on appropriate Shop Drawings.

All alignments, including curves and straight portions, shall be smooth and continuous with no lips, kinks or dents.

All ducts shall be carefully checked and repaired as necessary before the placing of any concrete commences. If a duct requires repair, the repair method shall be subject to approval by the Engineer. The use of any tape to repair or seal a duct shall not be permitted.

The tolerance on the location of the ducts for the tendons shall be as specified in section 7.5.

After installing the ducts in the forms and until final tendon grouting is complete, all ends of ducts, connections to anchorages, splices, inlets, outlets, and the like shall be sealed at all times to prevent the entry of water and debris. An absolute seal of anchorage and duct termination locations shall be provided by using plumber's plugs or equal. Grout inlets and outlets shall be installed with plugs or valves in the closed position, but low point outlets may be open. The use of duct tape shall not be permitted.

7.3 Splices and Joints: All splices, joints, couplings, connections (inlet and outlet) and valves shall be part of the approved post-tensioning system. At splices and joints, and connections to anchorages, ducts shall be smoothly aligned and secured with no lips or kinks. They shall be joined in a manner which positively prevents the entrance of cement paste and water from the concrete or unwanted leakage of grout during subsequent grouting operations. The use of any tape shall not be permitted as a method to seal or join splices, joints, or connections.

7.4 Grout Vents, Injection and Ejection Pipes: All ducts or anchorage assemblies for permanent post-tensioning shall be provided with pipes or other suitable connections at locations as shown on the Plans and shop drawings. As a minimum, ducts shall be vented in the following positions:

- a) Top of the tendon anchorage
- b) Top of the grout cap
- c) At the high points of the duct when the vertical distance between the highest and lowest point is more than 6 inches
- d) At all low points
- e) At other locations required by the Engineer

All connections to ducts shall be made with metallic or plastic structural fasteners.

Vent and grouting pipes shall be mortar tight and shall provide means for injection of grout through the vents and for sealing the vents. Duct tape shall not be used to join or repair ducts or make connections.

Grout injection pipes shall be fitted with positive mechanical shut-off valves. Vents and ejection pipes shall be fitted with valves, caps or other devices capable of withstanding the grout pumping pressures. Grout tubes shall be extended a sufficient distance out of the concrete member to allow for proper closing of the valves.

All grout caps used must be installed to prevent entrapment of air or water voids and must provide 100% coverage of all tendons.

7.5 Tolerances: Post-tensioning duct tolerance shall be $\pm\frac{1}{4}$ inch in the horizontal direction and $\pm\frac{1}{2}$ inch in the vertical direction.

Entrance and exit angles of tendon paths at anchorages and/or at faces of concrete shall be within ± 2 degrees of desired angle measured in any direction, and shall be accomplished with smooth transitions without any kinks.

Angle changes at duct joints shall not be greater than ± 2 degrees in any direction, and shall be accomplished with smooth transitions without any kinks.

Anchorage shall be located within $\pm\frac{1}{4}$ inch of desired position laterally and ± 1 inch along the tendon, except that all minimum cover and clearance requirements must be maintained.

Anchorage confinement reinforcement in the form of spirals, multiple U shaped bars or links, shall be positioned to start within $\frac{1}{2}$ inch of the back of the main anchor plate, and shall be properly centered around the duct.

In the event of conflicts between the reinforcement and post-tensioning duct, in general, the position of the post-tensioning duct shall prevail and the reinforcement shall be adjusted locally with the approval of the Engineer.

8.0 PLACING CONCRETE

8.1 Precautions: The Contractor shall exercise great care when placing and consolidating concrete so as not to displace or damage any of the post-tensioning ducts, anchorage assemblies, splices and connections, reinforcement or other embedments.

8.2 Proving of Post-Tensioning: Upon completion of concrete placement the Contractor shall prove that the post-tensioning ducts are free and clear of any obstructions or damage and will be able to accept the intended post-tensioning tendons by passing a torpedo

through the ducts. The torpedo shall have the same cross-sectional shape as the duct, and be $\frac{1}{4}$ inch smaller all around than the clear, nominal inside dimensions of the duct. No deductions to the torpedo section dimensions shall be made for tolerances allowed in the manufacture or fixing of the ducts. For curved ducts, the length shall be determined by the Contractor such that when both ends touch the outermost wall of the duct, the torpedo is $\frac{1}{4}$ inch clear of the innermost wall; it need not be longer than 2 ft. If the torpedo will not travel completely through the duct, the member shall be rejected, unless a workable repair can be made to clear the duct, all to the satisfaction of the Engineer. The torpedo shall be passed through the duct easily, by hand, without resorting to excessive effort or mechanical assistance.

8.3 Problems and Remedies: If the ducts or any part of the work is found to be deficient, it shall be rejected. No remedial or repair work shall be permitted without the approval of the Engineer.

9.0 INSTALLING TENDONS

Post-tensioning strands may be pushed or pulled through the ducts to make up a tendon. Pushing shall be done with care so as to avoid snagging on any lips or joints in the ducts. The Contractor shall take precautions by rounding off the end of the strand or fitting it with a smooth protective cap. During the installation of the post-tensioning strand into the duct, the strand shall not be intentionally rotated by any mechanical device.

Alternatively, strands may be assembled into the tendon which then may be pulled through the duct together using a special steel wire sock ("Chinese finger") or other device attached to the end. The ends of the strands may not be electric arc welded together for this purpose. Strands may be brazed together for pulling as long as 3 feet of strand from the brazed end is removed after installation. The end of the pre-assembled tendon shall be rounded for smooth passage through the duct. Cutting shall be done with an abrasive saw or similar. Flame cutting shall not be allowed.

Installation of tendons in ducts prior to concrete placement shall not be allowed.

No permanent tendons shall be installed prior to the completion of testing as required by these specifications or Plans, except for the "In Place Friction Test" where only the tendon to be tested may be installed prior to successful completion of the test.

10.0 POST-TENSIONING OPERATIONS

10.1 General: Post-tensioning forces shall not be applied until the concrete has attained the specified compressive strength as determined by cylinder tests.

10.2 Stressing Tendons: All post-tensioning steel shall be tensioned by means of hydraulic jacks. The post-tensioning force shall not be less than that required by the plans or approved shop drawings, or as otherwise approved by the Engineer. Monostrand jacks shall not be utilized for stressing tendons.

10.2.1 Maximum Stress at Jacking: The maximum temporary stress (jacking stress) in the post-tensioning steel shall not exceed 81% of its specified minimum ultimate tensile strength. Tendons shall not be overstressed to achieve the expected elongation.

10.2.2 Initial and Permanent Stresses: The post-tensioning steel shall be anchored at initial stresses that will result in the long term retention of permanent stresses or forces of not less than those shown on the Plans or the approved shop drawings. Unless otherwise approved by the Engineer, the initial stress after anchor set shall not exceed 70% of the specified ultimate tensile strength of the post-tensioning steel.

Permanent stress and permanent force are the stress and force remaining in the post-tensioning steel after all losses, including long term creep and shrinkage of concrete, elastic shortening of concrete, relaxation of steel, losses in the post-tensioning steel from the sequence of stressing, friction and unintentional wobble of the ducts, anchor set, friction in the anchorages and all other losses peculiar to the post-tensioning system.

10.2.3 Stressing Sequence: Except as noted otherwise on the Plans, the approved shop drawings, or as approved by the Engineer, permanent post-tensioning tendons shall be stressed from both ends. The required force may be applied at one end and subsequently at the other end or simultaneously.

For construction in stages where some tendons are required to be stressed before others, the sequence of installation and stressing shall be in accordance with the Plans, the approved shop drawings, or as otherwise approved by the Engineer.

10.3 Stressing Equipment: Equipment for tensioning the tendons shall be furnished by the manufacturer of the post-tensioning system (tendons, hardware, anchorages, etc.).

10.3.1 Stressing Jacks and Gauges: Each jack used to stress tendons shall be equipped with a pressure gauge for determining the jacking pressure. The pressure gauge shall have an accurately reading dial at least 6 inches in diameter.

10.3.2 Calibration of Jacks and Gauges: Each jack and its gauge shall be calibrated as a unit, with the cylinder extension in the approximate position it will be in at the final jacking force. Calibration shall be done when the jack is connected to the equipment (pumps and gauges) in the identical configuration as will be used on the job site (e.g. with the same length hydraulic lines). Initial calibration of the jacks and gauges shall be performed by the post-tensioning supplier or an independent laboratory. A proven load cell, calibrated within the past 12 months, shall be used to calibrate the stressing equipment. For each jack and gauge unit used on the project, the Contractor shall furnish certified calibration charts and curves to the Engineer prior to stressing the first tendon.

Certified calibration charts and curves shall be provided to the Engineer prior to the start of the work and at every 6 months thereafter, or as requested by the Engineer. At the option of the Contractor, calibrations subsequent to the initial calibration with a load cell may be accomplished by the use of a master gauge. The master gauge shall be supplied by the Contractor in a protective waterproof container capable of protecting the calibration of the master gauge during shipment to a laboratory. The Contractor shall provide a quick-attach coupler next to the permanent gauge in the hydraulic lines which enables the quick and easy installation of the master gauge to verify the permanent gauge readings. The master gauge shall be calibrated and provided to the Engineer. The master gauge shall remain in the possession of the Engineer for the duration of the project.

Any repair of the jacks, such as replacing seals or changing the length of the hydraulic lines, shall be cause for recalibration of the jacks using a load cell.

No extra compensation shall be allowed for the initial or subsequent calibrations, or for the use and required calibrations of the master gauge.

10.4 Stand-by Equipment: During post-tensioning operations, the Contractor shall provide a stand-by stressing jack with gauges located on the job site. The stand-by stressing jack and gauges shall be calibrated as described in Section 10.3 of this Special Provision. The stand-by equipment will be provided at no additional cost to the Department.

10.5 Elongations and Agreement Forces: The post-tensioning operation shall be so conducted such that the forces being applied to the tendon and the elongation of the post-tensioning tendon can be measured at all times.

Elongations shall be measured to the nearest 1/16 inch.

For the required tendon force, the observed elongation shall agree within 5% of the theoretical elongation or the entire operation shall be checked and the source of error determined and remedied to the satisfaction of the Engineer before proceeding further. The tendon shall not be overstressed to achieve the theoretical elongation.

In the event that agreement between the observed and theoretical elongations at the required force falls outside the acceptable tolerances, the Engineer may, at his discretion and without additional compensation to the Contractor, require additional test for "Tendon Modulus of Elasticity" and/or "In-Place Friction" in accordance with 5.1 and 5.2 of this Special Provision.

10.6 Friction: The Contract Plans were prepared based on the assumed friction and wobble coefficients and anchor set noted on the Plans. The Contractor shall submit calculations and show a typical tendon force diagram, after friction, wobble and anchor set losses, on the shop drawings based upon the expected actual coefficients and values for the post-tensioning system to be used. These coefficients and values shall be shown on the shop drawings.

If, in the opinion of the Engineer, the actual friction significantly varies from the expected friction, the Contractor shall revise the post-tensioning operations such that the final tendon force is in agreement with the Plans.

If friction must be reduced, the Contractor shall submit a plan of friction reduction to the Engineer for approval. Lubricants shall be flushed from the duct as soon as possible after stressing is completed by use of oil-free air. The ducts shall be flushed again just prior to the grouting operations. Water soluble oil shall not be used as a lubricant.

10.7 Wire Failures in Post-Tensioning Tendons: Multi strand post-tensioning tendons having wires which failed by breaking or slippage during stressing may be accepted provided the following conditions are met:

- (a) The completed structure shall have a final post-tensioning force of at least 98% of the design total post-tensioning force.
- (b) Any single tendon shall have no more than 5 % reduction in cross-sectional area of post-tensioning steel due to wire failure.

As an exception, any of the above conditions may be waived with the approval of the Engineer, when conditions permit the Contractor to propose acceptable alternative means of restoring the post-tensioning force lost due to wire failure.

10.8 Cutting of Post-Tensioning Steel: Post-tensioning steel shall be cut by an abrasive saw within $\frac{3}{4}$ inch to $1\frac{1}{2}$ inches away from the anchoring device. Flame cutting of post-tensioning steel is not allowed.

10.9 Record of Stressing Operations: The Contractor shall keep a record of the following post-tensioning operations for each tendon installed:

- (a) Project name, number.
- (b) Contractor and/or subcontractor.
- (c) Tendon location, size and type.
- (d) Date tendon was first installed in ducts.
- (e) Coil/reel number for strands or wires
- (f) Assumed and actual tendon cross-sectional area.
- (g) Assumed and actual tendon modulus of elasticity.
- (h) Date stressed.
- (i) Jack and gauge numbers per end of tendon.
- (j) Required jacking force.
- (k) Gauge pressures.
- (l) Elongations (theoretical and actual).
- (m) Anchor sets (anticipated and actual).
- (n) Stressing sequence (i.e. tendons to be stressed before and after).
- (o) Stressing mode (one end/ two ends/ simultaneous).

- (p) Witnesses to stressing operation (Contractor and inspector).
- (q) Date grouted, days from stressing to grouting, grouting pressure applied, and injection end.

Any other relevant information shall also be recorded. The Contractor shall provide the Engineer with a complete copy of all stressing and grouting operations

10.10 Tendon Protection: The Contractor shall install grout caps and seal all other tendon openings within four hours of stressing. If acceptance of the tendon is delayed, all tendon openings shall be sealed and the open ends of the anchorage(s) shall be temporarily weatherproofed. If tendon contamination occurs, the tendon shall be removed and replaced at no additional cost to the Department.

11.0 GROUTING OPERATIONS

11.1 General: Within 30 calendar days after installation of the post-tensioning steel, ducts shall be grouted in accordance with these specifications. Except when approved by the Engineer in writing, failure to grout tendons within the 30 calendar days specified shall result in stoppage of the affected work and no invoices shall be processed for payment of that affected work.

After stressing and prior to grouting, tendons shall be protected against corrosion or harmful effects of debris, by temporarily plugging or sealing all openings and vents until the tendon is grouted.

When stressing has been completed and the stressed tendons have been accepted by the Engineer, the annular space between the tendons and the duct shall be grouted.

11.2 Equipment: The grout mixer shall be capable of continuous mechanical mixing and shall produce a grout free of lumps and undispersed cement. The equipment shall be able to pump and mix grout in a manner which will comply with all the provisions specified herein. Accessory equipment which will provide for accurate solid and liquid measures shall be provided to batch all materials.

Grout pumps shall be positive displacement type and shall be able to produce an outlet pressure of at least 145 psi. Pumps shall have seals adequate to prevent oil, air or other foreign substances from entering into the grout and to prevent loss of grout or water. A pressure gauge having a full scale reading of no more than 300 psi shall be placed at some point in the grout line between the pumping outlet and the duct inlet. The grouting equipment shall contain a screen having clear opening of 1/8 in. maximum size to screen the grout prior to its introduction into the grout pump. If grout with an additive is used, a screen opening of 3/16 in. is satisfactory. This screen shall be easily accessible for inspection and cleaning. The grouting equipment shall utilize a gravity feed to the pump inlet from a hopper attached to and directly over it. The hopper must be kept at least partially full at all times during the pumping operation to prevent air from being drawn into the post-tensioning duct. Under normal conditions, the grout

equipment shall be capable of continuously grouting the longest tendon on the project in not more than 20 minutes.

- 11.3 Stand-by Equipment:** During grouting operations, the Contractor shall provide a stand-by grout mixer and pump. Where water is not supplied through the public water supply system, a water storage tank of sufficient capacity must be provided.

Stand-by water-flushing equipment shall be provided. This equipment shall be in addition to the grouting equipment described above. The stand-by water-flushing equipment shall use a different power source than the grouting equipment, have sufficient capacity to flush out any partially grouted enclosures if necessary due to blockage or breakdown of grouting equipment, and shall be capable of developing a pressure of at least 290 psi.

Stand-by equipment shall be provided at no additional cost to the Department.

- 11.4 Field Trial Tests:** Field trial batching and testing shall be performed with the same materials, personnel, and equipment used in production grouting. Field trial tests shall be conducted at least 1 week prior to initiation of production grouting.

Chloride ion content shall be independently tested on a trial batch to be shown it is below the limits of this specification for the mixed grout. All materials, including the water, shall be the same source as will be used for the production grouting.

One chloride ion concentration test shall be performed on the mixed grout per project at a minimum prior to start of grouting operations, with an additional test for each 40,000 lb. of dry weight material.

- 11.5 Grout Bag Monitoring:** Reject all bags of grout that contain clumps.

The weight of the grout bags shall be verified prior to beginning grouting operations and monitored throughout. After initial approval of an average weight by the Engineer, grout bags may be monitored at the frequency of one bag per day. If irregularities are determined during the initial weighing or monitoring, the water content of the grout should be adjusted accordingly.

- 11.6 Mixing:** Water shall be added to the mixer first, followed by pre-packaged grout and admixture, or as required by the admixture manufacturer. Mixing shall be of such duration as to obtain a uniform thoroughly blended grout, without excessive temperature increase or loss of properties of the admixture. The grout shall be continuously agitated until it is pumped. Water shall not be added to increase flowability that has decreased by delayed use of the grout. Proportions of the materials shall be based on manufacturer's recommendations. The water content shall be the minimum necessary for proper placement and shall not exceed the water-cement ratio of 0.45 or approximately 5 gal. of water per sack (95 lb.) of grout. The pumpability of the grout may be determined by the Engineer in accordance with ASTM C939 "Standard

Test Method for Flow of Grout." When this method is used, the efflux time of the grout sample immediately after mixing should be between 11 and 30 seconds. The flow cone test may not be suitable for a grout that incorporates a thixotropic additive.

- 11.7 Grout Injection:** All grout vents and high point vent openings shall be open when grouting starts. Injection and ejection vents shall be provided with positive shutoffs. Grout shall be allowed to flow from the first vent after the injection vent until any residual water or entrapped air has been removed, at which time the vent shall be closed. Remaining vents shall be closed in sequence in the same manner.

The pumping pressure at the injection vent shall not exceed 145 psi. Normal operations shall be performed at approximately 75 psi. If the actual grouting pressure exceeds the maximum allowed, the injection vent shall be closed and the grout shall be injected at the next vent which has been, or is ready to be, closed as long as a one way flow is maintained. Grout shall not be injected into a succeeding vent from which grout has not yet flowed. If this procedure is used, then the vent which is to be used for injection shall be fitted with a positive shut-off. When one-way flow of grout cannot be maintained as outlined above, the grout shall be immediately flushed out of the duct.

Grout shall be pumped through the duct and continuously wasted at the ejection vent until no visible slugs of water or air are ejected. To ensure that the tendon remains filled with grout, the ejection and injection vents shall be closed in sequence, respectively, under pressure when the tendon duct is completely filled with grout. If no leaks are present, bleed the pressure to 5 psi and wait a minimum of ten minutes for any entrapped air to flow to the high points. After the minimum ten minute period has expired, increase the pressure as needed and discharge grout at each high point outlet to eliminate any entrapped air or water. The ejection and injection vents shall then be reclosed in sequence. The positive shut-offs at the injection and ejection vents shall not be removed or opened until the grout has set.

- 11.8 Temperature Restrictions:** In temperatures below 32°F, ducts shall be kept free of water to avoid damage due to freezing. The temperature of the concrete shall be 36°F or higher from the time of grouting until job cured 2 in. cubes of grout reach a minimum compressive strength of 800 psi. Grout shall not be above 90°F during mixing or pumping. If necessary, the mixing water shall be cooled.

- 11.9 Finishing:** Valves, caps and vent pipes shall not be removed or opened until the grout has set. The ends of steel vents shall be removed at least 1 in. below the concrete surface after the grout has set. Ends of plastic vents shall be removed to the surface of the concrete after the grout has set. All miscellaneous material used for sealing grout caps shall be removed prior to carrying out further work to protect end anchorages or filling in concrete anchorage blockouts and the like. Miscellaneous materials include paper, tie wire, etc.

- 11.10 Post-Grouting Operations and Inspection:** Do not remove or open inlets and outlets until the grout has cured for 24 to 48 hours. Remove all outlets located at anchorages

and high points along the tendon to facilitate inspection and perform inspections within one hour after the removal of the inlet/outlet. Drill and inspect all high points along the tendon as well as the inlets or outlets located at the anchorages. Depending on the geometry of the grout inlets, drilling may be required to penetrate to the inner steel surface of the trumpet or duct. Use drilling equipment that will automatically shut-off when steel is encountered. Unless grout caps are determined to have voids by sounding, do not drill into the cap. Perform inspections in the presence of the Engineer using endoscopes or probes. If unsuitable grout is observed by the Engineer, the Contractor shall submit a repair procedure for approval by the Engineer. Within four hours of completion of the inspections or repairs, fill all duct and anchorage voids using the volumetric measuring vacuum grouting process.

Post-grouting inspection shall be performed for all tendons.

12.0 PROTECTION OF END ANCHORAGES

After tendons have been stressed, grouted, inspected and approved, exposed end anchorages, strands and other metal accessories shall be cleaned of rust, misplaced mortar, grout and other such materials and the concrete surface shall be roughened. Within 24 hours following the cleaning and roughening operation, encapsulate anchorage and permanent grout cap in pour-back of an approved, high-strength, high-bond, low-shrinkage, sand-filled epoxy grout. Anchorage recesses and drain pipes shall be filled to match the existing surface of the concrete girder. Only non-chloride bearing non-shrink grout mixes shall be used for anchorage protection.

13.0 BASIS OF PAYMENT

Unless otherwise specified on the Plans, post-tensioning tendons will be paid for at the contract unit price for "Post-Tensioning Tendons" - lump sum, of steel tendon, complete and in place. Payment shall be full compensation for furnishing, installing, stressing and grouting all post-tensioning tendons. Payment shall also include anchorage assemblies and post-tensioning system hardware which is not embedded in concrete, grout and grouting, all testing, anchorage protection systems and all labor, materials, tools, equipment and incidentals necessary for completing the work in accordance with these specifications and the Plans. This payment shall also include Engineer approved lubricants in the tendon ducts for friction control and flushing the lubricant from the tendon ducts after stressing.

GIRDER BRACING REQUIREMENTS FOR DECK SLAB PLACEMENT

(SPECIAL)

1.0 Description

The work covered by this section consists of calculating the necessary bracing, providing working drawings to the Engineer, furnishing, installing and removing all materials necessary to provide bridge deck girder bracing of the fascia girders for the deck slab placement. The work shall be performed in accordance with the details shown on approved

working drawings and the requirements of this Special Provision and the Special Provision entitled "Falsework and Formwork" and the Standard Specifications.

2.0 MATERIALS

Timber diagonals that are used as bracing shall conform to the requirements of Section 1082-1 or 1082-2 of the Standard Specifications.

Reinforcing steel that is used as tie bars shall conform to the requirements of Section 1070 - 2 of the Standard Specifications.

Plate steel that is used as tie plates shall be $\frac{1}{4}$ " thick and conform to the requirements of Section 1072-4 of the Standard Specifications, unless otherwise approved by the Engineer.

The Engineer must approve all other materials used in bracing.

3.0 CONSTRUCTION REQUIREMENTS AND METHODS

Girders that support deck slab overhang form supports that transmit horizontal force to girders or transmit torsional forces to the girders from the slab pour will be required to be braced for slab pour. This bracing is required to reduce objectionable locked-in torsional stresses in the fascia girders.

Bracing between the bridge fascia member and the interior members will be required at sufficiently close spacing as to limit the magnitude of this stress. Computed torsional stress due to all factored dead loads and construction loads shall not exceed the girder threshold torsion. Threshold torsion of precast prestressed concrete girders and post-tensioned girders shall be computed in accordance with ACI 318, Section 11.6. Stirrups that are shown in the Contract Plans are not closed and shall not be considered as torsional reinforcement. Torque capacity of the haunched girder segments shall be calculated at multiple locations to adequately define the behavior of the member at various depths.

Bracing, if required as defined above, shall be installed between the fascia member and the first interior member. It shall consist of timber struts and steel tie bars and tie plates. The timber struts shall be placed diagonally between the bottom flange of the fascia member and the top flange of the first interior member. The reinforcing steel tie bars shall be placed between the top flanges of the same girders, at the same locations as the timber struts. Additionally, tie plates shall be welded to girder stirrups and tie bars welded to each tie plate. Field welding of tie bars and tie plates shall be done in accordance with Section 1072-20 of the Standard Specifications and details specified on the approved working drawings. The strength of all proposed welded connections shall be verified by calculations. Struts shall be spaced sufficiently close so that the computed compression stresses do not exceed AASHTO allowable values.

The Contractor is to provide a structural analysis of the effect of the overhang system on the girders and on the permanent diaphragms. The analysis and bracing details, in the form of working drawings, shall be sealed by a North Carolina Registered Professional Engineer,

shall be submitted with the overhang falsework working drawings and are subject to review and approval by the Engineer.

Alternate methods of bracing, especially in the deep haunched section of the girders, which provide equivalent torsional restraint for the fascia girder, may be proposed. Details and calculations shall be submitted as working drawings and are subject to review and approval by the Engineer.

Timber struts, tie plate, and tie bars shall be installed prior to any application of loads from screed equipment, work bridges and the pouring of the bridge deck slab.

Timber struts used as bracing, or any other falsework bracing, shall be removed following curing of the deck.

4.0 BASIS OF PAYMENT

No separate payment will be made for the temporary bracing, but the entire cost for designing the system, providing working drawings, and the furnishing, installing and removal of bracing, shall be included in reinforced concrete deck slab pay items.

NAVIGATIONAL CLEARANCE VERIFICATION & WATERWAY INSPECTION

(SPECIAL)

The Contractor is responsible for the following requirements:

Upon removal of all temporary work bridges, inspect the waterway bottom to insure that all construction waste materials have been completely removed. Remove any bridge-related debris discovered during this survey. Provide a certification in writing by a licensed engineer or licensed surveyor in the State of North Carolina that the waterway has not been impaired and all construction related debris has been cleared from it. The certification shall include the actual method used to conduct the inspection.

Upon completion of the proposed bridge, verify as-built clearances for the navigational channel and provide a certification by a licensed surveyor or registered professional engineer in the State of North Carolina attesting to the correctness of the clearances.

No separate payment or compensation will be made for this work. Include all costs for performing this work in the various pay items.

ANCHOR BOLTS

(SPECIAL)

The second paragraph Section 1072-4 of the 2012 Standard Specifications shall be revised as follows:

Provide anchor bolts for bearing plate assemblies meeting ASTM F1554.

BRIDGE MOUNTED CHAIN LINK FENCE**(SPECIAL)**

Construct the chain link fence in accordance with the applicable sections of the Standard Specifications, the details shown on the plans and this special provision.

The quantity of chain link fence will be the actual number of linear feet of fence, measured in place from end post to end post, which has been completed and accepted. All posts used for the chain link fence are included in the price of the fence and will not be paid for separately. There will be no measurement made for installing adhesive anchors in concrete parapets as such work is considered incidental.

Work includes but is not limited to furnishing and installing fence fabric, tie wires, stretcher bars, stretcher bar bands, tie rods, turnbuckles, brace rails, posts, post caps, brackets, adhesive anchors, fittings and any other materials necessary to complete the work as described in the plans and this special provision.

Payment will be made under:

72" Chain Link Fence _____ Linear Foot

PLASTIC LUMBER FENDER BOARDS AT CHANNEL BENTS**(SPECIAL)****1.0 DESCRIPTION**

The work for providing plastic and composite lumber consists of furnishing and installing the materials and all miscellaneous hardware to complete the work in accordance with the plans and this special provision.

2.0 MATERIALS

Plastic and composite lumber shall be made of polyethylene, contain appropriate colorants and UV inhibitors, and shall meet the material property requirements specified in Table 1. Plastic and composite lumber shall contain glass filament. The lumber must not corrode, rot, warp, splinter or crack. The outer surface of the lumber shall be black in color unless otherwise specified in the Contract Documents. The skin shall be generally smooth, uniform and consolidated but may contain occasional small blisters or pockmarks. Small voids shall be repaired as directed by the Engineer with a repair procedure approved by the Engineer.

Manufacture plastic and composite lumber as one continuous piece with no joints or splices. Plastic and composite lumber shall be free of twist and curvature. Steel reinforcement in the lumber is not permitted.

Plastic and composite lumber must meet the minimum structural properties listed in Table 3 and the dimensions and tolerances of Table 2.

Table 1 Plastic and Composite Lumber Material Properties		
Applicable ASTM Code	Applies To	Requirement
Density ASTM D792	Skin of lumber	55 pcf min.
Density ASTM D792	Core of lumber	48 pcf min.
Water Absorption ASTM D570	Skin of lumber	24 hrs: <3.0% weight increase
Impact Resistance ASTM D256 Method A or ASTM D256 Method D	Skin of lumber	Greater than 0.55 ft-lbs/in
Hardness ASTM D2240	Skin of lumber	44-75 (Shore D)
Ultraviolet Light ASTM D4329 UVA	Skin of lumber	500 hours <10% change in Shore D Durometer Hardness
Abrasion ASTM D4060	Skin of lumber	Weight Loss: < 0.03 oz Cycles = 10,000 Wheel = CS17 Load: 2.2 lbs
Chemical Resistance ASTM D756 or ASTM D543	Skin and Core of lumber Sea Water Gasoline No. 2 Diesel	< 1.5% weight increase < 9.5% weight increase < 6.0% weight increase
Tensile Properties ASTM D638	Core of lumber	Minimum 2200 psi at break
Compressive Modulus ASTM D695	Core of lumber	Minimum 40 ksi
Static Coefficient of Friction ASTM D1894	Skin of lumber	Maximum 0.25, wet
Nail Pull-Out or Screw Withdrawal ASTM D6117	Skin and Core of lumber	Minimum 60 lbs (nail) Minimum 400 lbs (screw)

Table 2 Dimensions and Tolerances		
Plastic and Composite lumber	Dimension	Tolerance
Length	Per order (80ft max)	+6 -0 in
Width	See Contract Plans	± ¼ in
Height	See Contract Plans	± ¼ in
Corner Radius –Lumber with reinforcing rods	1 ¼ in	± ½ in
- Lumber without reinforcing rods	¼ in	± 1/16 in
Outer Skin Thickness – (if reinforced with rods)	3/16 in	± 1/8 in
Distance from outer surface to rod elements (if reinforced with rods)	1 ½ in	± 5/8 in
Straightness (gap, bend or inside while lying on a flat surface)		<1 ½ in per 10 feet

Determine the modulus of elasticity for plastic and composite lumber by conducting a three point or four point bend test as per ASTM D790 or D6109. The modulus for lumber with reinforcing rods is to be taken at a strain of 0.01 inches per inch. The modulus for lumber reinforced without reinforcing rods may be taken by one of the methods suggested in ASTM D6109.

Table 3 Structural Properties for Composite Lumber	
Modulus of Elasticity (ASTM D6109)	300 ksi min.
Flexural Strength (ASTM D6109)	No fracture at 2500 psi
Compressive Strength (ASTM D6108)	2200 psi min. parallel to grain 700 psi min. perpendicular to grain

3.0 ACCEPTANCE

The Contractor shall submit the following information to the Resident Engineer and Steve Walton of Materials & Tests (336-993-2300) at least 20 days prior to shipping any plastic and composite lumber:

- Copies of the plastic and composite lumber manufacturer's standards and most recent brochure for the lumber products covered by these specifications.
- Independent test lab report confirming the plastic and composite lumber products meet the plastic material properties found in Table 1.
- Independent test lab report confirming the submitted lumber products meet the minimum structural property requirements found in Table 3.
- Written certification from the manufacturer that the submitted plastic and composite lumber products satisfy the requirements of this.

The independent test lab reports must be no older than five (5) years.

The Department reserves the right to place a duly authorized inspector in the plant prior to shipment of any plastic and composite lumber product for the purpose of determining preapproval. Notify the Engineer at least 7 days in advance of any shipment. Preapproval of lumber products shall be on the basis of tests of materials, inspection of lumber products, conformance with specified dimensions, appearance, and freedom from defect. Each individual plastic and composite lumber piece shall be available for inspection by the inspector. The inspector shall have the authority to reject any or all lumber products not manufactured in accordance with these specifications. Any plastic and composite lumber products found to be defective in any manner at any time shall be rejected and replaced by an acceptable plastic and composite lumber product or repaired in a manner approved by the Engineer. All lumber products preapproved by the inspector shall be stamped as approved. Preapproval does not guarantee final acceptance.

Final acceptance of all plastic and composite lumber products shall be determined by the Engineer.

4.0 CONSTRUCTION DETAILS

Protect materials at all times against exposure to extreme heat or impact. Transport plastic and composite lumber in a manner that will minimize scratching or damage to the outer surfaces, stack on dunnage above ground so that it may be easily inspected and store in a manner that will avoid damage. Lumber damaged in shipping or handling will be rejected.

Cut, bevel, drill, countersink, and otherwise fabricate plastic and composite lumber in accordance with the manufacturer's recommendations. Set all material accurately to required levels and lines, with members plumb and true and accurately cut and fitted. Securely attach all composite lumber to substrate by anchoring and fastening as shown on plans. Perform all cutting and drilling in a manner that allows for the collection of all debris and dispose of properly.

5.0 BASIS OF PAYMENT

The lump sum price bid for "Plastic Lumber Fender Boards At Bent 7" will be the full compensation for all lumber and all equipment, tools, and work necessary for their installation. The lump sum price bid for "Plastic Lumber Fender Boards At Bent 7" will be full compensation for all other work including but not limited to material, equipment, tools, disposal, fasteners, plates, spare parts package, and other necessary items or effort required for completing the work.

STRUCTURE DRAINAGE SYSTEM AT STATION 353+32.50 -L- (SPECIAL)

General:

The work in this section covers the furnishing of materials and installation of the drainage system and all its appurtenances called for on the plans at the locations on the plans to the lines and grades shown. The work shall also include the construction of joints or connections to other drainage structures to complete the system as shown on plans. The Contractor shall submit a plan for the drainage system, including but not limited to attachments to the bridge, pipe alignment and pipe lengths, and all necessary fittings, elbows, wyes, adapters, guides and joints.

The pipe, pipe anchors, pipe hangers, inserts and components of each shall be manufactured in accordance with the details and as indicated on the plans. All metallic components in the drainage system, except stainless steel and malleable iron parts are required to be hot dipped galvanized.

Structure drainage system installation shall be in accordance with the drawings and manufacture recommendations and as directed by the Engineer.

R-2633BB

Basis of Payment:

Payment will be made at the contract lump sum price for "Structure Drainage System at Station 353+32.50 -L-". Such payment will include full compensation for all work, but not limited to providing materials and labor to install the structure drainage system as detailed in the plans.

30" VOIDED PRESTRESSED CONCRETE PILES

(SPECIAL)

30" Prestressed Concrete Piles shall be in accordance with the contract plans and Section 450 of the Standard Specifications.

Payment will be made under:

30" Voided Prestressed Concrete PilesLin. Ft.

36" VOIDED PRESTRESSED CONCRETE PILES

(SPECIAL)

36" Prestressed Concrete Piles shall be in accordance with the contract plans and Section 450 of the Standard Specifications.

Payment will be made under:

36" Voided Prestressed Concrete PilesLin. Ft.

TIP: R-2633BB

New Hanover County

CSX TRANSPORTATION, INC. - RAILROAD SPECIAL PROVISIONSNOTICE TO THE RAILROAD COMPANY OF START OF WORK:

The Contractor shall notify CSX Transportation, Inc., herein called the Railroad Company, at least thirty (30) days in advance of the date on which he expects to start work on the railroad right-of-way. A written notice is required. No work shall commence on CSXT right-of-way until the Railroad Company has received and approved the Contractor's insurance policy.

RELOCATION OF WIRE LINES:

Any temporary or permanent changes in wire lines necessitated by the construction of the project will be made by others without cost to the Contractor. However, the Contractor will be required to bear the cost of any changes that are made at his request solely for his convenience in the conduct of his operations.

DELAYS CAUSED BY OPERATIONS OF OTHERS:

The Contractor's attention is called to the fact that neither the North Carolina Department of Transportation, herein called the Department of Transportation, nor the Railroad Company assumes any responsibility for any work performed by others in connection with the construction of the project, and the Contractor shall have no claim whatsoever against the Department of Transportation or the Railroad Company for any inconvenience, delay, or additional cost incurred by him on account of such operations by others.

COOPERATION WITH OTHERS:

The Contractor shall cooperate with others participating in the construction of the project to the end that all work may be carried on to the best advantage.

AUTHORITY OF RAILROAD ENGINEER:

The authorized representative of the Railroad Company hereinafter referred to as Railroad Engineer, shall have the final authority in all matters affecting the safe maintenance of railroad traffic of his company.

CONSTRUCTION CORRESPONDENCE AND SUBMITTALS:

Initially, direct all construction related correspondence to the Philadelphia AECOM office, CSXT's General Engineering Contractor. The Philadelphia office address is:

Mr. Brian V. Harrison, PE
AECOM
1700 Market Street
Suite 1600
Philadelphia, PA 19103

R-2633BB

And a copy to:

Clyde Gray
CSX Transportation
1610 Forest Avenue
Suite 120
Richmond, VA 23229

All required construction submittals shall be forwarded to and approved in writing by the Railroad Company prior to proceeding with construction of each applicable phase. Thirty (30) days will be required to review all construction submittals. An additional thirty (30) day will be required to review any subsequent submissions returned not approved.

EMERGENCY ACTION PLAN:

The Contractor shall develop and submit an emergency action plan indicating the location of the site, contact names and phone numbers, access to the site, instructions for emergency response, and location of the nearest hospitals. The plan shall also cover the Contractor's means of fire suppression that may include the phone number and location of the nearest fire department. The plan shall cover all items required in the event of an emergency at the site.

CONSTRUCTION SCHEDULE:

The Contractor shall prepare and submit a detailed construction schedule for the duration of the project clearly indicating the time periods while working on and around CSXT right-of-way.

INTERFERENCE WITH RAILROAD OPERATIONS:

The Contractor shall so arrange and conduct his work that there will be no interference with railroad operations, including train, signal, telephone and telegraphic services, or damage to the property of the Railroad Company or to the poles, wire, and other facilities of tenants on the rights-of-way of the Railroad Company. Wherever work is liable to affect the operations or safety of trains, the method of doing such work shall first be submitted to the Railroad Engineer for approval, but such approval shall not relieve the Contractor from liability.

Should conditions arising from or in connection with the work, require that immediate and unusual provisions be made to protect train operations and property of the Railroad Company, it shall be a part of the required services by the Contractor to make such provisions and if, in the judgement of the Railroad Engineer such provisions is insufficient, the Railroad Engineer or the Highway Engineer, may at the expense of the Contractor, require or provide such provisions as may be deemed necessary.

The Contractor will not be permitted to provide less than the following temporary clearances during construction of the proposed overhead bridge:

15'-0" horizontal clearance measured to track from centerline of track to falsework.

22'-0" vertical clearance from top of rail to falsework.

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STRUCTURE EXCAVATION AND SHORING:

The Contractor shall furnish evidence to the Department of Transportation and the Railroad Company that, upon starting construction of the proposed grade separation structure, he shall expedite the excavation and bridge work continuously and diligently to completion.

The Contractor will be required to take special precaution and care in connection with excavating and shoring pits, and in driving piles, for highway bridge footings adjacent to track to provide adequate lateral support for the track and loads which it carries without disturbance of track alignment and service, and to avoid obstructing track clearances with working equipment, tools or other material. The procedure for doing such work, including need of and plans for shoring, shall first be approved by the Railroad, but such approval shall not relieve the contractor from liability.

Shoring or sheeting protection shall be provided when excavating adjacent to an active railroad track, except as noted below.

Shoring will not be required if both the following conditions are satisfied:

1. Excavation does not encroach upon a $1\frac{1}{2}$ horizontal: 1 vertical theoretical slope line starting 1'-6" below top of rail and at 12'-0" minimum from centerline of the track.
2. Track is on level ground or in a cut section and on stable soil.

When track is on embankment, excavating the toe of embankment without shoring may affect the stability of the embankment. Therefore, excavation of embankment toe without shoring will not be permitted.

Preferred protection is the cofferdam type that completely encloses the excavation. Where dictated by conditions, partial cofferdams with open sides away from the track may be used. Cofferdams shall be constructed using steel sheet piling or steel soldier beams with timber lagging. Wales and struts shall be provided as needed. The following shall be considered when designing cofferdams:

- a. Sheeting shall be designed to resist a vertical live load surcharge of 1800 lbs per square foot, in addition to active earth pressure. The surcharge shall be assumed to act on a continuous strip, 8'-6" wide. Lateral pressures due to surcharge shall be computed using the strip load formula shown in A.R.E.M.A. specifications, Chapter 8, Part 20.
- b. Allowable stresses in materials shall be in accordance with A.R.E.M.A. Specifications, Chapter 7, 8, and 15.
- c. A construction procedure for temporary shoring shall be shown on the drawing.

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- d. Safety railing shall be installed when temporary shoring is within 12 feet of track.
- e. A minimum distance of 10 feet from centerline of the track to face of sheeting shall be maintained.

The Contractor shall submit the following drawings and calculations for Railroad review and approval.

1. Three (3) sets of detailed drawings of the shoring systems showing sizes of all structural members, details of connections, and distances from centerline of track to face of shoring. Drawing shall show a section showing height of sheeting and track elevation in relation to bottom of excavation.
2. One set of calculations of the cofferdam design prepared in accordance with CSXT's Criteria for Overhead Bridges dated September 14, 2007. The drawings and calculations shall be prepared by a North Carolina Registered Professional Engineer experienced in the design of shoring and cofferdams and shall bear his seal and signature.

The subgrade of an operated track shall be maintained with edge of berm at least 10' from centerline of track and not more than 24" below top of rail. Unless so indicated on the plans the Contractor will not be required to make the existing section meet this specification and if substandard, the existing section will be maintained.

DEMOLITION OF EXISTING STRUCTURE:

Railroad tracks and right-of-way shall be protected from damage during demolition of existing structure or replacement of deck slab.

During demolition of the deck, a protection shield shall be erected over the track to catch falling debris. The protection shield shall be supported from girders or beams and shall not be lower than allowed temporary clearance. The deck shall be removed by cutting it in sections and lifting out. All cranes and hardware used in picks is to account for a 150% Factor of Safety. Factor of safety implied in crane charts is not to be considered in determination of lifting capacity. Large pieces of deck shall not be allowed to fall on protection shield.

Blasting will not be permitted to demolish a structure over or within railroad right-of-way.

The Contractor shall submit detailed demolition plans, including protection shield details to the Railroad Engineer for approval prior to the start of demolition. The plans shall also indicate the location and capacity of the proposed cranes and estimated lifting loads. The plans shall be prepared by a North Carolina Registered Professional Engineer and shall bear his seal and signature.

BLASTING:

Explosives shall not be used adjacent to any track or other railroad property without the advance approval of the Highway Engineer and the Railroad Engineer, but such approval will not relieve the Contractor of any liability. If use of explosives is permitted, the blasting shall be done with light charges under the direct experienced supervision of a responsible officer or employee of the Contractor, or of the Department of Transportation. Electric detonating fuses or charges shall not be used on account of possible premature explosions resulting from operation of 2-way train radios. Every precaution shall be taken to avoid damage to property, injury to persons and interruption of railroad operations.

No blasting shall be done without an authorized Railroad representative present, who will determine the approximate location of trains in order that the Contractor can be certain whether or not sufficient time will be available for blasting and subsequent cleanup without delaying trains. The Contractor shall notify the Railroad Engineer at least 10 days in advance of blasting to permit arrangement for the presence of an authorized Railroad representative and such flagging service as may be deemed necessary.

The Contractor shall have adequate equipment, labor, and materials at the job site and provide sufficient time to clean up the debris resulting from the blasting without delay to trains. He will at his expense correct any track misalignment or other damage to railroad property resulting from the blasting as directed by the Railroad Engineer. If his actions result in delays to trains, the Contractor shall bear the entire cost thereof.

Blasting shall be discontinued immediately upon notice by the Railroad Engineer or the Highway Engineer that it is too hazardous.

STORAGE OF MATERIALS:

Materials and equipment shall not be stored where they will interfere with railroad operations, nor on the rights-of-way of the Railroad Company without first having obtained permission from the Railroad Engineer, and such permission will be with the understanding that the Railroad Company will not be liable for damage to such material and equipment from any cause and that the Railroad Engineer may move or require the Contractor to move, at the Contractor's expense, such material and equipment.

DAMAGES:

The Contractor shall assume all liability for any and all damages to his work, employees, servants, equipment and materials caused by railroad traffic.

MAINTENANCE OF DITCHES ADJACENT TO RAILROAD TRACKS:

The Contractor shall submit plans indicating the proposed methods of erosion control during construction, in particular, excavation for the piers and grading.

The Contractor shall exercise necessary precautions to prevent fouling of track ballast and existing ditches in the excavation of material at the proposed structure site. He shall maintain the

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existing railroad ditches free from obstruction and silt through the duration of his construction operations and upon completion of the structure shall leave the ditches in conditions satisfactory to the Railroad Engineer.

Should material from excavating at the proposed structure site foul the track ballast, the Contractor will be required to clean or replace the fouled ballast under the direction of and to the satisfaction of the Railroad Engineer.

Any cost incurred by the Railroad Company for repairing damage to its property or to property of its tenants, caused by or resulting from the operations of the Contractor, shall be paid by the Contractor to the Railroad Company.

TEMPORARY RAILROAD GRADE CROSSINGS:

Where the plans show or imply that equipment or materials of any nature must be transported across a Railroad, unless the Department of Transportation has included arrangements for such crossings in its agreement with the Railroad, the Contractor will be required to first obtain authority for its installation, maintenance, and removal from the Railroad Engineer. The Contractor shall execute CSX Railroad's standard private road crossing agreement. Railroad Forces will do all work within two feet of the rail and the Contractor will pay all cost associated with the installation, maintenance and removal of the temporary grade crossing. The Contractor shall arrange for any resulting necessity of watching and flagging and to furnish the Railroad Company with a separate Railroad Protective Liability Policy other than the one required by these special provisions. All the above shall be at no cost to the Department of Transportation.

In the event the Department of Transportation has made arrangements for the Temporary Grade Crossings, the Contractor will need to have a railroad flagman on site during any use of the crossing and the crossings must be physically barricaded during such times that it is not required for use. The Contractor shall construct the road and approaches such that it does not interrupt existing drainage patterns and to the satisfaction of the Railroad. Flagman must be on site for construction and the roadway must be removed upon completion of the project. The Contractor shall restore the property including any drainage ditches. The Contractor's attention is called to the fact that he will not be required to bear the cost of the flagging services required by the Railroad Company or provide any additional railroad insurance except that required by the Insurance Special Provision.

ERECTION PROCEDURE:

The Contractor shall submit a detailed procedure for erecting the bridge over railroad tracks and right-of-way. Equipment used for the erection, or removal of structures over railroad facilities, shall have a minimum lifting capacity of one hundred-fifty percent (150%). Factor of safety implied in crane charts is not to be considered in determination of lifting capacity. The procedure shall indicate the capacity of cranes, location of cranes with respect to the tracks and estimated lifting loads. The erection procedure must follow CSX Construction Guidelines and be prepared by a North Carolina Registered Professional Engineer and shall bear his seal and signature. The procedure must be approved by the Railroad.

FLAGGING PROTECTION OR WATCHMAN SERVICE:

The watchman and flagging service required by the Railroad Company for the safety of railroad operations because of work performed by the Contractor or subcontractors in connection with the construction of the proposed overhead bridge will be provided by CSX Transportation, Inc. and the Contractor's special attention is called to the fact that he will not be required to bear the cost of any watchman or flagging service required by CSX Transportation, Inc., other than that required at any temporary grade crossing, as the Railroad Company will be reimbursed by the Department of Transportation on bills rendered monthly. All bills to be prepared in accordance with the Federal-Aid Policy Guide 23 CFR 646B.

When the Contractor's men or equipment are working within eighteen (18) feet of the nearest rail, over, under or adjacent to the track over which trains are operated, or when work is being performed adjacent to an operated track which may present a hazard to train operations, or when equipment is being used which does, or may infringe on such limits, and at other times, when in the opinion of the Railroad Engineer such protection is necessary, the services of a man or men will be used for flagman or watchman service.

The Contractor shall give 10 days advance notice to the Railroad Engineer in order that flagging service can be arranged and provided. No work shall be undertaken until the flagman, or flagmen, are at the job site. The estimated number and classification of men are shown in the Force Account Estimate.

The estimated cost of Flagging Protection or Watchman Service is shown in the Force Account Estimates prepared by CSX Transportation, Inc., and made a part of the Plans, Specifications and Estimate.

If the Railroad Company for any reason finds it necessary to furnish a watchman or flagman of a different classification from that shown in the Force Account Estimate, bills will be rendered and shall be paid on the basis of the rate of pay for the men used whether that is above or below the rate given. If the rate of pay of any employee that is to be used for watchman or flagging service is changed before the work is started or during the progress of the work, either by law or agreement between the Railroad Company and its employees, or if the tax rates on labor are changed, bills will be rendered by the Railroad Company and paid by the Department of Transportation on the new rates.

The Contractor's attention is also called to the fact that he will be required to carry on his operations which require flagging protection or watchman service in such a manner and sequence that the cost of such will be as economical as possible.

COMPLETION AND ACCEPTANCE OF WORK:

Upon completion of the work, the Contractor shall remove from within the limits of the railroad right of way all machinery, equipment, surplus materials, rubbish or temporary buildings of the Contractor, and leave said rights-of-way in a neat and orderly condition. After the final inspection has been made and work found to be completed in a satisfactory manner acceptable to

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the Department of Transportation and the Railroad Company, the Department of Transportation will be notified of the Railroad Company's acceptance in writing by the Railroad Engineer within ten (10) days or as soon thereafter as practicable.

At project completion, a complete set of "As Built" plans for the proposed construction shall be submitted to CSXT Bridge Maintenance and Design Group. CSXT will keep these plans on file in Jacksonville for future reference. Please address these plans to:

Mr. Rick Garro
500 Water Street
J-350
Jacksonville, FL 32202

INSURANCE SPECIAL PROVISIONS FOR
CSX TRANSPORTATION, INC.
STRUCTURE

TIP: R-2633BB

New Hanover County

- A. In addition to any other forms of insurance or bonds required elsewhere in the contract documents, the Contractor will be required to provide coverage conforming to the requirements of the Federal-Aid Policy Guide outlined under 23 CFR 646A for all work to be performed on Railroad right(s)-of-way under the terms of the contract by carrying insurance of the following kinds:

1. CONTRACTOR'S COMMERCIAL GENERAL LIABILITY INSURANCE:

- a. The Contractor shall furnish an original and one copy of the certificates of insurance and one certified copy of the policy to the Department of Transportation as evidence that, with respect to the operations he performs on railroad right-of-way, he carries Commercial General Liability Insurance including "XCU" coverage providing for limits of liability as follows:

<u>COVERAGE</u>	<u>MINIMUM COMBINED LIMITS OF LIABILITY</u>
Bodily Injury Liability	\$ 5,000,000 Per Occurrence
Property Damage Liability	\$ 5,000,000 Aggregate

- b. If any part of the work is sublet, similar insurance and evidence thereof in the same amounts as required of the Prime Contractor, shall be provided by the subcontractor to cover his operations on railroad right-of-way. As an alternative, the Prime Contractor may provide insurance for the subcontractor by means of separate and individual policies.
- c. Certificates of Insurance holders are to be sent to the addressees given below. Certificates shall make reference to the project, milepost and county.

NCDOT Rail Division
Engineering & Safety Branch
c/o State Railroad Agent
1556 Mail Service Center
Raleigh, N.C. 27699-1556

CSX Transportation, Inc.
Risk Manager
500 Water Street
Jacksonville, Florida
32202

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2. RAILROAD PROTECTIVE LIABILITY INSURANCE:

- a. The Contractor shall furnish to the Department of Transportation an original and one duplicate of the Railroad Protective Liability Insurance Policy with limits of liability as follows:

<u>COVERAGE</u>	<u>MINIMUM COMBINED LIMITS OF LIABILITY</u>
Bodily Injury Liability	\$5,000,000 Per Occurrence
Property Damage Liability	\$10,000,000 Aggregate Per Annual Policy Period
Physical Damage to Property	

- b. The Railroad Protective Liability Policy is to be written on the ISO/RIMA Form No. CG 00 35 10 93 (or updates thereof) including Endorsements CG 28 31 11 85 and IL 00 21 or their equivalents.
- c. The insurer must be financially stable and rated A- or better in A.M. Best & Company's Insurance Reports.
- d. The name and address of Contractor and Department of Transportation must be shown on the Declarations page.
- e. The named insured, description of the work and designation of the job site to be shown on the Policy are as follows:

Named Insured: CSX Transportation, Inc.
Casualty Insurance Department (J-907)
500 Water Street
Jacksonville, Florida 32202

Description and Designation: Proposed bridges on I-140 (Wilmington Bypass) over the tracks of CSX Transportation, Inc. in New Hanover County, North Carolina near milepost AF-288.53 (4 bridges) and Spur Line at Milepost AF- 288.85 (2 Bridges) identified as State Project 34491.1.2 (R-2633BB) and Federal Project STPNHF-17(1).

- B. The Railroad Protective Liability Policy shall contain a clause requiring that sixty (60) days written notice be given the Department of Transportation and the Railroad Company prior to cancellation or change.

All other policies and certificates shall contain a clause requiring that thirty (30) days written notice be given to the Department of Transportation and the Railroad Company

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prior to cancellation or change. The notices shall make reference to the project, milepost and county.

NOTICE TO:

CSX Transportation, Inc.
Risk Manager
500 Water St.
Jacksonville, Florida
32202

COPY NOTICE TO:

NCDOT Rail Division
Engineering & Safety Branch
c/o State Railroad Agent
1556 Mail Service Center
Raleigh, N. C. 27699-1556

- C. All insurance herein before specified shall be carried until the final inspection and acceptance of the project, or that portion of the project within railroad right-of-way, by the Department of Transportation or, in the case of subcontractors, until the Contractor furnishes a letter to the Engineer stating that the subcontractor has completed his subcontracted work within railroad right-of-way to the satisfaction of the Contractor and that the Contractor will accomplish any additional work necessary on railroad right-of-way with his own forces. It is understood that the amounts specified are minimum amounts and that the Contractor may carry insurance in larger amounts if he so desires. As to "aggregate limits", if the insurer establishes loss reserves equal to or in excess of the aggregate limit specified in any of the required insurance policies, Contractor shall immediately notify the Department of Transportation and shall cease all operations until the aggregate limit is reinstated. If the insurer establishes loss reserves equal to or in excess of one-half of the aggregate limit, Contractor shall arrange to restore the aggregate limit to at least the minimum amount stated in these requirements. Any insurance policies and certificates taken out and furnished due to these requirements shall be approved by the Department of Transportation and the Railroad Company as to form and amount prior to beginning work on railroad right-of-way.

No extra allowance will be made for the insurance required hereunder; the entire cost of same is to be included in the unit contract price bids for the several pay items.

- D. Evidence of insurance as required above shall be furnished for review to the Department of Transportation at the address shown below after which it will be forwarded by the Department of Transportation to the Railroad.

Send to Department:

NCDOT Rail Division
Engineering & Safety Branch
c/o State Railroad Agent
1556 Mail Service Center
Raleigh, NC 27699-1556

TIP: R-2633BB

New Hanover County

CSX TRANSPORTATION, INC. & PROGRESS ENERGY - RAILROAD SPECIAL
PROVISIONS

NOTICE TO THE RAILROAD COMPANY OF START OF WORK:

The Contractor shall notify CSX Transportation, Inc., herein called the Railroad Company, at least thirty (30) days in advance of the date on which he expects to start work on the railroad right-of-way. A written notice is required. No work shall commence on CSXT right-of-way until the Railroad Company has received and approved the Contractor's insurance policy.

RELOCATION OF WIRE LINES:

Any temporary or permanent changes in wire lines necessitated by the construction of the project will be made by others without cost to the Contractor. However, the Contractor will be required to bear the cost of any changes that are made at his request solely for his convenience in the conduct of his operations.

DELAYS CAUSED BY OPERATIONS OF OTHERS:

The Contractor's attention is called to the fact that neither the North Carolina Department of Transportation, herein called the Department of Transportation, nor the Railroad Company assumes any responsibility for any work performed by others in connection with the construction of the project, and the Contractor shall have no claim whatsoever against the Department of Transportation or the Railroad Company for any inconvenience, delay, or additional cost incurred by him on account of such operations by others.

COOPERATION WITH OTHERS:

The Contractor shall cooperate with others participating in the construction of the project to the end that all work may be carried on to the best advantage.

AUTHORITY OF RAILROAD ENGINEER:

The authorized representative of the Railroad Company hereinafter referred to as Railroad Engineer, shall have the final authority in all matters affecting the safe maintenance of railroad traffic of his company.

CONSTRUCTION CORRESPONDENCE AND SUBMITTALS:

Initially, direct all construction related correspondence to the Philadelphia AECOM office, CSXT's General Engineering Contractor. The Philadelphia office address is:

Mr. Brian V. Harrison, PE
AECOM
1700 Market Street
Suite 1600

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Philadelphia, PA 19103

And a copy to:

Clyde Gray
 CSX Transportation
 1610 Forest Avenue
 Suite 120
 Richmond, VA 23229

All required construction submittals shall be forwarded to and approved in writing by the Railroad Company prior to proceeding with construction of each applicable phase. Thirty (30) days will be required to review all construction submittals. An additional thirty (30) day will be required to review any subsequent submissions returned not approved.

EMERGENCY ACTION PLAN:

The Contractor shall develop and submit an emergency action plan indicating the location of the site, contact names and phone numbers, access to the site, instructions for emergency response, and location of the nearest hospitals. The plan shall also cover the Contractor's means of fire suppression that may include the phone number and location of the nearest fire department. The plan shall cover all items required in the event of an emergency at the site.

CONSTRUCTION SCHEDULE:

The Contractor shall prepare and submit a detailed construction schedule for the duration of the project clearly indicating the time periods while working on and around CSXT right-of-way.

INTERFERENCE WITH RAILROAD OPERATIONS:

The Contractor shall so arrange and conduct his work that there will be no interference with railroad operations, including train, signal, telephone and telegraphic services, or damage to the property of the Railroad Company or to the poles, wire, and other facilities of tenants on the rights-of-way of the Railroad Company. Wherever work is liable to affect the operations or safety of trains, the method of doing such work shall first be submitted to the Railroad Engineer for approval, but such approval shall not relieve the Contractor from liability.

Should conditions arising from or in connection with the work, require that immediate and unusual provisions be made to protect train operations and property of the Railroad Company, it shall be a part of the required services by the Contractor to make such provisions and if, in the judgement of the Railroad Engineer such provisions is insufficient, the Railroad Engineer or the Highway Engineer, may at the expense of the Contractor, require or provide such provisions as may be deemed necessary.

The Contractor will not be permitted to provide less than the following temporary clearances during construction of the proposed overhead bridge:

15'-0" horizontal clearance measured to track from centerline of track to falsework.

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22'-0" vertical clearance from top of rail to falsework.

STRUCTURE EXCAVATION AND SHORING:

The Contractor shall furnish evidence to the Department of Transportation and the Railroad Company that, upon starting construction of the proposed grade separation structure, he shall expedite the excavation and bridge work continuously and diligently to completion.

The Contractor will be required to take special precaution and care in connection with excavating and shoring pits, and in driving piles, for highway bridge footings adjacent to track to provide adequate lateral support for the track and loads which it carries without disturbance of track alignment and service, and to avoid obstructing track clearances with working equipment, tools or other material. The procedure for doing such work, including need of and plans for shoring, shall first be approved by the Railroad, but such approval shall not relieve the contractor from liability.

Shoring or sheeting protection shall be provided when excavating adjacent to an active railroad track, except as noted below.

Shoring will not be required if both the following conditions are satisfied:

1. Excavation does not encroach upon a $1\frac{1}{2}$ horizontal: 1 vertical theoretical slope line starting 1'-6" below top of rail and at 12'-0" minimum from centerline of the track.
2. Track is on level ground or in a cut section and on stable soil.

When track is on embankment, excavating the toe of embankment without shoring may affect the stability of the embankment. Therefore, excavation of embankment toe without shoring will not be permitted.

Preferred protection is the cofferdam type that completely encloses the excavation. Where dictated by conditions, partial cofferdams with open sides away from the track may be used. Cofferdams shall be constructed using steel sheet piling or steel soldier beams with timber lagging. Wales and struts shall be provided as needed. The following shall be considered when designing cofferdams:

- a. Sheeting shall be designed to resist a vertical live load surcharge of 1800 lbs per square foot, in addition to active earth pressure. The surcharge shall be assumed to act on a continuous strip, 8'-6" wide. Lateral pressures due to surcharge shall be computed using the strip load formula shown in A.R.E.M.A. specifications, Chapter 8, Part 20.
- b. Allowable stresses in materials shall be in accordance with A.R.E.M.A. Specifications, Chapter 7, 8, and 15.
- c. A construction procedure for temporary shoring shall be shown on the drawing.

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- d. Safety railing shall be installed when temporary shoring is within 12 feet of track.
- e. A minimum distance of 10 feet from centerline of the track to face of sheeting shall be maintained.

The Contractor shall submit the following drawings and calculations for Railroad review and approval.

- 1. Three (3) sets of detailed drawings of the shoring systems showing sizes of all structural members, details of connections, and distances from centerline of track to face of shoring. Drawing shall show a section showing height of sheeting and track elevation in relation to bottom of excavation.
- 2. One set of calculations of the cofferdam design prepared in accordance with CSXT's Criteria for Overhead Bridges dated September 14, 2007. The drawings and calculations shall be prepared by a North Carolina Registered Professional Engineer experienced in the design of shoring and cofferdams and shall bear his seal and signature.

The subgrade of an operated track shall be maintained with edge of berm at least 10' from centerline of track and not more than 24" below top of rail. Unless so indicated on the plans the Contractor will not be required to make the existing section meet this specification and if substandard, the existing section will be maintained.

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Blasting will not be permitted to demolish a structure over or within railroad right-of-way.

The Contractor shall submit detailed demolition plans, including protection shield details to the Railroad Engineer for approval prior to the start of demolition. The plans shall also indicate the location and capacity of the proposed cranes and estimated lifting loads. The plans shall be prepared by a North Carolina Registered Professional Engineer and shall bear his seal and signature.

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BLASTING:

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No blasting shall be done without an authorized Railroad representative present, who will determine the approximate location of trains in order that the Contractor can be certain whether or not sufficient time will be available for blasting and subsequent cleanup without delaying trains. The Contractor shall notify the Railroad Engineer at least 10 days in advance of blasting to permit arrangement for the presence of an authorized Railroad representative and such flagging service as may be deemed necessary.

The Contractor shall have adequate equipment, labor, and materials at the job site and provide sufficient time to clean up the debris resulting from the blasting without delay to trains. He will at his expense correct any track misalignment or other damage to railroad property resulting from the blasting as directed by the Railroad Engineer. If his actions result in delays to trains, the Contractor shall bear the entire cost thereof.

Blasting shall be discontinued immediately upon notice by the Railroad Engineer or the Highway Engineer that it is too hazardous.

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Materials and equipment shall not be stored where they will interfere with railroad operations, nor on the rights-of-way of the Railroad Company without first having obtained permission from the Railroad Engineer, and such permission will be with the understanding that the Railroad Company will not be liable for damage to such material and equipment from any cause and that the Railroad Engineer may move or require the Contractor to move, at the Contractor's expense, such material and equipment.

DAMAGES:

The Contractor shall assume all liability for any and all damages to his work, employees, servants, equipment and materials caused by railroad traffic.

MAINTENANCE OF DITCHES ADJACENT TO RAILROAD TRACKS:

The Contractor shall submit plans indicating the proposed methods of erosion control during construction, in particular, excavation for the piers and grading.

The Contractor shall exercise necessary precautions to prevent fouling of track ballast and existing ditches in the excavation of material at the proposed structure site. He shall maintain the

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existing railroad ditches free from obstruction and silt through the duration of his construction operations and upon completion of the structure shall leave the ditches in conditions satisfactory to the Railroad Engineer.

Should material from excavating at the proposed structure site foul the track ballast, the Contractor will be required to clean or replace the fouled ballast under the direction of and to the satisfaction of the Railroad Engineer.

Any cost incurred by the Railroad Company for repairing damage to its property or to property of its tenants, caused by or resulting from the operations of the Contractor, shall be paid by the Contractor to the Railroad Company.

TEMPORARY RAILROAD GRADE CROSSINGS:

Where the plans show or imply that equipment or materials of any nature must be transported across a Railroad, unless the Department of Transportation has included arrangements for such crossings in its agreement with the Railroad, the Contractor will be required to first obtain authority for its installation, maintenance, and removal from the Railroad Engineer. The Contractor shall execute CSX Railroad's standard private road crossing agreement. Railroad Forces will do all work within two feet of the rail and the Contractor will pay all cost associated with the installation, maintenance and removal of the temporary grade crossing. The Contractor shall arrange for any resulting necessity of watching and flagging and to furnish the Railroad Company with a separate Railroad Protective Liability Policy other than the one required by these special provisions. All the above shall be at no cost to the Department of Transportation.

In the event the Department of Transportation has made arrangements for the Temporary Grade Crossings, the Contractor will need to have a railroad flagman on site during any use of the crossing and the crossings must be physically barricaded during such times that it is not required for use. The Contractor shall construct the road and approaches such that it does not interrupt existing drainage patterns and to the satisfaction of the Railroad. Flagman must be on site for construction and the roadway must be removed upon completion of the project. The Contractor shall restore the property including any drainage ditches. The Contractor's attention is called to the fact that he will not be required to bear the cost of the flagging services required by the Railroad Company or provide any additional railroad insurance except that required by the Insurance Special Provision.

ERECTION PROCEDURE:

The Contractor shall submit a detailed procedure for erecting the bridge over railroad tracks and right-of-way. Equipment used for the erection, or removal of structures over railroad facilities, shall have a minimum lifting capacity of one hundred-fifty percent (150%). Factor of safety implied in crane charts is not to be considered in determination of lifting capacity. The procedure shall indicate the capacity of cranes, location of cranes with respect to the tracks and estimated lifting loads. The erection procedure must follow CSX Construction Guidelines and be prepared by a North Carolina Registered Professional Engineer and shall bear his seal and signature. The procedure must be approved by the Railroad.

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FLAGGING PROTECTION OR WATCHMAN SERVICE:

The watchman and flagging service required by the Railroad Company for the safety of railroad operations because of work performed by the Contractor or subcontractors in connection with the construction of the proposed overhead bridge will be provided by CSX Transportation, Inc. and the Contractor's special attention is called to the fact that he will not be required to bear the cost of any watchman or flagging service required by CSX Transportation, Inc., other than that required at any temporary grade crossing, as the Railroad Company will be reimbursed by the Department of Transportation on bills rendered monthly. All bills to be prepared in accordance with the Federal-Aid Policy Guide 23 CFR 646B.

When the Contractor's men or equipment are working within eighteen (18) feet of the nearest rail, over, under or adjacent to the track over which trains are operated, or when work is being performed adjacent to an operated track which may present a hazard to train operations, or when equipment is being used which does, or may infringe on such limits, and at other times, when in the opinion of the Railroad Engineer such protection is necessary, the services of a man or men will be used for flagman or watchman service.

The Contractor shall give 10 days advance notice to the Railroad Engineer in order that flagging service can be arranged and provided. No work shall be undertaken until the flagman, or flagmen, are at the job site. The estimated number and classification of men are shown in the Force Account Estimate.

The estimated cost of Flagging Protection or Watchman Service is shown in the Force Account Estimates prepared by CSX Transportation, Inc., and made a part of the Plans, Specifications and Estimate.

If the Railroad Company for any reason finds it necessary to furnish a watchman or flagman of a different classification from that shown in the Force Account Estimate, bills will be rendered and shall be paid on the basis of the rate of pay for the men used whether that is above or below the rate given. If the rate of pay of any employee that is to be used for watchman or flagging service is changed before the work is started or during the progress of the work, either by law or agreement between the Railroad Company and its employees, or if the tax rates on labor are changed, bills will be rendered by the Railroad Company and paid by the Department of Transportation on the new rates.

The Contractor's attention is also called to the fact that he will be required to carry on his operations which require flagging protection or watchman service in such a manner and sequence that the cost of such will be as economical as possible.

COMPLETION AND ACCEPTANCE OF WORK:

Upon completion of the work, the Contractor shall remove from within the limits of the railroad right of way all machinery, equipment, surplus materials, rubbish or temporary buildings of the Contractor, and leave said rights-of-way in a neat and orderly condition. After the final inspection has been made and work found to be completed in a satisfactory manner acceptable to

R-2633BB

the Department of Transportation and the Railroad Company, the Department of Transportation will be notified of the Railroad Company's acceptance in writing by the Railroad Engineer within ten (10) days or as soon thereafter as practicable.

At project completion, a complete set of "As Built" plans for the proposed construction shall be submitted to CSXT Bridge Maintenance and Design Group. CSXT will keep these plans on file in Jacksonville for future reference. Please address these plans to:

Mr. Rick Garro
500 Water Street
J-350
Jacksonville, FL 32202

INSURANCE SPECIAL PROVISIONS FOR
CSX TRANSPORTATION, INC.
STRUCTURE

TIP: R-2633BB

New Hanover County

- A. In addition to any other forms of insurance or bonds required elsewhere in the contract documents, the Contractor will be required to provide coverage conforming to the requirements of the Federal-Aid Policy Guide outlined under 23 CFR 646A for all work to be performed on Railroad right(s)-of-way under the terms of the contract by carrying insurance of the following kinds:

1. CONTRACTOR'S COMMERCIAL GENERAL LIABILITY INSURANCE:

- a. The Contractor shall furnish an original and one copy of the certificates of insurance and one certified copy of the policy to the Department of Transportation as evidence that, with respect to the operations he performs on railroad right-of-way, he carries Commercial General Liability Insurance including "XCU" coverage providing for limits of liability as follows:

<u>COVERAGE</u>	<u>MINIMUM COMBINED LIMITS OF LIABILITY</u>
Bodily Injury Liability	\$ 5,000,000 Per Occurrence
Property Damage Liability	\$ 5,000,000 Aggregate

- b. If any part of the work is sublet, similar insurance and evidence thereof in the same amounts as required of the Prime Contractor, shall be provided by the subcontractor to cover his operations on railroad right-of-way. As an alternative, the Prime Contractor may provide insurance for the subcontractor by means of separate and individual policies.
- c. Certificates of Insurance holders are to be sent to the addressees given below. Certificates shall make reference to the project, milepost and county.

NCDOT Rail Division
Engineering & Safety Branch
c/o State Railroad Agent
1556 Mail Service Center
Raleigh, N.C. 27699-1556

CSX Transportation, Inc.
Risk Manager
500 Water Street
Jacksonville, Florida
32202

R-2633BB

2. RAILROAD PROTECTIVE LIABILITY INSURANCE:

- a. The Contractor shall furnish to the Department of Transportation an original and one duplicate of the Railroad Protective Liability Insurance Policy with limits of liability as follows:

<u>COVERAGE</u>	<u>MINIMUM COMBINED LIMITS OF LIABILITY</u>
Bodily Injury Liability	\$5,000,000 Per Occurrence
Property Damage Liability	\$10,000,000 Aggregate Per Annual Policy Period
Physical Damage to Property	

- b. The Railroad Protective Liability Policy is to be written on the ISO/RIMA Form No. CG 00 35 10 93 (or updates thereof) including Endorsements CG 28 31 11 85 and IL 00 21 or their equivalents.
- c. The insurer must be financially stable and rated A- or better in A.M. Best & Company's Insurance Reports.
- d. The name and address of Contractor and Department of Transportation must be shown on the Declarations page.
- e. The named insured, description of the work and designation of the job site to be shown on the Policy are as follows:

Named Insured: CSX Transportation, Inc.
Casualty Insurance Department (J-907)
500 Water Street
Jacksonville, Florida 32202

Description and Designation: Proposed bridges on I-140 (Wilmington Bypass) over the tracks owned by Progress Energy and operated by CSX Transportation, Inc. in New Hanover County, North Carolina on Progress Energy Lead Track near milepost AF-288.77 identified as State Project 34491.1.2 (R-2633BB) and Federal Project STPNHF-0017(125).

- B. The Railroad Protective Liability Policy shall contain a clause requiring that sixty (60) days written notice be given the Department of Transportation and the Railroad Company prior to cancellation or change.

All other policies and certificates shall contain a clause requiring that thirty (30) days written notice be given to the Department of Transportation and the Railroad Company

R-2633BB

prior to cancellation or change. The notices shall make reference to the project, milepost and county.

NOTICE TO:

CSX Transportation, Inc.
Risk Manager
500 Water St.
Jacksonville, Florida
32202

COPY NOTICE TO:

NCDOT Rail Division
Engineering & Safety Branch
c/o State Railroad Agent
1556 Mail Service Center
Raleigh, N. C. 27699-1556

- C. All insurance herein before specified shall be carried until the final inspection and acceptance of the project, or that portion of the project within railroad right-of-way, by the Department of Transportation or, in the case of subcontractors, until the Contractor furnishes a letter to the Engineer stating that the subcontractor has completed his subcontracted work within railroad right-of-way to the satisfaction of the Contractor and that the Contractor will accomplish any additional work necessary on railroad right-of-way with his own forces. It is understood that the amounts specified are minimum amounts and that the Contractor may carry insurance in larger amounts if he so desires. As to "aggregate limits", if the insurer establishes loss reserves equal to or in excess of the aggregate limit specified in any of the required insurance policies, Contractor shall immediately notify the Department of Transportation and shall cease all operations until the aggregate limit is reinstated. If the insurer establishes loss reserves equal to or in excess of one-half of the aggregate limit, Contractor shall arrange to restore the aggregate limit to at least the minimum amount stated in these requirements. Any insurance policies and certificates taken out and furnished due to these requirements shall be approved by the Department of Transportation and the Railroad Company as to form and amount prior to beginning work on railroad right-of-way.

No extra allowance will be made for the insurance required hereunder; the entire cost of same is to be included in the unit contract price bids for the several pay items.

- D. Evidence of insurance as required above shall be furnished for review to the Department of Transportation at the address shown below after which it will be forwarded by the Department of Transportation to the Railroad.

Send to Department:

NCDOT Rail Division
Engineering & Safety Branch
c/o State Railroad Agent
1556 Mail Service Center
Raleigh, NC 27699-1556

R-2633BB, Brunswick / New Hanover

Railroad Site Data:

The following information was received from the Railroad on July 10, 2013, and is provided as a convenience to the Contractor in bidding this project. This information is subject to change and the Contractor may, at his discretion, contact the Railroad directly to verify its current accuracy. Since this information is shown as a convenience to the Contractor, but is subject to change, the Contractor shall have no claims whatsoever against either the Railroad or the Department of Transportation for any delays or additional costs incurred based on changes in this information which occur after the above date of receipt.

Type and number of tracks within 50 ft. of project (mainline, branchline, siding, yard, etc.).

398+75.47 –L- 3-spur lines
425+60.75 –L- 1-spur line
All others over 1-mainline

Number of trains on affected track per day.

0

Type of trains (passenger or freight).

Freight

Maximum authorized operating speed of trains.

10 mph (if necessary)

Type and number of RR employees assigned to job.

No Flagman required

PROJECT SPECIAL PROVISION

(10-18-95)

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.

<u>PERMIT</u>	<u>AUTHORITY GRANTING THE PERMIT</u>
Navigation (DRAFT ONLY)	U. S. Coast Guard
Dredge and Fill and/or Work in Navigable Waters (404)	U. S. Army Corps of Engineers
State Dredge and Fill and/or CAMA	Division of Coastal Management, DENR State of North Carolina
Water Quality (401)	Division of Environmental Management, DENR 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 waters or wetlands provided that activities outside those areas is done in such a manner as to not affect the waters or wetlands.

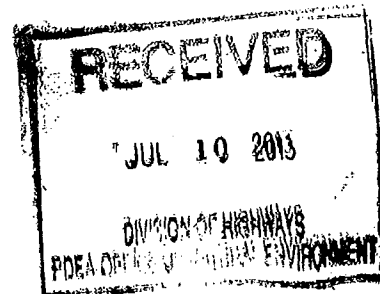
PLEASE NOTE - The following sheets, in the approved permit, were not made part of this contract:

Sheets 2 through 42 of 73
 Sheets 62 through 67 of 73
 Sheets 2, 3, 4, 9, 10, 12 of 15



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343



July 9, 2013

Regulatory Division

Action ID No. SAW-1994-03552

Gregory J. Thorpe, Ph.D.
Environmental Management Director, PDEA
N.C. Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Thorpe:

Reference the Department of the Army (DA) permit issued on February 28, 2011, for the discharge of fill material into waters and wetlands adjacent to various Creeks, and their tributaries in order to construct Section A of TIP# R -2633 (Wilmington Bypass), Brunswick County, North Carolina. Reference is also made to your permit modification dated April 8, 2013 with revisions dated May 2, 6, 14, and 24, 2013. With the referenced revisions and updated information received for Section B, which totals 8.02 miles starting along Highway 74/76 in Leland, Brunswick County and terminating at US 421 north of Wilmington in New Hanover County, the existing permit is currently being modified to include the Section B.

I have determined that the proposed project modifications described above are not contrary to the public interest and consistent with the 404 (B)(1) and therefore, the DA permit is hereby modified. The following conditions specific to Section B have been added:

All original conditions in the February 28, 2011 permit remain valid and are enforceable with Section B authorization. The Special Conditions for the permit modification are the following:

1. This permit modification only authorizes work on Section B of TIP R-2633. The permittee has minimized impacts to waters and wetlands to the maximum extent practicable, any modifications to the plans, and a compensatory mitigation plan, have been approved by the US Army Corps of Engineers (COE). Approved permit plans for Section B are attached.
2. In order to compensate for impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the attached Compensatory Mitigation Responsibility Transfer Form. The requirements

-2-

of this form, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit modification authorization.

Section A impact breakdown is:

- Riparian 7.16 acres (2:1 ratio from offsite) = 14.32 acres
- Non Riparian 16.38 acres (2:1 ratio from offsite) = 32.76 acres
- Stream 504 linear feet (2:1 ratio from offsite) = 1008 linear feet

Section B impact breakdown is:

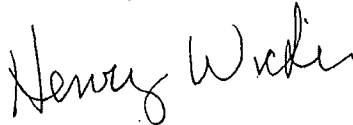
- Riparian 0.12 acre (2:1 ratio from offsite) = 0.24 acre
- Non Riparian 39.65 acres (2:1 ratio from offsite) = 79.30 acres
- Stream 5 linear feet (2:1 ratio from offsite) = 10 linear feet

Total: Riparian 14.56 acres, Non riparian 112.06, and stream 1,018 linear feet

The attached mitigation transfer form will cover the combined impacts of Section A and B.

This modification approval will be utilized for future compliance of the project. If you have questions, please contact Brad Shaver of the Wilmington Regulatory Field Office, at telephone (910) 251-4611.

Sincerely,



Steven A. Baker
Colonel, U. S. Army
District Commander

Enclosures

Copies Furnished (electronic w/o attachments):

Mr. Mason Herndon, NCDWQ
Mr. Stoney Mathis, NCDOT
Mr. Chris Rivenbark, NCDOT
Mr. Rachelle Beauregard, NCDOT
Mr. Chris Militscher, USEPA
Mr. Gary Jordan, USFWS
Mr. Travis Wilson, NCWRC
Ms. Beth Harmon, NCEEP
Mr. Todd Tugwell, USACE

U.S. ARMY CORPS OF ENGINEERS

Wilmington District

Compensatory Mitigation Responsibility Transfer Form

Permittee: North Carolina Department of Transportation
 Project Name: R-2633 A and B Wilmington Bypass

Action ID: SAW-1994-03552
 County: Brunswick

Instructions to Permittee: The Permittee must provide a copy of this form to the Mitigation Sponsor, either an approved Mitigation Bank or the North Carolina Ecosystem Enhancement Program (NCEEP), who will then sign the form to verify the transfer of the mitigation responsibility. Once the Sponsor has signed this form, it is the Permittee's responsibility to ensure that to the U.S. Army Corps of Engineers (USACE) Project Manager identified on page two is in receipt of a signed copy of this form before conducting authorized impacts, unless otherwise specified below. If more than one mitigation Sponsor will be used to provide the mitigation associated with the permit, or if the impacts and/or the mitigation will occur in more than one 8-digit Hydrologic Unit Code (HUC), multiple forms will be attached to the permit, and the separate forms for each Sponsor and/or HUC must be provided to the appropriate mitigation Sponsors.

Instructions to Sponsor: The Sponsor must verify that the mitigation requirements shown below are available at the identified site. By signing below, the Sponsor is accepting full responsibility for the identified mitigation, regardless of whether or not they have received payment from the Permittee. Once the form is signed, the Sponsor must update the appropriate ledger and provide a copy of the signed form to the Permittee and to the USACE Bank/In-Lieu Fee Program Manager. The Sponsor must also comply with all reporting requirements established in their authorizing instrument.

Permitted Impacts and Compensatory Mitigation Requirements:**Permitted Impacts Requiring Mitigation*****8-digit HUC and Basin:** 03030005, Cape Fear River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-riverine	Non-Riparian	Coastal
509				7.28	56.03	

*If more than one mitigation sponsor will be used for the permit, only include impacts to be mitigated by this sponsor.

Compensatory Mitigation Requirements:**8-digit HUC and Basin:** 03030005, Cape Fear River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-riverine	Non-Riparian	Coastal
1,018				14.56	112.06	

Mitigation Site Debited: NCEEP

(List the name of the bank to be debited. For umbrella banks, also list the specific site. For NCEEP, list NCEEP. If the NCEEP acceptance letter identifies a specific site, also list the specific site to be debited).

Section to be completed by the Mitigation Sponsor

Statement of Mitigation Liability Acceptance: I, the undersigned, verify that I am authorized to approve mitigation transactions for the Mitigation Sponsor shown below, and I certify that the Sponsor agrees to accept full responsibility for providing the mitigation identified in this document (see the table above), associated with the USACE Permittee and Action ID number shown. I also verify that released credits (and/or advance credits for NCEEP), as approved by the USACE, are currently available at the mitigation site identified above. Further, I understand that if the Sponsor fails to provide the required compensatory mitigation, the USACE Wilmington District Engineer may pursue measures against the Sponsor to ensure compliance associated with the mitigation requirements.

Mitigation Sponsor Name: _____

Name of Sponsor's Authorized Representative: _____

 Signature of Sponsor's Authorized Representative

 Date of Signature

**USACE Wilmington District
Compensatory Mitigation Responsibility Transfer Form, Page 2**

Conditions for Transfer of Compensatory Mitigation Credit:

- Once this document has been signed by the Mitigation Sponsor and the USACE is in receipt of the signed form, the Permittee is no longer responsible for providing the mitigation identified in this form, though the Permittee remains responsible for any other mitigation requirements stated in the permit conditions.
- Construction within jurisdictional areas authorized by the permit identified on page one of this form can begin only after the USACE is in receipt of a copy of this document signed by the Sponsor, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein. For authorized impacts conducted by the North Carolina Department of Transportation (NCDOT), construction within jurisdictional areas may proceed upon permit issuance; however, a copy of this form signed by the Sponsor must be provided to the USACE within 30 days of permit issuance. NCDOT remains fully responsible for the mitigation until the USACE has received this form, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein.
- Signed copies of this document must be retained by the Permittee, Mitigation Sponsor, and in the USACE administrative records for both the permit and the Bank/ILF Instrument. It is the Permittee's responsibility to ensure that the USACE Project Manager (address below) is provided with a signed copy of this form.
- If changes are proposed to the type, amount, or location of mitigation after this form has been signed and returned to the USACE, the Sponsor must obtain case-by-case approval from the USACE Project Manager and/or North Carolina Interagency Review Team (NCIRT). If approved, higher mitigation ratios may be applied, as per current District guidance and a new version of this form must be completed and included in the USACE administrative records for both the permit and the Bank/ILF Instrument.

Comments/Additional Conditions:

This transfer form combines the impacts previously authorized in the section A authorization and combines them with the new section B authorization impact numbers and required mitigation.

This form is not valid unless signed by the mitigation Sponsor and USACE Project Manager. For questions regarding this form or any of the conditions of the permit authorization, contact the Project Manager at the address below.

USACE Project Manager: Brad Shaver
USACE Field Office: Wilmington Regulatory Field Office
US Army Corps of Engineers
69 Darlington Avenue
Wilmington, NC 28403

Email:



USACE Project Manager Signature

July 8, 2013

Date of Signature

Current Wilmington District mitigation guidance, including information on mitigation ratios, functional assessments, and mitigation bank location and availability, and credit classifications (including stream temperature and wetland groupings) is available at <http://ribits.usace.army.mil>.



North Carolina Department of Environment and Natural Resources

Division of Water Quality
Charles Wakild, P. E.
Director

Pat McCrory
Governor

NEW 8-29-13

John E. Skvarla, III
Secretary

May 31, 2013

Dr. Greg Thorpe, PhD., Manager
Project Development and Environmental Analysis
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina, 27699-1598

Subject: Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act and ISOLATED WETLANDS PERMIT Pursuant to IWGP100000 with ADDITIONAL CONDITIONS for Proposed improvements to the Wilmington Bypass from US 17 in Brunswick County, north of the NC 87 intersection, to US 421 in New Hanover County. Federal Aid Project Nos. NHF-0017(96) and STM-0017(97), State Project Nos. 34491.1.3.GV2 and 34497.3.ST1, Brunswick and New Hanover Counties, TIP R-2633AA/AB and R-2633B.

NCDWQ Project No. 20100867 v. 4

Dear Dr. Thorpe:

Attached hereto is a modification of Certification No. 3842 issued to The North Carolina Department of Transportation (NCDOT) dated January 7, 2011 and reissuance dated January 13, 2011.

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

Sincerely,

Charles Wakild
Director

Attachments

cc: Brad Shaver, US Army Corps of Engineers, Wilmington Field Office (electronic copy only)
Stoney Mathis, Division 3 Environmental Officer
Chris Militscher, Environmental Protection Agency (electronic copy only)
Gary Jordan, US Fish and Wildlife Service (electronic copy only)
Travis Wilson, NC Wildlife Resources Commission (electronic copy only)
Rachelle Beauregard, NCDOT, Natural Environment Section (electronic copy only)
Jason Elliot, NCDOT, Natural Environment Section (electronic copy only)
Steve Sollod, NC Coastal Management (electronic copy only)
Jim Stanfill, Ecosystem Enhancement Program
Sonia Carrillo, NCDWQ Central Office
File Copy

Transportation and Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1617
Location: 512 N. Salisbury St. Raleigh, North Carolina 27604
Phone: 919-807-6300 \ FAX: 919-807-6492
Internet: www.ncwaterquality.org

An Equal Opportunity / Affirmative Action Employer

One
North Carolina
Naturally

**Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act
with ADDITIONAL CONDITIONS**

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality (NCDWQ) Regulations in 15 NCAC 2H .0500. This certification modification authorizes the NCDOT to impact 103.65 acres of jurisdictional wetlands, 0.22 acres of isolated wetlands, 0.23 acres of waters and 978 linear feet of jurisdictional streams in Brunswick and New Hanover Counties. The project shall be constructed pursuant to the modification dated received April 3, 2013 and revisions received on May 8, 2013, May 14, 2013 and May 24, 2013. The modified authorized impacts are as described below:

Stream Impacts in the Cape Fear River Basin

Site	Station	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
SECTION AA & AB⁽¹⁾							
Total		16	115	683	30	844	627
SECTION B							
19	-Y7- 52+90	0	0	5	39	44	0
19	-Y7 DET- 16+45	0	0	0	90	90	0
Total		0	0	5	129	134	0
Project Total		16	115	688	159	978	627

⁽¹⁾Impacts authorized in the original 401 certification dated January 7, 2011, reissuance on January 11, 2011 and modifications dated May 9, 2011 and April 5, 2012.

Total Stream Impact for Project: 978 linear feet (134 linear feet for Section B)

Wetland Impacts in the Cape Fear River Basin

Site	Station	Wetland Type ⁽¹⁾	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Total Wetland Impact (ac)	Impacts Requiring Mitigation (ac)
SECTION AA & AB⁽²⁾									
Total			22.56	0.53	0.34	1.57	1.70	26.70	24.47
SECTION B									
* 3	-LREV- 339+73 to 358+92	NR	7.45	0	0.03	0	0.58	8.06	7.48
* 5	-LREV-372+74 to L-85+08	NR	1.04	0	0	0	0.12	1.16	1.04
* 6	-L- 109+28 to 134+54	NR	9.72	0	0	0	1.13	10.85	9.72
* 6A	-L- 138+11 to 140+70	NR	0.68	0	0	0	0	0.68	0.68
* 6B	-L-141+20 to 144+29	NR	0.41	0	0	0	0.02	0.43	0.41
* 7	-L- 146+78 to 165+66	NR	10.55	0	0	0	0.98	11.53	10.55
* 9	-L- 186+97 to 191+88	NR	1.04	0	0	0	0.09	1.13	1.04
* 11	-L- 194+75 to 216+13	NR	8.72	0	0	0	0.93	9.65	8.72
* 14	-L- 264+32 to 266+94	R	0	0	0	0.03	0.30	0.33	0.03
* 15	-L- 319+46 to 387+92	R	0.05	0	0.93 ⁽³⁾	0	29.40	30.38	0.05
19	-Y7 DET- 16+45	R	0	0.06	0	0	0.03	0.09	0
20	-Y8- 47+74 to 49+95	R	<0.01	0	0	0.04	0.31	0.35	0.04
	EC measures in HC areas		0	0.75	0	0	0	0.75	0
SECTION B UTILITIES									
* 1	-Y8- 48+60	R	0	0	0	0	0.15	0.15	0
* 1	-Y8- 48+58	R	<0.01	0	0	0	0	<0.01	0
* 2	-L- 138+96 to 141+92	NR	0	0	0	0	0.83	0.83	0
* 2	-L- 140+36 to 140+74	NR	0	0	0.02 ⁽³⁾	0	0	0.02 ⁽³⁾	0
* 2	-L- 140+62 to 147+63	NR	0	0	0	0	0.48	0.48	0
* 2	-L- 147+50 to 147+89	NR	0	0	0.02 ⁽³⁾	0	0	0.02 ⁽³⁾	0
2	-L- 147+75 to 148+80	NR	0	0	0	0	0.05	0.05	0

Total*	39.67	0.81	1.00	0.07	35.40	76.95	39.77
Project Total	62.23	1.34	1.34	1.64	37.10	103.65	64.24

⁽¹⁾ Wetland Type: R = Riparian; NR=Non-Riparian. ⁽²⁾ Impacts authorized in the original 401 certification dated January 7, 2011, reissuance on January 11, 2011 and modifications dated May 9, 2011 and April 5, 2012. ⁽³⁾ Denotes temporary excavation and does not require mitigation. *totals may not match sum of individual impacts due to rounding.

Total Wetland Impact for Project: 103.65 (76.95 acres for Section B)

Isolated Wetland Impacts in the Cape Fear River Basin

Site	Station	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Total Wetland Impact (ac)	Impacts Requiring Mitigation (ac)
SECTION AA & AB⁽¹⁾								
Total		0	0	0	0	0	0	0
SECTION B								
16	-L-399+43 to 400+51	0.22	0	0	0	0	0.22	0.22
Total		0.22	0	0	0	0	0.22	0.22
Project Total		0.22	0	0	0	0	0.22	0.22

Total Isolated Wetland Impact for Project: 0.22 acres.

Open Water (Ponds/Tributary) Impacts in the Cape Fear River Basin

Site	Station	Permanent Fill in Open Waters (ac)	Temporary Fill in Open Waters (ac)	Total Fill in Open Waters (ac)
R-2303A⁽¹⁾				
* Total		0	0	0
R-2303B				
11	-L- 194+75 to 216+13	0.07	<0.01	0.07
14	-L- 264+32 to 266+94	<0.01	0	<0.01
15	-L- 319+46 to 387+92	0.13	0.03	0.16
Total		0.20	0.03	0.23
Project Total		0.20	0.03	0.23

⁽¹⁾Impacts authorized in the original 401 certification dated January 7, 2011, reissuance on January 11, 2011 and modifications dated May 9, 2011 and April 5, 2012.

Total Open Water Impact for Project: 0.23 acres. (0.23 acres for Section B)

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 modified application dated received April 3, 2013 and revisions received on May 8, 2013. All the authorized activities and conditions of certification associated with the original Water Quality Certification dated January 7, 2011 (reissuance on January 11, 2011) and modifications dated May 9, 2011 and April 5, 2012 still apply except where superceded by this certification. Should your project change, you are required to notify NCDWQ and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

Condition(s) of Certification:

Project Specific Conditions

1. This modification is applicable only to the additional proposed activities. All of the authorized activities and conditions of certification associated with the original Water Quality Certification dated January 7, 2011 (reissuance on January 11, 2011) and modifications dated May 9, 2011 and April 5, 2012 still apply except where superseded by this certification
2. The B-Section of this project must be constructed in accordance with the Stormwater Management Plan submitted in the application and dated April 3, 2013.
3. Compensatory mitigation for permanent impacts to 627 linear feet of streams is required for R-2633AA & AB and R-2633B based on the final impact numbers provided for the B-section. Mitigation will be provided through a combination of both onsite and offsite mitigation. Mitigation will be credited as detailed below:
 - a. The NCDOT will provide compensatory mitigation for 180 linear feet of streams to be performed onsite at Bishops Branch Mitigation Site at a required 1:1 ratio. Compensatory mitigation for the above impacts to jurisdictional streams will be through a combination of restoration and preservation. The NCDOT will restore 66 linear feet of stream via removal of the existing culvert at a 1:1 credit ratio (66 linear feet). Additionally, 570 linear feet of preservation will occur at a 5:1 ratio for 114 linear feet of credit. The onsite restoration shall be constructed in accordance with the design submitted in your application dated October 18, 2010.
 - b. All onsite mitigation requirements listed in Conditions 17 b, 17c and 17d in the original Water Quality Certification dated January 7, 2011 (reissuance on January 11, 2011) still apply.
 - c. We understand that you have chosen to perform compensatory mitigation for the remaining permanent impacts to 447 linear feet of jurisdictional streams through the North Carolina Ecosystem Enhancement Program (EEP), and that the EEP has agreed to implement the mitigation for the project. EEP has indicated in a letter dated May 30, 2013 that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with the EEP Mitigation Banking Instrument signed July 28, 2010.

Based on the above information, stream mitigation can be summarized as follows:

Mitigation Source	Mitigation Required (feet)	Debit Ratio	Debits Required (feet)
Sections AA & AB			
EEP	447	1:1	447
On Site Restoration	66	1:1	66
On Site Preservation	114	5:1	570
TOTAL:	627		1,083
Section B			
TOTAL:	0		0
Project Total			
TOTAL:	627		1,083

4. Mitigation for permanent impacts to 64.46 acres of wetland (404 and isolated) is required for R-2633AA & AB and R-2633B based on the final impact numbers provided for the B-section. Mitigation will be provided through a combination of both onsite and offsite mitigation. Mitigation will be credited as detailed below:
 - a. The NCDOT will provide compensatory mitigation impacts for 1.22 acres (0.63 acres restoration and 0.59 acres preservation) on site at the Bishop Branch Mitigation Site. The permittee shall comply with the on-site wetland mitigation plan submitted with the application dated October 18, 2010.
 - b. All onsite mitigation requirements listed in Conditions 18 b and 18c in the original Water Quality Certification dated January 7, 2011 (reissuance on January 11, 2011) still apply.
 - c. We understand that you have chosen to perform compensatory mitigation for the remaining 63.24 acres of impact (6.99 acres riparian and 56.25 acres non-riparian) wetlands through the North Carolina Ecosystem Enhancement Program (EEP), and that the EEP has agreed to implement the

mitigation for the project. EEP has indicated in a letter dated May 30, 2013 that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with the EEP Mitigation Banking Instrument signed July 28, 2010.

Based on the above information, wetland mitigation can be summarized as follows:

Mitigation Source	Wetland Type	Mitigation Credits Required	Debit Ratio	Credit or Debits (acres) Required
Sections AA & AB				
EEP	Riparian	6.87	2:1	13.74 (credits)
EEP	Non Riparian	16.38	2:1	32.76 (credits)
On Site Restoration	Riparian	0.63	1:1	0.63 (acres)
On Site Preservation	Riparian	0.59	5:1	2.95 (acres)
Section B				
EEP	Riparian	0.12	2:1	0.24
EEP	Non Riparian	39.87	2:1	79.74

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:

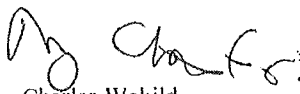
Office of Administrative Hearings
6714 Mail Service Center
Raleigh, NC 27699-6714
Telephone: (919)-431-3000, Facsimile: (919)-431-3100

A copy of the petition must also be served on DENR as follows:

Mr. Lacy Presnell, General Counsel
Department of Environment and Natural Resources
1601 Mail Service Center
Raleigh, NC 27699-1601

This the 31st day of May 2013

DIVISION OF WATER QUALITY


Charles Wakild
Director

Addendum No. 1

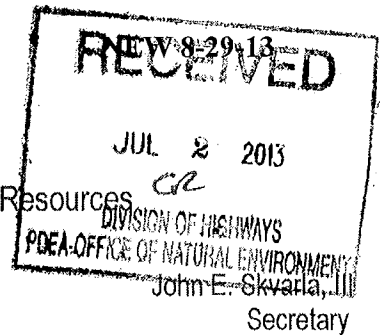
R-11



North Carolina Department of Environment and Natural Resources
Division of Coastal Management

Pat McCrory
Governor

Braxton C. Davis
Director



June 28, 2013

Gregory J. Thorpe, Ph.D.
Environmental Manager Director
Project Development and Environmental Analysis Branch
NC Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Dr. Thorpe:

The enclosed permit constitutes authorization under the Coastal Area Management Act, and where applicable, the State Dredge and Fill Law, for you to proceed with your project proposal. The original (buff-colored form) is retained by you and it must be available on site when the project is inspected for compliance. Please sign both the original and the copy and return the copy to this office in the enclosed envelope. Signing the permit and proceeding means you have waived your right of appeal described below.

If you object to the permit or any of the conditions, you may request a hearing pursuant to NCGS 113A-121.1 or 113-229. Your petition for a hearing must be filed in accordance with NCGS Chapter 150B with the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, NC 27611-6714, (919) 733-2698 within twenty (20) days of this decision on your permit. You should also be aware that if another qualified party submits a valid objection to the issuance of this permit within twenty (20) days, the matter must be resolved prior to work initiation. The Coastal Resources Commission makes the final decision on any appeal.

The project plan is subject to those conditions appearing on the permit form. Otherwise, all work must be carried out in accordance with your application. Modifications, time extensions, and future maintenance require additional approval. Please read your permit carefully prior to starting work and review all project plans, as approved. If you are having the work done by a contractor, it would be to your benefit to be sure that he fully understands all permit requirements.

From time to time, Department personnel will visit the project site. To facilitate this review, we request that you complete and mail the enclosed Notice Card just prior to work initiation. However, if questions arise concerning permit conditions, environmental safeguards, or problem areas, you may contact Department personnel at any time for assistance. By working in accordance with the permit, you will be helping to protect our vitally important coastal resources.

Sincerely,

Douglas V. Huggett
Major Permits and Consistency Manager

Enclosure

Permit Class
NEW

Permit Number
76-13

STATE OF NORTH CAROLINA
Department of Environment and Natural Resources
and
Coastal Resources Commission

Permit

for

X Major Development in an Area of Environmental Concern
pursuant to NCGS 113A-118

X Excavation and/or filling pursuant to NCGS 113-229

Issued to N.C. Department of Transportation, 1598 Mail Service Center, Raleigh, NC 27699-1548

Authorizing development in Brunswick and New Hanover County at a new crossing of the Cape Fear River and
Toomers Creek (US 17 Wilmington Bypass) as requested in the permittee's application dated 4/3/13, including
the attached drawings as referenced in Condition No. 1 of this permit.

This permit, issued on 6/28/13, is subject to compliance with the application (where consistent with the permit), all applicable regulations, special conditions and notes set forth below. Any violation of these terms may be subject to fines, imprisonment or civil action; or may cause the permit to be null and void.

US 17 Bypass of Wilmington (TIP No. R-2633B)

- 1) Unless specifically altered herein, all work authorized by this permit shall be carried out in accordance with the following seventy seven (76) workplan drawings:

1/2 size drawings: Twenty six (26) drawings dated 11/30/12, five (5) drawings dated 12/3/12, two (2) drawings dated 2/8/13, three (3) drawings dated as received on 4/8/13, twenty four (24) drawings dated 5/2/13, three (3) drawings dated 5/6/13, two (2) drawings dated 5/14/13, and eleven (11) drawings dated 5/24/13.

(See attached sheets for Additional Conditions)

This permit action may be appealed by the permittee or other qualified persons within twenty (20) days of the issuing date. An appeal requires resolution prior to work initiation or continuance as the case may be.

This permit must be accessible on-site to Department personnel when the project is inspected for compliance.

Any maintenance work or project modification not covered hereunder requires further Division approval.

All work must cease when the permit expires on

No Expiration Date, pursuant to GS 136-44.7B

In issuing this permit, the State of North Carolina agrees that your project is consistent with the North Carolina Coastal Management Program.

Signed by the authority of the Secretary of DENR and the Chairman of the Coastal Resources Commission.

Douglas V. Haggitt
for

Braxton C. Davis, Director
Division of Coastal Management

This permit and its conditions are hereby accepted.

E. L. Luke for Gregory J. Thayer
Signature of Permittee

ADDITIONAL CONDITIONS

- 2) In accordance with project commitments made within the CAMA permit application, and in order to protect anadromous fish during spawning periods and through embryonic, larval or juvenile life stages, no in-water work shall be conducted in the Cape Fear River and Toomers Creek from February 1st through June 15th of any year without prior approval of the NC Division of Coastal Management (DCM), in consultation with the NC Wildlife Resources Commission (WRC) and the NC Division of Marine Fisheries (DMF). For the purposes of this moratorium, in-water is defined as extending 35 meters (115 feet) from the main channel where the vegetation line meets open water and into adjacent wetlands. The in-water work moratorium prohibits pile installation, both vibratory and impact, and activities associated with the construction of any temporary work bridge.
- 3) Unless specifically altered herein, the permittee shall implement NCDOT's Stream Crossing Guidelines for Anadromous Fish Passage.
- 4) The West Indian Manatee, *Trichechus manatus*, which is listed as a federally endangered species, has been reported in North Carolina waters. Therefore, in accordance with commitments made by the permittee and in order to protect the West Indian Manatee all work should be done during the period from November 1 to May 31. If work must be done during the period from June through October the enclosed guidelines prepared by the U.S. Fish and Wildlife Service (USFWS), entitled "Guidelines for Avoiding Impacts to the West Indian Manatee: Precautionary Measures for Construction Activities in North Carolina Waters (rev. 06/03)" shall be followed.
- 5) The authorized project is located within a Primary Nursery Area (PNA). Therefore, in accordance with T15A:07H.0208 of the rules of the Coastal Resources Commission, no new dredging or excavation within PNA shall be permitted. Dredging in any manner, including "kicking" with boat propellers is not authorized. This prohibition shall be applied and enforced throughout the construction and any following maintenance activities.
- 6) The permanent and temporary work bridge piles shall be installed with vibratory hammer, pile driver, or drilling. Should jetting of any bridge piles become necessary, additional authorization shall be required by DCM in consultation with the appropriate resource agencies.
- 7) Turbidity curtains shall be used to isolate all in-water work areas from the adjacent waterbody, including but not limited to pile driving/drilling or removal activities and excavation and filling activities. The turbidity curtains shall encircle the immediate work area but, shall not impede navigation. The turbidity curtains shall be properly maintained and retained in the water until construction is complete and shall only be removed when turbidity within the curtains reaches ambient levels.
- 8) Drill slurry, uncured concrete, and water that has been in contact with uncured concrete, shall not be allowed to contact waters of the State or water that will enter waters of the State. Drilling fluids shall be disposed of in an upland disposal site. Water returning to the river shall be of sufficient quality so as not to pose as threat to aquatic organisms or otherwise violate State water quality standards.
- 9) Excavated material from the drill-shaft construction shall be removed from the encasements directly into containment vessels and sufficient efforts shall be utilized to minimize spillage of spoil material into waters of the State.

ADDITIONAL CONDITIONS

- 10) Excavated material from the drill-shaft construction shall be removed from the encasements directly into containment vessels and sufficient efforts shall be utilized to minimize spillage of spoil material into waters of the State.
- 11) The permittee and/or his contractor shall exercise all available precautions in day-to-day operations to prevent waste from entering the adjacent waters and wetlands.
- 12) Any debris resulting from the construction of the new bridges shall not enter wetlands or waters of the State, even temporarily.
- 13) Any waste materials and debris associated with bridge construction or other activities shall be disposed of at an approved upland site or shall be recycled in an environmentally appropriate manner provided appropriate authorizations are obtained from any relevant state, federal, or local authorities.
- 14) The permittee and/or his contractor shall provide for proper storage and handling of all oils, chemicals, etc., necessary to carry out the project.
- 15) Construction staging areas shall be located only in upland areas, and not in wetlands or waters of the State.
- 16) Placement of riprap shall be limited to the areas as depicted on the attached workplan drawings. The riprap material shall be free from loose dirt or any pollutant. The riprap material shall consist of clean rock or masonry materials, such as but not limited to, granite, marl, or broken concrete.
- 17) The temporary work bridges shall be removed in their entirety within 90 days after they are no longer needed. However, if this timeframe occurs while the moratorium referenced in Condition No. 2 of this permit is in effect, then the temporary work bridge shall be removed in its entirety within 90 days of the moratorium end date.
- 18) The permittee shall minimize the need to cross wetlands in transporting equipment to the maximum extent practicable.
- 19) Construction mats shall be utilized to support equipment within wetland areas to minimize temporary wetland impacts. These mats shall be removed immediately following project completion.
- 20) There shall be no clearing or grubbing of wetlands outside of the areas indicated on the attached workplan drawings without prior approval from DCM.
- 21) In accordance with project commitments made within the permit application, bridge deck drains shall not be located over the open waters of the Cape Fear River or Toomers Creek and shall not cause erosion of adjacent wetlands.
- 22) During bridge construction, the permittee shall make every attempt to allow the same navigation that is currently possible in the Cape Fear River. If this is not possible, then adequate notice shall be provided to the public that navigation will be limited during construction. The notice shall include an estimate of the amount of time that the limited navigation will occur.

ADDITIONAL CONDITIONS

- 23) During bridge construction, the permittee shall make every attempt to allow the same navigation that is currently possible in the Cape Fear River. If this is not possible, then adequate notice shall be provided to the public that navigation will be limited during construction. The notice shall include an estimate of the amount of time that the limited navigation will occur.
- 24) In accordance with project commitments made within the Record of Decision, dated October 2007, protective fencing shall be installed to ensure that no inadvertent impacts occur to populations of Pickering's Dawnflower, a listed Federal Species of Concern and state-listed endangered species, outside the limits of the construction easement.

Excavation and Fill

- 25) No excavation or filling shall take place at any time in any vegetated wetlands or surrounding waters outside of the alignment of the areas indicated on the attached workplan drawings, without permit modification.
- 26) Material excavated may be used in fill areas associated with the project or shall be removed from the site and taken to an approved high ground location.
- 27) All excavated materials shall be confined above normal high water level and landward of regularly or irregularly flooded wetlands behind adequate dikes or other retaining structures to prevent spillover of solids into any wetlands or surrounding waters.
- 28) No excavated or fill material shall be placed at any time in any vegetated wetlands or surrounding waters outside of the alignment of the areas as indicated on the attached workplan drawings, without permit modification.
- 29) The temporary placement and double handling of any excavated or fill material within waters or vegetated wetlands is not authorized.
- 30) All fill material shall be clean and free of any pollutants except in trace quantities.

Barges

- 31) Barges shall be removed promptly when they are no longer needed.
- 32) Barges shall be utilized only in areas of sufficient depth such that the barges do not rest on the bottom during periods of low tide.
- 33) Caution shall be exercised with placement and removal of any barges to ensure that impacts to shallow water habitat are avoided and minimized to the maximum extent practicable.

ADDITIONAL CONDITIONS**Sedimentation and Erosion Control**

- 34) This project shall conform to all requirements of the NC Sedimentation Pollution Control Act and NC DOT's Memorandum of Agreement with the Division of Energy, Mineral and Land Resources.
- 35) Unless specifically altered herein, the permittee shall follow "Best Management Practices for the Protection of Surface Waters (3/97)" and shall also implement sedimentation and erosion control measures sufficient to protect aquatic resources. At a minimum, appropriate sedimentation and erosion control devices, measures or structures shall be implemented to ensure that eroded materials do not enter adjacent wetlands, watercourses, and property (e.g. silt fence, diversion swales or berms, etc.).

Compensatory Mitigation

- 36) Due to the possibility that compaction, mechanized clearing and/or other site alterations might prevent any temporary Coastal Wetland impact area from re-attaining pre-project Coastal Wetland functions, the permittee shall monitor temporary Coastal Wetland impacts for three years after project completion. The permittee shall schedule a meeting with DCM to verify the extent and location of temporary impacts upon project completion. The permittee shall then provide an annual update on any Coastal Wetland areas temporarily impacted by this project. This annual update shall consist of photographs and written report on the progress of these temporarily impacted areas in re-attaining Coastal Wetland jurisdictional status. Three years after project completion, the permittee shall schedule an agency field meeting with DCM to determine if the Coastal Wetland areas temporarily impacted by this project have re-attained pre-project Coastal Wetland functions. If at the end of 3 years the Coastal Wetland areas temporarily impacted by this project have not re-attained pre-project Coastal Wetland functions, DCM shall determine whether compensatory Coastal Wetland mitigation shall be required.

NOTE:

The Ecosystem Enhancement Program (EEP) agreed to provide mitigation for the entire project (R-2633AA&AB and R-2633B) impacts of 7.28 acres of riparian wetlands, 56.25 acres of non-riparian wetlands, and 509.0 linear feet of stream impacts, in accordance to the EEP Mitigation Acceptance Letter, dated 5/30/13.

Utilities Relocation

- 37) Any relocation of utility lines that has not been previously permitted by DCM or is not already depicted on the attached work plan drawings, or described within the attached permit application, shall require approval by DCM, either under the authority of this permit, or by the utility company obtaining separate authorization.

General

- 38) The permittee and/or contractor shall contact the DCM Transportation Field Representative at (252) 808-2808 extension No. 208 to schedule a pre-construction conference prior to project initiation.

ADDITIONAL CONDITIONS

- 39) DWQ authorized the proposed project (DWQ Project No. 20100867 v.4) on 5/31/13 under Certification No. 3842 as a modification to the original Water Quality Certification, dated 1/7/11 and reissued on 1/13/11. Any violation of the Certification approved by the DWQ shall be considered a violation of this CAMA permit.

NOTE: DWQ provided confirmation that the subject project is excluded from State Coastal Stormwater permitting requirements by way of the Stormwater Permit Exclusion letter, dated ~~12/17/10~~ *5/13/13* (Project No. SW8 101115).

NOTE: If it is determined that additional permanent and/or temporary impacts are necessary that are not shown on the attached permit drawings or described in the authorized permit application, permit modification or additional authorization from DCM shall be required.

NOTE: This permit does not eliminate the need to obtain any additional state, federal, or local permits, approvals, or authorizations that may be required, including, but not limited to, the US Army Corps of Engineers and/or the US Coast Guard.



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

GUIDELINES FOR AVOIDING IMPACTS TO THE WEST INDIAN MANATEE Precautionary Measures for Construction Activities in North Carolina Waters

The West Indian manatee (*Trichechus manatus*), also known as the Florida manatee, is a Federally-listed endangered aquatic mammal protected under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) and the Marine Mammal Protection Act of 1972, as amended (16 U.S.C. 1461 *et seq.*). The manatee is also listed as endangered under the North Carolina Endangered Species Act of 1987 (Article 25 of Chapter 113 of the General Statutes). The U.S. Fish and Wildlife Service (Service) is the lead Federal agency responsible for the protection and recovery of the West Indian manatee under the provisions of the Endangered Species Act.

Adult manatees average 10 feet long and weigh about 2,200 pounds, although some individuals have been recorded at lengths greater than 13 feet and weighing as much as 3,500 pounds. Manatees are commonly found in fresh, brackish, or marine water habitats, including shallow coastal bays, lagoons, estuaries, and inland rivers of varying salinity extremes. Manatees spend much of their time underwater or partly submerged, making them difficult to detect even in shallow water. While the manatee's principal stronghold in the United States is Florida, the species is considered a seasonal inhabitant of North Carolina with most occurrences reported from June through October.

To protect manatees in North Carolina, the Service's Raleigh Field Office has prepared precautionary measures for general construction activities in waters used by the species. Implementation of these measure will allow in-water projects which do not require blasting to proceed without adverse impacts to manatees. In addition, inclusion of these guidelines as conservation measures in a Biological Assessment or Biological Evaluation, or as part of the determination of impacts on the manatee in an environmental document prepared pursuant to the National Environmental Policy Act, will expedite the Service's review of the document for the fulfillment of requirements under Section 7 of the Endangered Species Act. These measures include:

1. The project manager and/or contractor will inform all personnel associated with the project that manatees may be present in the project area, and the need to avoid any harm to these endangered mammals. The project manager will ensure that all construction personnel know the general appearance of the species and their habit of moving about completely or partially submerged in shallow water. All construction personnel will be informed that they are responsible for observing water-related activities for the presence of manatees.
2. The project manager and/or the contractor will advise all construction personnel that

there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act and the Endangered Species Act.

3. If a manatee is seen within 100 yards of the active construction and/or dredging operation or vessel movement, all appropriate precautions will be implemented to ensure protection of the manatee. These precautions will include the immediate shutdown of moving equipment if a manatee comes within 50 feet of the operational area of the equipment. Activities will not resume until the manatee has departed the project area on its own volition (i.e., it may not be herded or harassed from the area).

4. Any collision with and/or injury to a manatee will be reported immediately. The report must be made to the U.S. Fish and Wildlife Service (ph. 919.856.4520 ext. 16), the National Marine Fisheries Service (ph. 252.728.8762), and the North Carolina Wildlife Resources Commission (ph. 252.448.1546).

5. A sign will be posted in all vessels associated with the project where it is clearly visible to the vessel operator. The sign should state:

CAUTION: The endangered manatee may occur in these waters during the warmer months, primarily from June through October. Idle speed is required if operating this vessel in shallow water during these months. All equipment must be shut down if a manatee comes within 50 feet of the vessel or operating equipment. A collision with and/or injury to the manatee must be reported immediately to the U.S. Fish and Wildlife Service (919-856-4520 ext. 16), the National Marine Fisheries Service (252.728.8762), and the North Carolina Wildlife Resources Commission (252.448.1546).

6. The contractor will maintain a log detailing sightings, collisions, and/or injuries to manatees during project activities. Upon completion of the action, the project manager will prepare a report which summarizes all information on manatees encountered and submit the report to the Service's Raleigh Field Office.

7. All vessels associated with the construction project will operate at "no wake/idle" speeds at all times while in water where the draft of the vessel provides less than a four foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

8. If siltation barriers must be placed in shallow water, these barriers will be: (a) made of material in which manatees cannot become entangled; (b) secured in a manner that they cannot break free and entangle manatees; and, (c) regularly monitored to ensure that manatees have not become entangled. Barriers will be placed in a manner to allow manatees entry to or exit from essential habitat.

Prepared by (rev. 06/2003):
U.S. Fish and Wildlife Service
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726
919/856-4520

Figure 1. The whole body of the West Indian manatee may be visible in clear water; but in the dark and muddy waters of coastal North Carolina, one normally sees only a small part of the head when the manatee raises its nose to breathe.

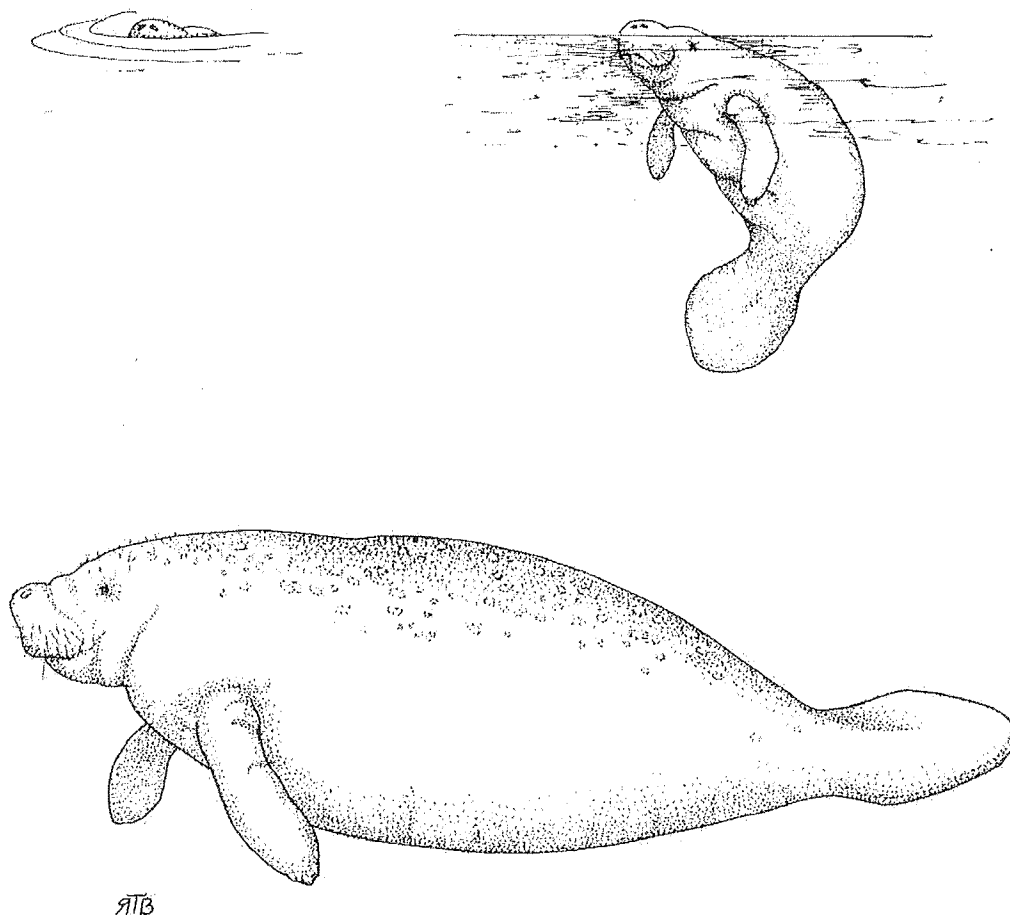
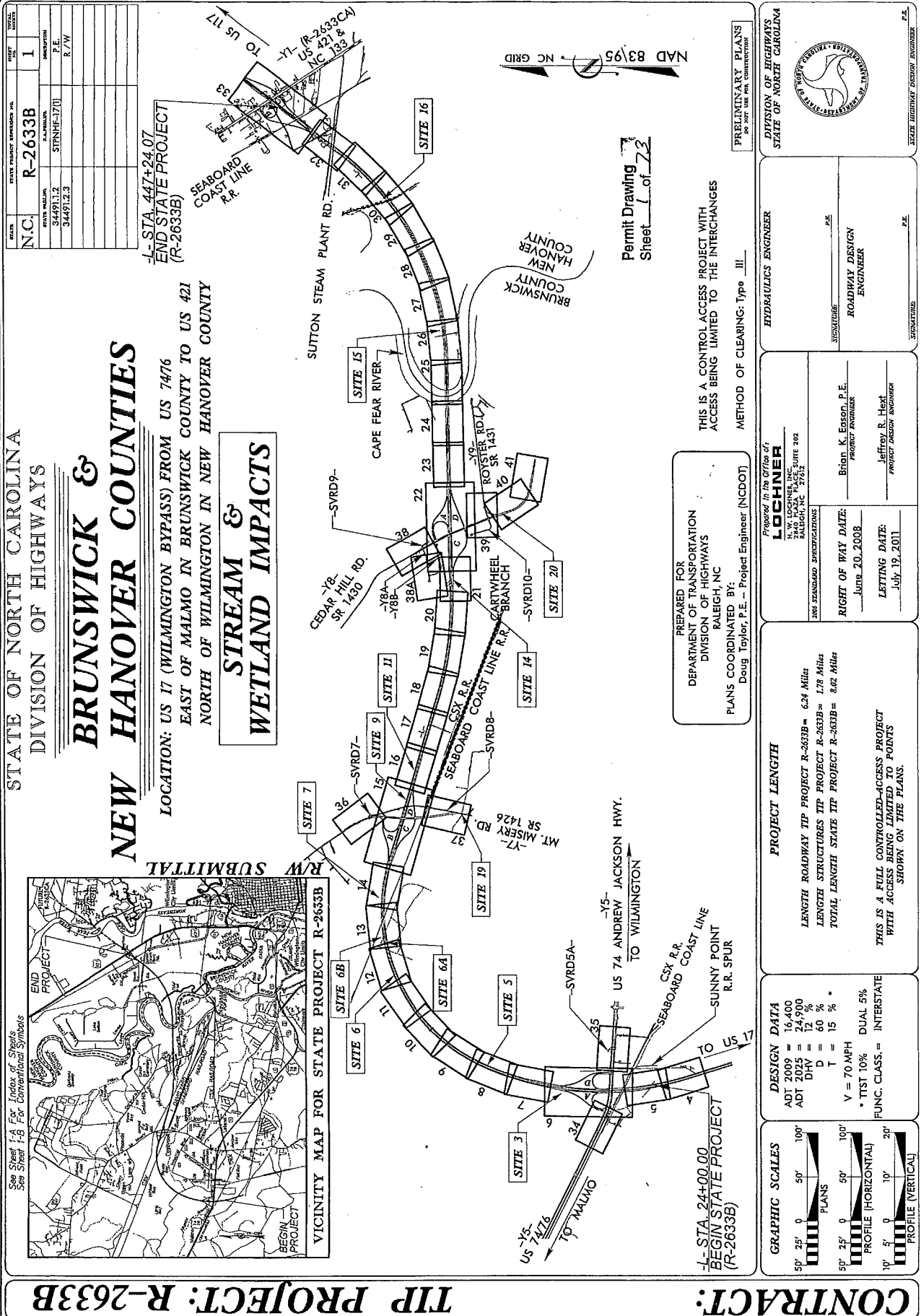


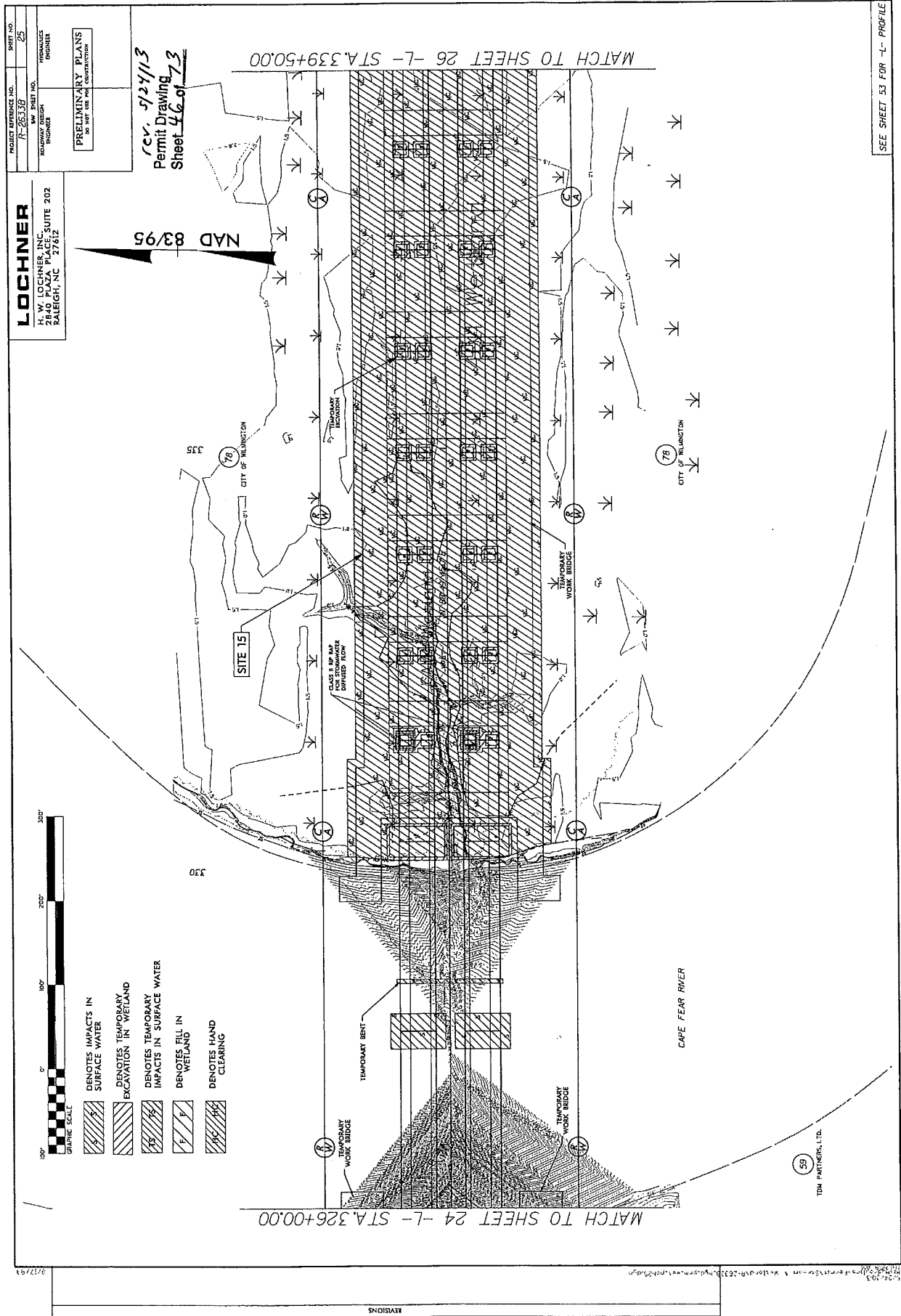
Illustration used with the permission of the North Carolina State Museum of Natural Sciences.
Source: Clark, M. K. 1987. Endangered, Threatened, and Rare Fauna of North Carolina: Part I. A re-evaluation of the mammals. Occasional Papers of the North Carolina Biological Survey 1987-3. North Carolina State Museum of Natural Sciences. Raleigh, NC. pp. 52.

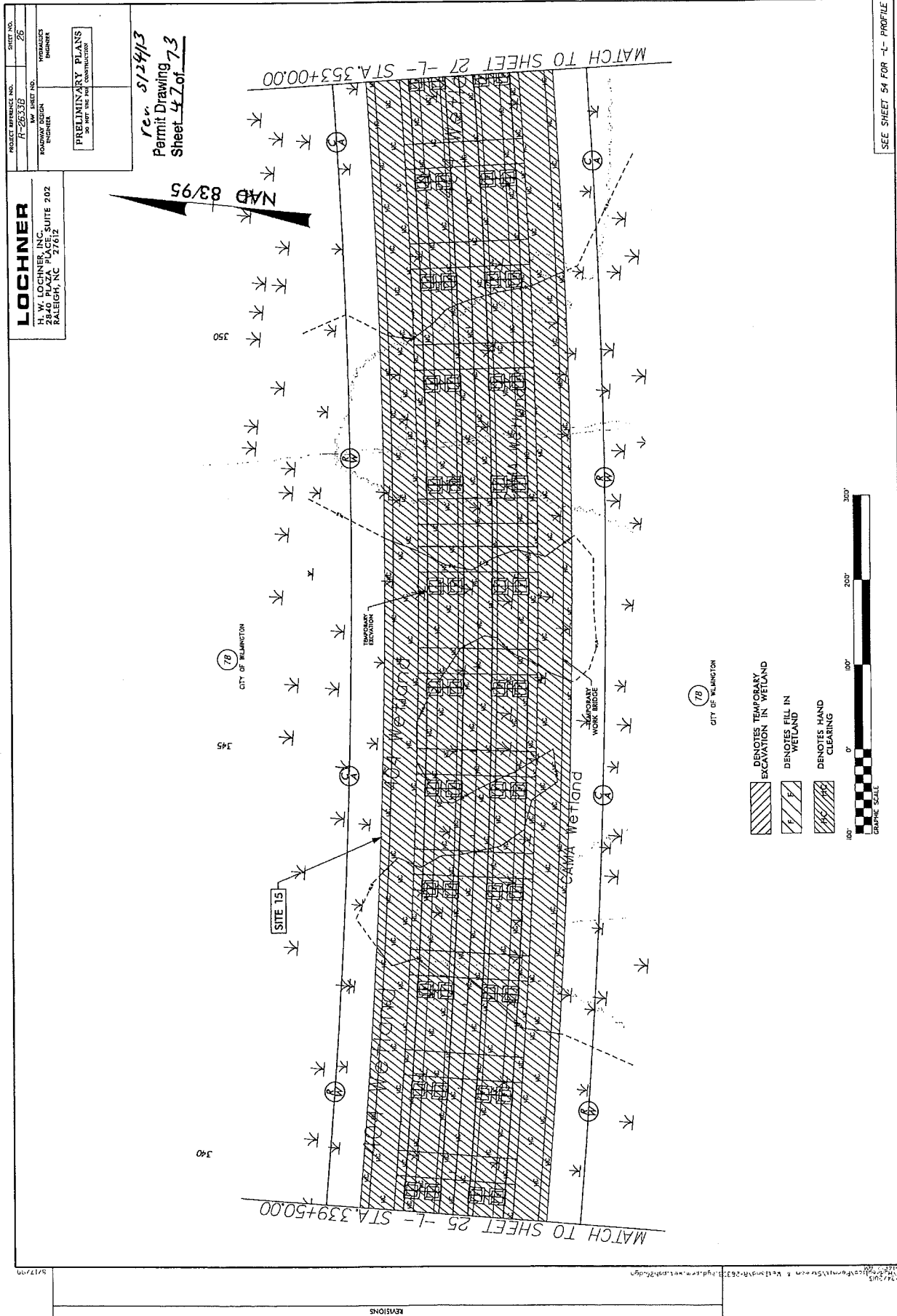


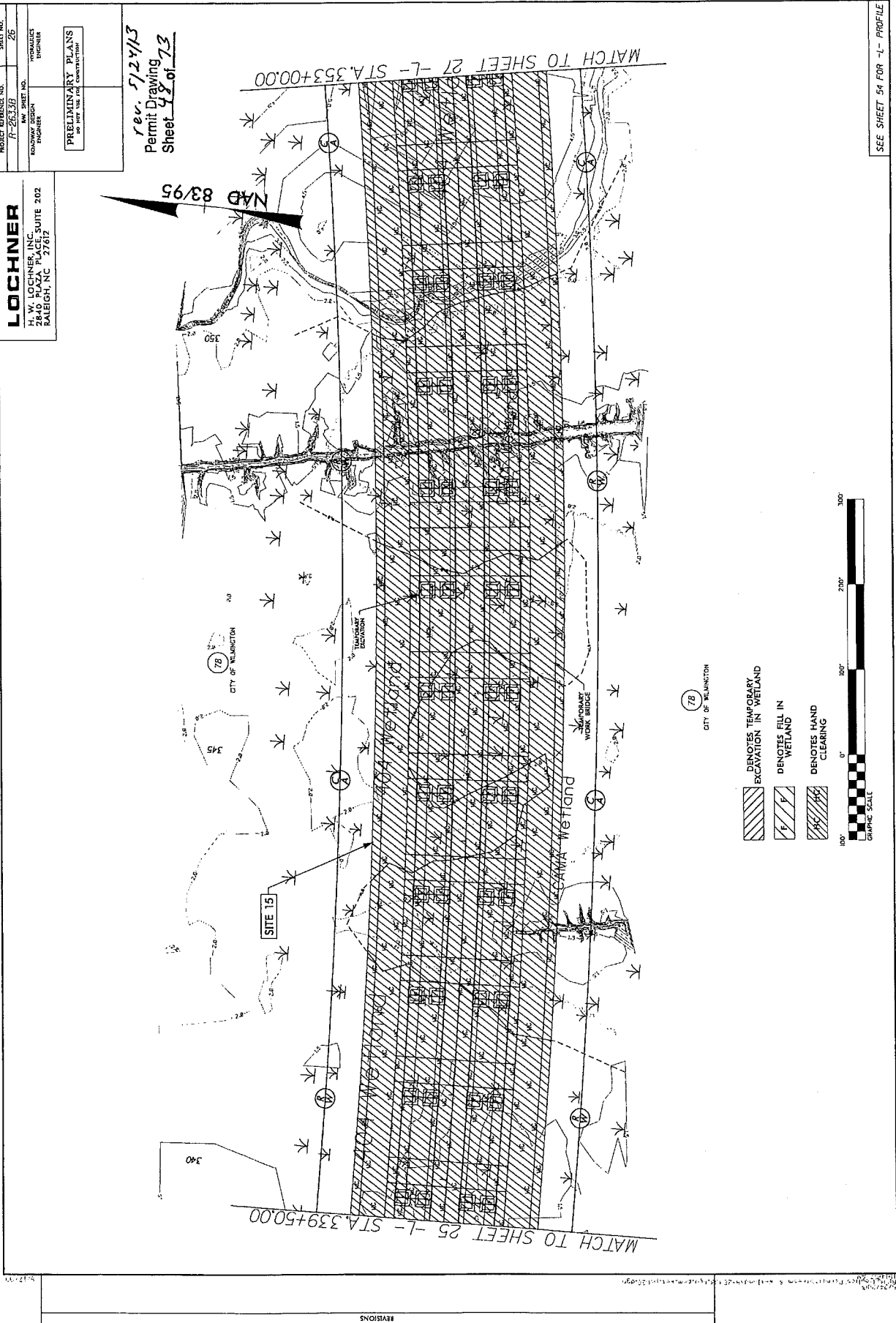
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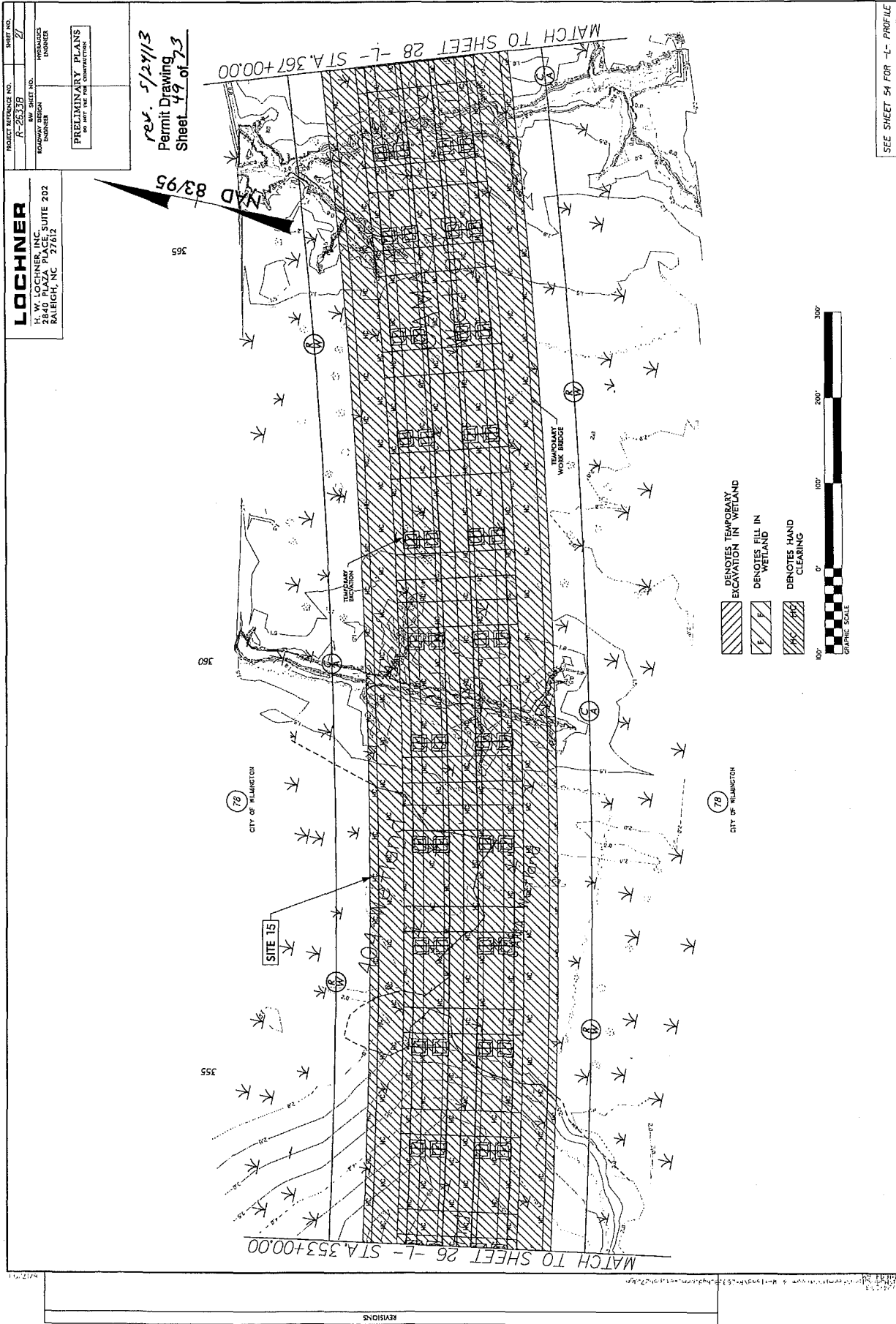
REVISIONS

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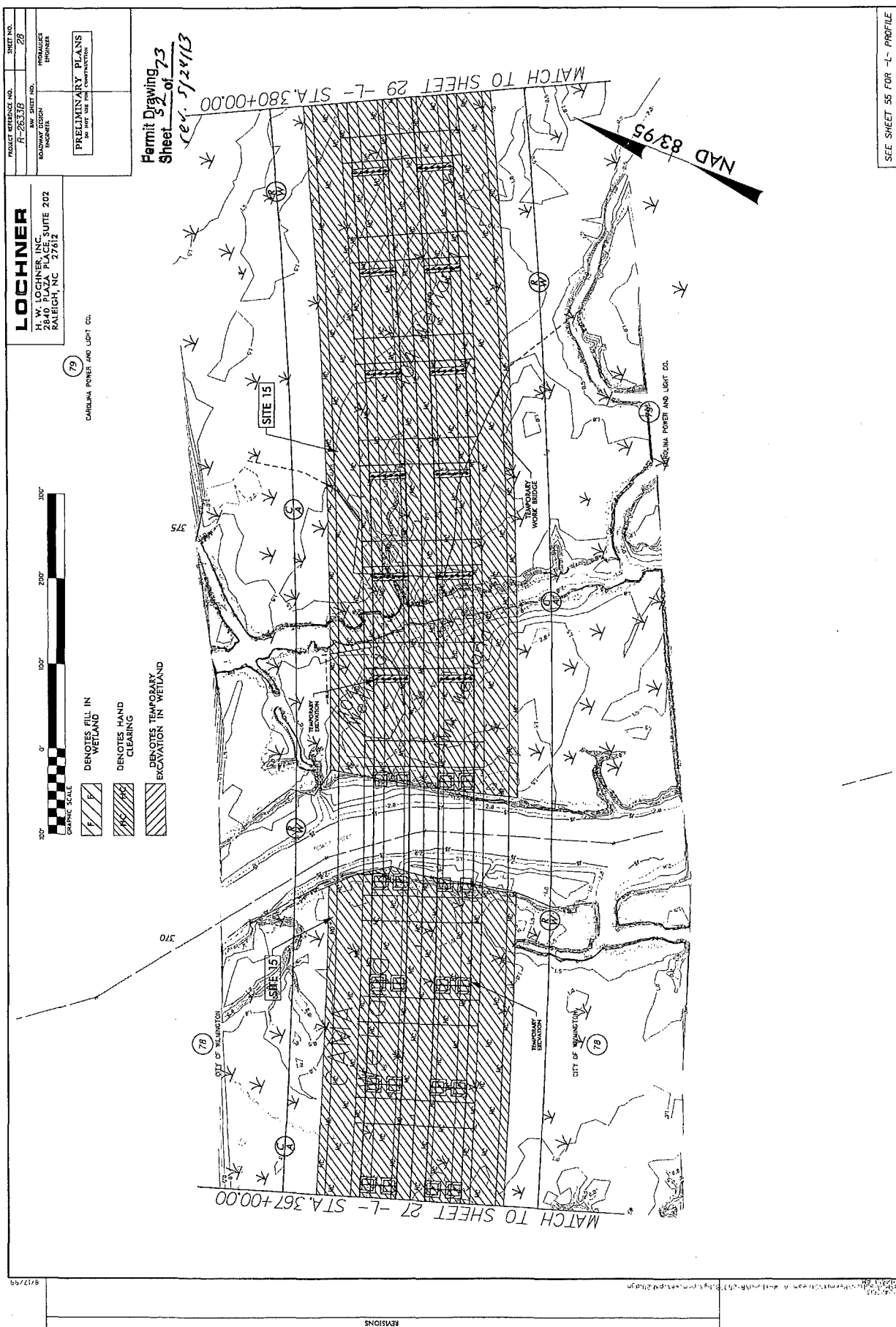


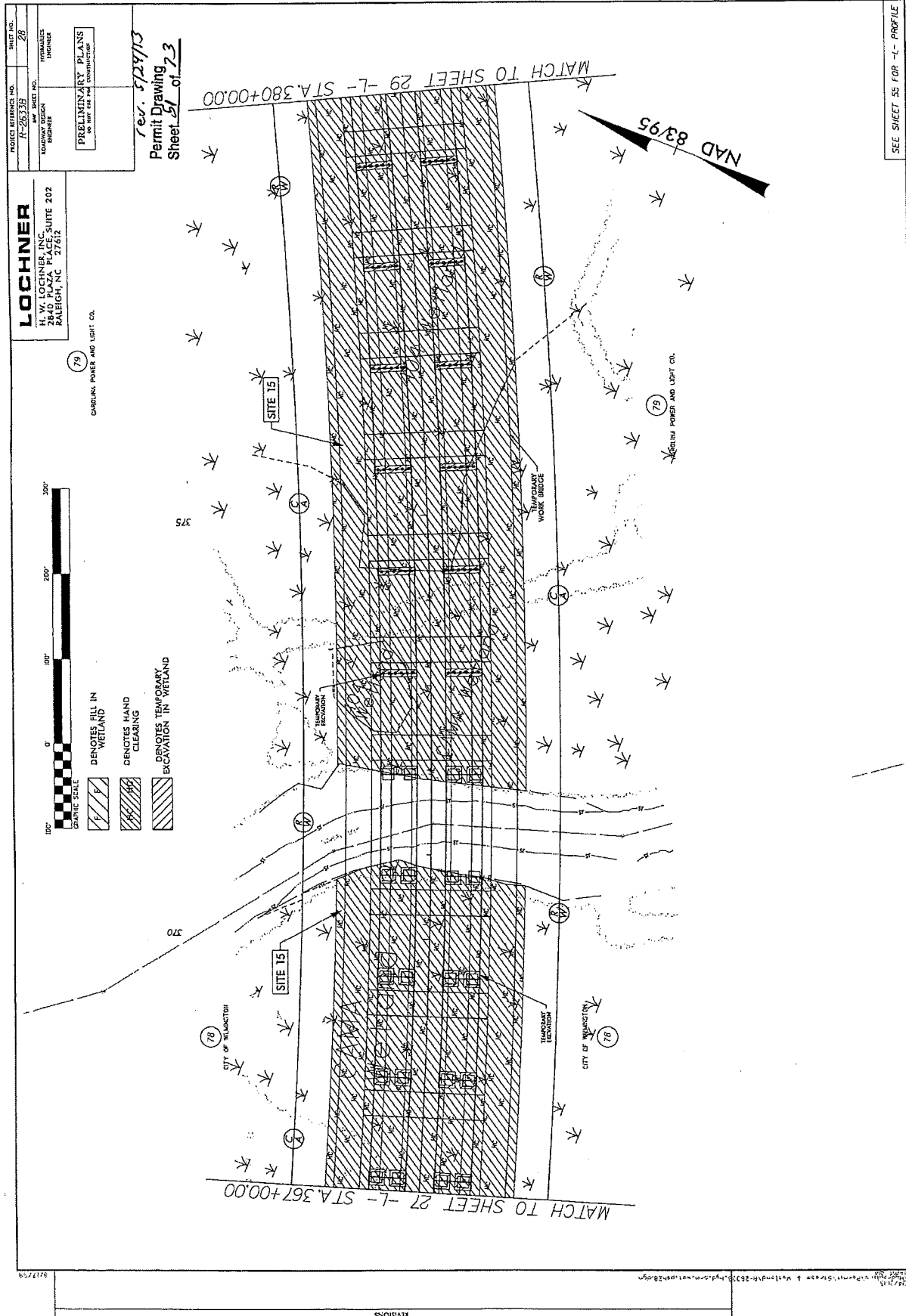


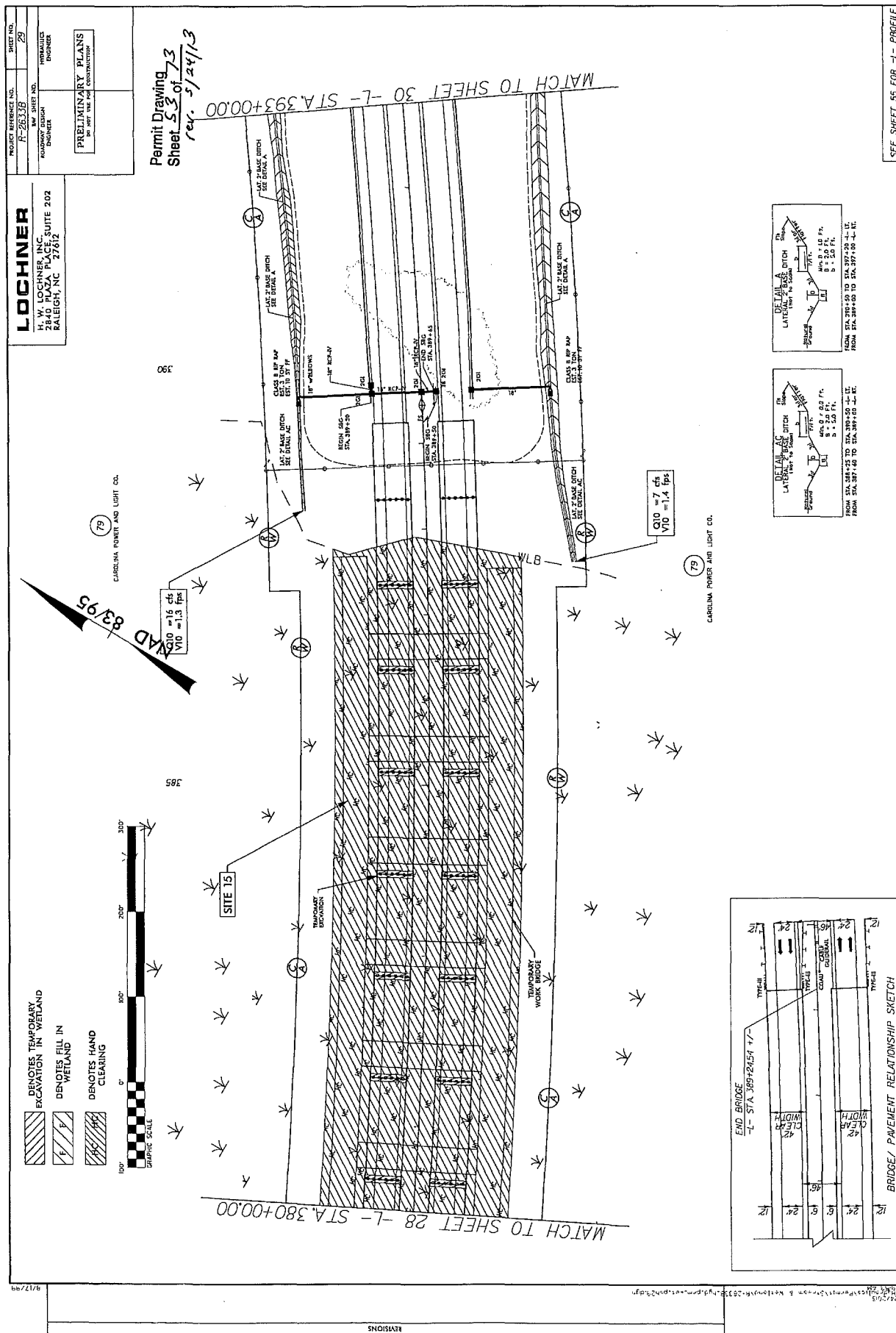


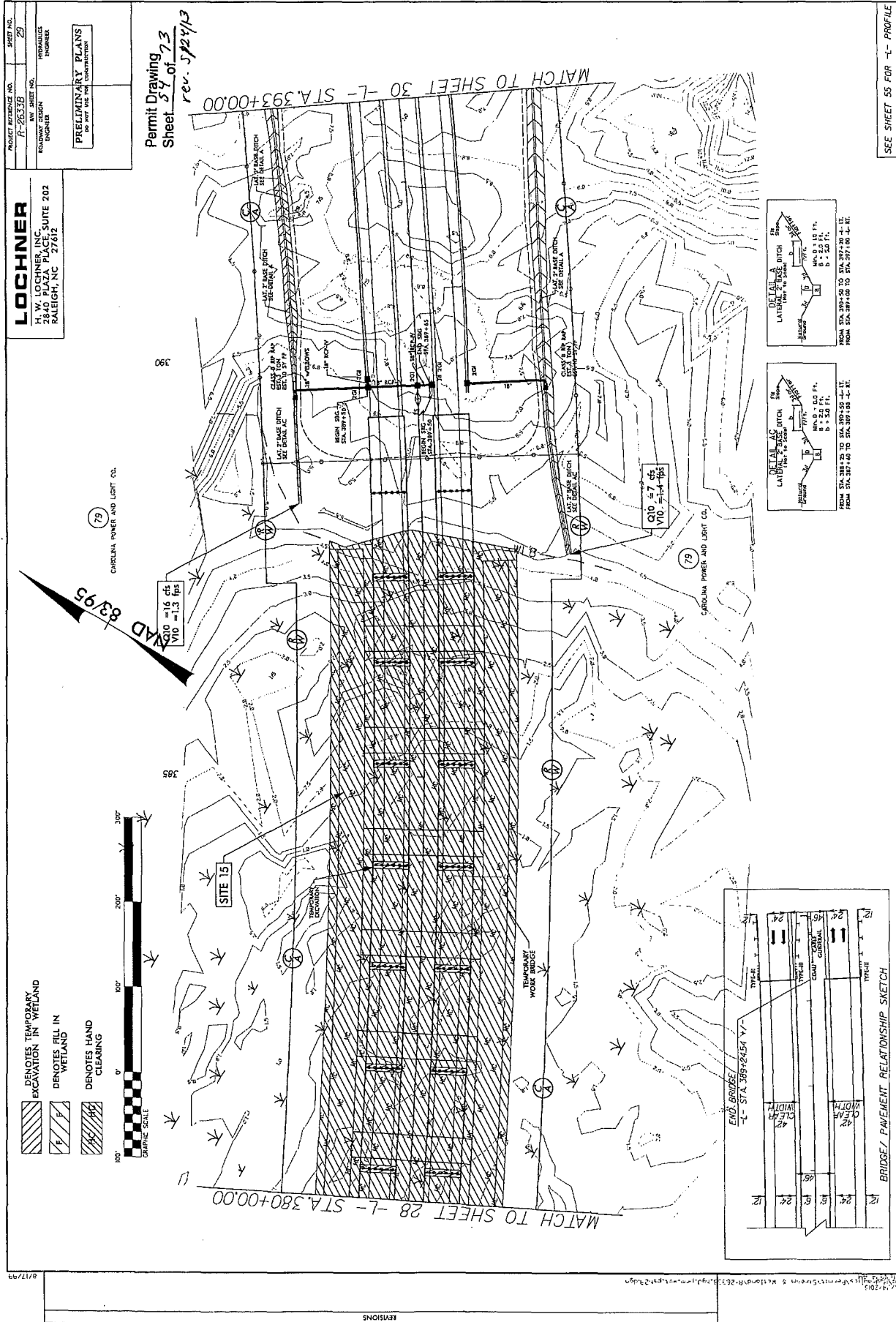
SEE SHEET 54 FOR -L- PROFILE

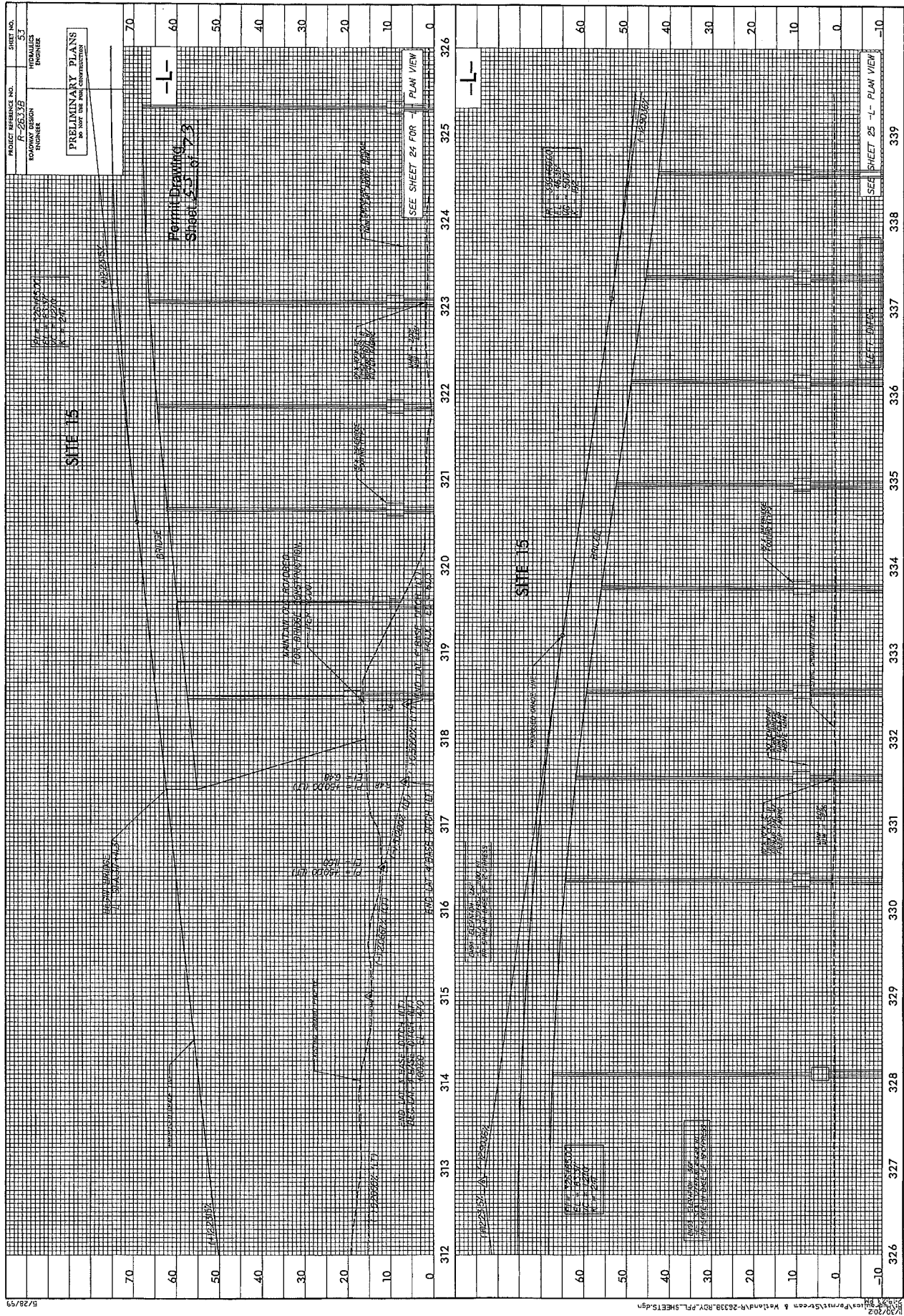
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C:\Program Files\Microsoft Office\Office12\outlook.exe

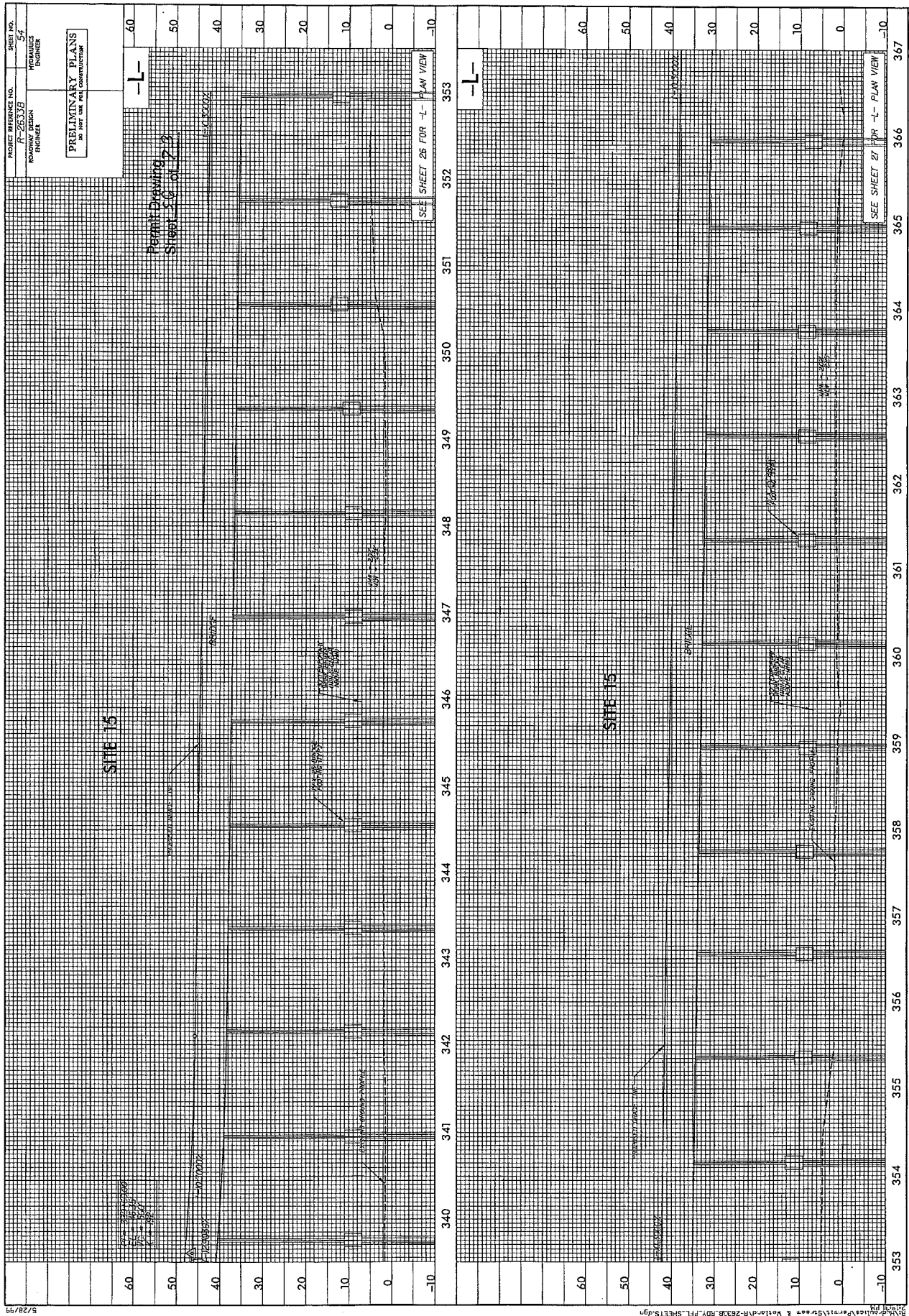






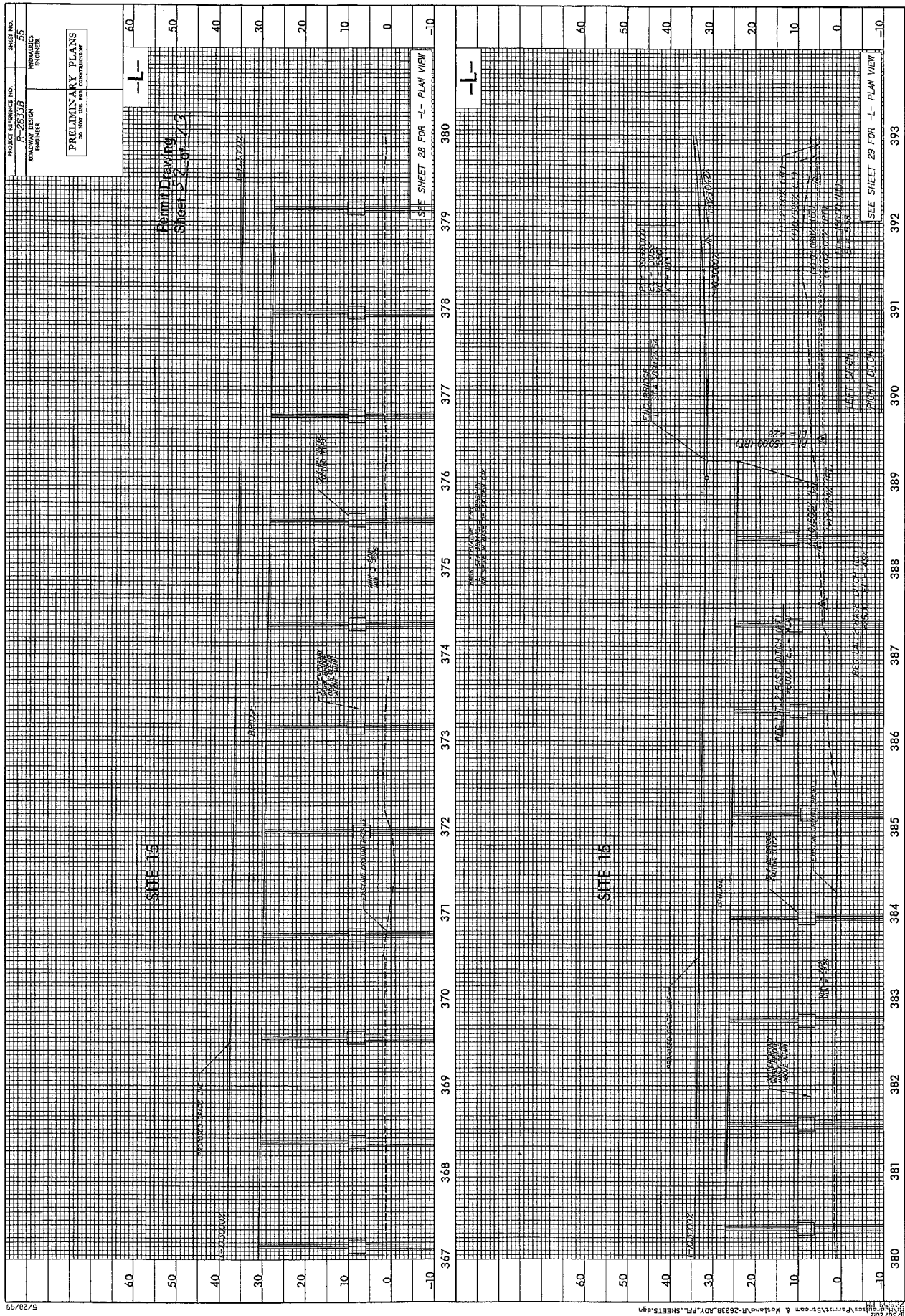






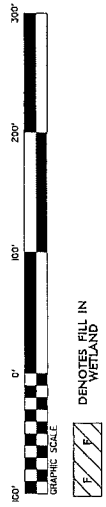
5/28/95

\\s0202\p01\102\Veritas\5room & Wold\4-R-2638.RDV.PLT.SHEETS.dgn



PROJECT REFERENCE NO.	PROJECT NO.
A-26359	30
DESIGNER	ENGINEER
ROADWAY DESIGN	HYDRAULICS
PRELIMINARY PLANS FOR THE NEW HIGHWAY	

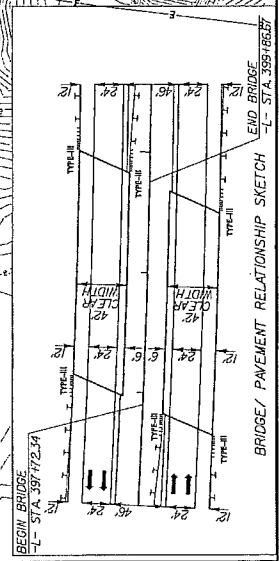
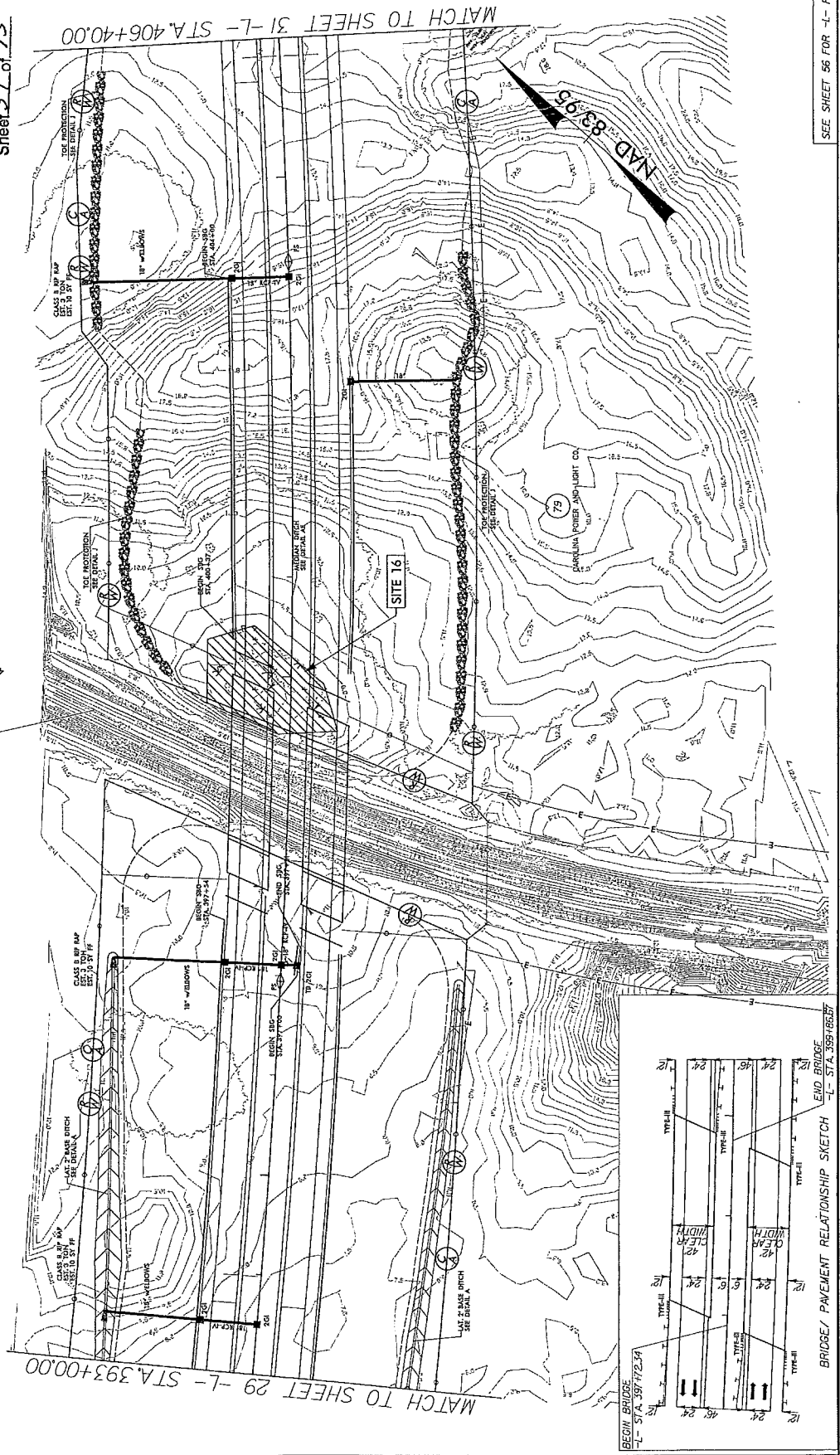
LOCHNER
 H. W. LOCHNER, INC.
 2840 PLAYA PLACE, SUITE 202
 RALEIGH, NC 27612

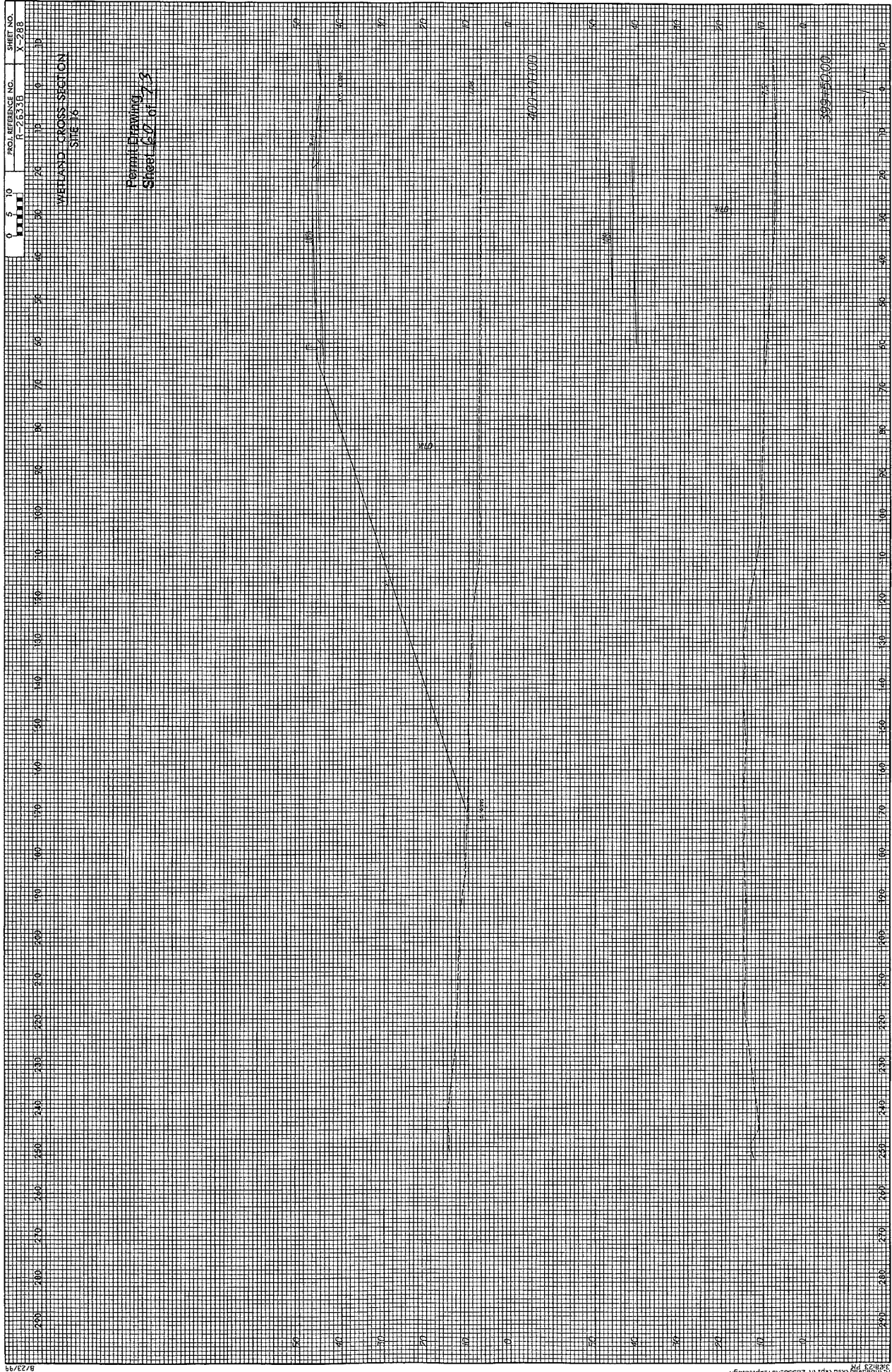


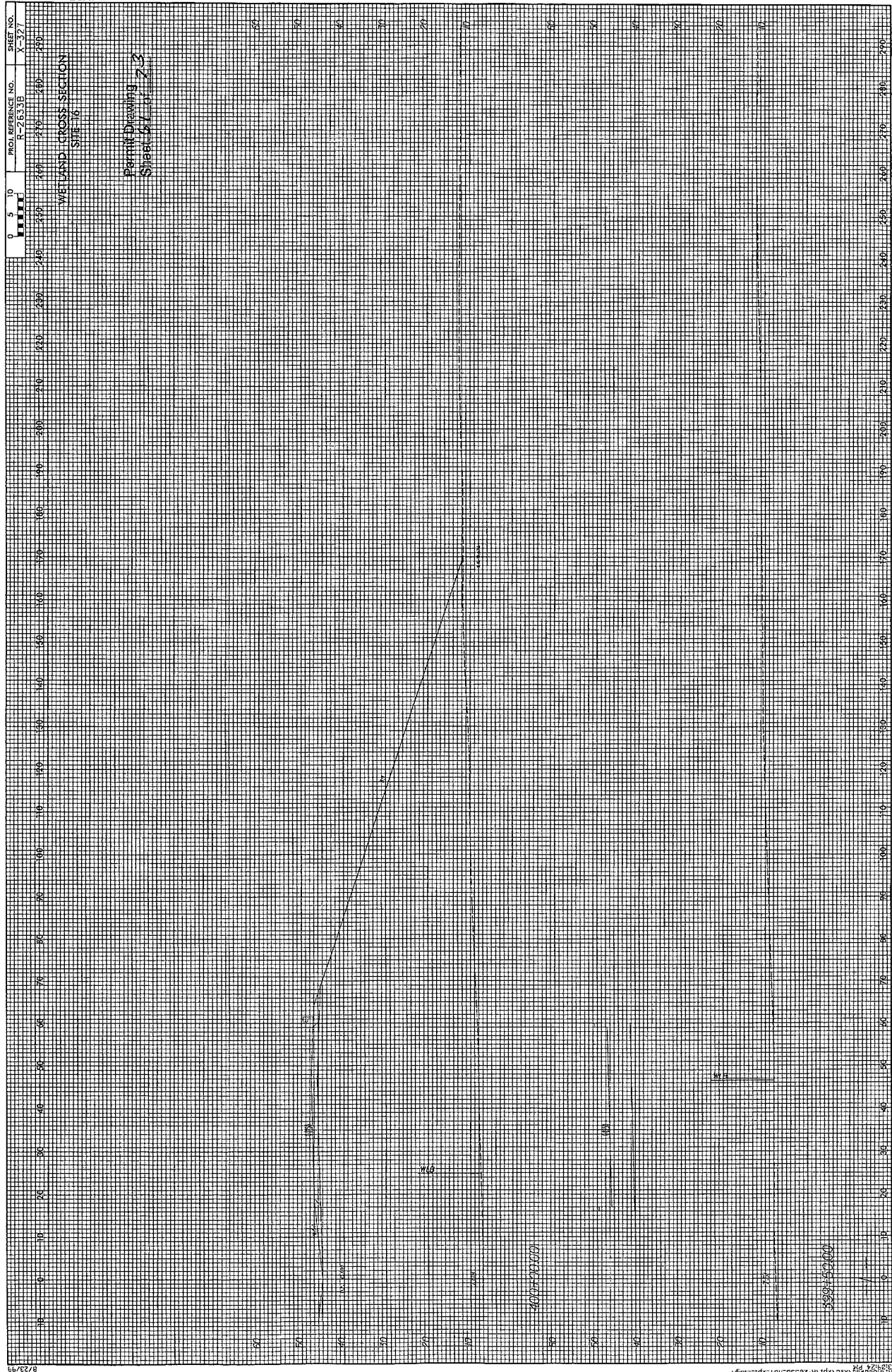
79
 CAROLINA POWER AND LIGHT CO.

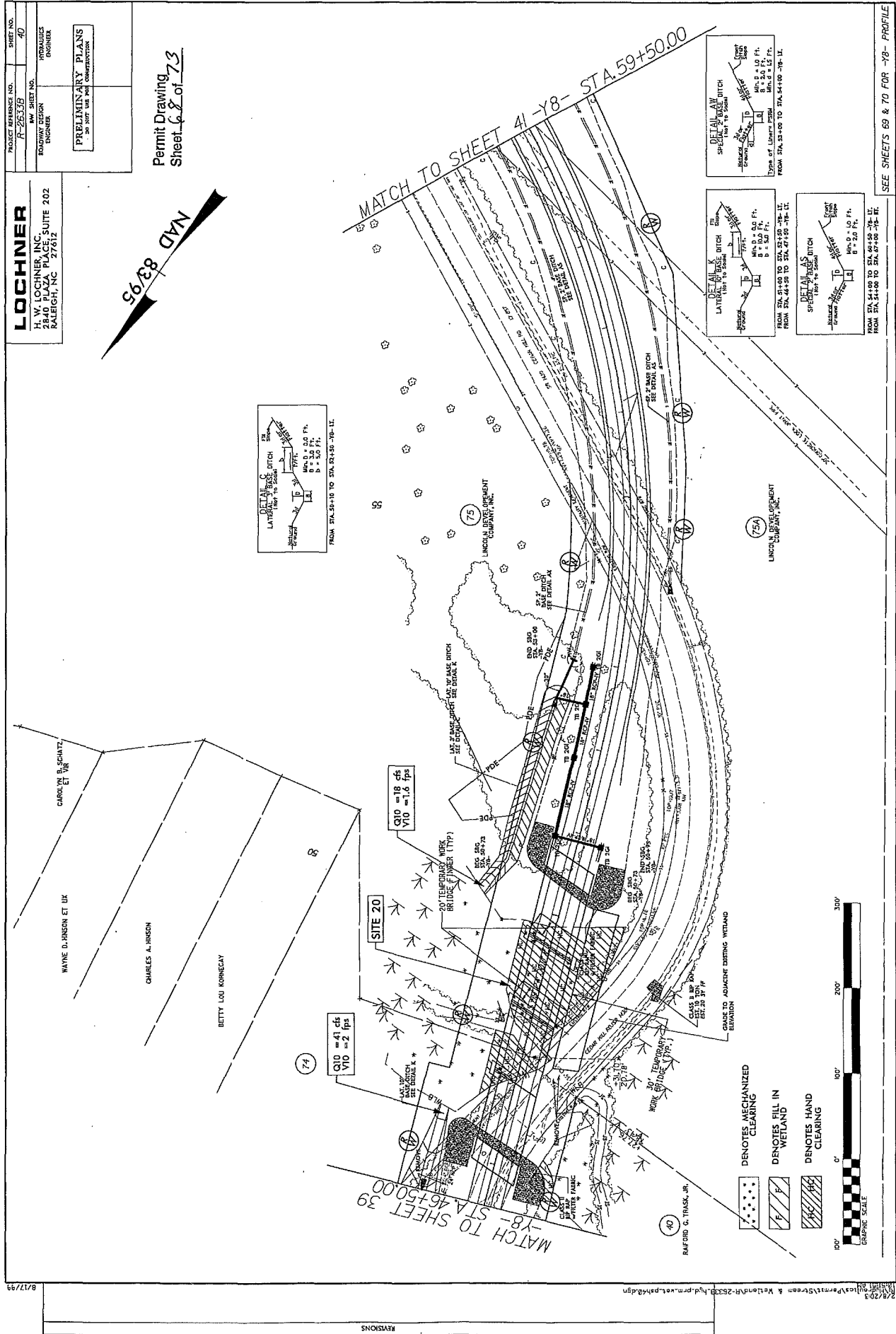
Permit Drawing
 Sheet 59 of 73

NOTE: TEMPORARY RAILROAD
 GRADE CROSSING.



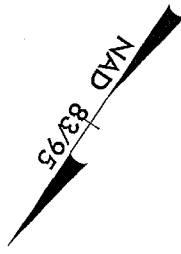




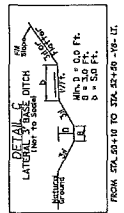
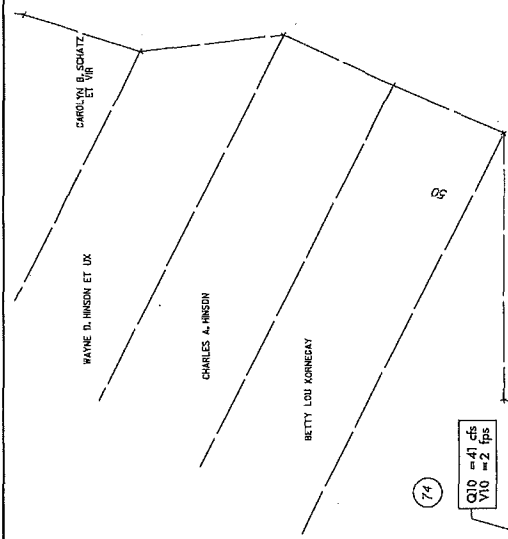


PROJECT REFERENCE NO. R-2633B	SHEET NO. 40
DESIGNER H. W. LOCHNER, INC. 2840 PLAZA PLACE, SUITE 202 RALEIGH, NC 27612	ENGINEER H. W. LOCHNER, INC. 2840 PLAZA PLACE, SUITE 202 RALEIGH, NC 27612
PRELIMINARY PLANS FOR THE PROJECT AND CONSTRUCTION	

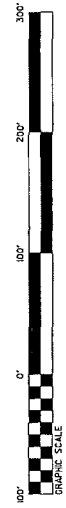
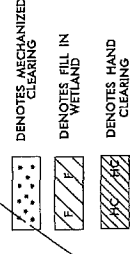
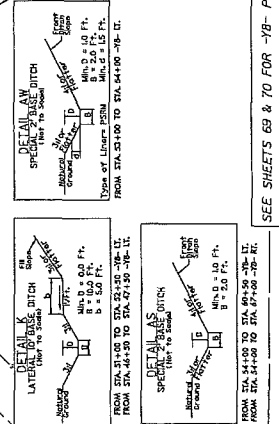
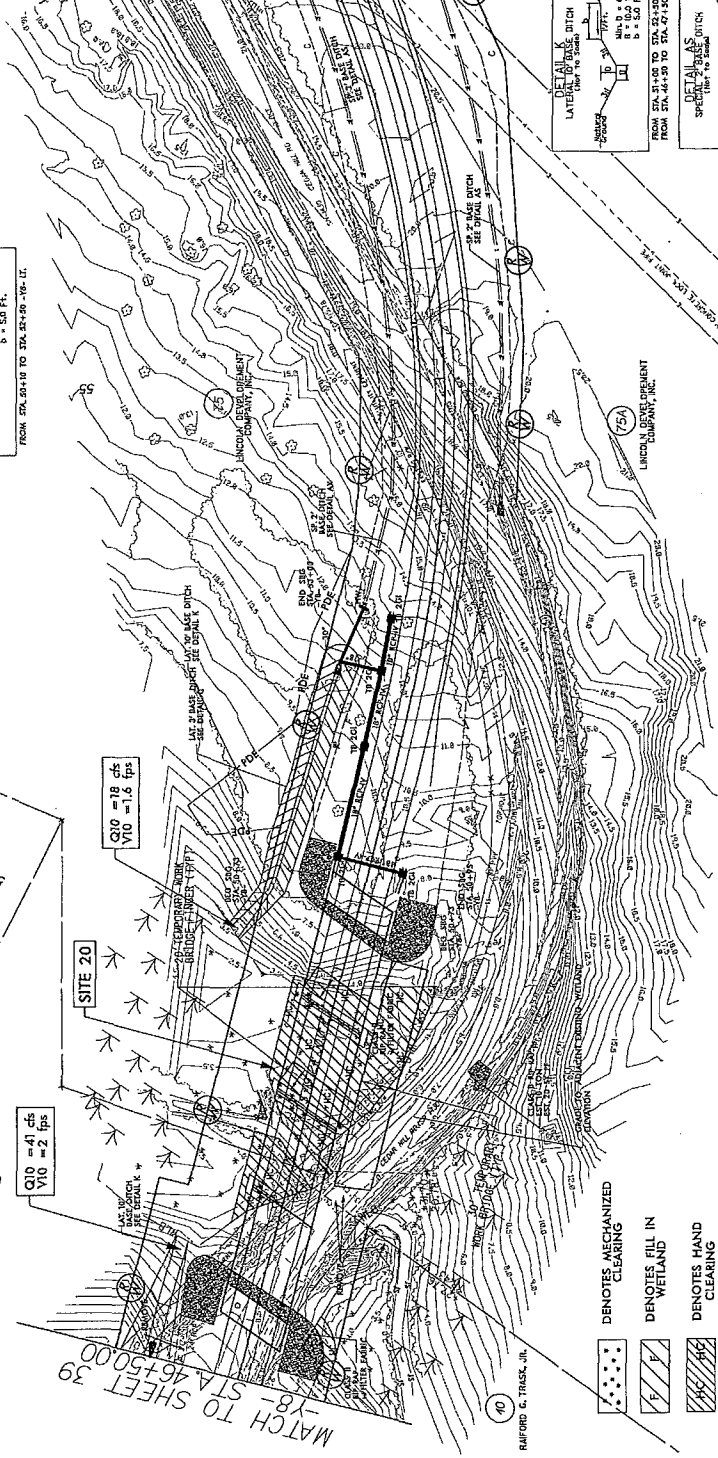
Permit Drawing
Sheet 69 of 73



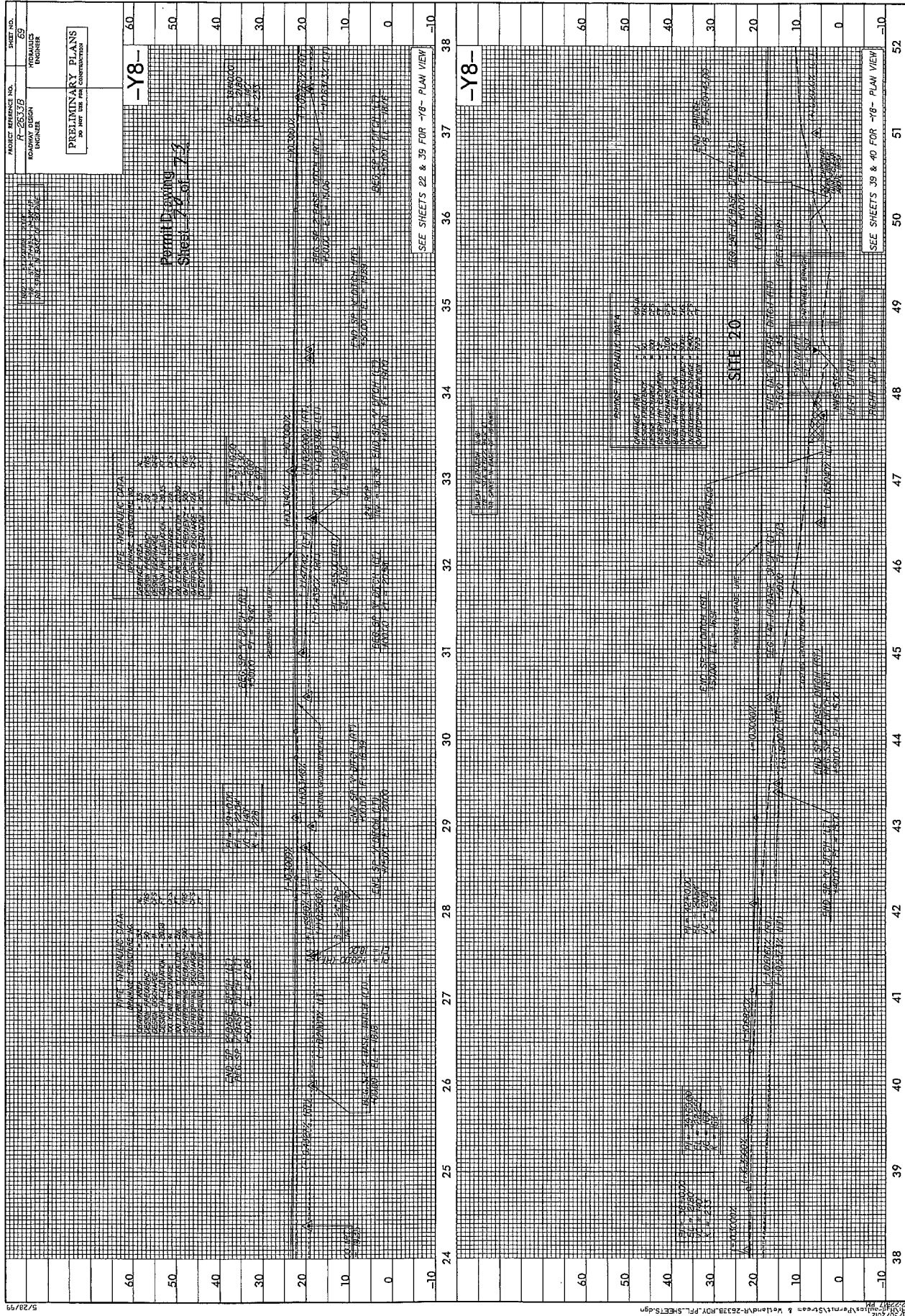
LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612



MATCH TO SHEET 41-Y8- STA. 59+50.00



SEE SHEETS 63 & 70 FOR -YB- PROFILE



PROPERTY OWNERS

NAMES AND ADDRESSES

REFERENCE NO.	NAMES	ADDRESSES
35	E.G.DALE ET UX	PO BOX 157 LELAND, NC 28451
36	ANNETTE ANDREWS TROY ET AL	2107 MT MISERY ROAD LELAND, NC 28451
39	LINCOLN DEVELOPMENT CO., INC.	PO BOX 2021 WILMINGTON, NC 28402
40	RAEFORD G. TRASK, JR.	1202 EASTWOOD ROAD WILMINGTON, NC 28403
59	TOM PARTNERS, LTD.	1508 MILITARY CUTOFF RD WILMINGTON, NC 28403
74	ESTATE OF ESSIE BLIZZARD	7524 ELKMONT CIRCLE WILMINGTON, NC 28411
75	LINCOLN LAND DEVELOPMENT CO., INC.	PO BOX 2021 WILMINGTON, NC 28402
78	CITY OF WILMINGTON	PO BOX 1810 WILMINGTON, NC 28408
79	CAROLINA POWER AND LIGHT CO.	410 SOUTH WILMINGTON ST RALEIGH, NC 27601

NCDOT

DIVISION OF HIGHWAYS
BRUNSWICK AND NEW HANOVER
COUNTIES
PROJECT: R-2633B

US 17 FROM 74/76
IN BRUNSWICK COUNTY TO
US 421 IN NEWHANOVER COUNTY

SHEET 71 OF 73 10/22/2012

PROPERTY OWNERS

NAMES AND ADDRESSES

REFERENCE NO.	NAMES	ADDRESSES
2	T.F.LIMITED HOLDINGS PARTNERSHIP	1202 EASTWOOD ROAD. WILMINGTON, NC 28403
3	JOHN M.HEWITT, ETUX	PO BOX 273 LELAND, NC 28451
4	V.A.CREECH, JR.	PO BOX 66 LELAND, NC 28451
10	MLH, LLC.	PO BOX 1967 WILMINGTON, NC 28402
11	WCM ENTERPRISES, LLC.	305 COLONIAL DRIVE WILMINGTON, NC 28403
13	CHADWICK-ONE, LLC.	PO BOX 452 LELAND, NC 28451
15	BARNEY L.PADGETT ET UX	PO BOX 7332 WILMINGTON, NC 28456
21	LOUISE VERZAAL JOYNER	5644 56th WAY WEST PALM BEACH, FL 33409

NCDOT

DIVISION OF HIGHWAYS
BRUNSWICK AND NEW HANOVER
COUNTIES
PROJECT: R-2633B

US 17 FROM 74/76
IN BRUNSWICK COUNTY TO
US 421 IN NEWHANOVER COUNTY

SHEET 72 OF 73 10/22/2012

WETLAND PERMIT IMPACT SUMMARY										
Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS				SURFACE WATER IMPACTS			
			404 Permanent Fill In Wetlands (ac)	CAMA Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	404 Hand Clearing in Wetlands (ac)	CAMA Hand Clearing in Wetlands (ac)	Permanent SW Impacts (ac)
1***	L-24+75.44	Roadway Fill								
2***	L-37+96.44	Bridge								
3***	L-REV-339+73 to 388+52	Roadway Fill	7.45			0.03		0.58		
4	-RP D1-22+60	Deleted due to new JS delineation								
5*	-L-REV-372+74 to L-85+08	Roadway Fill	1.04					0.12		
6*	-L-109+28 to 134+54	Roadway Fill	9.72					1.13		
6A**	-L-138+11 to 140+70	Roadway Fill	0.68							
6B**	-L-141+20 to 144+29	Roadway Fill	0.41					0.02		
7*	-L-146+78 to 165+66	Roadway Fill	10.55					0.98		
8	-L-168+60	Deleted due to new JS delineation								
9*	-L-186+87 to 191+88	Roadway Fill	1.04					0.09		
10	-RP D2-19+20 Lt	Deleted due to new JS delineation								
11*	-L-194+75 to 216+13	Roadway Fill 3@42"	8.72					0.93		
12	-L-230+39 to 242+11	Deleted due to new JS delineation								
13	-L-258+36 to 265+87	Deleted due to new JS delineation								
14*	-L-264+32 to 266+64	Bridge					0.03	0.20		
15*	319+48 to 387+92	Temp. Work Bridge	0.05			***0.93		10.48	7.79	0.13
16*	-L-399+43 to 400+51	Temp. Work Bridge	0.22					8.43	4.70	
17***	-Y5-16+25 Rl	Roadway Fill								
18***	-Y5-16+25 Rl	48" RCP								
19*	-Y7-52+09	Culvert								
20*	-Y7 DET-16+45	Detour Culvert			0.06					
	-Y8-47+74 to 49+88	Bridge	<0.01				0.04	0.17		
	-Y8-48+78 to 49+95	Temp. Work Bridge						0.14		
TOTALS:			39.69		0.06	0.96	0.07	21.40	12.49	0.20
										0.63
										210
										149
										0.00

NC DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

BRUNSWICK AND NEW HANOVER COUNTIES
WBS - 34491.1.2 (R-2633B)

SHEET

73 of 73

rev. 5/24/13

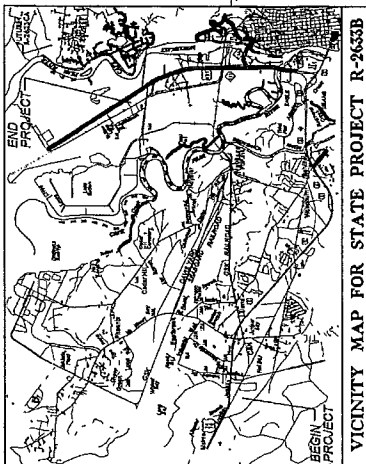
Site 14 See Structures sheet for Bridge Impacts on Cartwheel Branch
 Site 15 Impacts for Permanent Dual Bridges CAMA=0.07 Ac, 404=0.07 Ac, Surface Water=0.14 Ac, Total=0.15 Ac.
 Site 15 Impacts for Temporary Work Bridge CAMA=0.16 Ac, 404=0.21 Ac, Surface Water=0.01 Ac, Total=0.38 Ac.
 * Revised due to new JS Delineation
 ** New Site due to new JS Delineation
 *** Sites 1, 2, 17, and 18 are now permitted with R-2633AA & AB and the impacts are included with that project.
 **** A portion of Site 3 is now permitted with R-2633AA & AB and the impacts are included with that project.
 ***** Temporary Excavation, CAMA=0.41 Ac, 404 =0.52 Ac, Total=0.91 Ac.
 0.75 acres of Temp. Fill in 404 Wetlands in the Hand Clearing areas for Erosion Control Measures

ATN/Revised 2/20/05

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

NEU PERMIT PLANS BRUNSWICK -NEW HANOVER COUNTY

LOCATION: US 17(WILMINGTON BYPASS) FROM US 1476
EAST OF MALMO IN BRUNSWICK COUNTY TO US 421
NORTH OF WILMINGTON IN NEW HANOVER COUNTY
TYPE OF WORK: UTILITIES RELOCATION

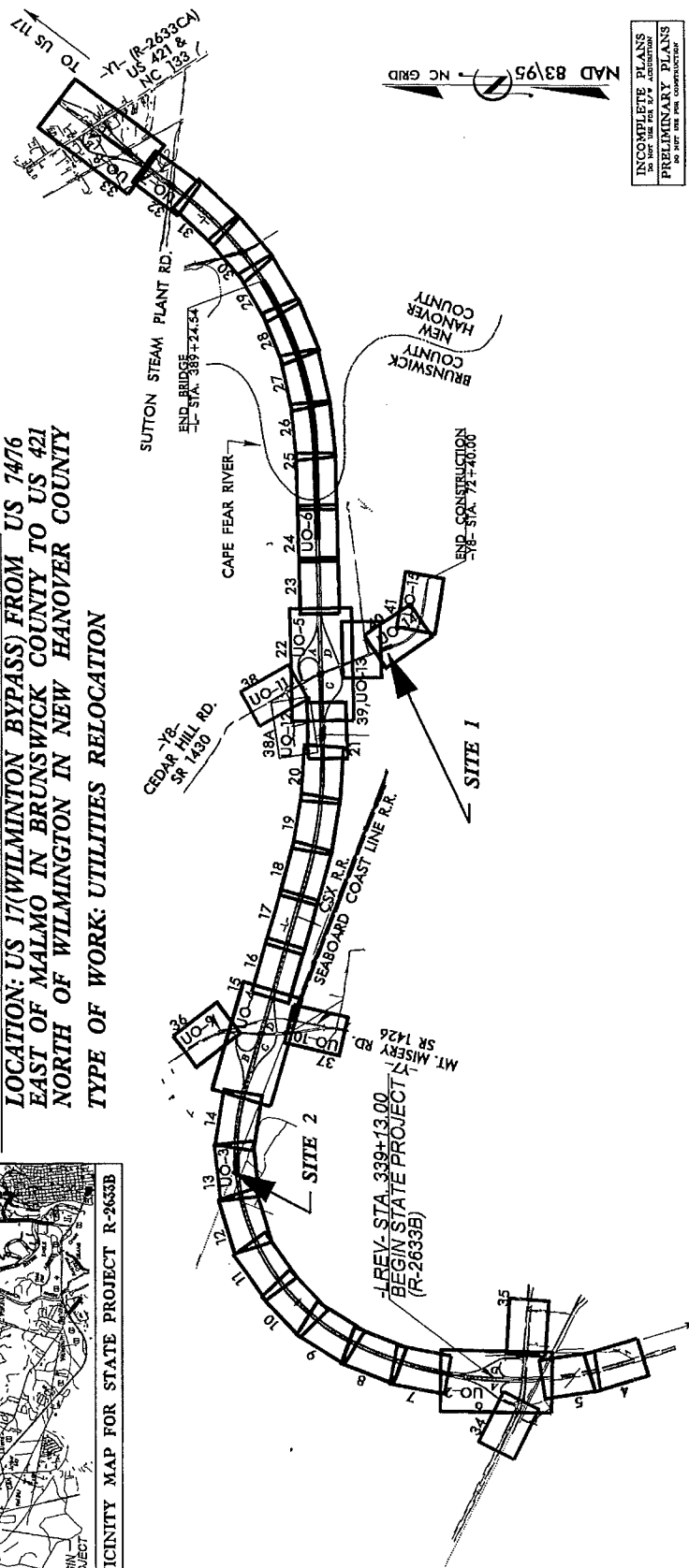


VICINITY MAP FOR STATE PROJECT R-2633B

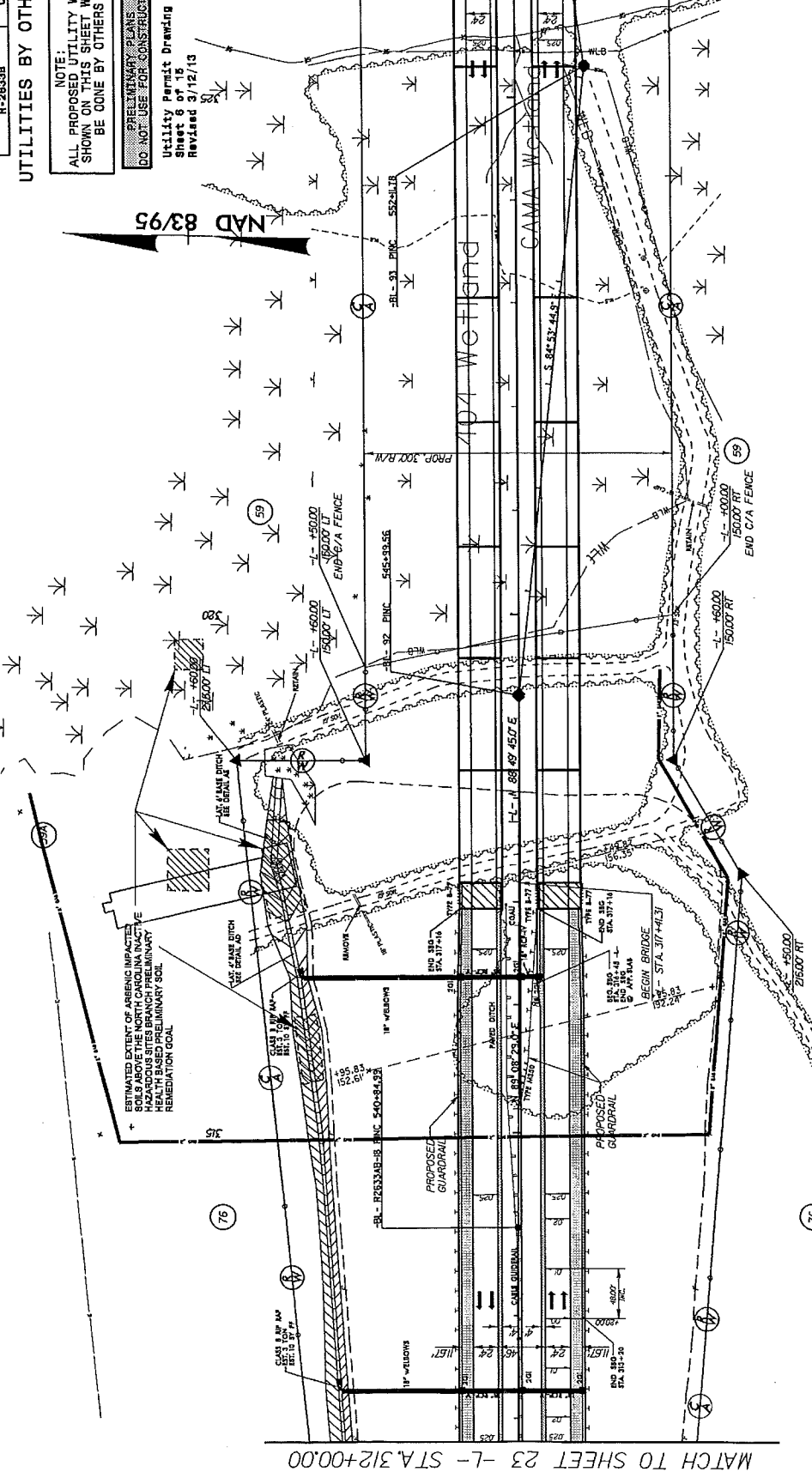
TIP NO. R-2633B
SHEET NO. 1

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Utility Permit Drawing
Sheet 1 of 15
Revised 3/28/13



MATCH TO SHEET 23-L- STA. 312+00.00



②

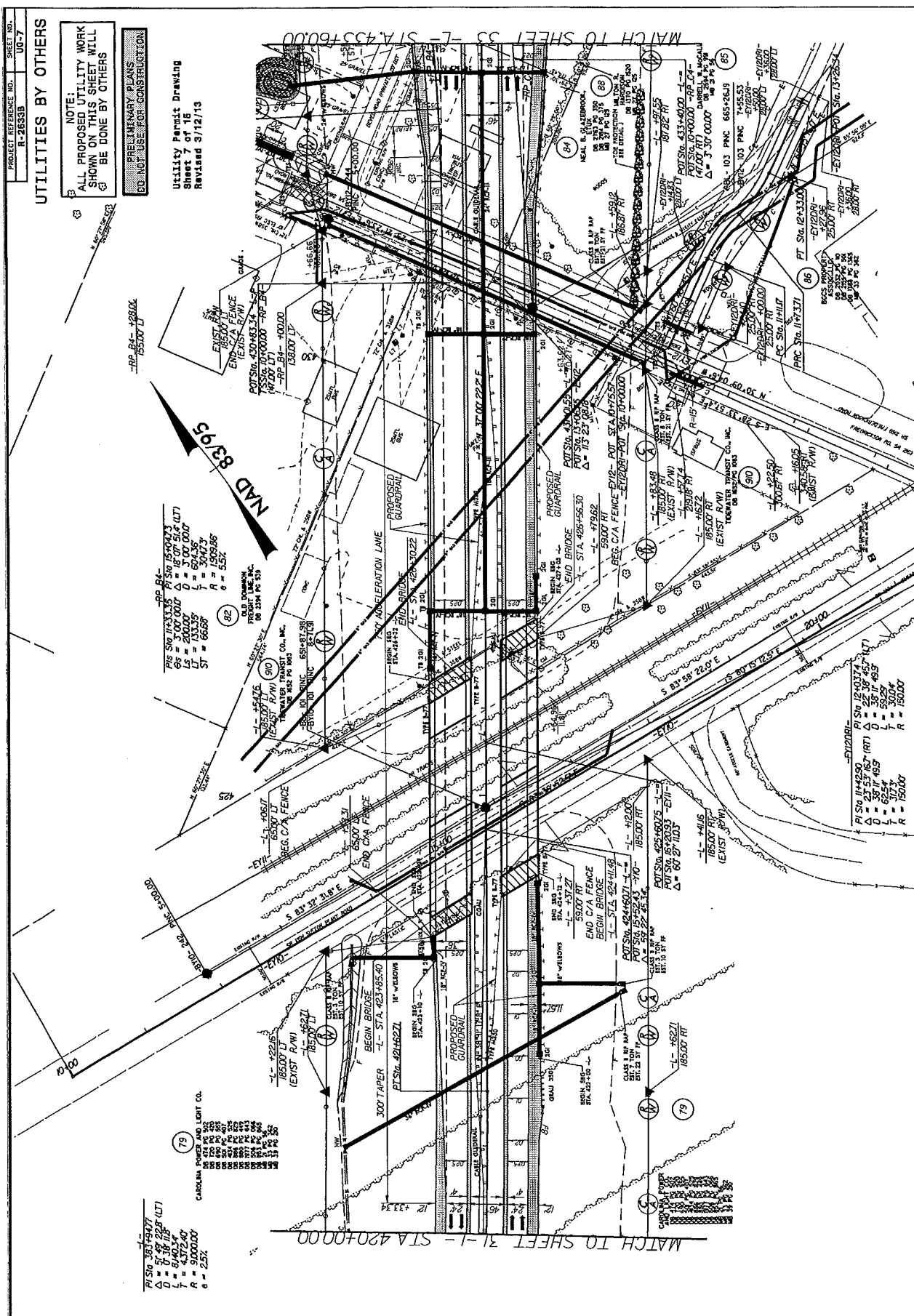
76

UTILITIES BY OTHERS

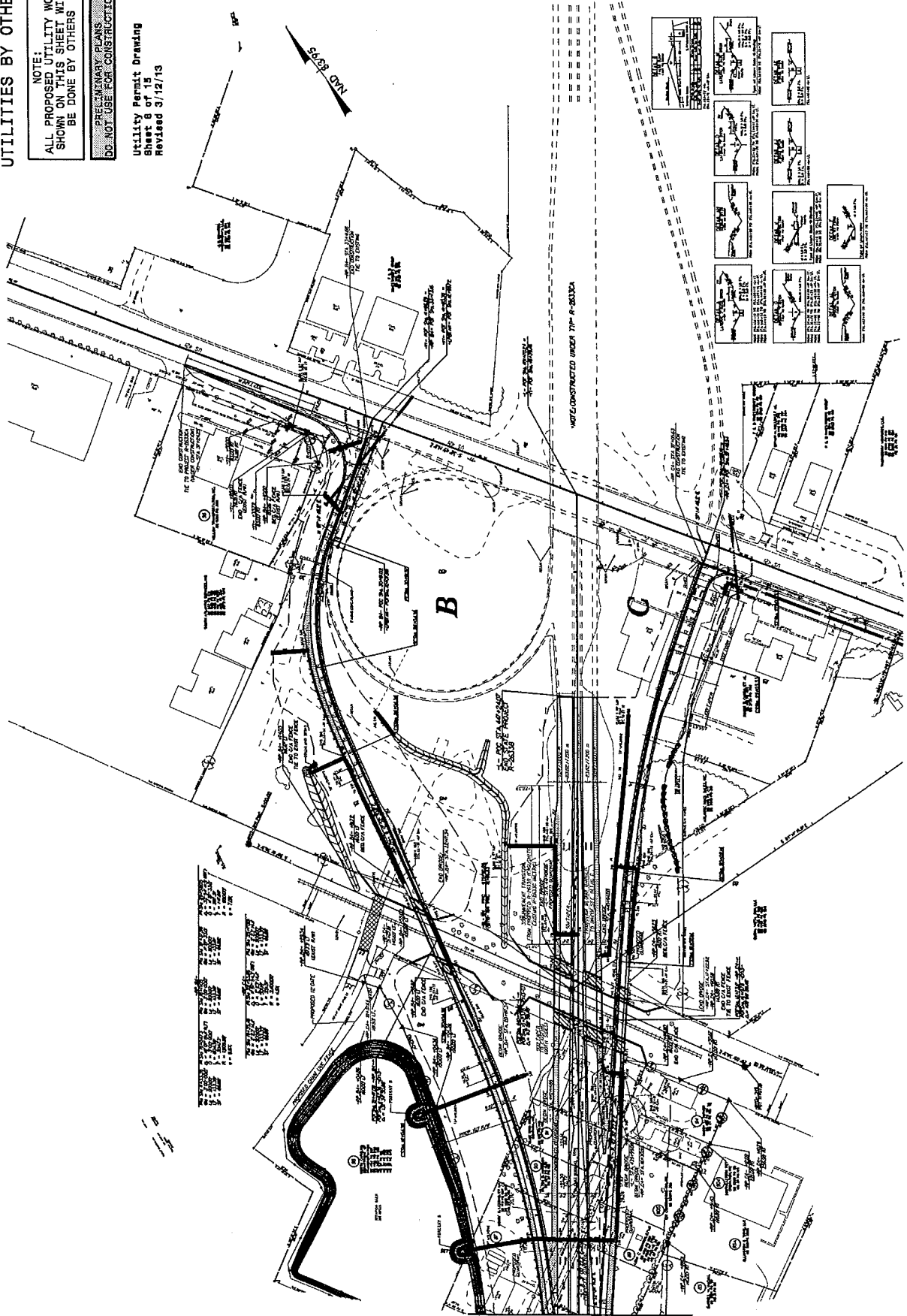
NOTE:
ALL PROPOSED UTILITY WORK
SHOWN ON THIS SHEET WILL
BE DONE BY OTHERS

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Utility Permit Drawing
Sheet 7 of 15
Revised 3/12/13



Utility Permit Drawing
Sheet 8 of 15
Revised 3/12/13

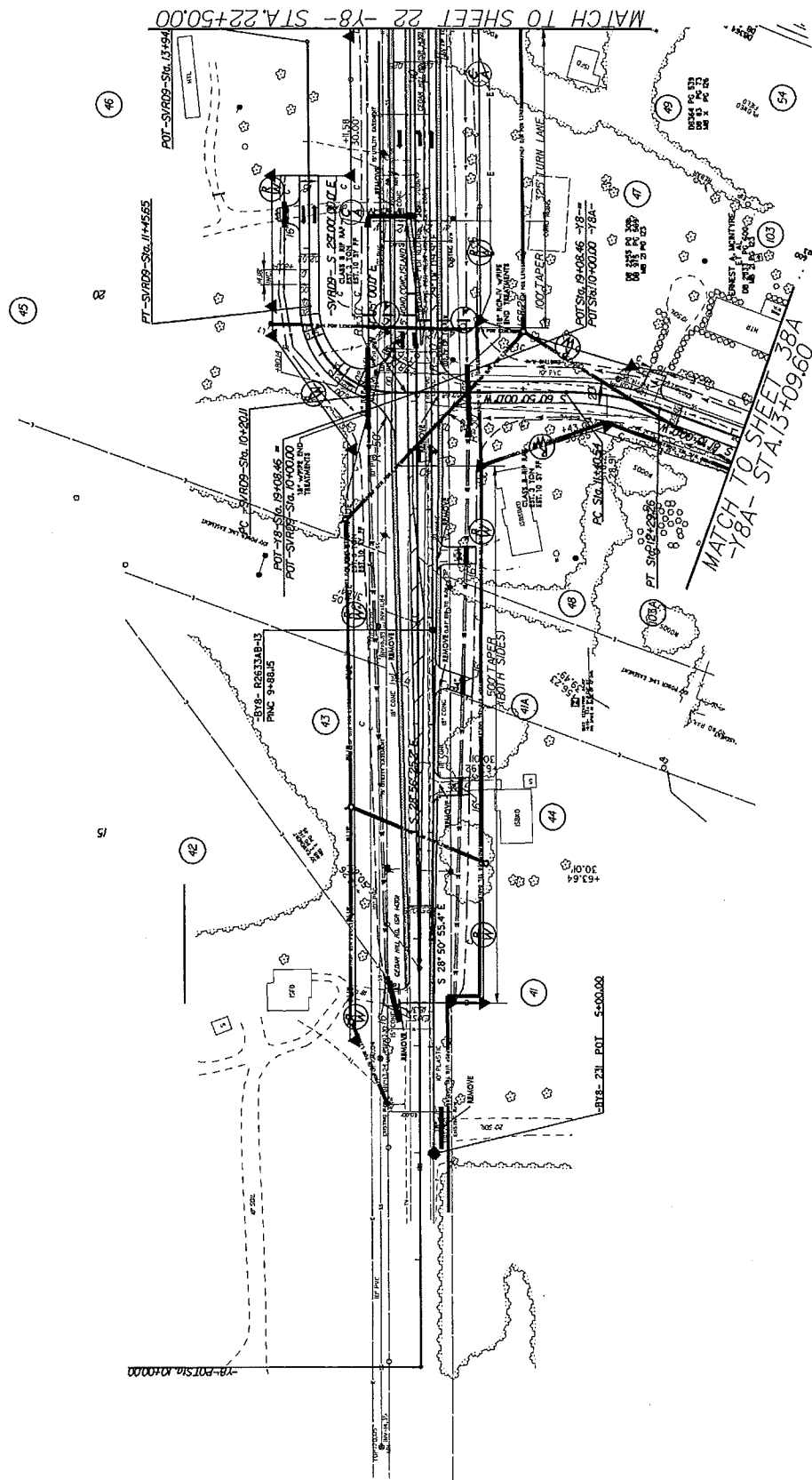
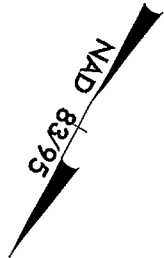


UTILITIES BY OTHERS

NOTE:
ALL PROPOSED UTILITY WORK
SHOWN ON THIS SHEET WILL
BE DONE BY OTHERS

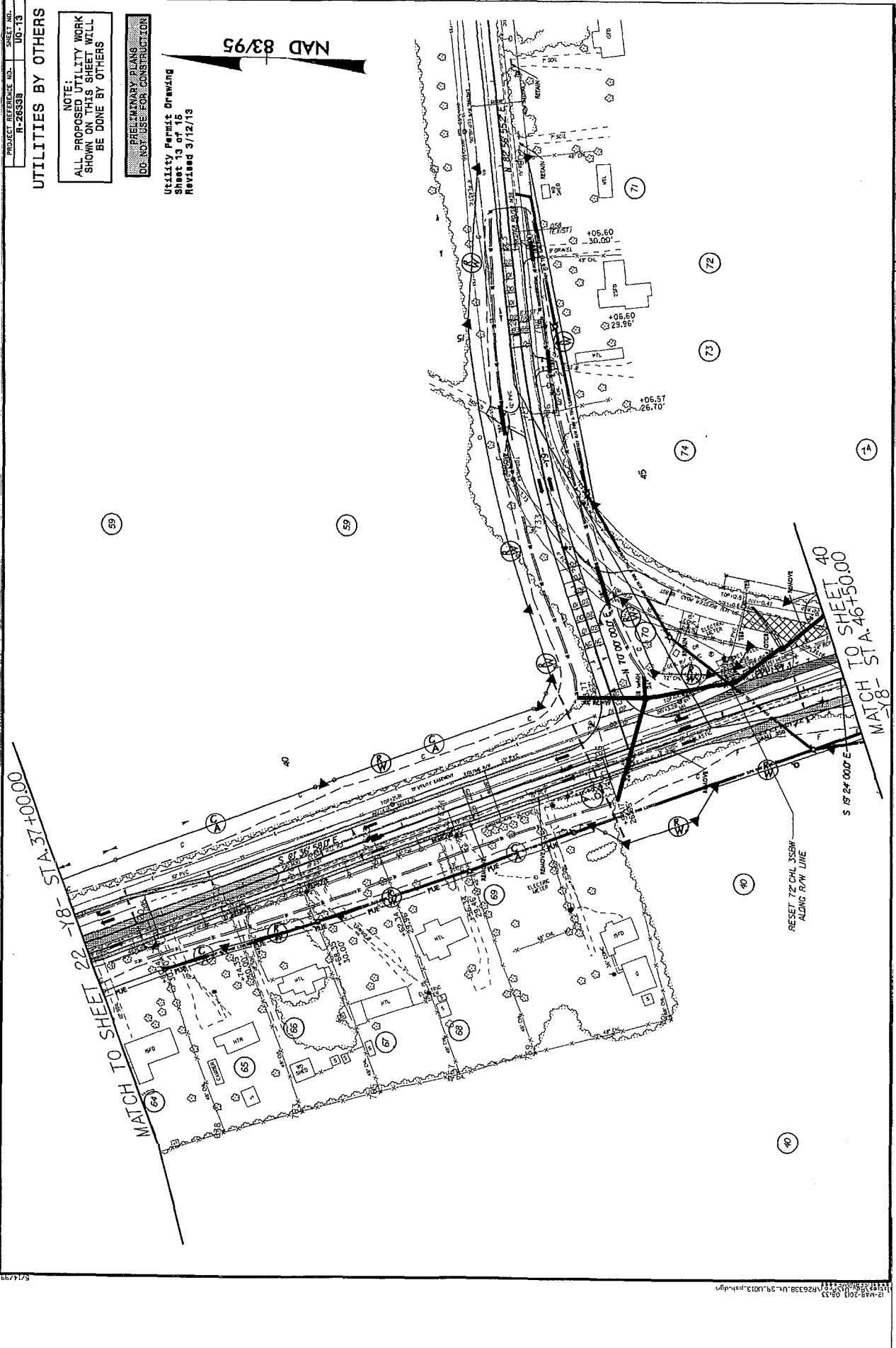
PRELIMINARY PLANS

Utility Permit Drawing
Sheet 11 of 15
Revised 3/12/13



MATCH TO SHEET 22-Y8-STA.22+50.00

MATCH TO SHEET 38A
-Y8A- STA. 13+09.60



PROJECT REFERENCE NO.	SHEET NO.
A-2833B	2

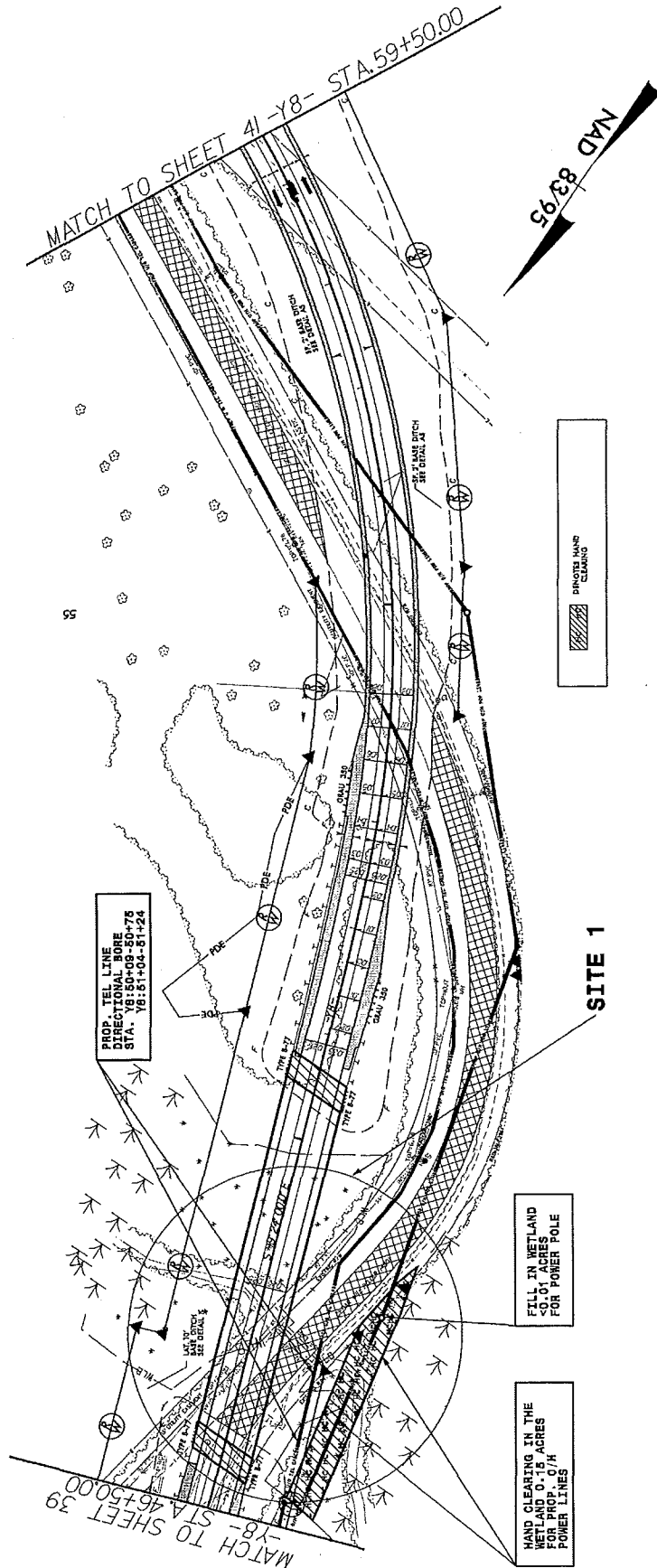
ET NO. 2

UTILITIES BY OTHERS

NOTE:
ALL PROPOSED UTILITY WORK
SHOWN ON THIS SHEET WILL
BE DONE BY OTHERS

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Utility Permit Drawing
Sheet 14 of 15
Revised 3/28/13



PC 60

SITE 1

FILL IN WETLAND
<0.01 ACRES

CLEARING IN THE
AND 0.15 ACRES
PROP. C/H

PROP. TEL LINE
DIRECTIONAL BORE
STA. Y8:50+09-50+75

MATCH TO SHEET 39
-Y8- STA. 46+50.00

PROJECT REFERENCE NO.	SHEET NO.
A-2833B	U0-15

UTILITIES BY OTHERS

NOTE:
ALL PROPOSED UTILITY WORK
SHOWN ON THIS SHEET WILL
BE DONE BY OTHERS

**PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION**

**Utility Permit Drawing
Sheet 15 of 15
Revised 3/12/13**

NAD 83/95

01

55

9

75
LINCOLN DEVELOPMENT
COMPANY, INC.
DB 284 PD 662

ST-Y8-S1a. 63+75.51

MATCH TO SHEET 40-Y8-SHA.59+50.00

75A
ROGERS FAMILY PROPERTIES, LLC,
DB 2122 PC 0782

12-MAR-2013 09:39
1) 11:55 Rdy Ut P 10
1) R26333-U-41.U015-psh.dgn

MANUSCRIPT REVIEWED 3/21/05



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

August 23, 2013

Regulatory Division

Action ID No. SAW-1994-03552

Phil Harris
Manager, PDEA
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Harris:

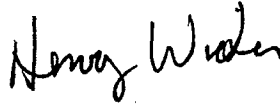
Reference the Department of the Army permit issued on January 13, 2011 and subsequent phased modification issued on July 9, 2013, to construct a fully controlled access freeway on new alignment from north of U 74/76 in Brunswick County to US 421 in New Hanover County approximately 7.6 miles. Reference is also made to your permit modification request dated July 31, 2013, revised plan view drawings, and revised impact summary sheet dated 8/15/2013. The modification request is to construct two open trench cut utility lines through Cartwheel Branch and its abutting wetlands.

We have determined that the proposed change is minor, and that a supplemental public notice is not necessary. Your permit is hereby modified to include the aforementioned changes as described in the July 31, 2013 modification request. It is understood that all other conditions of the original permit and previous modifications remain applicable, including the permit expiration date of December 31, 2016.

-2-

This modification approval and referenced plans (attached) will be utilized for future compliance of the project. If you have questions, please contact Brad Shaver of the Wilmington Regulatory Field Office, at telephone (910) 251-4611.

Sincerely,



Steven A. Baker
Colonel, U. S. Army
District Commander

Copies Furnished:

Mr. Mason Herndon
Division of Water Quality
North Carolina Department of
Environment and Natural Resources
225 Green Street, Suite 714
Fayetteville, North Carolina 28301-5094

Mr. Stephen Lane
Division of Coastal Management
North Carolina Department of
Environment and Natural Resources
400 Commerce Avenue
Morehead City, North Carolina 28557

Electronic Copy:

Mr. Stoney Mathis, NCDOT
Ms. Rachelle Beauregard, NCDOT

Memo to File:

Date: 8/19/2013

Action ID#: SAW-1994-03352

From: Brad Shaver

Subject: R-2633 (B) modification to cover utility impacts from of water and sewer installation

On July 9, 2013, the Corps issued a major modification to a standard permit issued to the Department first on January 13, 2011 for the construction of Section B of the Wilmington Bypass. As indicated the initial permit was issued for A and B understanding that the B phase would come online later and would only be authorized for construction once additional avoidance and minimization was considered which did occur on the aforementioned July date. Section B of the Wilmington Bypass originates at Hwy 74 in Brunswick County and progresses north and east until it reaches section C of the Bypass at US 421 in New Hanover County.

On July 31, 2013, the Corps received a modification request in order to install a water and sewer line contrary to the previously approved plans necessitated when the utility company took a closer look at the water and sewer locations in relation to the toe of fill. The new water and sewer lines must be separated by 10 feet to meet current DENR regulations and thus the total impact expected by this modification would be <0.01 acre of wetland for temporary impact in wetlands. Additionally there would be temporary excavation in the stream channel of less than 0.01 acre and 16 feet of temporary stream impact originating for dewatering activities.

If conducted as planned there will be no permanent impact to waters of the U.S. The fact that dewatering activities are occurring should further minimize the potential for impacts to waters during construction. I see no reason why this permit should not be modified.

WETLAND IMPACTS

- Temporary Excavation
- Excavation will be set to the side and then place back into the hole.

SCIENTIFIC INFORMATION

51 of 51 SHEETS

rev. 8/15/13

R/W REVISION 06/20/09 -- REDED R/W ON PARCELS 14 AND 15 TO ACCOMMODATE WORK BRIDGE ALONG PROPOSED STRUCTURE.
 06/17/09 -- CHANGED MONUMENT ON PARCELS 40 TO 42 TO ACCOMMODATE R/W IMPROVEMENTS ON EXISTING R/W CHANGED PARCEL 75A TO
 06/17/09 -- WELLINGTON, MODERN-FAMILY PROPERTIES, LLC DB 0722 PG 0782.

Addendum No. 1



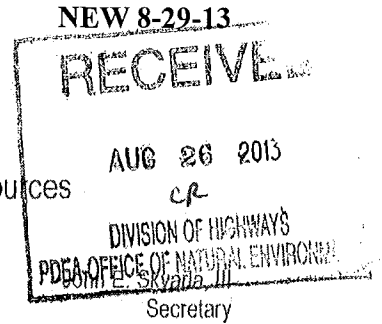
North Carolina Department of Environment and Natural Resources

Division of Water Resources

Water Quality Programs

Thomas A. Reeder

Director

Pat McCrory
Governor

August 19, 2013

Dr. Greg Thorpe, PhD., Manager
Project Development and Environmental Analysis
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina, 27699-1598

Subject: Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act and ISOLATED WETLANDS PERMIT Pursuant to IWGP100000 with ADDITIONAL CONDITIONS for Proposed improvements to the Wilmington Bypass from US 17 in Brunswick County, north of the NC 87 intersection, to US 421 in New Hanover County. Federal Aid Project Nos. NHP-0017(96) and STM-0017(97), State Project Nos. 34491.1.3.GV2 and 34497.3.ST1, Brunswick and New Hanover Counties, TIP R-2633AA/AB and R-2633B.

NCDWR Project No. 20100867 v. 5

Dear Dr. Thorpe:

Attached hereto is a modification of Certification No. Attached hereto is a modification of Certification No. 3842 issued to The North Carolina Department of Transportation (NCDOT) dated January 13, 2011 and modifications dated May 9, 2011 and April 5, 2012 and May 31, 2013.

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

Sincerely,

Thomas A. Reeder

Attachments

cc: Brad Shaver, US Army Corps of Engineers, Wilmington Field Office (electronic copy only)
Stoney Mathis, Division 3 Environmental Officer
Chris Militscher, Environmental Protection Agency (electronic copy only)
Gary Jordan, US Fish and Wildlife Service (electronic copy only)
Travis Wilson, NC Wildlife Resources Commission (electronic copy only)
Rachelle Beauregard, NCDOT, Natural Environment Section (electronic copy only)
Jason Elliot, NCDOT, Natural Environment Section (electronic copy only)
Steve Sollod, NC Coastal Management (electronic copy only)
Sonia Carrillo, NCDWQ Central Office
File Copy

Transportation and Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
Location: 512 N. Salisbury St. Raleigh, North Carolina 27604
Phone: 919-807-6300 \ FAX: 919-807-6488
Internet: www.ncwaterquality.org

An Equal Opportunity \ Affirmative Action Employer

One
North Carolina
Naturally

**Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act,
and ISOLATED WETLANDS PERMIT Pursuant to IWGP100000) with ADDITIONAL CONDITIONS**

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Resources (NCDWR) Regulations in 15 NCAC 2H .0500 and ISOLATED WETLANDS PERMIT Pursuant to IWGP100000. This certification authorizes the NCDOT to impact an additional 0.01 acres of jurisdictional wetlands and 16 linear feet of jurisdictional streams in Brunswick County. The project shall be constructed pursuant to the modification dated received August 1, 2013 and revisions received on August 19, 2013. The authorized impacts are as described below:

Stream Impacts in the Cape Fear River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
Original approved utility impacts at Sta. -Y8- 46+77 to 48+10	0	0	0	0	0	0
New utility impacts with this approval at Sta. -Y8- 46+77 to 48+10	0	0	0	16	16	0
Total	0	0	0	16	16	0

Total New Stream Impact for (Site/Modification): 16 linear feet

Wetland Impacts in the Cape Fear River Basin (riparian)

Site	Fill (ac)	Fill (temporary) (ac)	Excavation (temporary) (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Total Wetland Impact (ac)
Original approved utility impacts at Sta. -Y8- 46+77 to 48+10	0	0	0	0	0	0
New utility impacts with this approval at Sta. -Y8- 46+77 to 48+10	0	0	<0.01	0	0	<0.01
Original approved utility impacts at Sta. -Y8- 46+72 to 47+58	0	0	0	0	0	0
New utility impacts with this approval at Sta. -Y8- 46+72 to 47+58	0	0	<0.01	0	0	<0.01
Total	0	0	0.01	0	0	0.01

Total Wetland Impact for (Site/Modification): 0.01 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 modified application dated received August 1, 2013 and revision received on August 19, 2013. All the authorized activities and conditions of certification associated with the original Water Quality Certification dated January 13, 2011 and modifications dated May 9, 2011 and April 5, 2012 and May 31, 2013 still apply except where superceded by this certification. Should your project change, you are required to notify the NCDWR and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation may be required as

described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

Condition(s) of Certification:

1. This modification is applicable only to the additional proposed activities. All of the authorized activities and conditions of certification associated with the original Water Quality Certification dated January 13, 2011 and subsequent modifications dated May 9, 2011 and April 5, 2012 and May 31, 2013 still apply except where superseded by this certification.
2. Material temporarily excavated for utility installation shall be stockpiled in an upland area and placed back into the excavated area in a manner that restores the original grade and soil profile with the organic/root layer on top.

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:

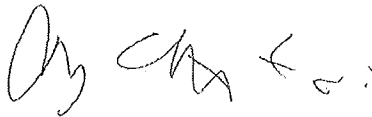
Office of Administrative Hearings
6714 Mail Service Center
Raleigh, NC 27699-6714
Telephone: (919)-431-3000, Facsimile: (919)-431-3100

A copy of the petition must also be served on DENR as follows:

Mr. Lacy Presnell, General Counsel
Department of Environment and Natural Resources
1601 Mail Service Center

This the 19th day of August 2013

DIVISION OF WATER RESOURCES



Thomas A. Reeder



North Carolina Department of Environment and Natural Resources
Division of Coastal Management

Pat McCrory
Governor

Braxton C. Davis
Director

John E. Skvarla, III
Secretary

August 22, 2013

Gregory J. Thorpe, Ph.D.
Environmental Management Director
Project Development and Environmental Analysis Branch
N.C. Dept. of Transportation
1548 Mail Service Center
Raleigh, N.C. 27699-1548

RE: Refinement of CAMA Major Development Permit No. 76-13 (TIP No. R-2633B).
Wilmington Bypass (B-Section), Brunswick County and New Hanover County.

Dear Dr. Thorpe:

This letter is in response to your request dated July 31, 2013, with additional information received from the North Carolina Department of Transportation on August 19, 2013, requesting authorization to revise the construction plans for the proposed water and sewer utility lines between Station 46+72 and Station 48+10 right of -Y8- on the Wilmington Bypass project.

Originally, the proposed water line was designed and permitted to cross under the fill and rip rap near the beginning of the proposed bridge over Cartwheel Branch. The revised design for the water line is to cross under the stream and adjacent wetland utilizing a 3' wide temporary trench, which would be immediately backfilled following completion of the utility line installation. The installation of the water line would be performed "in the dry" utilizing sand bags and a pump to divert the stream flow around the proposed work.

The sewer line was inadvertently omitted from the original permit plans. Current plans propose to construct the sewer line 10' from the proposed water line. The sewer line relocation would stop prior to crossing the stream and tie into the existing sewer force main. Additional total impacts from the water and sewer line relocation are 0.01 acre of temporary excavation in riparian wetlands, <0.01 acre of temporary excavation in surface waters, and 16 linear feet of stream impact.

This **Letter of Refinement** authorizes the revision to the water and sewer utility lines as described in your request dated July 31, 2013, with additional information received on August 19, 2013, including revised Utility Permit Drawing Sheets 14 of 15 and 15 of 15. This letter shall be attached to the original of amended CAMA Permit No. 76-13 and all documents must be readily available on site when a DCM representative inspects the NCDOT - Wilmington Bypass (T.I.P. R-2633B)

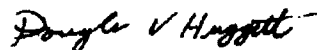
August 22, 2013

Page 2

project for compliance. All conditions and stipulations of the active permit remain in force unless altered herein.

Please contact Stephen Lane at (252) 808-2808 ext. 213 if you have any questions or concerns.

Sincerely,



Doug Huggett
Major Permits and Consistency Coordinator

cc: Rachelle Beauregard, NCDOT
Stephen Lane, NCDCM
Elizabeth Lusk, NCDOT
Chris Rivenbark, NCDOT
Steve Sollod, NCDCM
Brad Shaver, USACE
Mason Herndon, DWQ
Stonewall Mathis, NCDOT

New 9-11-13**Addendum No. 2****U.S. Department of
Homeland Security****United States
Coast Guard**Commander
United States Coast Guard
Fifth Coast Guard District431 Crawford Street
Portsmouth, Va. 23704-5004
Staff Symbol: (dpb)
Phone: (757) 398-6587
Fax: (757) 398-6334
Email: Terrance.A.Knowles@uscg.mil16591
10 Sep 2013

Gregory Thorpe, Ph.D., Manager
Project Development & Environmental Analysis Unit
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, NC 27699-1598

Dear Dr. Thorpe:

Enclosed are the Coast Guard Bridge Permits 6-13-5 and 7-13-5 dated September 5, 2013, approving the proposed construction of bridges across Cape Fear River, at mile 35.5 and Toomers Creek, at mile 1.4, near Wilmington, Brunswick and New Hanover Counties, NC, respectively. The following stipulations shall be adhered to:

a. The Contractor shall submit the plans and schedules of operation for approval at least 45 days prior to commencement of work in the waterways. One copy of such information shall be submitted concurrently to your Resident Engineer, the United States Coast Guard Commander (dpb); Federal Building, 4th Floor, 431 Crawford Street; Portsmouth, VA 23704-5004, and the U. S. Coast Guard Sector North Carolina at 2301 East Fort Macon Road, Atlantic Beach, NC 28512-5633. The information shall include a sketch of the waterways; the bridges; the location of any restrictions that will be placed in the waterways such as barges, anchors, and anchor lines; the location and height above mean high water and detailed description of any scaffolding, or netting; detailed description indicating the placement, type and dimension of any cofferdams if used. The schedules should also include the hours of operation and whether or not the equipment will be removed at night. The contractor shall comply with all provisions of the Navigation Rules International - Inland, available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. The Contractor shall submit to the Resident Engineer a copy of all correspondence between the Coast Guard. No deviation from the approved plans and schedules of operation may be made unless the modification has previously been submitted and approved by the Coast Guard.

b. At no time during the work will the waterways be closed to navigation without prior approval from the Coast Guard. You are required to maintain close and regular contact with Coast Guard Sector North Carolina to keep them informed to activities in waterways at (252) 247-4570.

c. Barges that are used in the waterways during the project must be marked. Enclosure (2) outlines temporary marking and lighting requirements for barges and structures not part of the bridge that will be used during construction. If barge or float anchor lines are used, they must be marked by buoys, which should be lighted. If you should have any questions, regarding lights on the barges or work floats, please contact Mr. John Walters, Chief, Waterways Management Section, at (757) 398-6230. Floating equipment shall have a radiotelephone capable of operation

16591
10 Sep 2013

from its main control station in accordance with Part 26 of Title 33, Code of Federal Regulations and shall be monitored during all periods the floating equipment is on station.

d. During the progress of work, while the channels are in operation, should any material, machinery or equipment be lost, dumped, thrown overboard, sunk or misplaced which may be dangerous to or obstruct navigation, immediate notice shall be given to the Coast Guard and the object removed with the utmost dispatch. Until removal can be effected, the objects shall be properly marked in order to protect navigation. Notice to the Coast Guard shall give a description and location of any such object and the action taken or being taken to protect navigation.

e. Upon completion of the proposed project, an inspection of the waterways bottom shall be performed to insure that all construction waste materials have been completely removed. Certification will be required in writing by a licensed engineer or licensed surveyor that the waterway has not been impaired and all construction related debris has been cleared from it. The certification shall include the actual method used to conduct the inspection. The Contractor shall remove any bridge related debris, resulting from the current or prior work or occurrences, discovered during this survey.

f. Upon completion of the bridgework, a responsible official of the North Carolina Department of Transportation shall verify as-built clearances and a statement attesting to the correctness of the clearances shall be forwarded to this office for record purpose. In lieu of verification by the above listed official, certification by a licensed surveyor or registered professional engineer registered in the State of North Carolina will be accepted.

g. Except as shown on the plans, no dredging, excavation, filling, rip-rap, or other work affecting the bottom, shall be done in conjunction with this work.

h. If during the periods of construction, permanent lighting cannot be maintained operable, the fenders of each pier shall be marked with a battery or power operated white light of not less than 60 flashes per minute and visible for a range of 2,000 yards on 90% of the nights of the year. Generally, a lamp of 20-candle power will meet these requirements. If necessary to obtain coverage required, a light or lights on the upstream and downstream sides shall be installed. The piers shall be so marked until the construction has been completed and permanent navigational lighting has been reinstalled and determined to be operating satisfactorily. Written approval from the Coast Guard of temporary lighting during periods of construction is required. No existing bridge navigation lights shall be impaired or blocked during darkness or periods of reduced visibility.

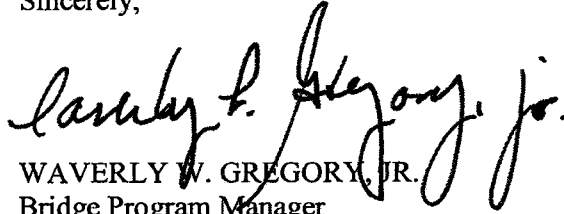
i. Compliance with the requirements stated herein does not relieve the contractor of the obligation or responsibility for compliance with the provisions of any other law or regulation as may be under the jurisdiction of the State of North Carolina, or any other federal, state or local authority having cognizance of any aspect of the location, construction or maintenance of said bridge. It is advised that the Coast Guard can levy monetary civil penalties for violations of bridge regulations and statutes.

16591
10 Sep 2013

j. In accordance with Title 33 Code of Federal Regulations Part 118.25 – Application procedure, approval of lights and other signals required shall be obtained prior to construction. Application shall be by letter accompanied by duplicate sets of drawings showing (1) the plan and elevation of the structure showing lights and signals proposed, and (2) a small scale vicinity chart showing proposed bridges and all other bridges within 1,000 feet above or below the proposed bridge.

The office of the Bridge Administrator, Fifth Coast Guard District, shall be notified immediately upon completion of the project. If you should have any questions regarding this matter, please contact Mr. Terrance Knowles at the above listed address or telephone number.

Sincerely,

A handwritten signature in black ink, appearing to read "Waverly W. Gregory, Jr.", is written over the typed name and title.

WAVERLY W. GREGORY, JR.
Bridge Program Manager
By direction of the Commander
Fifth Coast Guard District

Encl: (1) Bridge Permits 6-13-5 and 7-13-5 dated September 5, 2013
(2) USCG Temporary Marking & Lighting

Copy: John Walters, (dpw) w/encl
USCG Sector North Carolina, Waterways Management w/encl

***LIGHTING REQUIREMENTS FOR BARGES AND STRUCTURES NOT PART OF A
BRIDGE OR APPROACH STRUCTURE***

88.13 Lights on barges at bank or dock.

- (a) The following barges shall display at night and, if practicable, in periods of restricted visibility the lights described in paragraph (b) of this section -
 - (1) Every barge projecting into a buoyed or restricted channel.
 - (2) Every barge so moored that it reduces the available navigable width of any channel to less than 80 meters.
 - (3) Barges moored in groups of more than two barges wide or to a maximum width of over 25 meters.
 - (4) Every barge not moored parallel to the bank or dock.
- (b) Barges described in paragraph (a) shall carry two unobstructed white lights of an intensity to be visible for a least one mile on a clear dark night and arranged as follows:
 - (1) On a single moored barge, lights shall be placed on the two corners farthest from the bank or dock.
 - (2) On barges moored in group formation, a light shall be placed on each of the upstream and downstream ends of the group, on the corners farthest from the bank or dock.
 - (3) Any barge in a group, projecting from the main body of the group toward the channel, shall be lighted as a single barge.
- (c) Barges moored in any slip or slough, which is used primarily for mooring purposes, are exempt from the lighting requirements of this section.

***33 CODE OF FEDERAL REGULATIONS, SECTION 118.95
LIGHTS ON STRUCTURES NOT PART OF A BRIDGE OR APPROACH STRUCTURE***

Lights on sheer booms, isolated piers, obstructions, and other structures not part of a bridge or approach structure must meet the requirements for aids to navigation in Subpart 66.01 of Part 66 of this chapter.

33 CODE OF FEDERAL REGULATIONS, SECTION 66.01-10

- (a) The characteristics of a private aid to navigation shall conform to the United States Aids to Navigation System described in Subpart B of Part 62 of this subchapter, except that only tungsten-incandescent light sources will be approved for electric lights.

Therefore in accordance with 33 CFR 66.01-10(a), the above lights shall be marked with slow flashing yellow lights visible for two miles on a clear dark night. Lights similar to the Tideland ML-120 Barge Light may be used. Only tungsten-incandescent light sources will be approved for electric lights.

U.S. Department of
Homeland Security
United States
Coast Guard



BRIDGE PERMIT

3 SEP 2013

(6-13-5)

WHEREAS by Title V of an act of Congress approved August 2, 1946, entitled "General Bridge Act of 1946," as amended (33 U.S.C. 525-533), the consent of Congress was granted for the construction, maintenance and operation of bridges and approaches thereto over the navigable waters of the United States;

AND WHEREAS the Secretary of Homeland Security has delegated the authority of Section 502(b) of that act to the Commandant, U.S. Coast Guard by Department of Homeland Security Delegation Number: 0170.1;

AND WHEREAS before construction is commenced, the Commandant must approve the location and plans of any such bridge and may impose any specific conditions relating to the construction, maintenance and operation of the structure deemed necessary in the interest of public navigation, such conditions to have the force of law;

AND WHEREAS the - STATE OF NORTH CAROLINA - has submitted for approval the location and plans of dual bridges to be constructed across the Cape Fear River near Wilmington, North Carolina;

NOW THEREFORE, This is to certify that the location and plans dated 28 March 2013 are hereby approved by the Commandant, subject to the following conditions:

1. No deviation from the approved plans may be made either before or after completion of the structures unless the modification of said plans has previously been submitted to and received the approval of the Commandant.

2. The construction of falsework, pilings, cofferdams or other obstructions, if required, shall be in accordance with plans submitted to and approved by the Commander, Fifth Coast Guard District, prior to construction of the bridges. All work shall be so conducted that the free navigation of the waterway is not unreasonably interfered with and the present navigable depths are not impaired. Timely notice of any and all events that may affect navigation shall be given to the District Commander during construction of the bridges. The channel or channels through the structures shall be promptly cleared of all obstructions placed therein or caused by the construction of the bridges to the satisfaction of the District Commander, when in the judgment of the District Commander the construction work has reached a point where such action should be taken, but in no case later than 90 days after the bridges have been opened to traffic.

Continuation Sheet

**Bridges across the Cape Fear River near Wilmington, North
Carolina**

15 SEP 2013

BRIDGE PERMIT

(6-13-5)

3. Issuance of this permit does not relieve the permittee of the obligation or responsibility for compliance with the provisions of any other law or regulation as may be under the jurisdiction of the U.S. Department of Commerce, National Marine Fisheries Service, or any other federal, state or local authority having cognizance of any aspect of the location, construction or maintenance of said bridges.

4. A bridge fendering system shall be installed and maintained in good condition by and at the expense of the owner of the bridges when so required by the District Commander. Said installation and maintenance shall be for the safety of navigation and be in accordance with plans submitted to and approved by the District Commander prior to its construction.

5. Clearance gauges shall be installed and maintained in a good and legible condition by and at the expense of the owner of the bridges when so required by the District Commander. The type of gauges and the locations in which they are to be installed will be submitted to the District Commander for approval.

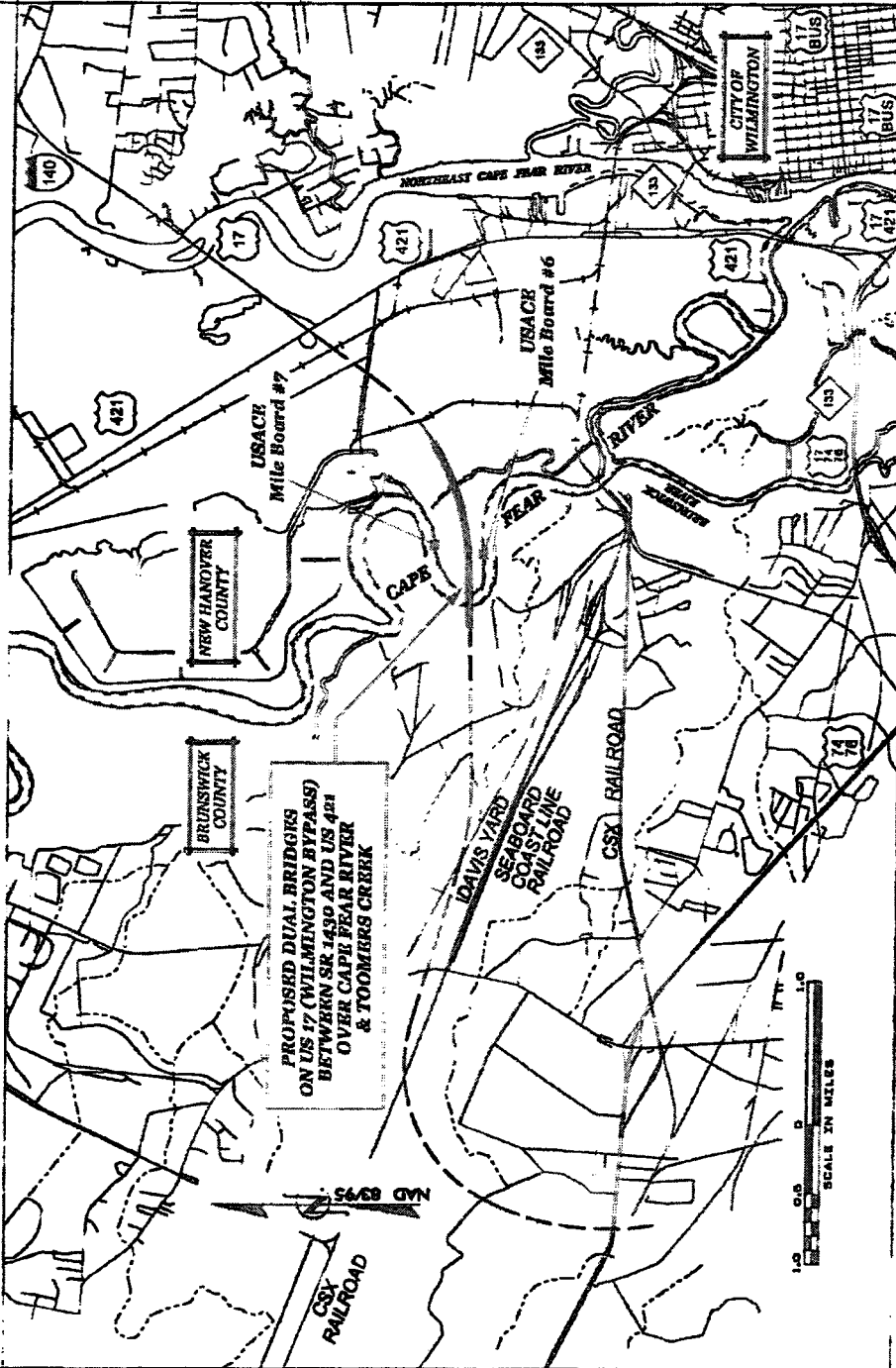
6. When the proposed bridges are no longer used for transportation purposes, they shall be removed in their entirety or to an elevation deemed appropriate by the District Commander and the waterway cleared to the satisfaction of the District Commander. Such removal and clearance shall be completed by and at the expense of the owner of the bridges upon due notice from the District Commander.

7. The approval hereby granted shall cease and be null and void unless construction of the bridges is commenced within three years and completed within five years after the date of this permit.



Brian L. Dunn
Chief, Office of Bridge Programs
U.S. Coast Guard
By direction of the Commandant

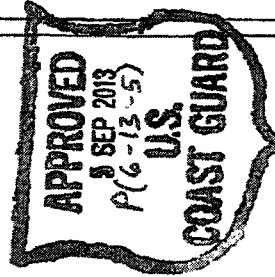
VICINITY MAP



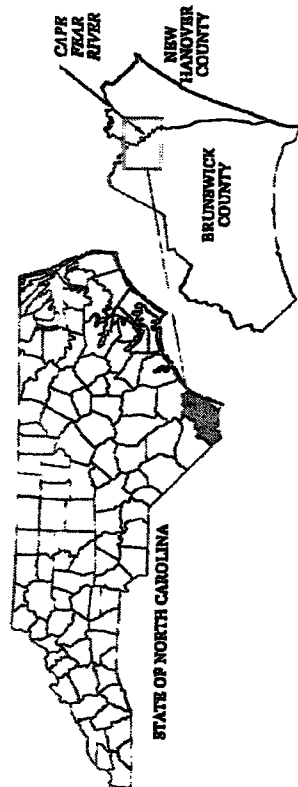
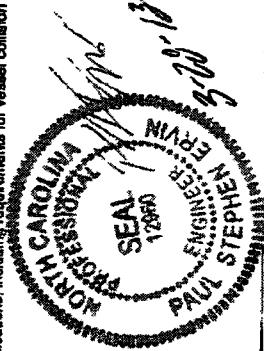
For portions of these bridges in and adjacent to Cape Fear River, the design vessel is the tugboat, "Coast" with the tank barge, "B201", in tow.

Tugboat and tank barge owner: Chatham Towing Company, Inc.

For all other portions of these bridges, where applicable, the design vessel (per AASHTO Guide Specifications) is the load associated with an empty, drifting 180 - foot by 38 - foot hopper barge.



This bridge has been designed in accordance with the requirements of AASHTO LRFD bridge design specifications, including requirements for vessel collision.



State of North Carolina
Department of Transportation
 Raleigh, NC

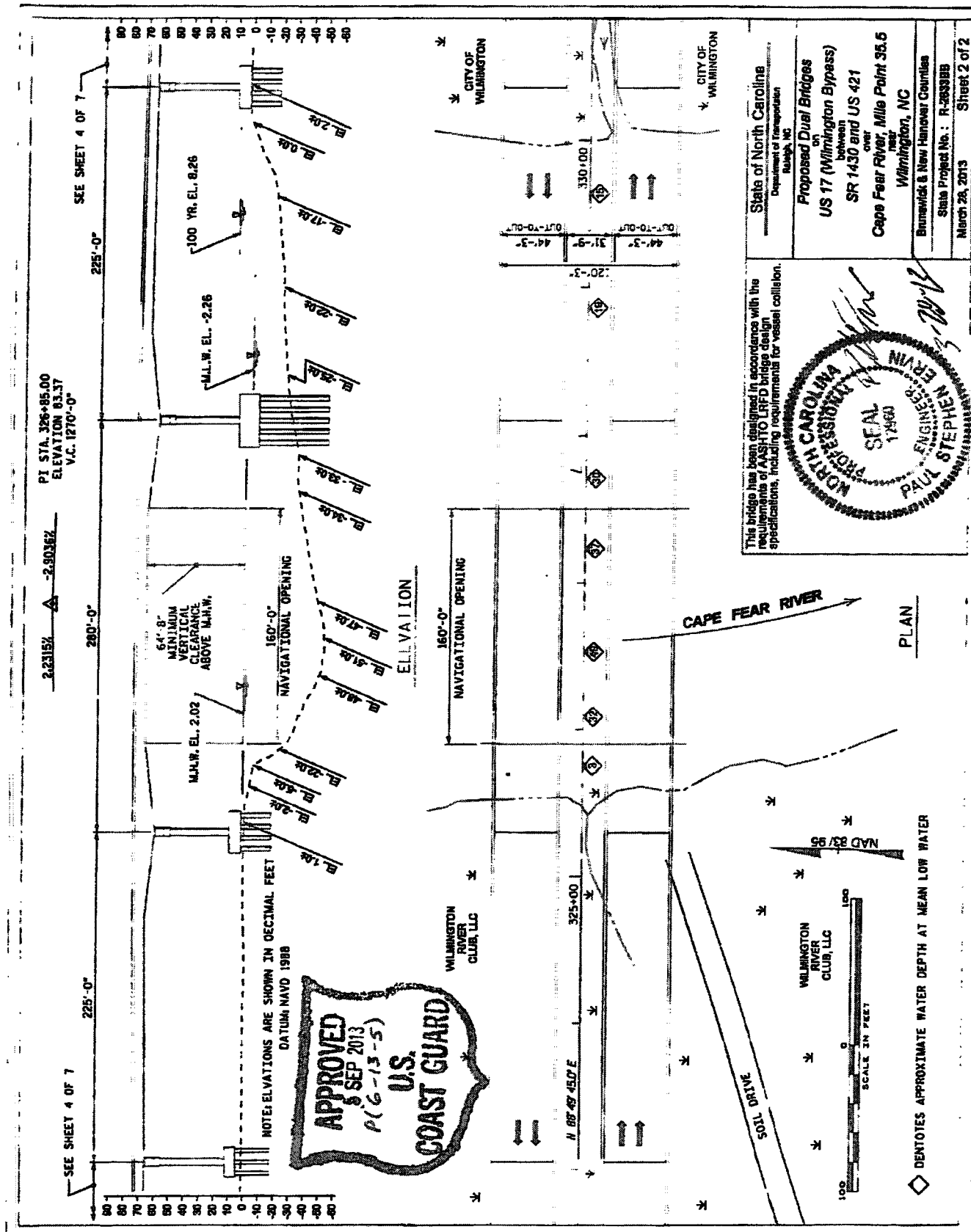
Proposed Dual Bridges
on
US 17 (Wilmington Bypass)
between
SR 1430 and US 421
over
Cape Fear River, Mile Point 35.5
near
Wilmington, NC

Brunswick & New Hanover Counties

State Project No.: R-2833BB

March 28, 2013

Sheet 1 of 2



U.S. Department of
Homeland Security
United States
Coast Guard



BRIDGE PERMIT

5 SEP 2013

(7-13-5)

WHEREAS by Title V of an act of Congress approved August 2, 1946, entitled "General Bridge Act of 1946," as amended (33 U.S.C. 525-533), the consent of Congress was granted for the construction, maintenance and operation of bridges and approaches thereto over the navigable waters of the United States;

AND WHEREAS the Secretary of Homeland Security has delegated the authority of Section 502(b) of that act to the Commandant, U.S. Coast Guard by Department of Homeland Security Delegation Number: 0170.1;

AND WHEREAS before construction is commenced, the Commandant must approve the location and plans of any such bridge and may impose any specific conditions relating to the construction, maintenance and operation of the structure deemed necessary in the interest of public navigation, such conditions to have the force of law;

AND WHEREAS the - STATE OF NORTH CAROLINA - has submitted for approval the location and plans of dual bridges to be constructed across Toomers Creek near Wilmington, North Carolina;

NOW THEREFORE, This is to certify that the location and plans dated 28 March 2013 are hereby approved by the Commandant, subject to the following conditions:

1. No deviation from the approved plans may be made either before or after completion of the structures unless the modification of said plans has previously been submitted to and received the approval of the Commandant.

2. The construction of falsework, pilings, cofferdams or other obstructions, if required, shall be in accordance with plans submitted to and approved by the Commander, Fifth Coast Guard District, prior to construction of the bridges. All work shall be so conducted that the free navigation of the waterway is not unreasonably interfered with and the present navigable depths are not impaired. Timely notice of any and all events that may affect navigation shall be given to the District Commander during construction of the bridges. The channel or channels through the structures shall be promptly cleared of all obstructions placed therein or caused by the construction of the bridges to the satisfaction of the District Commander, when in the judgment of the District Commander the construction work has reached a point where such action should be taken, but in no case later than 90 days after the bridges have been opened to traffic.

Continuation Sheet

Bridges across Toomers Creek near Wilmington, North Carolina

5 SEP 2013

BRIDGE PERMIT

(7-13-5)

3. Issuance of this permit does not relieve the permittee of the obligation or responsibility for compliance with the provisions of any other law or regulation as may be under the jurisdiction of the U.S. Department of Commerce, National Marine Fisheries Service, or any other federal, state or local authority having cognizance of any aspect of the location, construction or maintenance of said bridges.

4. A bridge fendering system shall be installed and maintained in good condition by and at the expense of the owner of the bridges when so required by the District Commander. Said installation and maintenance shall be for the safety of navigation and be in accordance with plans submitted to and approved by the District Commander prior to its construction.

5. Clearance gauges shall be installed and maintained in a good and legible condition by and at the expense of the owner of the bridges when so required by the District Commander. The type of gauges and the locations in which they are to be installed will be submitted to the District Commander for approval.

6. When the proposed bridges are no longer used for transportation purposes, they shall be removed in their entirety or to an elevation deemed appropriate by the District Commander and the waterway cleared to the satisfaction of the District Commander. Such removal and clearance shall be completed by and at the expense of the owner of the bridges upon due notice from the District Commander.

7. The approval hereby granted shall cease and be null and void unless construction of the bridges is commenced within three years and completed within five years after the date of this permit.

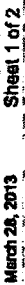


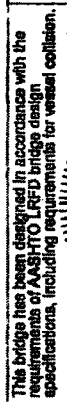
Brian L. Dunn

Chief, Office of Bridge Programs

U.S. Coast Guard

By direction of the Commandant





R-79

Addendum No. 2

**U.S. Department of
Homeland Security**

**United States
Coast Guard**



Commander
United States Coast Guard
Fifth Coast Guard District

New 9-11-13

431 Crawford Street
Portsmouth, Va. 23704-5004
Staff Symbol: (dpb)
Phone: (757) 398-6587
Fax: (757) 398-6334
Email: Terrance.A.Knowles@uscg.mil

16591
10 Sep 2013

Gregory J. Thorpe, Ph.D., Manager
Project Development and Environment Analysis Unit
State of North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, NC 27699-1598

Dear Dr. Thorpe:

We reviewed the bridge lighting plans for the proposed dual bridges on US 17 (Wilmington Bypass) between SR 1430 and US 421 over Cape Fear River near Wilmington, NC. The bridge lighting plan is approved and a copy enclosed for your files. No deviation from the approved plan may be made unless the modifications are submitted to and approved by this office.

Please contact Terrance Knowles at the above-listed telephone number, if you should have any questions regarding this matter,.

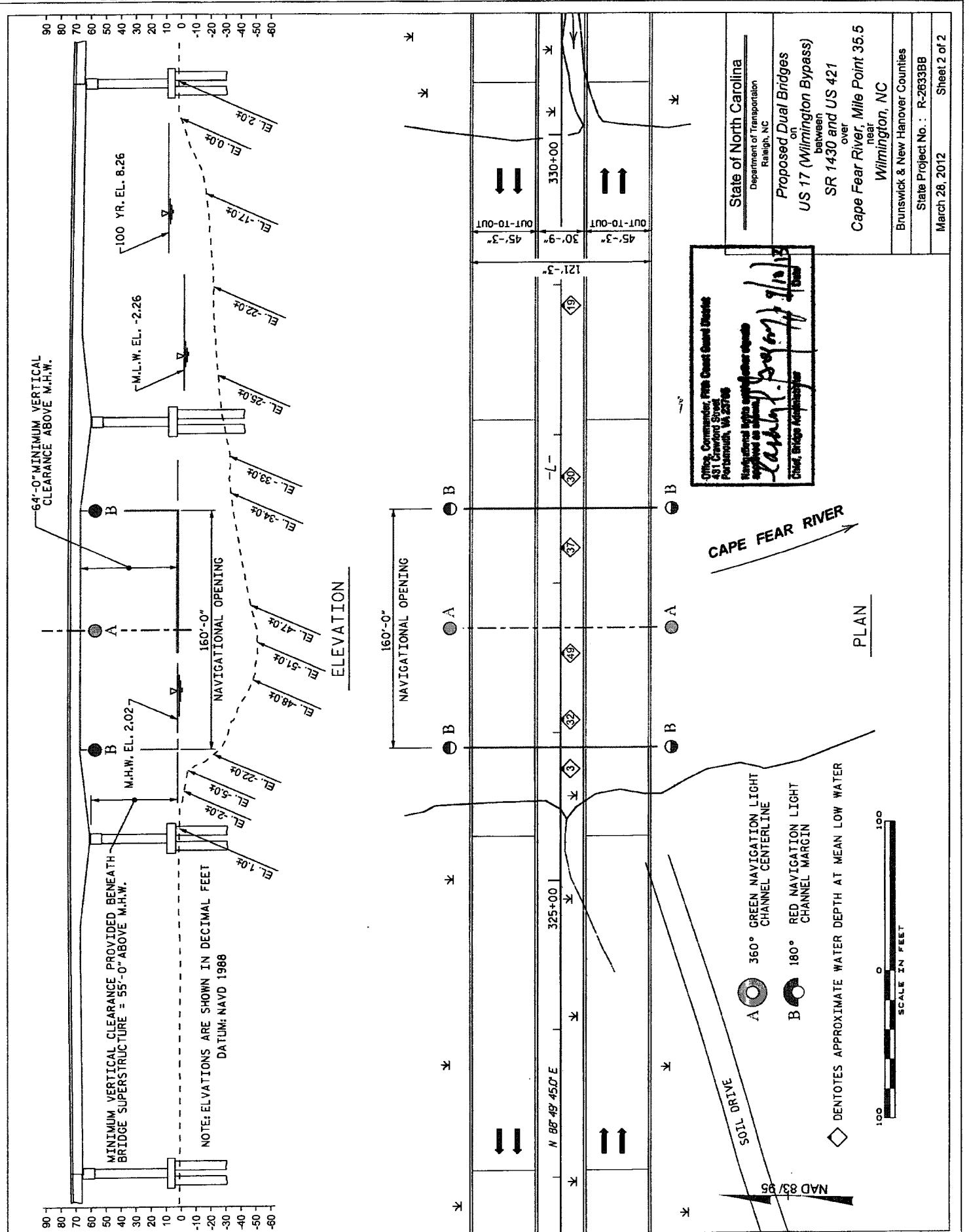
Sincerely,

A handwritten signature in black ink that reads "Waverly W. Gregory, Jr.".

WAVERLY W. GREGORY, JR.
Bridge Program Manager
By direction of the Commander
Fifth Coast Guard District

Encl: Copy of approved navigational lighting plan

Copy: CG Sector North Carolina, Waterways Management w/encl



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 Croton, Smooth Croton, Sickpod, 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:

<u>Restricted Noxious Weed</u>	<u>Limitations per Lb. Of Seed</u>	<u>Restricted Noxious Weed</u>	<u>Limitations per Lb. of Seed</u>
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. 9-18-12)

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 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 10

Page 10-74, Table 1056-1 Geotextile Requirements, replace “50%” for the UV Stability (Retained Strength) of Type 5 geotextiles with “70%”.

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 15-6, Subarticle 1510-3(B), after line 21, replace the allowable leakage formula with the following: $W = LD\sqrt{P} \div 148,000$

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, And Other Noxious Weeds)**

(3-18-03)

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, 919-733-6932, or <http://www.ncagr.com/plantind/> 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 or other noxious weeds.

STANDARD SPECIAL PROVISION**AWARD OF CONTRACT**

(6-28-77)

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”.

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 or 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 AreasArea 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 FemaleParticipation 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](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 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 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 contractor). "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.

* * * * *

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 contractor). "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. 5-21-13)

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. A sample agreement is available at www.ncbowd.com/section/on-the-job-training.

Training Classifications

The Contractor shall provide on-the-job training aimed at developing full journeyman level workers in the construction craft/operator positions. Preference shall be given to providing training in the following skilled work classifications:

Equipment Operators	Office Engineers
Truck Drivers	Estimators
Carpenters	Iron / Reinforcing Steel Workers
Concrete Finishers	Mechanics
Pipe Layers	Welders

The Department has established common training classifications and their respective training requirements that may be used by the contractors. However, the classifications established are not all-inclusive. Where the training is oriented toward construction applications, training will be allowed in lower-level management positions such as office engineers and estimators. Contractors shall submit new classifications for specific job functions that their employees are performing. The Department will review and recommend for acceptance to FHWA the new classifications proposed by contractors, if applicable. New classifications shall meet the following requirements:

Proposed training classifications are reasonable and realistic based on the job skill classification needs, and

The number of training hours specified in the training classification is consistent with common practices and provides enough time for the trainee to obtain journeyman level status.

The Contractor may allow trainees to be trained by a subcontractor provided that the Contractor retains primary responsibility for meeting the training and this provision is made applicable to the subcontract. However, only the Contractor will receive credit towards the annual goal for the trainee.

Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman level status or in which they have been employed as a journeyman.

Records and Reports

The Contractor shall maintain enrollment, monthly and completion reports documenting company compliance under these contract documents. These documents and any other information as requested shall be submitted to the OJT Program Manager.

Upon completion and graduation of the program, the Contractor shall provide each trainee with a certification Certificate showing the type and length of training satisfactorily completed.

Trainee Interviews

All trainees enrolled in the program will receive an initial and Trainee/Post graduate interview conducted by the OJT program staff.

Trainee Wages

Contractors shall compensate trainees on a graduating pay scale based upon a percentage of the prevailing minimum journeyman wages (Davis-Bacon Act). Minimum pay shall be as follows:

60 percent	of the journeyman wage for the first half of the training period
75 percent	of the journeyman wage for the third quarter of the training period
90 percent	of the journeyman wage for the last quarter of the training period

In no instance shall a trainee be paid less than the local minimum wage. The Contractor shall adhere to the minimum hourly wage rate that will satisfy both the NC Department of Labor (NCDOL) and the Department.

Achieving or Failing to Meet Training Goals

The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and who receives training for at least 50 percent of the specific program requirement. Trainees will be allowed to be transferred between projects if required by the Contractor's scheduled workload to meet training goals.

If a contractor fails to attain their training assignments for the calendar year, they may be taken off the NCDOT's Bidders List.

Measurement and Payment

No compensation will be made for providing required training in accordance with these contract documents.

STANDARD SPECIAL PROVISION
MINIMUM WAGES
GENERAL DECISION NC130095 01/04/2013 NC95

Z-95

Date: January 4, 2013

General Decision Number: NC130095 01/04/2013 NC95

Superseded General Decision Numbers: NC20120095

State: North Carolina

Construction Type: HIGHWAY

COUNTIES:

Brunswick

New Hanover

Pender

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects, railroad construction, bascule, suspension and spandrel arch bridges designed for commercial navigation, bridges involving marine construction, and other major bridges).

Modification Number

0

Publication Date

01/04/2013

SUNC2011-076 09/16/2011

	Rates	Fringes
CARPENTER (Form Work Only)	13.69	
CEMENT MASON/CONCRETE FINISHER	12.35	
IRONWORKER (Reinforcing)	14.88	
LABORER		
Asphalt, Asphalt Distributor, Raker, and Spreader	12.20	
Common or General		
Brunswick County	10.04	
New Hanover and Pender Counties	10.88	
Concrete Saw	13.52	
Landscape	9.34	
Luteman	12.73	
Mason Tender (Cement/Concrete)	11.43	
Pipelayer	12.05	
Traffic Control (Cone Setter)	11.15	
Traffic Control (Flagger)	9.89	
POWER EQUIPMENT OPERATORS		
Backhoe/Excavator/Trackhoe	13.86	
Broom/Sweeper	13.97	
Bulldozer	12.88	
Crane	19.87	
Curb Machine	14.43	
Distributor	15.27	
Drill	18.28	
Grader/Blade	16.47	
Loader	14.16	
Mechanic	17.37	
Milling Machine	14.38	
Oiler	13.58	
Paver	15.64	
Roller	13.94	
Scraper	14.35	
Screed	14.86	
Tractor	14.47	
TRUCK DRIVER		
Distributor	16.75	
Dump Truck	11.13	
Flatbed Truck	15.02	
Lowboy Truck	15.34	
Off the Road Truck	13.78	
Single Axle Truck	12.13	
Tack Truck	16.51	
Water Truck	13.39	

Welders – Receive rate prescribed for craft performing operation to which welding is incidental.

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 union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters, PLUM, indicate the international union and the four-digit number, 0198, that follows 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. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

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

STANDARD SPECIAL PROVISION
MINIMUM WAGES
GENERAL DECISION NC130078 01/04/2013 NC78

Z-78

Date: January 4, 2013

General Decision Number: NC130078 01/04/2013 NC78

Superseded General Decision Numbers: NC20120078

State: North Carolina

Construction Type: HEAVY

COUNTIES:

Brunswick	New Hanover	Pender
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Modification Number

0

Publication Date

01/04/2013

SUNC2011-059 08/26/2011

	Rates	Fringes
CARPENTER (Includes Form Work)	13.89	0.69
ELECTRICIAN	15.41	3.13
LABORER, Common or General	9.21	0.00
LABORER, Pipelayer	12.87	2.21
OPERATOR, Backhoe/Excavator/Trackhoe	14.71	0.00
OPERATOR, Bulldozer	14.63	0.00
OPERATOR, Loader	15.13	2.79
TRUCK DRIVER	13.12	1.89

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200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

County : Brunswick, New Hanover

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 & GRUB-BING	4 ACR		
0004	0015000000-N	205	SEALING ABANDONED WELLS	5 EA		
0005	0022000000-E	225	UNCLASSIFIED EXCAVATION	59,000 CY		
0006	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (317+50 -L-LT)	Lump Sum	L.S.	
0007	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (317+50 -L-RT)	Lump Sum	L.S.	
0008	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (398+75.47 -L-LT)	Lump Sum	L.S.	
0009	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (398+75.47 -L-RT)	Lump Sum	L.S.	
0010	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (425+60.75 -L-LT)	Lump Sum	L.S.	
0011	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (425+60.75 -L-RT)	Lump Sum	L.S.	
0012	0036000000-E	225	UNDERCUT EXCAVATION	4,500 CY		
0013	0106000000-E	230	BORROW EXCAVATION	2,240,000 CY		
0014	0134000000-E	240	DRAINAGE DITCH EXCAVATION	4,700 CY		
0015	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	520 SY		
0016	0177000000-E	250	BREAKING OF EXISTING ASPHALT PAVEMENT	3,430 SY		
0017	0192000000-N	260	PROOF ROLLING	20 HR		

County : Brunswick, New Hanover

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0018	0195000000-E	265	SELECT GRANULAR MATERIAL	4,500 CY		
0019	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZATION	12,200 SY		
0020	0241000000-E	SP	GENERIC GRADING ITEM GEOGRID FOR BRIDGE END SLOPES	16,400 SY		
0021	0318000000-E	300	FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES	1,070 TON		
0022	0320000000-E	300	FOUNDATION CONDITIONING GEOTEXTILE	3,350 SY		
0023	0344000000-E	310	18" SIDE DRAIN PIPE	2,828 LF		
0024	0345000000-E	310	24" SIDE DRAIN PIPE	144 LF		
0025	0348000000-E	310	*** SIDE DRAIN PIPE ELBOWS (18")	38 EA		
0026	0348000000-E	310	*** SIDE DRAIN PIPE ELBOWS (24")	2 EA		
0027	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	400 LF		
0028	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	536 LF		
0029	0408000000-E	310	54" RC PIPE CULVERTS, CLASS III	128 LF		
0030	0448000000-E	310	***** RC PIPE CULVERTS, CLASS IV (48")	232 LF		
0031	0448300000-E	310	18" RC PIPE CULVERTS, CLASS IV	3,208 LF		
0032	0448400000-E	310	24" RC PIPE CULVERTS, CLASS IV	72 LF		
0033	0448500000-E	310	30" RC PIPE CULVERTS, CLASS IV	136 LF		
0034	0448600000-E	310	36" RC PIPE CULVERTS, CLASS IV	1,212 LF		
0035	0448700000-E	310	42" RC PIPE CULVERTS, CLASS IV	320 LF		

County : Brunswick, New Hanover

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0036	0588000000-E	310	18" CS PIPE CULVERTS, 0.064" THICK	148 LF		
0037	0636000000-E	310	*** CS PIPE ELBOWS, ***** THICK (18", 0.064")	2 EA		
0038	0995000000-E	340	PIPE REMOVAL	192 LF		
0039	1011000000-N	500	FINE GRADING	Lump Sum	L.S.	
0040	1099500000-E	505	SHALLOW UNDERCUT	1,000 CY		
0041	1099700000-E	505	CLASS IV SUBGRADE STABILIZATION	1,900 TON		
0042	1110000000-E	510	STABILIZER AGGREGATE	6,250 TON		
0043	1121000000-E	520	AGGREGATE BASE COURSE	67,700 TON		
0044	1220000000-E	545	INCIDENTAL STONE BASE	500 TON		
0045	1275000000-E	600	PRIME COAT	288.75 GAL		
0046	1491000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0C	17,600 TON		
0047	1498000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B	1,700 TON		
0048	1503000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C	15,300 TON		
0049	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	2,100 TON		
0050	1523000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5C	14,200 TON		
0051	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	2,545 TON		
0052	1840000000-E	665	MILLED RUMBLE STRIPS (ASPHALT CONCRETE)	29,600 LF		
0053	2022000000-E	815	SUBDRAIN EXCAVATION	336 CY		

County : Brunswick, New Hanover

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0054	2026000000-E	815	GEOTEXTILE FOR SUBSURFACE DRAINS	1,000 SY		
0055	2036000000-E	815	SUBDRAIN COARSE AGGREGATE	168 CY		
0056	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	1,000 LF		
0057	2070000000-N	815	SUBDRAIN PIPE OUTLET	2 EA		
0058	2077000000-E	815	6" OUTLET PIPE	12 LF		
0059	2209000000-E	838	ENDWALLS	17.1 CY		
0060	2220000000-E	838	REINFORCED ENDWALLS	5 CY		
0061	2253000000-E	840	PIPE COLLARS	0.55 CY		
0062	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	81 EA		
0063	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	42.2 LF		
0064	2354000000-N	840	FRAME WITH GRATE, STD 840.22	1 EA		
0065	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	38 EA		
0066	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	28 EA		
0067	2396000000-N	840	FRAME WITH COVER, STD 840.54	2 EA		
0068	2407000000-N	840	STEEL FRAME WITH TWO GRATES, STD 840.37	14 EA		
0069	2556000000-E	846	SHOULDER BERM GUTTER	9,400 LF		
0070	2647000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)	440 SY		
0071	2703000000-E	854	CONCRETE BARRIER, TYPE ***** (T-2)	200 LF		
0072	2717000000-E	854	VARIABLE HEIGHT CONCRETE BARRIER, TYPE ***** (T-2)	700 LF		

County : Brunswick, New Hanover

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0073	2815000000-N	858	ADJUSTMENT OF DROP INLETS	1 EA		
0074	2938000000-N	859	CONVERT EXISTING DROP INLET TO JUNCTION BOX WITH MANHOLE	1 EA		
0075	3000000000-N	SP	IMPACT ATTENUATOR UNIT, TYPE 350	1 EA		
0076	3030000000-E	862	STEEL BM GUARDRAIL	11,300 LF		
0077	3045000000-E	862	STEEL BM GUARDRAIL, SHOP CURVED	75 LF		
0078	3105000000-N	862	STEEL BM GUARDRAIL TERMINAL SECTIONS	4 EA		
0079	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	10 EA		
0080	3195000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE AT-1	1 EA		
0081	3210000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE CAT-1	5 EA		
0082	3270000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE 350	6 EA		
0083	3285000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE M-350	8 EA		
0084	3317000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE B-77	28 EA		
0085	3389200000-E	865	CABLE GUIDERAIL	6,600 LF		
0086	3389500000-N	865	ADDITIONAL GUIDERAIL POSTS	10 EA		
0087	3389600000-N	865	CABLE GUIDERAIL ANCHOR UNITS	12 EA		
0088	3503000000-E	866	WOVEN WIRE FENCE, 47" FABRIC	10,400 LF		
0089	3509000000-E	866	4" TIMBER FENCE POSTS, 7'-6" LONG	680 EA		
0090	3515000000-E	866	5" TIMBER FENCE POSTS, 8'-0" LONG	140 EA		

County : Brunswick, New Hanover

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0091	3533000000-E	866	CHAIN LINK FENCE, *** FABRIC (120")	7,700 LF		
0092	3533000000-E	866	CHAIN LINK FENCE, *** FABRIC (72")	3,200 LF		
0093	3539000000-E	866	METAL LINE POSTS FOR *** CHAIN LINK FENCE (120")	640 EA		
0094	3539000000-E	866	METAL LINE POSTS FOR *** CHAIN LINK FENCE (72")	270 EA		
0095	3545000000-E	866	METAL TERMINAL POSTS FOR *** CHAIN LINK FENCE (120")	40 EA		
0096	3545000000-E	866	METAL TERMINAL POSTS FOR *** CHAIN LINK FENCE (72")	20 EA		
0097	3557000000-E	866	ADDITIONAL BARBED WIRE	100 LF		
0098	3564000000-E	866	SINGLE GATES, *** HIGH, *** WIDE, *** OPENING (120", 20', 20')	2 EA		
0099	3564000000-E	866	SINGLE GATES, *** HIGH, *** WIDE, *** OPENING (72", 20', 20')	1 EA		
0100	3628000000-E	876	RIP RAP, CLASS I	30 TON		
0101	3649000000-E	876	RIP RAP, CLASS B	1,410 TON		
0102	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	4,600 SY		
0103	4048000000-E	902	REINFORCED CONCRETE SIGN FOUNDATIONS	35 CY		
0104	4054000000-E	902	PLAIN CONCRETE SIGN FOUNDATIONS	1 CY		
0105	4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	6,877 LB		
0106	4066000000-E	903	SUPPORTS, SIMPLE STEEL BEAM	15,928 LB		

County : Brunswick, New Hanover

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0107	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	493 LF		
0108	4078000000-E	903	SUPPORTS, 2-LB STEEL U-CHANNEL	25 EA		
0109	4096000000-N	904	SIGN ERECTION, TYPE D	1 EA		
0110	4102000000-N	904	SIGN ERECTION, TYPE E	12 EA		
0111	4108000000-N	904	SIGN ERECTION, TYPE F	7 EA		
0112	4109000000-N	904	SIGN ERECTION, TYPE *** (OVER- HEAD) (A)	3 EA		
0113	4109000000-N	904	SIGN ERECTION, TYPE *** (OVER- HEAD) (B)	2 EA		
0114	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	12 EA		
0115	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)	9 EA		
0116	4114000000-N	904	SIGN ERECTION, MILEMARKERS	25 EA		
0117	4115000000-N	904	SIGN ERECTION, OVERLAY (OVER- HEAD)	1 EA		
0118	4116000000-N	904	SIGN ERECTION, OVERLAY (GROUND MOUNTED)	9 EA		
0119	4152000000-N	907	DISPOSAL OF SIGN SYSTEM, STEEL BEAM	5 EA		
0120	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U- CHANNEL	5 EA		
0121	4234000000-N	907	DISPOSAL OF SIGN, A OR B (OVERHEAD)	7 EA		
0122	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	208 SF		
0123	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	410 SF		

County : Brunswick, New Hanover

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0124	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	68 SF		
0125	4415000000-N	1115	FLASHING ARROW BOARD	1 EA		
0126	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	1 EA		
0127	4430000000-N	1130	DRUMS	100 EA		
0128	4435000000-N	1135	CONES	50 EA		
0129	4445000000-E	1145	BARRICADES (TYPE III)	184 LF		
0130	4455000000-N	1150	FLAGGER	38 DAY		
0131	4480000000-N	1165	TMA	1 EA		
0132	4516000000-N	1180	SKINNY DRUM	50 EA		
0133	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	368 LF		
0134	4686000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)	378 LF		
0135	4710000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)	160 LF		
0136	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	12 EA		
0137	4847100000-E	1205	POLYUREA PAVEMENT MARKING LINES (6", *****) (HIGHLY REFLECTIVE ELEMENTS)	77,841 LF		
0138	4847120000-E	1205	POLYUREA PAVEMENT MARKING LINES (12", *****) (HIGHLY REFLECTIVE ELEMENTS)	2,446 LF		
0139	4905000000-N	1253	SNOWPLOWABLE PAVEMENT MARKERS	647 EA		
0140	5325800000-E	1510	8" WATER LINE	700 LF		
0141	5546000000-E	1515	8" VALVE	2 EA		

County : Brunswick, New Hanover

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0142	5835700000-E	1540	16" ENCASEMENT PIPE	390 LF		
0143	6000000000-E	1605	TEMPORARY SILT FENCE	35,000 LF		
0144	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	1,000 TON		
0145	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	5,000 TON		
0146	6012000000-E	1610	SEDIMENT CONTROL STONE	5,000 TON		
0147	6015000000-E	1615	TEMPORARY MULCHING	100 ACR		
0148	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	2,900 LB		
0149	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEED- ING	13.25 TON		
0150	6024000000-E	1622	TEMPORARY SLOPE DRAINS	10,000 LF		
0151	6029000000-E	SP	SAFETY FENCE	11,000 LF		
0152	6030000000-E	1630	SILT EXCAVATION	15,000 CY		
0153	6036000000-E	1631	MATting FOR EROSION CONTROL	25,000 SY		
0154	6037000000-E	SP	COIR FIBER MAT	500 SY		
0155	6038000000-E	SP	PERMANENT SOIL REINFORCEMENT MAT	750 SY		
0156	6042000000-E	1632	1/4" HARDWARE CLOTH	4,800 LF		
0157	6048000000-E	SP	FLOATING TURBIDITY CURTAIN	150 SY		
0158	6070000000-N	1639	SPECIAL STILLING BASINS	4 EA		
0159	6071012000-E	SP	COIR FIBER WATTLE	350 LF		
0160	6071020000-E	SP	POLYACRYLAMIDE (PAM)	275 LB		
0161	6071030000-E	1640	COIR FIBER BAFFLE	5,000 LF		

County : Brunswick, New Hanover

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0162	6071050000-E	SP	*** SKIMMER (1-1/2")	5 EA		
0163	6071050000-E	SP	*** SKIMMER (2")	3 EA		
0164	6084000000-E	1660	SEEDING & MULCHING	150 ACR		
0165	6087000000-E	1660	MOWING	50 ACR		
0166	6090000000-E	1661	SEED FOR REPAIR SEEDING	1,350 LB		
0167	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	10.25 TON		
0168	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	5,675 LB		
0169	6108000000-E	1665	FERTILIZER TOPDRESSING	170 TON		
0170	6114500000-N	1667	SPECIALIZED HAND MOWING	40 MHR		
0171	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	125 EA		
0172	6123000000-E	1670	REFORESTATION	5 ACR		
0173	6135000000-E	SP	GENERIC EROSION CONTROL ITEM COMPOST BLANKET	10 ACR		
0174	7060000000-E	1705	SIGNAL CABLE	1,400 LF		
0175	7120000000-E	1705	VEHICLE SIGNAL HEAD (12", 3 SECTION)	11 EA		
0176	7132000000-E	1705	VEHICLE SIGNAL HEAD (12", 4 SECTION)	1 EA		
0177	7144000000-E	1705	VEHICLE SIGNAL HEAD (12", 5 SECTION)	1 EA		
0178	7300000000-E	1715	UNPAVED TRENCHING (***** (1, 2")	750 LF		
0179	7300000000-E	1715	UNPAVED TRENCHING (***** (2, 2")	30 LF		

County : Brunswick, New Hanover

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0180	7300100000-E	1715	UNPAVED TRENCHING FOR TEMP- ORARY LEAD-IN	900 LF		
0181	7301000000-E	1715	DIRECTIONAL DRILL (***** (1, 2"))	250 LF		
0182	7301000000-E	1715	DIRECTIONAL DRILL (***** (2, 2"))	200 LF		
0183	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	11 EA		
0184	7360000000-N	1720	WOOD POLE	4 EA		
0185	7372000000-N	1721	GUY ASSEMBLY	6 EA		
0186	7408000000-E	1722	1" RISER WITH WEATHERHEAD	1 EA		
0187	7420000000-E	1722	2" RISER WITH WEATHERHEAD	4 EA		
0188	7444000000-E	1725	INDUCTIVE LOOP SAWCUT	1,500 LF		
0189	7456000000-E	1726	LEAD-IN CABLE (***** (14-2)	5,000 LF		
0190	7588000000-N	SP	METAL POLE WITH SINGLE MAST ARM	1 EA		
0191	7590000000-N	SP	METAL POLE WITH DUAL MAST ARM	1 EA		
0192	7613000000-N	SP	SOIL TEST	2 EA		
0193	7614100000-E	SP	DRILLED PIER FOUNDATION	14 CY		
0194	7631000000-N	SP	MAST ARM WITH METAL POLE DE- SIGN	2 EA		
0195	7684000000-N	1750	SIGNAL CABINET FOUNDATION	2 EA		
0196	7756000000-N	1751	CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED)	2 EA		
0197	7780000000-N	1751	DETECTOR CARD (TYPE 2070L)	10 EA		
0198	7901000000-N	1753	CABINET BASE EXTENDER	2 EA		

County : Brunswick, New Hanover

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0250	0000400000-N	801	CONSTRUCTION SURVEYING	Lump Sum	L.S.	
0251	0000700000-N	SP	FIELD OFFICE	Lump Sum	L.S.	
WALL ITEMS						
0199	8847000000-E	SP	GENERIC RETAINING WALL ITEM MSE RETAINING WALL NO 1	15,039 SF		
0200	8847000000-E	SP	GENERIC RETAINING WALL ITEM MSE RETAINING WALL NO 2	4,729 SF		
0201	8847000000-E	SP	GENERIC RETAINING WALL ITEM MSE RETAINING WALL NO 3	8,463 SF		
STRUCTURE ITEMS						
0202	8017000000-N	SP	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (353+32.50-L-)	Lump Sum	L.S.	
0203	8112730000-N	450	PDA TESTING	45 EA		
0204	8147000000-E	420	REINFORCED CONCRETE DECK SLAB	627,059 SF		
0205	8154000000-E	420	REINFORCED CONCRETE DECK SLAB (SAND LIGHTWEIGHT CONC)	64,606 SF		
0206	8161000000-E	420	GROOVING BRIDGE FLOORS	625,253 SF		
0207	8175000000-E	420	CLASS AA CONCRETE (BRIDGE)	16,377.3 CY		
0208	8182000000-E	420	CLASS A CONCRETE (BRIDGE)	781 CY		
0209	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (16+73.17-RP C4-)	Lump Sum	L.S.	

County : Brunswick, New Hanover

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0210	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (21+47.09-RP B4-)	Lump Sum	L.S.	
0211	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (353+32.50-L-LT)	Lump Sum	L.S.	
0212	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (353+32.50-L-RT)	Lump Sum	L.S.	
0213	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (398+75.47-L-LT)	Lump Sum	L.S.	
0214	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (398+75.47-L-RT)	Lump Sum	L.S.	
0215	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (425+60.75-L-LT)	Lump Sum	L.S.	
0216	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (425+60.75-L-RT)	Lump Sum	L.S.	
0217	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (440+50.13-L-LT)	Lump Sum	L.S.	
0218	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (440+50.13-L-RT)	Lump Sum	L.S.	
0219	8217000000-E	425	REINFORCING STEEL (BRIDGE)	109,668 LB		
0220	8224000000-E	425	EPOXY COATED REINFORCING STEEL (BRIDGE)	3,165,144 LB		
0221	8226000000-E	425	EPOXY COATED SPIRAL COLUMN RE- INFORCING STEEL (BRIDGE)	120,862 LB		
0222	8262000000-E	430	45" PRESTRESSED CONCRETE GIR- DERS	690.9 LF		
0223	8265000000-E	430	54" PRESTRESSED CONCRETE GIR- DERS	3,951.49 LF		

County : Brunswick, New Hanover

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0224	8277000000-E	430	MODIFIED 72" PRESTRESSED CONC GIRDERS	1,752.03 LF		
0225	8333000000-E	450	16" PRESTRESSED CONCRETE PILES	2,080 LF		
0226	8350000000-E	450	24" PRESTRESSED CONCRETE PILES	31,900 LF		
0227	8364000000-E	450	HP12X53 STEEL PILES	10,450 LF		
0228	8392500000-E	450	PREDRILLING FOR PILES	28,662 LF		
0229	8393000000-N	450	PILE REDRIVES	602 EA		
0230	8503000000-E	460	CONCRETE BARRIER RAIL	2,791.7 LF		
0231	8505000000-E	460	VERTICAL CONCRETE BARRIER RAIL	28,809.47 LF		
0232	8524000000-E	SP	***1 CHAIN LINK FENCE (72")	2,495.23 LF		
0233	8531000000-E	462	4" SLOPE PROTECTION	4,390 SY		
0234	8594000000-E	876	RIP RAP, CLASS B	20 TON		
0235	8608000000-E	876	RIP RAP CLASS II (2'-0" THICK)	5,575 TON		
0236	8622000000-E	876	GEOTEXTILE FOR DRAINAGE	6,195 SY		
0237	8657000000-N	430	ELASTOMERIC BEARINGS	Lump Sum	L.S.	
0238	8706000000-N	SP	EXPANSION JOINT SEALS	Lump Sum	L.S.	
0239	8713000000-N	SP	MODULAR EXPANSION JOINT SEALS	Lump Sum	L.S.	
0240	8741000000-N	SP	STRUCTURE DRAINAGE SYSTEM AT STA***** (353+32.50-L-LT)	Lump Sum	L.S.	
0241	8741000000-N	SP	STRUCTURE DRAINAGE SYSTEM AT STA***** (353+32.50-L-RT)	Lump Sum	L.S.	
0242	8744000000-N	SP	SOLAR ARRAY SUPPORT PLATFORM	Lump Sum	L.S.	

County : Brunswick, New Hanover

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0243	8860000000-N	SP	GENERIC STRUCTURE ITEM PLASTIC LUMBER FENDER BOARDS @ BENT 7	Lump Sum	L.S.	
0244	8860000000-N	SP	GENERIC STRUCTURE ITEM POST TENSIONING TENDONS	Lump Sum	L.S.	
0245	8860000000-N	SP	GENERIC STRUCTURE ITEM STATIC AXIAL COMPRESSIVE LOAD TEST ON 30" SQ VOIDED PRESTR CONC PILE	Lump Sum	L.S.	
0246	8867000000-E	SP	GENERIC STRUCTURE ITEM 30" VOIDED PRESTR CONC PILES	34,290 LF		
0247	8867000000-E	SP	GENERIC STRUCTURE ITEM 36" VOIDED PRESTR CONC PILES	16,264 LF		
0248	8867000000-E	SP	GENERIC STRUCTURE ITEM 78" PRESTR CONC GIRDERS	51,250.6 LF		
0249	8867000000-E	SP	GENERIC STRUCTURE ITEM 78" P-T PRESTR CONC GIRDERS	7,210 LF		
1050/Sep06/Q7825315.82/D1157396212000/E251			Total Amount Of Bid For Entire Project :			

Vendor 1 of 8: BALFOUR BEATTY INFRASTRUCTURE INC
(2948)
Call Order 004 (Proposal: C203198)

Bid Information

County: NEW HANOVER
Address: PO Box 12267
Wilmington , NC , 28405
Signature Check: William_D._Heston_2948
Time Bid Received: September 17, 2013 01:54 PM
Amendment Count: 2

Bid Checksum: E07DDC9C
Bid Total: \$124,368,202.88 ✓
Items Total: \$124,368,202.88
Time Total: \$0.00

Bidding Errors:

Item Warning : item 8503000000-E (Line# 0230) quantity
Item Warning : item 8505000000-E (Line# 0231) quantity

DBE GOAL SET 8.0

DBE GOAL MET 8.0

Vendor 1 of 8: BALFOUR BEATTY INFRASTRUCTURE INC
(2948)
Call Order 004 (Proposal: C203198)

Bid Bond Information

Projects:	Bond Maximum:
Counties:	State of Incorporation:
Bond ID: YCWK-DEH5-4BM3-J981	Agency Execution Date: 9/17/2013
Paid by Check: No	Surety Name: SurePathNetwork
Bond Percent: 5%	Bond Agency Name: Travelers Casualty and Surety Company of America

Vendor 2948's Bid Information for Call 004, Letting L130917, 09/17/13

Balfour Beatty Infrastructure, Inc. (2948)
Call Order 004 (Proposal ID C203198)

LIST OF DBE PARTICIPANTS

VENDOR NUMBER	DBE NAME ADDRESS	WORK CODE TYPE OF WORK	CERT TYPE AMOUNT	
7470 MB	JONES AND ASSOCIATES P.O. BOX 31125 , GREENVILLE, NC 27833		Sub	650,651.25 Committed
2324 WB	FREEMAN CURB & GUTTER, INC. POST OFFICE BOX 1021 , BURGAW, NC 28425		Sub	138,100.00 Committed
3230 WB	HIATT & MASON ENTERPRISES, INC POST OFFICE BOX 1378 , MOUNT AIRY, NC 27030		Sub	131,682.39 Committed
4898 WB	BULLINGTON CONSTRUCTION INC 417 FOXGLOVE LANE , INDIAN TRAIL, NC 28079		Sub	574,013.75 Committed
7466 WB	BEAR & CO SIGNS & LIGHTING, INC 2201 WEST LEE STREET , GREENSBORO, NC 27403		Sub	119,162.90 Committed
5796 WB	A-1 PAVEMENT MARKING LLC 238 N BIVENS RD , MONROE, NC 28110		Sub	111,033.62 Committed
2432 WB	ACE STEEL OF NORTH CAROLINA, LL POST OFFICE BOX 296 , MT. AIRY, NC 27030		Sub	4,914,504.00 Committed
10486 MB	JAMES L MORGAN TRUCKING 2090 TURKEY TRAP RD SW , SUPPLY, NC 28462		Sub	874,650.00 Committed
4720 MB	MILITARY & FEDERAL CONSTRUCTION 317-C CENTER STREET , JACKSONVILLE, NC 28546		Sub	2,455,040.00 Committed
			TOTAL:	\$9,968,837.91
				8.02%

Vendor 2948's Bid Information for Call 004, Letting L130917, 09/17/13

Balfour Beatty Infrastructure, Inc. (2948)
Call Order 004 (Proposal ID C203198)

Miscellaneous 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:

- a. NO
- b. NO
- c. NO
- d. NO

AWARD LIMITS ON MULTIPLE PROJECTS

By answering YES to this statement, the bidder acknowledges 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	
NOT ANSWERED	
NOT ANSWERED	
NOT ANSWERED	
NOT ANSWERED	

Bid Bond Data Info - Contractor Responses:

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BondID: YCWK-DEH5-4BM3-J981
Surety Registry Agency: SurePathNetwork
Verified?: Yes
Surety Agency: Travelers Casualty and Surety Company of America
Bond Execution Date: 9/17/2013
Bond Amount: \$6,218,410.14 (Five Percent of Bid)

Contract ID: C203198 Project(s): NHS-0017(131)
Letting Date: 09-17-13 Call Order: 004
Bidder: 2948 - Balfour Beatty Infrastructure, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Ct
Section 0001 ROADWAY ITEMS				
Alt Group				
0001	0000100000-N MOBILIZATION	LUMP	LUMP	6,070,000.00
0002	0001000000-E CLEARING & GRUBBING .. ACRE(S)	LUMP	LUMP	1,500,000.00
0003	0008000000-E SUPPLEMENTARY CLEARING & GRUB-BING	4.000 ACR	4,000.00000	16,000.00
0004	0015000000-N SEALING ABANDONED WELLS	5.000 EA	3,500.00000	17,500.00
0005	0022000000-E UNCLASSIFIED EXCAVATION	59,000.000 CY	4.00000	236,000.00
0006	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (317+50 -L-LT)	LUMP	LUMP	18,000.00
0007	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (317+50 -L-RT)	LUMP	LUMP	18,000.00
0008	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (398+75.47 -L-LT)	LUMP	LUMP	13,000.00
0009	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (398+75.47 -L-RT)	LUMP	LUMP	13,000.00

State of NC
Dept of Transportation

Date: 07-23-13
Revised: 09-06-13

Contract ID: C203198 Project(s): NHS-0017(131)
Letting Date: 09-17-13 Call Order: 004
Bidder: 2948 - Balfour Beatty Infrastructure, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Ct
0010	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (425+60.75 -L-LT)	LUMP	LUMP	15,000.00
0011	0029000000-N REINFORCED BRIDGE APPROACH FILL, STATION ***** (425+60.75 -L-RT)	LUMP	LUMP	15,000.00
0012	0036000000-E UNDERCUT EXCAVATION	4,500.000 CY	9.00000	40,500.00
0013	0106000000-E BORROW EXCAVATION	2,240,000.000 CY	6.50000	14,560,000.00
0014	0134000000-E DRAINAGE DITCH EXCAVATION	4,700.000 CY	3.50000	16,450.00
0015	0156000000-E REMOVAL OF EXISTING ASPHALT PAVEMENT	520.000 SY	4.50000	2,340.00
0016	0177000000-E BREAKING OF EXISTING ASPHALT PAVEMENT	3,430.000 SY	2.30000	7,889.00
0017	0192000000-N PROOF ROLLING	20.000 HR	400.00000	8,000.00
0018	0195000000-E SELECT GRANULAR MATERIAL	4,500.000 CY	9.00000	40,500.00
0019	0196000000-E GEOTEXTILE FOR SOIL STABILIZA-TION	12,200.000 SY	1.30000	15,860.00
0020	0241000000-E GENERIC GRADING ITEM GEOGRID FOR BRIDGE END SLOPES	16,400.000 SY	6.00000	98,400.00

State of NC
Dept of Transportation

Date: 07-23-13
Revised: 09-06-13

Contract ID: C203198

Project(s): NHS-0017(131)

Letting Date: 09-17-13 Call Order: 004

Bidder: 2948 - Balfour Beatty Infrastructure, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Cts
0021	0318000000-E FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES	1,070.000 TON	35.00000	37,450.00
0022	0320000000-E FOUNDATION CONDITIONING GEOTEXTILE	3,350.000 SY	1.30000	4,355.00
0023	0344000000-E 18" SIDE DRAIN PIPE	2,828.000 LF	26.00000	73,528.00
0024	0345000000-E 24" SIDE DRAIN PIPE	144.000 LF	35.00000	5,040.00
0025	0348000000-E ***" SIDE DRAIN PIPE ELBOWS (18")	38.000 EA	450.00000	17,100.00
0026	0348000000-E ***" SIDE DRAIN PIPE ELBOWS (24")	2.000 EA	600.00000	1,200.00
0027	0372000000-E 18" RC PIPE CULVERTS, CLASS III	400.000 LF	30.00000	12,000.00
0028	0378000000-E 24" RC PIPE CULVERTS, CLASS III	536.000 LF	33.00000	17,688.00
0029	0408000000-E 54" RC PIPE CULVERTS, CLASS III	128.000 LF	130.00000	16,640.00
0030	0448000000-E ****" RC PIPE CULVERTS, CLASS IV (48")	232.000 LF	90.00000	20,880.00
0031	0448300000-E 18" RC PIPE CULVERTS, CLASS IV	3,208.000 LF	28.00000	89,824.00
0032	0448400000-E 24" RC PIPE CULVERTS, CLASS IV	72.000 LF	40.00000	2,880.00

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Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Ct
0033	0448500000-E 30" RC PIPE CULVERTS, CLASS IV LF	136.000	53.00000	7,208.00
0034	0448600000-E 36" RC PIPE CULVERTS, CLASS IV LF	1,212.000	63.00000	76,356.00
0035	0448700000-E 42" RC PIPE CULVERTS, CLASS IV LF	320.000	80.00000	25,600.00
0036	0588000000-E 18" CS PIPE CULVERTS, 0.064" THICK LF	148.000	21.00000	3,108.00
0037	0636000000-E **" CS PIPE ELBOWS, ***** THICK (18", 0.064") EA	2.000	250.00000	500.00
0038	0995000000-E PIPE REMOVAL LF	192.000	24.00000	4,608.00
0039	1011000000-N FINE GRADING LUMP		LUMP	3,000,000.00
0040	1099500000-E SHALLOW UNDERCUT CY	1,000.000	12.50000	12,500.00
0041	1099700000-E CLASS IV SUBGRADE STABILIZA- TION TON	1,900.000	36.00000	68,400.00
0042	1110000000-E STABILIZER AGGREGATE TON	6,250.000	38.00000	237,500.00
0043	1121000000-E AGGREGATE BASE COURSE TON	67,700.000	31.00000	2,098,700.00
0044	1220000000-E INCIDENTAL STONE BASE TON	500.000	41.00000	20,500.00

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			Dollars	Cts	Dollars	Ct
0045	1275000000-E PRIME COAT GAL	288.750	11.50000		3,320.63	
0046	1491000000-E ASPHALT CONC BASE COURSE, TYPE B25.0C TON	17,600.000	48.95000		861,520.00	
0047	1498000000-E ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B TON	1,700.000	53.75000		91,375.00	
0048	1503000000-E ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C TON	15,300.000	50.75000		776,475.00	
0049	1519000000-E ASPHALT CONC SURFACE COURSE, TYPE S9.5B TON	2,100.000	58.95000		123,795.00	
0050	1523000000-E ASPHALT CONC SURFACE COURSE, TYPE S9.5C TON	14,200.000	53.60000		761,120.00	
0051	1575000000-E ASPHALT BINDER FOR PLANT MIX TON	2,545.000	472.00000		1,201,240.00	
0052	1840000000-E MILLED RUMBLE STRIPS (ASPHALT CONCRETE) LF	29,600.000	0.20000		5,920.00	
0053	2022000000-E SUBDRAIN EXCAVATION CY	336.000	9.00000		3,024.00	
0054	2026000000-E GEOTEXTILE FOR SUBSURFACE DRAINS SY	1,000.000	2.00000		2,000.00	
0055	2036000000-E SUBDRAIN COARSE AGGREGATE CY	168.000	72.00000		12,096.00	
0056	2044000000-E 6" PERFORATED SUBDRAIN PIPE LF	1,000.000	4.00000		4,000.00	

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			Dollars	Cts	Dollars	Ct
0057	2070000000-N SUBDRAIN PIPE OUTLET	2.000 EA	425.00000		850.00	
0058	2077000000-E 6" OUTLET PIPE	12.000 LF	28.00000		336.00	
0059	2209000000-E ENDWALLS	17.100 CY	1,050.00000		17,955.00	
0060	2220000000-E REINFORCED ENDWALLS	5.000 CY	1,150.00000		5,750.00	
0061	2253000000-E PIPE COLLARS	0.550 CY	675.00000		371.25	
0062	2286000000-N MASONRY DRAINAGE STRUCTURES	81.000 EA	1,650.00000		133,650.00	
0063	2308000000-E MASONRY DRAINAGE STRUCTURES	42.200 LF	225.00000		9,495.00	
0064	2354000000-N FRAME WITH GRATE, STD 840.22	1.000 EA	300.00000		300.00	
0065	2364200000-N FRAME WITH TWO GRATES, STD 840.20	38.000 EA	400.00000		15,200.00	
0066	2365000000-N FRAME WITH TWO GRATES, STD 840.22	28.000 EA	450.00000		12,600.00	
0067	2396000000-N FRAME WITH COVER, STD 840.54	2.000 EA	350.00000		700.00	
0068	2407000000-N STEEL FRAME WITH TWO GRATES, STD 840.37	14.000 EA	1,300.00000		18,200.00	

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0069	2556000000-E SHOULDER BERM GUTTER	9,400.000 LF	13.00000		122,200.00	
0070	2647000000-E 5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)	440.000 SY	40.00000		17,600.00	
0071	2703000000-E CONCRETE BARRIER, TYPE ***** (T-2)	200.000 LF	226.95000		45,390.00	
0072	2717000000-E VARIABLE HEIGHT CONCRETE BAR- RIER, TYPE ***** (T-2)	700.000 LF	226.95000		158,865.00	
0073	2815000000-N ADJUSTMENT OF DROP INLETS	1.000 EA	600.00000		600.00	
0074	2938000000-N CONVERT EXISTING DROP INLET TO JUNCTION BOX WITH MANHOLE	1.000 EA	1,000.00000		1,000.00	
0075	3000000000-N IMPACT ATTENUATOR UNIT, TYPE 350	1.000 EA	14,000.00000		14,000.00	
0076	3030000000-E STEEL BM GUARDRAIL	11,300.000 LF	14.75000		166,675.00	
0077	3045000000-E STEEL BM GUARDRAIL, SHOP CURVED	75.000 LF	17.25000		1,293.75	
0078	3105000000-N STEEL BM GUARDRAIL TERMINAL SECTIONS	4.000 EA	40.00000		160.00	
0079	3150000000-N ADDITIONAL GUARDRAIL POSTS	10.000 EA	35.00000		350.00	

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			Dollars	Cts	Dollars	Ct
0080	3195000000-N GUARDRAIL ANCHOR UNITS, TYPE AT-1	1.000 EA	550.00000		550.00	
0081	3210000000-N GUARDRAIL ANCHOR UNITS, TYPE CAT-1	5.000 EA	450.00000		2,250.00	
0082	3270000000-N GUARDRAIL ANCHOR UNITS, TYPE 350	6.000 EA	1,800.00000		10,800.00	
0083	3285000000-N GUARDRAIL ANCHOR UNITS, TYPE M-350	8.000 EA	1,550.00000		12,400.00	
0084	3317000000-N GUARDRAIL ANCHOR UNITS, TYPE B-77	28.000 EA	1,425.00000		39,900.00	
0085	3389200000-E CABLE GUIDERAIL	6,600.000 LF	6.75000		44,550.00	
0086	3389500000-N ADDITIONAL GUIDERAIL POSTS	10.000 EA	40.00000		400.00	
0087	3389600000-N CABLE GUIDERAIL ANCHOR UNITS	12.000 EA	1,550.00000		18,600.00	
0088	3503000000-E WOVEN WIRE FENCE, 47" FABRIC	10,400.000 LF	2.50000		26,000.00	
0089	3509000000-E 4" TIMBER FENCE POSTS, 7'-6" LONG	680.000 EA	14.00000		9,520.00	
0090	3515000000-E 5" TIMBER FENCE POSTS, 8'-0" LONG	140.000 EA	28.00000		3,920.00	
0091	3533000000-E CHAIN LINK FENCE, *** FABRIC (120")	7,700.000 LF	14.85000		114,345.00	

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0092	3533000000-E CHAIN LINK FENCE, **" FABRIC (72")	3,200.000 LF	8.75000	28,000.00
0093	3539000000-E METAL LINE POSTS FOR **" CHAINLINK FENCE (120")	640.000 EA	83.00000	53,120.00
0094	3539000000-E METAL LINE POSTS FOR **" CHAINLINK FENCE (72")	270.000 EA	49.00000	13,230.00
0095	3545000000-E METAL TERMINAL POSTS FOR **" CHAIN LINK FENCE (120")	40.000 EA	165.00000	6,600.00
0096	3545000000-E METAL TERMINAL POSTS FOR **" CHAIN LINK FENCE (72")	20.000 EA	130.00000	2,600.00
0097	3557000000-E ADDITIONAL BARBED WIRE	100.000 LF	1.00000	100.00
0098	3564000000-E SINGLE GATES, **" HIGH, **' WIDE, **' OPENING (120", 20', 20')	2.000 EA	1,750.00000	3,500.00
0099	3564000000-E SINGLE GATES, **" HIGH, **' WIDE, **' OPENING (72", 20', 20')	1.000 EA	1,150.00000	1,150.00
0100	3628000000-E RIP RAP, CLASS I	30.000 TON	64.00000	1,920.00
0101	3649000000-E RIP RAP, CLASS B	1,410.000 TON	64.00000	90,240.00
0102	3656000000-E GEOTEXTILE FOR DRAINAGE	4,600.000 SY	2.50000	11,500.00

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0103	4048000000-E REINFORCED CONCRETE SIGN FOUN-DATIONS	35.000 CY	650.00000		22,750.00	
0104	4054000000-E PLAIN CONCRETE SIGN FOUNDA- TIONS	1.000 CY	450.00000		450.00	
0105	4060000000-E SUPPORTS, BREAKAWAY STEEL BEAM	6,877.000 LB	3.90000		26,820.30	
0106	4066000000-E SUPPORTS, SIMPLE STEEL BEAM	15,928.000 LB	2.75000		43,802.00	
0107	4072000000-E SUPPORTS, 3-LB STEEL U-CHANNEL	493.000 LF	4.20000		2,070.60	
0108	4078000000-E SUPPORTS, 2-LB STEEL U-CHANNEL	25.000 EA	68.00000		1,700.00	
0109	4096000000-N SIGN ERECTION, TYPE D	1.000 EA	95.00000		95.00	
0110	4102000000-N SIGN ERECTION, TYPE E	12.000 EA	45.00000		540.00	
0111	4108000000-N SIGN ERECTION, TYPE F	7.000 EA	65.00000		455.00	
0112	4109000000-N SIGN ERECTION, TYPE *** (OVER-HEAD) (A)	3.000 EA	475.00000		1,425.00	
0113	4109000000-N SIGN ERECTION, TYPE *** (OVER-HEAD) (B)	2.000 EA	475.00000		950.00	
0114	4110000000-N SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	12.000 EA	475.00000		5,700.00	

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0115	4110000000-N SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)	9.000 EA	475.00000	4,275.00
0116	4114000000-N SIGN ERECTION, MILEMARKERS	25.000 EA	75.00000	1,875.00
0117	4115000000-N SIGN ERECTION, OVERLAY (OVER-HEAD)	1.000 EA	375.00000	375.00
0118	4116000000-N SIGN ERECTION, OVERLAY (GROUND MOUNTED)	9.000 EA	375.00000	3,375.00
0119	4152000000-N DISPOSAL OF SIGN SYSTEM, STEELBEAM	5.000 EA	150.00000	750.00
0120	4155000000-N DISPOSAL OF SIGN SYSTEM, U-CHANNEL	5.000 EA	1.00000	5.00
0121	4234000000-N DISPOSAL OF SIGN, A OR B (OVERHEAD)	7.000 EA	250.00000	1,750.00
0122	4400000000-E WORK ZONE SIGNS (STATIONARY)	208.000 SF	4.89700	1,018.58
0123	4405000000-E WORK ZONE SIGNS (PORTABLE)	410.000 SF	24.00000	9,840.00
0124	4410000000-E WORK ZONE SIGNS (BARRICADE MOUNTED)	68.000 SF	7.25000	493.00
0125	4415000000-N FLASHING ARROW BOARD	1.000 EA	2,550.00000	2,550.00
0126	4420000000-N PORTABLE CHANGEABLE MESSAGE SIGN	1.000 EA	22,000.00000	22,000.00

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0127	4430000000-N DRUMS EA	100.000	49.00000	4,900.00
0128	4435000000-N CONES EA	50.000	17.00000	850.00
0129	4445000000-E BARRICADES (TYPE III) LF	184.000	49.00000	9,016.00
0130	4455000000-N FLAGGER DAY	38.000	200.00000	7,600.00
0131	4480000000-N TMA EA	1.000	20,614.43000	20,614.43
0132	4516000000-N SKINNY DRUM EA	50.000	32.00000	1,600.00
0133	4685000000-E THERMOPLAST IC PAVEMENT MARKING LINES (4", 90 MILS) LF	368.000	2.50000	920.00
0134	4686000000-E THERMOPLAST IC PAVEMENT MARKING LINES (4", 120 MILS) LF	378.000	2.55000	963.90
0135	4710000000-E THERMOPLAST IC PAVEMENT MARKING LINES (24", 120 MILS) LF	160.000	11.00000	1,760.00
0136	4725000000-E THERMOPLAST IC PAVEMENT MARKING SYMBOL (90 MILS) EA	12.000	175.00000	2,100.00
0137	4847100000-E POLYUREA PAVEMENT MARKING LINES (6", *****) (HIGHLY REFLECTIVE ELEMENTS) LF	77,841.000	1.02000	79,397.82

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0138	4847120000-E POLYUREA PAVEMENT MARKING LINES (12", *****) (HIGHLY REFLECTIVE ELEMENTS)	2,446.000 LF	2.65000	6,481.90
0139	4905000000-N SNOWPLOWABLE PAVEMENT MARKERS	647.000 EA	30.00000	19,410.00
0140	5325800000-E 8" WATER LINE	700.000 LF	42.00000	29,400.00
0141	5546000000-E 8" VALVE	2.000 EA	1,150.00000	2,300.00
0142	5835700000-E 16" ENCASEMENT PIPE	390.000 LF	52.00000	20,280.00
0143	6000000000-E TEMPORARY SILT FENCE	35,000.000 LF	1.85000	64,750.00
0144	6006000000-E STONE FOR EROSION CONTROL, CLASS A	1,000.000 TON	61.00000	61,000.00
0145	6009000000-E STONE FOR EROSION CONTROL, CLASS B	5,000.000 TON	61.00000	305,000.00
0146	6012000000-E SEDIMENT CONTROL STONE	5,000.000 TON	43.00000	215,000.00
0147	6015000000-E TEMPORARY MULCHING	100.000 ACR	400.08000	40,008.00
0148	6018000000-E SEED FOR TEMPORARY SEEDING	2,900.000 LB	2.75100	7,977.90

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0149	6021000000-E FERTILIZER FOR TEMPORARY SEED-ING	13.250 TON	900.18000	11,927.39
0150	6024000000-E TEMPORARY SLOPE DRAINS	10,000.000 LF	9.00000	90,000.00
0151	6029000000-E SAFETY FENCE	11,000.000 LF	1.00000	11,000.00
0152	6030000000-E SILT EXCAVATION	15,000.000 CY	13.00000	195,000.00
0153	6036000000-E MATTING FOR EROSION CONTROL	25,000.000 SY	1.40000	35,000.00
0154	6037000000-E COIR FIBER MAT	500.000 SY	6.00100	3,000.50
0155	6038000000-E PERMANENT SOIL REINFORCEMENT MAT	750.000 SY	4.50100	3,375.75
0156	6042000000-E 1/4" HARDWARE CLOTH	4,800.000 LF	4.25100	20,404.80
0157	6048000000-E FLOATING TURBIDITY CURTAIN	150.000 SY	32.00000	4,800.00
0158	6070000000-N SPECIAL STILLING BASINS	4.000 EA	254.00000	1,016.00
0159	6071012000-E COIR FIBER WATTLE	350.000 LF	7.00100	2,450.35
0160	6071020000-E POLYACRYLAM IDE (PAM)	275.000 LB	6.00100	1,650.28

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0161	6071030000-E COIR FIBER BAFFLE LF	5,000.000	5.75100	28,755.00
0162	6071050000-E *** SKIMMER (1-1/2") EA	5.000	800.00000	4,000.00
0163	6071050000-E *** SKIMMER (2") EA	3.000	950.00000	2,850.00
0164	6084000000-E SEEDING & MULCHING ACR	150.000	1,550.31000	232,546.50
0165	6087000000-E MOWING ACR	50.000	60.01200	3,000.60
0166	6090000000-E SEED FOR REPAIR SEEDING LB	1,350.000	3.25100	4,388.85
0167	6093000000-E FERTILIZER FOR REPAIR SEEDING TON	10.250	900.18000	9,226.85
0168	6096000000-E SEED FOR SUPPLEMENTAL SEEDING LB	5,675.000	3.50100	19,868.18
0169	6108000000-E FERTILIZER TOPDRESSING TON	170.000	900.18000	153,030.60
0170	6114500000-N SPECIALIZED HAND MOWING MHR	40.000	45.00900	1,800.36
0171	6117000000-N RESPONSE FOR EROSION CONTROL EA	125.000	40.00800	5,001.00
0172	6123000000-E REFORESTATI ON ACR	5.000	1,000.20000	5,001.00

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0173	6135000000-E GENERIC EROSION CONTROL ITEM COMPOST BLANKET	10.000 ACR	6,001.20000		60,012.00	
0174	7060000000-E SIGNAL CABLE	1,400.000 LF	3.75000		5,250.00	
0175	7120000000-E VEHICLE SIGNAL HEAD (12", 3 SECTION)	11.000 EA	825.00000		9,075.00	
0176	7132000000-E VEHICLE SIGNAL HEAD (12", 4 SECTION)	1.000 EA	800.00000		800.00	
0177	7144000000-E VEHICLE SIGNAL HEAD (12", 5 SECTION)	1.000 EA	1,275.00000		1,275.00	
0178	7300000000-E UNPAVED TRENCHING (***** (1, 2")	750.000 LF	7.00000		5,250.00	
0179	7300000000-E UNPAVED TRENCHING (***** (2, 2")	30.000 LF	7.00000		210.00	
0180	7300100000-E UNPAVED TRENCHING FOR TEMP- ORARY LEAD-IN	900.000 LF	4.20000		3,780.00	
0181	7301000000-E DIRECTIONAL DRILL (***** (1, 2")	250.000 LF	18.00000		4,500.00	
0182	7301000000-E DIRECTIONAL DRILL (***** (2, 2")	200.000 LF	18.00000		3,600.00	
0183	7324000000-N JUNCTION BOX (STANDARD SIZE)	11.000 EA	175.00000		1,925.00	
0184	7360000000-N WOOD POLE	4.000 EA	900.00000		3,600.00	

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0185	7372000000-N GUY ASSEMBLY	6.000 EA	340.00000	2,040.00
0186	7408000000-E 1" RISER WITH WEATHERHEAD	1.000 EA	825.00000	825.00
0187	7420000000-E 2" RISER WITH WEATHERHEAD	4.000 EA	450.00000	1,800.00
0188	7444000000-E INDUCTIVE LOOP SAWCUT	1,500.000 LF	5.40000	8,100.00
0189	7456000000-E LEAD-IN CABLE (*****)(14-2)	5,000.000 LF	1.25000	6,250.00
0190	7588000000-N METAL POLE WITH SINGLE MAST ARM	1.000 EA	10,728.00000	10,728.00
0191	7590000000-N METAL POLE WITH DUAL MAST ARM	1.000 EA	14,320.00000	14,320.00
0192	7613000000-N SOIL TEST	2.000 EA	1,200.00000	2,400.00
0193	7614100000-E DRILLED PIER FOUNDATION	14.000 CY	1,025.00000	14,350.00
0194	7631000000-N MAST ARM WITH METAL POLE DE- SIGN	2.000 EA	125.00000	250.00
0195	7684000000-N SIGNAL CABINET FOUNDATION	2.000 EA	850.00000	1,700.00
0196	7756000000-N CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED)	2.000 EA	12,520.00000	25,040.00

Contract ID: C203198 Project(s): NHS-0017(131)
Letting Date: 09-17-13 Call Order: 004
Bidder: 2948 - Balfour Beatty Infrastructure, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cts	Dollars	Ct
0197	7780000000-N DETECTOR CARD (TYPE 2070L)	10.000 EA	100.00000		1,000.00	
0198	7901000000-N CABINET BASE EXTENDER	2.000 EA	200.00000		400.00	
0250	0000400000-N CONSTRUCTION SURVEYING	LUMP	LUMP		2,020,177.23	
0251	0000700000-N FIELD OFFICE	LUMP	LUMP		162,000.00	
	Section 0001 Total				37,935,771.30	

Section 0003 WALL ITEMS

Alt Group

0199	8847000000-E GENERIC RETAINING WALL ITEM MSE	15,039.000 SF	100.00000		1,503,900.00	
0200	8847000000-E GENERIC RETAINING WALL ITEM MSE	4,729.000 SF	75.00000		354,675.00	
0201	8847000000-E GENERIC RETAINING WALL ITEM MSE	8,463.000 SF	96.00000		812,448.00	
	Section 0003 Total				2,671,023.00	

Section 0004 STRUCTURE ITEMS

Alt Group

0202	8017000000-N CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (353+32.50-L-)	LUMP	LUMP		10,347,000.00	
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State of NC
Dept of Transportation

Date: 07-23-13
Revised: 09-06-13

Contract ID: C203198

Project(s): NHS-0017(131)

Letting Date: 09-17-13 Call Order: 004

Bidder: 2948 - Balfour Beatty Infrastructure, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Cts
0203	8112730000-N PDA TESTING EA	45.000	1,900.00000	85,500.00
0204	8147000000-E REINFORCED CONCRETE DECK SLAB SF	627,059.000	27.45400	17,215,277.79
0205	8154000000-E REINFORCED CONCRETE DECK SLAB (SAND LIGHTWEIGHT CONC) SF	64,606.000	46.20800	2,985,314.05
0206	8161000000-E GROOVING BRIDGE FLOORS SF	625,253.000	0.25000	156,313.25
0207	8175000000-E CLASS AA CONCRETE (BRIDGE) CY	16,377.300	724.90700	11,872,019.41
0208	8182000000-E CLASS A CONCRETE (BRIDGE) CY	781.000	740.74000	578,517.94
0209	8210000000-N BRIDGE APPROACH SLABS, STATION***** (16+73.17-RP C4-) LUMP		LUMP	22,500.00
0210	8210000000-N BRIDGE APPROACH SLABS, STATION***** (21+47.09-RP B4-) LUMP		LUMP	22,500.00
0211	8210000000-N BRIDGE APPROACH SLABS, STATION***** (353+32.50-L-LT) LUMP		LUMP	33,000.00
0212	8210000000-N BRIDGE APPROACH SLABS, STATION***** (353+32.50-L-RT) LUMP		LUMP	33,000.00

State of NC
Dept of Transportation

Date: 07-23-13
Revised: 09-06-13

Contract ID: C203198 Project(s): NHS-0017(131)
Letting Date: 09-17-13 Call Order: 004
Bidder: 2948 - Balfour Beatty Infrastructure, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cts	Dollars	Ct
0213	8210000000-N BRIDGE APPROACH SLABS, STATION***** (398+75.47-L-LT)	LUMP	LUMP		33,000.00	
0214	8210000000-N BRIDGE APPROACH SLABS, STATION***** (398+75.47-L-RT)	LUMP	LUMP		33,000.00	
0215	8210000000-N BRIDGE APPROACH SLABS, STATION***** (425+60.75-L-LT)	LUMP	LUMP		37,000.00	
0216	8210000000-N BRIDGE APPROACH SLABS, STATION***** (425+60.75-L-RT)	LUMP	LUMP		33,000.00	
0217	8210000000-N BRIDGE APPROACH SLABS, STATION***** (440+50.13-L-LT)	LUMP	LUMP		32,500.00	
0218	8210000000-N BRIDGE APPROACH SLABS, STATION***** (440+50.13-L-RT)	LUMP	LUMP		32,000.00	
0219	8217000000-E REINFORCING STEEL (BRIDGE)	109,668.000 LB	0.72100		79,070.63	
0220	8224000000-E EPOXY COATED REINFORCING STEEL (BRIDGE)	3,165,144.000 LB	0.80500		2,547,940.92	
0221	8226000000-E EPOXY COATED SPIRAL COLUMN RE-INFORCING STEEL (BRIDGE)	120,862.000 LB	1.70100		205,586.26	
0222	8262000000-E 45" PRESTRESSED CONCRETE GIR- DERS	690.900 LF	260.00000		179,634.00	

State of NC
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Date: 07-23-13
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Contract ID: C203198 Project(s): NHS-0017(131)
Letting Date: 09-17-13 Call Order: 004
Bidder: 2948 - Balfour Beatty Infrastructure, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Ct
0223	8265000000-E 54" PRESTRESSED CONCRETE GIRDERS	3,951.490 LF	200.00000	790,298.00
0224	8277000000-E MODIFIED 72" PRESTRESSED CONCRETE GIRDERS	1,752.030 LF	220.00000	385,446.60
0225	8333000000-E 16" PRESTRESSED CONCRETE PILES	2,080.000 LF	52.00000	108,160.00
0226	8350000000-E 24" PRESTRESSED CONCRETE PILES	31,900.000 LF	80.00000	2,552,000.00
0227	8364000000-E HP12X53 STEEL PILES	10,450.000 LF	45.00000	470,250.00
0228	8392500000-E PREDRILLING FOR PILES	28,662.000 LF	10.00000	286,620.00
0229	8393000000-N PILE REDRIVES	602.000 EA	200.00000	120,400.00
0230	8503000000-E CONCRETE BARRIER RAIL	2,791.700 LF	52.00000	145,168.40
0231	8505000000-E VERTICAL CONCRETE BARRIER RAIL	28,809.470 LF	52.00000	1,498,092.44
0232	8524000000-E *** CHAIN LINK FENCE (72")	2,495.230 LF	93.00000	232,056.39
0233	8531000000-E 4" SLOPE PROTECTION	4,390.000 SY	110.00000	482,900.00
0234	8594000000-E RIP RAP, CLASS B	20.000 TON	62.00000	1,240.00

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Contract ID: C203198 Project(s): NHS-0017(131)
Letting Date: 09-17-13 Call Order: 004
Bidder: 2948 - Balfour Beatty Infrastructure, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Ct
0235	8608000000-E RIP RAP CLASS II (2'-0" THICK)	5,575.000 TON	72.00000	401,400.00
0236	8622000000-E GEOTEXTILE FOR DRAINAGE	6,195.000 SY	1.50000	9,292.50
0237	8657000000-N ELASTOMERIC BEARINGS	LUMP	LUMP	265,000.00
0238	8706000000-N EXPANSION JOINT SEALS	LUMP	LUMP	1,220,000.00
0239	8713000000-N MODULAR EXPANSION JOINT SEALS	LUMP	LUMP	131,000.00
0240	8741000000-N STRUCTURE DRAINAGE SYSTEM AT STA***** (353+32.50-L-LT)	LUMP	LUMP	174,000.00
0241	8741000000-N STRUCTURE DRAINAGE SYSTEM AT STA***** (353+32.50-L-RT)	LUMP	LUMP	173,000.00
0242	8744000000-N SOLAR ARRAY SUPPORT PLATFORM	LUMP	LUMP	60,000.00
0243	8860000000-N GENERIC STRUCTURE ITEM PLASTIC LUMBER FENDER BOARDS @ BENT 7	LUMP	LUMP	70,000.00
0244	8860000000-N GENERIC STRUCTURE ITEM POST TENSIONING TENDONS	LUMP	LUMP	1,000,000.00

State of NC
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Contract ID: C203198 Project(s): NHS-0017(131)
Letting Date: 09-17-13 Call Order: 004
Bidder: 2948 - Balfour Beatty Infrastructure, Inc.

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Ct
0245	8860000000-N GENERIC STRUCTURE ITEM STATIC AXIAL COMPRESSIVE LOAD TEST ON 30" SQ VOIDED PRESTR CONC PILE	LUMP	LUMP	150,000.00
0246	8867000000-E GENERIC STRUCTURE ITEM 30" VOIDED PRESTR CONC PILES	34,290.000 LF	140.00000	4,800,600.00
0247	8867000000-E GENERIC STRUCTURE ITEM 36" VOIDED PRESTR CONC PILES	16,264.000 LF	190.00000	3,090,160.00
0248	8867000000-E GENERIC STRUCTURE ITEM 78" PRESTR CONC GIRDERS	51,250.600 LF	250.00000	12,812,650.00
0249	8867000000-E GENERIC STRUCTURE ITEM 78" P-T PRESTR CONC GIRDERS	7,210.000 LF	800.00000	5,768,000.00
	Section 0004 Total			83,761,408.58
	Bid Total			124,368,202.88

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:

- a. NO
- b. NO
- c. NO
- d. NO

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 acknowledges 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.

NORTH CAROLINA STATE DEPARTMENT OF TRANSPORTATION
DBE COMMITMENT ITEMS

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PROPOSAL: C203198
LETTING: L130917 CALL: 004
VENDOR: 2948 Balfour Beatty Infrastructure, Inc.

LINE NO.	ITEM NO.	ITEM DESC.	UNIT TYPE	SUBCONTRACTOR QUANTITY	SUBCONTRACTOR UNIT PRICE	EXTENDED AMOUNT
DBE SUBCONTRACTOR: 7470 JONES AND ASSOCIATES Will Use Quote: Yes						
0143	6000000000-E	TEMPORARY SI	LF	31500.000	1.85000	58275.00
0147	6015000000-E	TEMPORARY MU	ACR	90.000	400.00000	36000.00
0148	6018000000-E	SEED FOR TEM	LB	2610.000	2.75000	7177.50
0149	6021000000-E	FERT FOR TEM	TON	13.000	900.00000	11700.00
0151	6029000000-E	SAFETY FENCE	LF	9900.000	1.00000	9900.00
0153	6036000000-E	MATTING FOR	SY	22500.000	1.40000	31500.00
0154	6037000000-E	COIR FIBER M	SY	450.000	6.00000	2700.00
0155	6038000000-E	PERM SOIL RE	SY	675.000	4.50000	3037.50
0156	6042000000-E	1/4" HARDWAR	LF	4320.000	4.25000	18360.00
0159	6071012000-E	COIR FIBER W	LF	315.000	7.00000	2205.00
0161	6071030000-E	COIR FIBER B	LF	4500.000	5.75000	25875.00
0164	6084000000-E	SEEDING AND	ACR	135.000	1550.00000	209250.00
0165	6087000000-E	MOWING	ACR	45.000	60.00000	2700.00
0166	6090000000-E	SEED FOR REP	LB	1215.000	3.25000	3948.75
0167	6093000000-E	FERT FOR REP	TON	9.250	900.00000	8325.00
0168	6096000000-E	SEED FOR SUP	LB	5100.000	3.50000	17850.00
0169	6108000000-E	FERTILIZER T	TON	153.000	900.00000	137700.00
0170	6114500000-N	SPECIALIZED	MHR	36.000	45.00000	1620.00
0171	6117000000-N	RESPONSE FOR	EA	112.500	40.00000	4500.00
0172	6123000000-E	REFORESTATIO	ACR	4.500	895.00000	4027.50
0173	6135000000-E	GENERIC EROS	ACR	9.000	6000.00000	54000.00

DBE COMMITMENT TOTAL FOR SUBCONTRACTOR: 650,651.25 Committed
DBE COMMITMENT TOTAL FOR VENDOR (SubContractor) 650,651

DBE SUBCONTRACTOR: 2324 FREEMAN CURB & GUTTER, INC.
Will Use Quote: Yes

0069	2556000000-E	SHOULDER BER	LF	9300.000	13.00000	120900.00
0070	2647000000-E	5" MONO CONC	SY	430.000	40.00000	17200.00

DBE COMMITMENT TOTAL FOR SUBCONTRACTOR: 138,100.00 Committed
DBE COMMITMENT TOTAL FOR VENDOR (SubContractor) 138,100

DBE SUBCONTRACTOR: 3230 HIATT & MASON ENTERPRISES, INC
Will Use Quote: Yes

0204	8147000000-E	REINF CONCRE	SF	627059.000	0.21000	131682.39
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DBE COMMITMENT TOTAL FOR SUBCONTRACTOR: 131,682.39 Committed
DBE COMMITMENT TOTAL FOR VENDOR (SubContractor) 131,682

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LINE NO.	ITEM NO.	ITEM DESC.	UNIT TYPE	SUBCONTRACTOR QUANTITY	SUBCONTRACTOR UNIT PRICE	EXTENDED AMOUNT
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DBE SUBCONTRACTOR: 4898 BULLINGTON CONSTRUCTION INC
Will Use Quote: Yes

0088	3503000000-E	WOVEN WIRE F LF		10400.000	2.50000	26000.00
0089	3509000000-E	4" TIMBER PO EA		680.000	14.00000	9520.00
0090	3515000000-E	5" TIMBER PO EA		140.000	28.00000	3920.00
0091	3533000000-E	CHN LK FENCE LF		7700.000	14.85000	114345.00
0092	3533000000-E	CHN LK FENCE LF		3200.000	8.75000	28000.00
0093	3539000000-E	MET LINE PST EA		640.000	83.00000	53120.00
0094	3539000000-E	MET LINE PST EA		270.000	49.00000	13230.00
0095	3545000000-E	MET TERM PST EA		40.000	165.00000	6600.00
0096	3545000000-E	MET TERM PST EA		20.000	130.00000	2600.00
0097	3557000000-E	ADDITIONAL B LF		100.000	1.00000	100.00
0098	3564000000-E	SGL GATE **H EA		2.000	1750.00000	3500.00
0099	3564000000-E	SGL GATE **H EA		1.000	1150.00000	1150.00
0075	3000000000-N	IMPACT ATTEN EA		1.000	14000.00000	14000.00
0076	3030000000-E	STL BM GUARD LF		11300.000	14.75000	166675.00
0077	3045000000-E	SBGR SHOP CU LF		75.000	17.25000	1293.75
0078	3105000000-N	SBGR TERM SE EA		4.000	40.00000	160.00
0079	3150000000-N	ADDIT GUARDR EA		10.000	35.00000	350.00
0080	3195000000-N	GR ANCHOR TY EA		1.000	550.00000	550.00
0081	3210000000-N	GR ANCHOR TY EA		5.000	450.00000	2250.00
0082	3270000000-N	GR ANCHOR TY EA		6.000	1800.00000	10800.00
0083	3285000000-N	GR ANCHOR TY EA		8.000	1550.00000	12400.00
0084	3317000000-N	GR ANCHOR TY EA		28.000	1425.00000	39900.00
0085	3389200000-E	CABLE GUIDER LF		6600.000	6.75000	44550.00
0086	3389500000-N	ADDITIONAL G EA		10.000	40.00000	400.00
0087	3389600000-N	CBL GUIDERAI EA		12.000	1550.00000	18600.00

DBE COMMITMENT TOTAL FOR SUBCONTRACTOR:

574,013.75 Committed

DBE COMMITMENT TOTAL FOR VENDOR (SubContractor)

574,013

DBE SUBCONTRACTOR: 7466 BEAR & CO SIGNS & LIGHTING, INC.
Will Use Quote: Yes

0103	4048000000-E	REINF CONC F CY		35.000	650.00000	22750.00
0104	4054000000-E	PLN CONC FOU CY		1.000	450.00000	450.00
0105	4060000000-E	SUPPORT, BRE LB		6877.000	3.90000	26820.30
0106	4066000000-E	SUPPORTS, SI LB		15928.000	2.75000	43802.00
0107	4072000000-E	SUPPORT, 3-L LF		493.000	4.20000	2070.60
0108	4078000000-E	SUPPORT, 2-L EA		25.000	68.00000	1700.00
0109	4096000000-N	SIGN ERECTIO EA		1.000	95.00000	95.00
0110	4102000000-N	SIGN ERECTIO EA		12.000	45.00000	540.00
0111	4108000000-N	SIGN ERECTIO EA		7.000	65.00000	455.00
0112	4109000000-N	SIGN ERECTIO EA		3.000	475.00000	1425.00
0113	4109000000-N	SIGN ERECTIO EA		2.000	475.00000	950.00
0114	4110000000-N	SIGN ERECTIO EA		12.000	475.00000	5700.00
0115	4110000000-N	SIGN ERECTIO EA		9.000	475.00000	4275.00
0116	4114000000-N	SIGN ERECTIO EA		25.000	75.00000	1875.00
0117	4115000000-N	SIGN ERECTIO EA		1.000	375.00000	375.00
0118	4116000000-N	SIGN ERECTIO EA		9.000	375.00000	3375.00

NORTH CAROLINA STATE DEPARTMENT OF TRANSPORTATION
DBE COMMITMENT ITEMS

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LINE NO.	ITEM NO.	ITEM DESC.	UNIT TYPE	SUBCONTRACTOR QUANTITY	SUBCONTRACTOR UNIT PRICE	EXTENDED AMOUNT
0119	4152000000-N	DISPOSE SIGN EA		5.000	150.00000	750.00
0120	4155000000-N	DISPOSE SIGN EA		5.000	1.00000	5.00
0121	4234000000-N	DISPOSE SIGN EA		7.000	250.00000	1750.00

DBE COMMITMENT TOTAL FOR SUBCONTRACTOR:

119,162.90 Committed

DBE COMMITMENT TOTAL FOR VENDOR (SubContractor)

119,162

DBE SUBCONTRACTOR: 5796 A-1 PAVEMENT MARKING LLC

Will Use Quote: Yes

0133	4685000000-E	THERMO PVT M LF		368.000	2.50000	920.00
0134	4686000000-E	THERMO PVT M LF		378.000	2.55000	963.90
0135	4710000000-E	24"WIDE THER LF		160.000	11.00000	1760.00
0136	4725000000-E	THERMO PVT S EA		12.000	175.00000	2100.00
0137	4847100000-E	POLYUREA LIN LF		77841.000	1.02000	79397.82
0138	4847120000-E	POLYUREA LIN LF		2446.000	2.65000	6481.90
0139	4905000000-N	SNOWPLB PVMT EA		647.000	30.00000	19410.00

DBE COMMITMENT TOTAL FOR SUBCONTRACTOR:

111,033.62 Committed

DBE COMMITMENT TOTAL FOR VENDOR (SubContractor)

111,033

DBE SUBCONTRACTOR: 2432 ACE STEEL OF NORTH CAROLINA, LLC

Will Use Quote: Yes

0204	8147000000-E	REINF CONCRE SF		627059.000	3.13000	1962694.67
0205	8154000000-E	REINF CONC D SF		64606.000	4.80000	310108.80
0209	8210000000-N	BRG APPR SLA LS		1.000	5427.00000	5427.00
0210	8210000000-N	BRG APPR SLA LS		1.000	5755.00000	5755.00
0211	8210000000-N	BRG APPR SLA LS		1.000	8848.00000	8848.00
0212	8210000000-N	BRG APPR SLA LS		1.000	8848.00000	8848.00
0213	8210000000-N	BRG APPR SLA LS		1.000	8665.00000	8665.00
0214	8210000000-N	BRG APPR SLA LS		1.000	8665.00000	8665.00
0215	8210000000-N	BRG APPR SLA LS		1.000	9990.00000	9990.00
0216	8210000000-N	BRG APPR SLA LS		1.000	8906.00000	8906.00
0217	8210000000-N	BRG APPR SLA LS		1.000	8388.00000	8388.00
0218	8210000000-N	BRG APPR SLA LS		1.000	8268.00000	8268.00
0219	8217000000-E	REINF STEEL LB		109668.000	0.56000	61414.08
0220	8224000000-E	EPOXY COAT R LB		3165144.000	0.62000	1962389.28
0221	8226000000-E	EPOXY CTD SP LB		120862.000	0.62000	74934.44
0230	8503000000-E	CONCRETE BAR LF		2791.700	12.68000	35398.76
0231	8505000000-E	VERT CONC BA LF		28809.470	14.78000	425803.97

DBE COMMITMENT TOTAL FOR SUBCONTRACTOR:

4,914,504.00 Committed

DBE COMMITMENT TOTAL FOR VENDOR (SubContractor)

4,914,5

DBE SUBCONTRACTOR: 10486 JAMES L MORGAN TRUCKING

Will Use Quote: Yes

0013	0106000000-E	BORROW EXCAV CY		357000.000	2.45000	874650.00
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DBE COMMITMENT ITEMS

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LINE NO.	ITEM NO.	ITEM DESC.	UNIT TYPE	SUBCONTRACTOR QUANTITY	SUBCONTRACTOR UNIT PRICE	EXTENDED AMOUNT
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DBE COMMITMENT TOTAL FOR SUBCONTRACTOR:					874,650.00	Committed
DBE COMMITMENT TOTAL FOR VENDOR (SubContractor)					874,650	

DBE SUBCONTRACTOR: 4720 MILITARY & FEDERAL CONSTRUCTION CO., INC
Will Use Quote: Yes

0013	0106000000-E	BORROW EXCAV CY		896000.000	2.74000	2455040.00
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DBE COMMITMENT TOTAL FOR SUBCONTRACTOR:					2,455,040.00	Committed
DBE COMMITMENT TOTAL FOR VENDOR (SubContractor)					2,455,0	

TOTAL DBE COMMITMENT FOR VENDOR:	Entered:	8.02% or	9968837.91
	Required:	8.00% or	9949456.23
		<GOAL MET>	

Contract Item Sheets For C203198

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
ROADWAY ITEMS						
0001	0000100000-N	800	MOBILIZATION	Lump Sum LS	6,070,000.00	6,070,000.00
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 & GRUB- BING	4 ACR	4,000.00	16,000.00
0004	0015000000-N	205	SEALING ABANDONED WELLS	5 EA	3,500.00	17,500.00
0005	0022000000-E	225	UNCLASSIFIED EXCAVATION	59,000 CY	4.00	236,000.00
0006	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (317+50 -L-LT)	Lump Sum LS	18,000.00	18,000.00
0007	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (317+50 -L-RT)	Lump Sum LS	18,000.00	18,000.00
0008	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (398+75.47 -L-LT)	Lump Sum LS	13,000.00	13,000.00
0009	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (398+75.47 -L-RT)	Lump Sum LS	13,000.00	13,000.00
0010	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (425+60.75 -L-LT)	Lump Sum LS	15,000.00	15,000.00
0011	0029000000-N	SP	REINFORCED BRIDGE APPROACH FILL, STATION ***** (425+60.75 -L-RT)	Lump Sum LS	15,000.00	15,000.00
0012	0036000000-E	225	UNDERCUT EXCAVATION	4,500 CY	9.00	40,500.00
0013	0106000000-E	230	BORROW EXCAVATION	2,240,000 CY	6.50	14,560,000.00
0014	0134000000-E	240	DRAINAGE DITCH EXCAVATION	4,700 CY	3.50	16,450.00
0015	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	520 SY	4.50	2,340.00
0016	0177000000-E	250	BREAKING OF EXISTING ASPHALT PAVEMENT	3,430 SY	2.30	7,889.00
0017	0192000000-N	260	PROOF ROLLING	20 HR	400.00	8,000.00

Contract Item Sheets For C203198

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0018	0195000000-E	265	SELECT GRANULAR MATERIAL	4,500 CY	9.00	40,500.00
0019	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZATION	12,200 SY	1.30	15,860.00
0020	0241000000-E	SP	GENERIC GRADING ITEM GEOGRID FOR BRIDGE END SLOPES	16,400 SY	6.00	98,400.00
0021	0318000000-E	300	FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES	1,070 TON	35.00	37,450.00
0022	0320000000-E	300	FOUNDATION CONDITIONING GEOTEXTILE	3,350 SY	1.30	4,355.00
0023	0344000000-E	310	18" SIDE DRAIN PIPE	2,828 LF	26.00	73,528.00
0024	0345000000-E	310	24" SIDE DRAIN PIPE	144 LF	35.00	5,040.00
0025	0348000000-E	310	*** SIDE DRAIN PIPE ELBOWS (18")	38 EA	450.00	17,100.00
0026	0348000000-E	310	*** SIDE DRAIN PIPE ELBOWS (24")	2 EA	600.00	1,200.00
0027	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	400 LF	30.00	12,000.00
0028	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	536 LF	33.00	17,688.00
0029	0408000000-E	310	54" RC PIPE CULVERTS, CLASS III	128 LF	130.00	16,640.00
0030	0448000000-E	310	***** RC PIPE CULVERTS, CLASS IV (48")	232 LF	90.00	20,880.00
0031	0448300000-E	310	18" RC PIPE CULVERTS, CLASS IV	3,208 LF	28.00	89,824.00
0032	0448400000-E	310	24" RC PIPE CULVERTS, CLASS IV	72 LF	40.00	2,880.00
0033	0448500000-E	310	30" RC PIPE CULVERTS, CLASS IV	136 LF	53.00	7,208.00
0034	0448600000-E	310	36" RC PIPE CULVERTS, CLASS IV	1,212 LF	63.00	76,356.00
0035	0448700000-E	310	42" RC PIPE CULVERTS, CLASS IV	320 LF	80.00	25,600.00

Contract Item Sheets For C203198

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0036	0588000000-E	310	18" CS PIPE CULVERTS, 0.064" THICK	148 LF	21.00	3,108.00
0037	0636000000-E	310	*** CS PIPE ELBOWS, ***** THICK (18", 0.064")	2 EA	250.00	500.00
0038	0995000000-E	340	PIPE REMOVAL	192 LF	24.00	4,608.00
0039	1011000000-N	500	FINE GRADING	Lump Sum LS	3,000,000.00	3,000,000.00
0040	1099500000-E	505	SHALLOW UNDERCUT	1,000 CY	12.50	12,500.00
0041	1099700000-E	505	CLASS IV SUBGRADE STABILIZATION	1,900 TON	36.00	68,400.00
0042	1110000000-E	510	STABILIZER AGGREGATE	6,250 TON	38.00	237,500.00
0043	1121000000-E	520	AGGREGATE BASE COURSE	67,700 TON	31.00	2,098,700.00
0044	1220000000-E	545	INCIDENTAL STONE BASE	500 TON	41.00	20,500.00
0045	1275000000-E	600	PRIME COAT	288.75 GAL	11.50	3,320.63
0046	1491000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0C	17,600 TON	48.95	861,520.00
0047	1498000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0B	1,700 TON	53.75	91,375.00
0048	1503000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C	15,300 TON	50.75	776,475.00
0049	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	2,100 TON	58.95	123,795.00
0050	1523000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5C	14,200 TON	53.60	761,120.00
0051	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	2,545 TON	472.00	1,201,240.00
0052	1840000000-E	665	MILLED RUMBLE STRIPS (ASPHALT CONCRETE)	29,600 LF	0.20	5,920.00
0053	2022000000-E	815	SUBDRAIN EXCAVATION	336 CY	9.00	3,024.00

Contract Item Sheets For C203198

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0054	2026000000-E	815	GEOTEXTILE FOR SUBSURFACE DRAINS	1,000 SY	2.00	2,000.00
0055	2036000000-E	815	SUBDRAIN COARSE AGGREGATE	168 CY	72.00	12,096.00
0056	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	1,000 LF	4.00	4,000.00
0057	2070000000-N	815	SUBDRAIN PIPE OUTLET	2 EA	425.00	850.00
0058	2077000000-E	815	6" OUTLET PIPE	12 LF	28.00	336.00
0059	2209000000-E	838	ENDWALLS	17.1 CY	1,050.00	17,955.00
0060	2220000000-E	838	REINFORCED ENDWALLS	5 CY	1,150.00	5,750.00
0061	2253000000-E	840	PIPE COLLARS	0.55 CY	675.00	371.25
0062	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	81 EA	1,650.00	133,650.00
0063	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	42.2 LF	225.00	9,495.00
0064	2354000000-N	840	FRAME WITH GRATE, STD 840.22	1 EA	300.00	300.00
0065	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	38 EA	400.00	15,200.00
0066	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	28 EA	450.00	12,600.00
0067	2396000000-N	840	FRAME WITH COVER, STD 840.54	2 EA	350.00	700.00
0068	2407000000-N	840	STEEL FRAME WITH TWO GRATES, STD 840.37	14 EA	1,300.00	18,200.00
0069	2556000000-E	846	SHOULDER BERM GUTTER	9,400 LF	13.00	122,200.00
0070	2647000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (SURFACE MOUNTED)	440 SY	40.00	17,600.00
0071	2703000000-E	854	CONCRETE BARRIER, TYPE ***** (T-2)	200 LF	226.95	45,390.00
0072	2717000000-E	854	VARIABLE HEIGHT CONCRETE BARRIER, TYPE ***** (T-2)	700 LF	226.95	158,865.00

Contract Item Sheets For C203198

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0073	2815000000-N	858	ADJUSTMENT OF DROP INLETS	1 EA	600.00	600.00
0074	2938000000-N	859	CONVERT EXISTING DROP INLET TO JUNCTION BOX WITH MANHOLE	1 EA	1,000.00	1,000.00
0075	3000000000-N	SP	IMPACT ATTENUATOR UNIT, TYPE 350	1 EA	14,000.00	14,000.00
0076	3030000000-E	862	STEEL BM GUARDRAIL	11,300 LF	14.75	166,675.00
0077	3045000000-E	862	STEEL BM GUARDRAIL, SHOP CURVED	75 LF	17.25	1,293.75
0078	3105000000-N	862	STEEL BM GUARDRAIL TERMINAL SECTIONS	4 EA	40.00	160.00
0079	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	10 EA	35.00	350.00
0080	3195000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE AT-1	1 EA	550.00	550.00
0081	3210000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE CAT-1	5 EA	450.00	2,250.00
0082	3270000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE 350	6 EA	1,800.00	10,800.00
0083	3285000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE M-350	8 EA	1,550.00	12,400.00
0084	3317000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE B-77	28 EA	1,425.00	39,900.00
0085	3389200000-E	865	CABLE GUIDERAIL	6,600 LF	6.75	44,550.00
0086	3389500000-N	865	ADDITIONAL GUIDERAIL POSTS	10 EA	40.00	400.00
0087	3389600000-N	865	CABLE GUIDERAIL ANCHOR UNITS	12 EA	1,550.00	18,600.00
0088	3503000000-E	866	WOVEN WIRE FENCE, 47" FABRIC	10,400 LF	2.50	26,000.00
0089	3509000000-E	866	4" TIMBER FENCE POSTS, 7'-6" LONG	680 EA	14.00	9,520.00
0090	3515000000-E	866	5" TIMBER FENCE POSTS, 8'-0" LONG	140 EA	28.00	3,920.00

Contract Item Sheets For C203198

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0091	3533000000-E	866	CHAIN LINK FENCE, **** FABRIC (120")	7,700 LF	14.85	114,345.00
0092	3533000000-E	866	CHAIN LINK FENCE, **** FABRIC (72")	3,200 LF	8.75	28,000.00
0093	3539000000-E	866	METAL LINE POSTS FOR **** CHAIN LINK FENCE (120")	640 EA	83.00	53,120.00
0094	3539000000-E	866	METAL LINE POSTS FOR **** CHAIN LINK FENCE (72")	270 EA	49.00	13,230.00
0095	3545000000-E	866	METAL TERMINAL POSTS FOR **** CHAIN LINK FENCE (120")	40 EA	165.00	6,600.00
0096	3545000000-E	866	METAL TERMINAL POSTS FOR **** CHAIN LINK FENCE (72")	20 EA	130.00	2,600.00
0097	3557000000-E	866	ADDITIONAL BARBED WIRE	100 LF	1.00	100.00
0098	3564000000-E	866	SINGLE GATES, **** HIGH, *** WIDE, *** OPENING (120", 20', 20')	2 EA	1,750.00	3,500.00
0099	3564000000-E	866	SINGLE GATES, **** HIGH, *** WIDE, *** OPENING (72", 20', 20')	1 EA	1,150.00	1,150.00
0100	3628000000-E	876	RIP RAP, CLASS I	30 TON	64.00	1,920.00
0101	3649000000-E	876	RIP RAP, CLASS B	1,410 TON	64.00	90,240.00
0102	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	4,600 SY	2.50	11,500.00
0103	4048000000-E	902	REINFORCED CONCRETE SIGN FOUNDATIONS	35 CY	650.00	22,750.00
0104	4054000000-E	902	PLAIN CONCRETE SIGN FOUNDATIONS	1 CY	450.00	450.00
0105	4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	6,877 LB	3.90	26,820.30
0106	4066000000-E	903	SUPPORTS, SIMPLE STEEL BEAM	15,928 LB	2.75	43,802.00
0107	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	493 LF	4.20	2,070.60

Contract Item Sheets For C203198

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0108	4078000000-E	903	SUPPORTS, 2-LB STEEL U-CHANNEL	25 EA	68.00	1,700.00
0109	4096000000-N	904	SIGN ERECTION, TYPE D	1 EA	95.00	95.00
0110	4102000000-N	904	SIGN ERECTION, TYPE E	12 EA	45.00	540.00
0111	4108000000-N	904	SIGN ERECTION, TYPE F	7 EA	65.00	455.00
0112	4109000000-N	904	SIGN ERECTION, TYPE *** (OVER-HEAD) (A)	3 EA	475.00	1,425.00
0113	4109000000-N	904	SIGN ERECTION, TYPE *** (OVER-HEAD) (B)	2 EA	475.00	950.00
0114	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	12 EA	475.00	5,700.00
0115	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)	9 EA	475.00	4,275.00
0116	4114000000-N	904	SIGN ERECTION, MILEMARKERS	25 EA	75.00	1,875.00
0117	4115000000-N	904	SIGN ERECTION, OVERLAY (OVER-HEAD)	1 EA	375.00	375.00
0118	4116000000-N	904	SIGN ERECTION, OVERLAY (GROUND MOUNTED)	9 EA	375.00	3,375.00
0119	4152000000-N	907	DISPOSAL OF SIGN SYSTEM, STEEL BEAM	5 EA	150.00	750.00
0120	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	5 EA	1.00	5.00
0121	4234000000-N	907	DISPOSAL OF SIGN, A OR B (OVERHEAD)	7 EA	250.00	1,750.00
0122	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	208 SF	4.90	1,018.58
0123	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	410 SF	24.00	9,840.00
0124	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	68 SF	7.25	493.00

Contract Item Sheets For C203198

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0125	4415000000-N	1115	FLASHING ARROW BOARD	1 EA	2,550.00	2,550.00
0126	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	1 EA	22,000.00	22,000.00
0127	4430000000-N	1130	DRUMS	100 EA	49.00	4,900.00
0128	4435000000-N	1135	CONES	50 EA	17.00	850.00
0129	4445000000-E	1145	BARRICADES (TYPE III)	184 LF	49.00	9,016.00
0130	4455000000-N	1150	FLAGGER	38 DAY	200.00	7,600.00
0131	4480000000-N	1165	TMA	1 EA	20,614.43	20,614.43
0132	4516000000-N	1180	SKINNY DRUM	50 EA	32.00	1,600.00
0133	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	368 LF	2.50	920.00
0134	4686000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)	378 LF	2.55	963.90
0135	4710000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)	160 LF	11.00	1,760.00
0136	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	12 EA	175.00	2,100.00
0137	4847100000-E	1205	POLYUREA PAVEMENT MARKING LINES (6", *****) (HIGHLY REFLECTIVE ELEMENTS)	77,841 LF	1.02	79,397.82
0138	4847120000-E	1205	POLYUREA PAVEMENT MARKING LINES (12", *****) (HIGHLY REFLECTIVE ELEMENTS)	2,446 LF	2.65	6,481.90
0139	4905000000-N	1253	SNOWPLOWABLE PAVEMENT MARKERS	647 EA	30.00	19,410.00
0140	5325800000-E	1510	8" WATER LINE	700 LF	42.00	29,400.00
0141	5546000000-E	1515	8" VALVE	2 EA	1,150.00	2,300.00
0142	5835700000-E	1540	16" ENCASEMENT PIPE	390 LF	52.00	20,280.00
0143	6000000000-E	1605	TEMPORARY SILT FENCE	35,000 LF	1.85	64,750.00

Contract Item Sheets For C203198

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0144	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	1,000 TON	61.00	61,000.00
0145	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	5,000 TON	61.00	305,000.00
0146	6012000000-E	1610	SEDIMENT CONTROL STONE	5,000 TON	43.00	215,000.00
0147	6015000000-E	1615	TEMPORARY MULCHING	100 ACR	400.08	40,008.00
0148	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	2,900 LB	2.75	7,977.90
0149	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEEDING	13.25 TON	900.18	11,927.39
0150	6024000000-E	1622	TEMPORARY SLOPE DRAINS	10,000 LF	9.00	90,000.00
0151	6029000000-E	SP	SAFETY FENCE	11,000 LF	1.00	11,000.00
0152	6030000000-E	1630	SILT EXCAVATION	15,000 CY	13.00	195,000.00
0153	6036000000-E	1631	MATTING FOR EROSION CONTROL	25,000 SY	1.40	35,000.00
0154	6037000000-E	SP	COIR FIBER MAT	500 SY	6.00	3,000.50
0155	6038000000-E	SP	PERMANENT SOIL REINFORCEMENT MAT	750 SY	4.50	3,375.75
0156	6042000000-E	1632	1/4" HARDWARE CLOTH	4,800 LF	4.25	20,404.80
0157	6048000000-E	SP	FLOATING TURBIDITY CURTAIN	150 SY	32.00	4,800.00
0158	6070000000-N	1639	SPECIAL STILLING BASINS	4 EA	254.00	1,016.00
0159	6071012000-E	SP	COIR FIBER WATTLE	350 LF	7.00	2,450.35
0160	6071020000-E	SP	POLYACRYLAMIDE (PAM)	275 LB	6.00	1,650.28
0161	6071030000-E	1640	COIR FIBER BAFFLE	5,000 LF	5.75	28,755.00
0162	6071050000-E	SP	*** SKIMMER (1-1/2")	5 EA	800.00	4,000.00

Contract Item Sheets For C203198

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0163	6071050000-E	SP	*** SKIMMER (2")	3 EA	950.00	2,850.00
0164	6084000000-E	1660	SEEDING & MULCHING	150 ACR	1,550.31	232,546.50
0165	6087000000-E	1660	MOWING	50 ACR	60.01	3,000.60
0166	6090000000-E	1661	SEED FOR REPAIR SEEDING	1,350 LB	3.25	4,388.85
0167	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	10.25 TON	900.18	9,226.85
0168	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	5,675 LB	3.50	19,868.18
0169	6108000000-E	1665	FERTILIZER TOPDRESSING	170 TON	900.18	153,030.60
0170	6114500000-N	1667	SPECIALIZED HAND MOWING	40 MHR	45.01	1,800.36
0171	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	125 EA	40.01	5,001.00
0172	6123000000-E	1670	REFORESTATION	5 ACR	1,000.20	5,001.00
0173	6135000000-E	SP	GENERIC EROSION CONTROL ITEM COMPOST BLANKET	10 ACR	6,001.20	60,012.00
0174	7060000000-E	1705	SIGNAL CABLE	1,400 LF	3.75	5,250.00
0175	7120000000-E	1705	VEHICLE SIGNAL HEAD (12", 3 SECTION)	11 EA	825.00	9,075.00
0176	7132000000-E	1705	VEHICLE SIGNAL HEAD (12", 4 SECTION)	1 EA	800.00	800.00
0177	7144000000-E	1705	VEHICLE SIGNAL HEAD (12", 5 SECTION)	1 EA	1,275.00	1,275.00
0178	7300000000-E	1715	UNPAVED TRENCHING (*****)(1, 2")	750 LF	7.00	5,250.00
0179	7300000000-E	1715	UNPAVED TRENCHING (*****)(2, 2")	30 LF	7.00	210.00
0180	7300100000-E	1715	UNPAVED TRENCHING FOR TEMP-ORARY LEAD-IN	900 LF	4.20	3,780.00
0181	7301000000-E	1715	DIRECTIONAL DRILL (*****)(1, 2")	250 LF	18.00	4,500.00

Contract Item Sheets For C203198

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0182	7301000000-E	1715	DIRECTIONAL DRILL (*****) (2, 2")	200 LF	18.00	3,600.00
0183	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	11 EA	175.00	1,925.00
0184	7360000000-N	1720	WOOD POLE	4 EA	900.00	3,600.00
0185	7372000000-N	1721	GUY ASSEMBLY	6 EA	340.00	2,040.00
0186	7408000000-E	1722	1" RISER WITH WEATHERHEAD	1 EA	825.00	825.00
0187	7420000000-E	1722	2" RISER WITH WEATHERHEAD	4 EA	450.00	1,800.00
0188	7444000000-E	1725	INDUCTIVE LOOP SAWCUT	1,500 LF	5.40	8,100.00
0189	7456000000-E	1726	LEAD-IN CABLE (***** (14-2)	5,000 LF	1.25	6,250.00
0190	7588000000-N	SP	METAL POLE WITH SINGLE MAST ARM	1 EA	10,728.00	10,728.00
0191	7590000000-N	SP	METAL POLE WITH DUAL MAST ARM	1 EA	14,320.00	14,320.00
0192	7613000000-N	SP	SOIL TEST	2 EA	1,200.00	2,400.00
0193	7614100000-E	SP	DRILLED PIER FOUNDATION	14 CY	1,025.00	14,350.00
0194	7631000000-N	SP	MAST ARM WITH METAL POLE DE- SIGN	2 EA	125.00	250.00
0195	7684000000-N	1750	SIGNAL CABINET FOUNDATION	2 EA	850.00	1,700.00
0196	7756000000-N	1751	CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED)	2 EA	12,520.00	25,040.00
0197	7780000000-N	1751	DETECTOR CARD (TYPE 2070L)	10 EA	100.00	1,000.00
0198	7901000000-N	1753	CABINET BASE EXTENDER	2 EA	200.00	400.00
0250	0000400000-N	801	CONSTRUCTION SURVEYING	Lump Sum LS	2,020,177.23	2,020,177.23
0251	0000700000-N	SP	FIELD OFFICE	Lump Sum LS	162,000.00	162,000.00

Contract Item Sheets For C203198

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0199	8847000000-E	SP	GENERIC RETAINING WALL ITEM MSE RETAINING WALL NO 1	15,039 SF	100.00	1,503,900.00
0200	8847000000-E	SP	GENERIC RETAINING WALL ITEM MSE RETAINING WALL NO 2	4,729 SF	75.00	354,675.00
0201	8847000000-E	SP	GENERIC RETAINING WALL ITEM MSE RETAINING WALL NO 3	8,463 SF	96.00	812,448.00

Contract Item Sheets For C203198

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0202	8017000000-N	SP	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA ***** (353+32.50-L-)	Lump Sum LS	10,347,000.00	10,347,000.00
0203	8112730000-N	450	PDA TESTING	45 EA	1,900.00	85,500.00
0204	8147000000-E	420	REINFORCED CONCRETE DECK SLAB	627,059 SF	27.45	17,215,277.79
0205	8154000000-E	420	REINFORCED CONCRETE DECK SLAB (SAND LIGHTWEIGHT CONC)	64,606 SF	46.21	2,985,314.05
0206	8161000000-E	420	GROOVING BRIDGE FLOORS	625,253 SF	0.25	156,313.25
0207	8175000000-E	420	CLASS AA CONCRETE (BRIDGE)	16,377.3 CY	724.91	11,872,019.41
0208	8182000000-E	420	CLASS A CONCRETE (BRIDGE)	781 CY	740.74	578,517.94
0209	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (16+73.17-RP C4-)	Lump Sum LS	22,500.00	22,500.00
0210	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (21+47.09-RP B4-)	Lump Sum LS	22,500.00	22,500.00
0211	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (353+32.50-L-LT)	Lump Sum LS	33,000.00	33,000.00
0212	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (353+32.50-L-RT)	Lump Sum LS	33,000.00	33,000.00
0213	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (398+75.47-L-LT)	Lump Sum LS	33,000.00	33,000.00
0214	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (398+75.47-L-RT)	Lump Sum LS	33,000.00	33,000.00
0215	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (425+60.75-L-LT)	Lump Sum LS	37,000.00	37,000.00
0216	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (425+60.75-L-RT)	Lump Sum LS	33,000.00	33,000.00

Contract Item Sheets For C203198

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0217	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (440+50.13-L-LT)	Lump Sum LS	32,500.00	32,500.00
0218	8210000000-N	422	BRIDGE APPROACH SLABS, STATION ***** (440+50.13-L-RT)	Lump Sum LS	32,000.00	32,000.00
0219	8217000000-E	425	REINFORCING STEEL (BRIDGE)	109,668 LB	0.72	79,070.63
0220	8224000000-E	425	EPOXY COATED REINFORCING STEEL (BRIDGE)	3,165,144 LB	0.81	2,547,940.92
0221	8226000000-E	425	EPOXY COATED SPIRAL COLUMN RE- INFORCING STEEL (BRIDGE)	120,862 LB	1.70	205,586.26
0222	8262000000-E	430	45" PRESTRESSED CONCRETE GIR- DERS	690.9 LF	260.00	179,634.00
0223	8265000000-E	430	54" PRESTRESSED CONCRETE GIR- DERS	3,951.49 LF	200.00	790,298.00
0224	8277000000-E	430	MODIFIED 72" PRESTRESSED CONC GIRDERS	1,752.03 LF	220.00	385,446.60
0225	8333000000-E	450	16" PRESTRESSED CONCRETE PILES	2,080 LF	52.00	108,160.00
0226	8350000000-E	450	24" PRESTRESSED CONCRETE PILES	31,900 LF	80.00	2,552,000.00
0227	8364000000-E	450	HP12X53 STEEL PILES	10,450 LF	45.00	470,250.00
0228	8392500000-E	450	PREDRILLING FOR PILES	28,662 LF	10.00	286,620.00
0229	8393000000-N	450	PILE REDRIVES	602 EA	200.00	120,400.00
0230	8503000000-E	460	CONCRETE BARRIER RAIL	2,791.7 LF	52.00	145,168.40
0231	8505000000-E	460	VERTICAL CONCRETE BARRIER RAIL	28,809.47 LF	52.00	1,498,092.44
0232	8524000000-E	SP	*** CHAIN LINK FENCE (72")	2,495.23 LF	93.00	232,056.39
0233	8531000000-E	462	4" SLOPE PROTECTION	4,390 SY	110.00	482,900.00
0234	8594000000-E	876	RIP RAP, CLASS B	20 TON	62.00	1,240.00

Contract Item Sheets For C203198

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0235	8608000000-E	876	RIP RAP CLASS II (2'-0" THICK)	5,575 TON	72.00	401,400.00
0236	8622000000-E	876	GEOTEXTILE FOR DRAINAGE	6,195 SY	1.50	9,292.50
0237	8657000000-N	430	ELASTOMERIC BEARINGS	Lump Sum LS	265,000.00	265,000.00
0238	8706000000-N	SP	EXPANSION JOINT SEALS	Lump Sum LS	1,220,000.00	1,220,000.00
0239	8713000000-N	SP	MODULAR EXPANSION JOINT SEALS	Lump Sum LS	131,000.00	131,000.00
0240	8741000000-N	SP	STRUCTURE DRAINAGE SYSTEM AT STA***** (353+32.50-L-LT)	Lump Sum LS	174,000.00	174,000.00
0241	8741000000-N	SP	STRUCTURE DRAINAGE SYSTEM AT STA***** (353+32.50-L-RT)	Lump Sum LS	173,000.00	173,000.00
0242	8744000000-N	SP	SOLAR ARRAY SUPPORT PLATFORM	Lump Sum LS	60,000.00	60,000.00
0243	8860000000-N	SP	GENERIC STRUCTURE ITEM PLASTIC LUMBER FENDER BOARDS @ BENT 7	Lump Sum LS	70,000.00	70,000.00
0244	8860000000-N	SP	GENERIC STRUCTURE ITEM POST TENSIONING TENDONS	Lump Sum LS	1,000,000.00	1,000,000.00
0245	8860000000-N	SP	GENERIC STRUCTURE ITEM STATIC AXIAL COMPRESSIVE LOAD TEST ON 30" SQ VOIDED PRESTR CONC PILE	Lump Sum LS	150,000.00	150,000.00
0246	8867000000-E	SP	GENERIC STRUCTURE ITEM 30" VOIDED PRESTR CONC PILES	34,290 LF	140.00	4,800,600.00
0247	8867000000-E	SP	GENERIC STRUCTURE ITEM 36" VOIDED PRESTR CONC PILES	16,264 LF	190.00	3,090,160.00
0248	8867000000-E	SP	GENERIC STRUCTURE ITEM 78" PRESTR CONC GIRDERS	51,250.6 LF	250.00	12,812,650.00
0249	8867000000-E	SP	GENERIC STRUCTURE ITEM 78" P-T PRESTR CONC GIRDERS	7,210 LF	800.00	5,768,000.00

TOTAL AMOUNT OF BID FOR ENTIRE PROJECT

\$124,368,202.88



Contract No. C203198

Rev. 5-19-11

County BRUNSWICK, NEW HANOVER

**EXECUTION OF CONTRACT
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION 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 Affidavit 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

BALFOUR BEATTY INFRASTRUCTURE, INC

Full name of Corporation

999 PEACHTREE ST NE, STE 200, ATLANTA, GA 30309

Address as Prequalified

Attest

William D. Heston
~~Secretary~~ Assistant Secretary
Select appropriate title

By

Mark R. Johnnie
~~President~~ Vice President/Assistant Vice President
Select appropriate title

WILLIAM D. HESTON

Print or type Signer's name

MARK R. JOHNNIE

Print or type Signer's name

CORPORATE SEAL

AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the

14th day of OCTOBER, 2013.

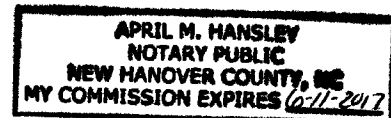
April M. Hansley
Signature of Notary Public

of New Hanover County

State of North Carolina

My Commission Expires: June 11, 2017

NOTARY SEAL



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.

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. **C203198**

County (ies): **Brunswick-New Hanover**

ACCEPTED BY THE
DEPARTMENT OF TRANSPORTATION

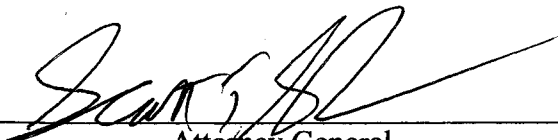


Contract Officer

10/17/13

Date

Execution of Contract and Bonds
Approved as to Form:



Attorney General

Signature Sheet (Bid - Acceptance by Department)

Contract No.
CountyC203198
Brunswick, New Hanover

Rev 5-17-11

CONTRACT PAYMENT BOND

Date of Payment Bond Execution October 7, 2013

Name of Principal Contractor Balfour Beatty Infrastructure, Inc.
Travelers Casualty and Surety Company of America, Fidelity and Deposit Company of Maryland,
Zurich American Insurance Company, Liberty Mutual Insurance Company & Federal Insurance Company

Name of Surety: _____

Name of Contracting Body: North Carolina Department of Transportation
Raleigh, North Carolina
One Hundred Twenty Four Million Three Hundred Sixty Eight Thousand
Two Hundred Two and 88/100 Dollars (\$124,368,202.88)

Amount of Bond: _____

Contract ID No.: C203198

County Name: Brunswick, New Hanover

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL CONTRACTOR (hereafter, PRINCIPAL) and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the Contracting Body, numbered as shown above and hereto attached:

NOW THEREFORE, if the principal shall promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Contract No.
County

C203198
Brunswick, New Hanover

Rev 5-17-11

CONTRACT PAYMENT BOND

Travelers Casualty and Surety Company of America, Fidelity and Deposit Company of Maryland,
Zurich American Insurance Company, Liberty Mutual Insurance Company & Federal Insurance Company

Affix Seal of Surety Company

Print or type Surety Company Name

By Jennifer B. Gullett

Print, stamp or type name of Attorney-in-Fact

Jennifer B. Gullett

Signature of Attorney-in-Fact

Catherine Thompson

Signature of Witness

Catherine Thompson

Print or type Signer's name

P.O. Box 31817, Charlotte, NC 28231-1817

Address of Attorney-in-Fact

Contract No.
County

C203198
Brunswick, New Hanover

Rev 5-17-11

CONTRACT PAYMENT BOND

CORPORATION

SIGNATURE OF CONTRACTOR (Principal)

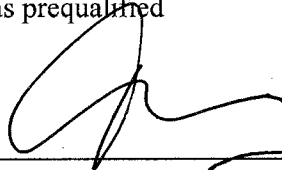
Balfour Beatty Infrastructure, Inc.

Full name of Corporation

999 Peachtree St., Suite 200, Atlanta, GA 30309

Address as prequalified

By



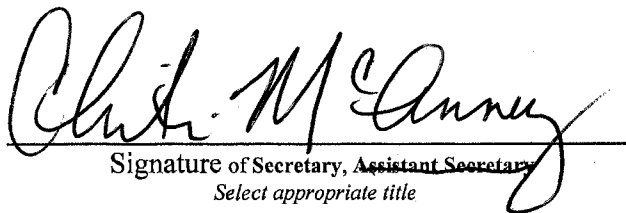
Signature of President, Vice President, Assistant Vice President
Select appropriate title

Todd R. Folk

Print or type Signer's name

Affix Corporate Seal

Attest



Signature of Secretary, Assistant Secretary
Select appropriate title

Christine McAnney

Print or type Signer's name



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. 225134

Certificate No. 005304739

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

Matthew W. Varner, Jennifer B. Gullett, Catherine Thompson, Walter Caldwell, Carol S. Card, and Amy Waugh

of the City of Charlotte, 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 13th day of December, 2012.

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 13th day of December, 2012, 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, 2016.



Marie C. Tetreault
 Marie C. Tetreault, Notary Public

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 7th day of October, 2013.

WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER


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.

**ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND
POWER OF ATTORNEY**

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **JAMES M. CARROLL, Vice President**, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Matthew W. VARNER, Jennifer B. GULLETT, Catherine THOMPSON, Walter CALDWELL, Carol S. CARD and Amy R. WAUGH, all of Charlotte, North Carolina, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings**, and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

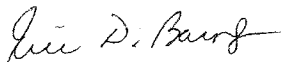
IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND**, this 4th day of June, A.D. 2013.

ATTEST:

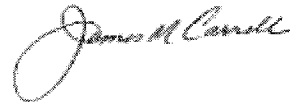
**ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND**



By:



*Assistant Secretary
Eric D. Barnes*

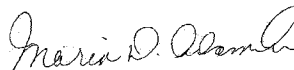


*Vice President
James M. Carroll*

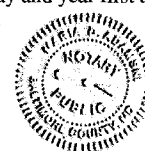
State of Maryland
City of Baltimore

On this 4th day of June, A.D. 2013, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **JAMES M. CARROLL, Vice President, and ERIC D. BARNES, Assistant Secretary**, of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposeth and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.



*Maria D. Adamski, Notary Public
My Commission Expires: July 8, 2015*



EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify or revoke any such appointment or authority at any time."

CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 7th day of October, 20 13.



Geoffrey Delisio

Geoffrey Delisio, Vice President

THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON RED BACKGROUND.

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

Certificate No. 6045779

American Fire and Casualty Company
The Ohio Casualty Insurance Company

Liberty Mutual Insurance Company
West American Insurance Company

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That American Fire & Casualty Company and The Ohio Casualty Insurance Company are corporations duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Indiana (herein collectively called the "Companies"); pursuant to and by authority herein set forth, does hereby name, constitute and appoint, Amy R. Waugh; Carol S. Card; Catherine Thompson; Jennifer B. Gullett; Matthew W. Varner; Walter S. Caldwell

all of the city of Charlotte, state of NC each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents and shall be as binding upon the Companies as if they have been duly signed by the president and attested by the secretary of the Companies in their own proper persons.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 20th day of March, 2013.



STATE OF WASHINGTON ss
COUNTY OF KING

American Fire and Casualty Company
The Ohio Casualty Insurance Company
Liberty Mutual Insurance Company
West American Insurance Company

By: Gregory W. Davenport
Gregory W. Davenport, Assistant Secretary

On this 20th day of March, 2013, before me personally appeared Gregory W. Davenport, who acknowledged himself to be the Assistant Secretary of American Fire and Casualty Company, Liberty Mutual Insurance Company, The Ohio Casualty Company, and West American Insurance Company, and that he, as such, being authorized so to do, execute 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 have hereunto subscribed my name and affixed my notarial seal at Seattle, Washington, on the day and year first above written.



By: KD Riley
KD Riley, Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-laws and Authorizations of American Fire and Casualty Company, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company which resolutions are now in full force and effect reading as follows:

ARTICLE IV – OFFICERS – Section 12. Power of Attorney. Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and execution of any such instruments and to attach thereto the seal of the Corporation. When so executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

ARTICLE XIII – Execution of Contracts – SECTION 5. Surety Bonds and Undertakings. Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

Certificate of Designation – The President of the Company, acting pursuant to the Bylaws of the Company, authorizes Gregory W. Davenport, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

Authorization – By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

I, David M. Carey, the undersigned, Assistant Secretary, of American Fire and Casualty Company, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy of the Power of Attorney executed by said Companies, 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 7th day of October, 2013.



By: David M. Carey
David M. Carey, Assistant Secretary

To confirm the validity of this Power of Attorney call
1-610-832-8240 between 9:00 am and 4:30 pm EST on any business day.

Not valid for mortgage, note, loan, letter of credit, bank deposit,
currency rate, interest rate or residual value guarantees.



**Chubb
Surety**

**POWER
OF
ATTORNEY**

**Federal Insurance Company
Vigilant Insurance Company
Pacific Indemnity Company**

**Attn: Surety Department
15 Mountain View Road
Warren, NJ 07059**

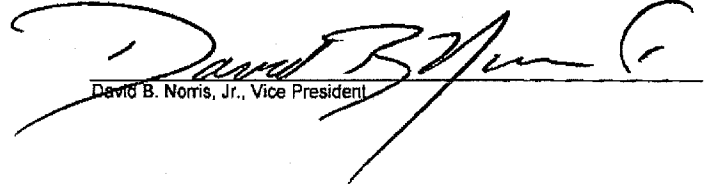
Know All by These Presents, That FEDERAL INSURANCE COMPANY, an Indiana corporation, VIGILANT INSURANCE COMPANY, a New York corporation, and PACIFIC INDEMNITY COMPANY, a Wisconsin corporation, do each hereby constitute and appoint Walter Caldwell, Carol S. Card, Jennifer B. Gullett, Catherine Thompson, Matthew W. Varner and Amy R. Waugh of Charlotte, North Carolina-----

each as their true and lawful Attorney-in-Fact to execute under such designation in their names and to affix their corporate seals to and deliver for and on their behalf as surety thereon or otherwise, bonds and undertakings and other writings obligatory in the nature thereof (other than bail bonds) given or executed in the course of business, and any instruments amending or altering the same, and consents to the modification or alteration of any instrument referred to in said bonds or obligations.

In Witness Whereof, said FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY have each executed and attested these presents and affixed their corporate seals on this **3rd** day of **June, 2013**.



Dawn M. Chloros, Assistant Secretary



David B. Norris, Jr., Vice President

STATE OF NEW JERSEY

County of Somerset

ss.

On this **3rd** day of **June, 2013** before me, a Notary Public of New Jersey, personally came Dawn M. Chloros, to me known to be Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY, the companies which executed the foregoing Power of Attorney, and the said Dawn M. Chloros, being by me duly sworn, did depose and say that she is Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY and knows the corporate seals thereof, that the seals affixed to the foregoing Power of Attorney are such corporate seals and were thereto affixed by authority of the By-Laws of said Companies; and that she signed said Power of Attorney as Assistant Secretary of said Companies by like authority; and that she is acquainted with David B. Norris, Jr., and knows him to be Vice President of said Companies; and that the signature of David B. Norris, Jr., subscribed to said Power of Attorney is in the genuine handwriting of David B. Norris, Jr., and was thereto subscribed by authority of said By-Laws and in deponent's presence.

Notarial Seal



**KATHERINE J. ADELAAR
NOTARY PUBLIC OF NEW JERSEY
No 2316685
Commission Expires July 16, 2014**



Notary Public

CERTIFICATION

Extract from the By-Laws of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY:

"All powers of attorney for and on behalf of the Company may and shall be executed in the name and on behalf of the Company, either by the Chairman or the President or a Vice President or an Assistant Vice President, jointly with the Secretary or an Assistant Secretary, under their respective designations. The signature of such officers may be engraved, printed or lithographed. The signature of each of the following officers: Chairman, 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 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 upon the Company with respect to any bond or undertaking to which it is attached."

I, Dawn M. Chloros, Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY (the "Companies") do hereby certify that

- (i) the foregoing extract of the By-Laws of the Companies is true and correct,
- (ii) the Companies are duly licensed and authorized to transact surety business in all 50 of the United States of America and the District of Columbia and are authorized by the U.S. Treasury Department; further, Federal and Vigilant are licensed in the U.S. Virgin Islands, and Federal is licensed in American Samoa, Guam, Puerto Rico, and each of the Provinces of Canada except Prince Edward Island; and
- (iii) the foregoing Power of Attorney is true, correct and in full force and effect.

Given under my hand and seals of said Companies at Warren, NJ this **7th** day of **October 2013**





Dawn M. Chloros, Assistant Secretary

IN THE EVENT YOU WISH TO NOTIFY US OF A CLAIM, VERIFY THE AUTHENTICITY OF THIS BOND OR NOTIFY US OF ANY OTHER MATTER, PLEASE CONTACT US AT ADDRESS LISTED ABOVE, OR BY Telephone (908) 903- 3493 Fax (908) 903- 3656

e-mail: surety@chubb.com

Contract No. C203198
County Brunswick, New Hanover

Rev 5-17-11

CONTRACT PERFORMANCE BOND

Date of Performance Bond Execution: October 7, 2013

Name of Principal Contractor: Balfour Beatty Infrastructure, Inc.
Travelers Casualty and Surety Company of America, Fidelity and Deposit Company of Maryland,
Zurich American Insurance Company, Liberty Mutual Insurance Company & Federal Insurance Company

Name of Surety: _____

Name of Contracting Body: North Carolina Department of Transportation
Raleigh, North Carolina
One Hundred Twenty Four Million Three Hundred Sixty Eight Thousand Two
Hundred Two and 88/100 Dollars (\$124,368,202.88)

Amount of Bond: _____

Contract ID No.: C203198

County Name: Brunswick, New Hanover

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL CONTRACTOR (hereafter, PRINCIPAL) and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the Contracting Body, numbered as shown above and hereto attached:

NOW THEREFORE, if the principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Contract No.
County

C203198
Brunswick, New Hanover

Rev 5-17-11

CONTRACT PERFORMANCE BOND

Travelers Casualty and Surety Company of America, Fidelity and Deposit Company of Maryland,
Zurich American Insurance Company, Liberty Mutual Insurance Company & Federal Insurance Company

Affix Seal of Surety Company

Print or type Surety Company Name

By Jennifer B. Gullett

Print, stamp or type name of Attorney-in-Fact

Jennifer B. Gullett

Signature of Attorney-in-Fact

Catherine Thompson

Signature of Witness

Catherine Thompson

Print or type Signer's name

P.O. Box 31817, Charlotte, NC 28231-1817

Address of Attorney-in-Fact

Contract No. C203198
County Brunswick, New Hanover

Rev 5-17-11

CONTRACT PERFORMANCE BOND

CORPORATION

SIGNATURE OF CONTRACTOR (Principal)

Balfour Beatty Infrastructure, Inc.

Full name of Corporation

999 Peachtree St., Suite 200, Atlanta, GA 30309

Address as prequalified

By 

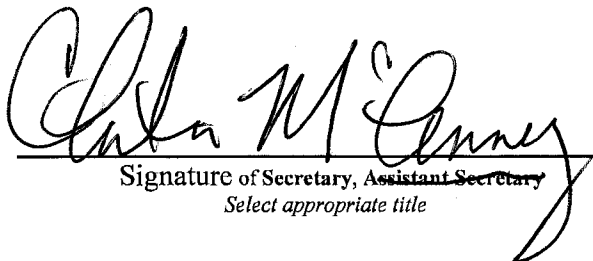
Signature of President, Vice President Assistant Vice President
Select appropriate title

Todd R. Folk

Print or type Signer's name

Affix Corporate Seal

Attest


Signature of Secretary, Assistant Secretary
Select appropriate title

Christine McAnney
Print or type Signer's name



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. 225134

Certificate No. 005304742

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

Matthew W. Varner, Jennifer B. Gullett, Catherine Thompson, Walter Caldwell, Carol S. Card, and Amy Waugh

of the City of Charlotte, 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 13th day of December, 2012.

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.

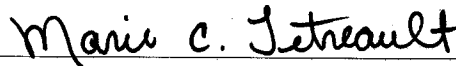
By: 

Robert L. Raney, Senior Vice President

On this the 13th day of December, 2012, 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, 2016.




 Marie C. Tetreault, Notary Public

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

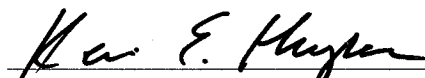
FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice 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 7th day of October, 20 13.

WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER


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.

**ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND
POWER OF ATTORNEY**

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **JAMES M. CARROLL, Vice President**, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Matthew W. VARNER, Jennifer B. GULLETT, Catherine THOMPSON, Walter CALDWELL, Carol S. CARD and Amy R. WAUGH, all of Charlotte, North Carolina, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings**, and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND**, this 4th day of June, A.D. 2013.

ATTEST:

**ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND**



By: _____

Eric D. Barnes

*Assistant Secretary
Eric D. Barnes*

James M. Carroll

*Vice President
James M. Carroll*

State of Maryland
City of Baltimore

On this 4th day of June, A.D. 2013, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **JAMES M. CARROLL, Vice President, and ERIC D. BARNES, Assistant Secretary**, of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, depose and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

Maria D. Adamski

*Maria D. Adamski, Notary Public
My Commission Expires: July 8, 2015*



EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify or revoke any such appointment or authority at any time."

CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney....Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 7th day of October, 20 13.



Geoffrey Delisio

Geoffrey Delisio, Vice President

THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON RED BACKGROUND.

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

Certificate No. 6045781

American Fire and Casualty Company
The Ohio Casualty Insurance Company

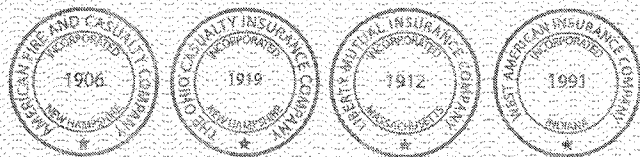
Liberty Mutual Insurance Company
West American Insurance Company

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That American Fire & Casualty Company and The Ohio Casualty Insurance Company are corporations duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Indiana (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint, Amy R. Waugh; Carol S. Card; Catherine Thompson; Jennifer B. Gullett; Matthew W. Varner; Walter S. Caldwell

all of the city of Charlotte, state of NC each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents and shall be as binding upon the Companies as if they have been duly signed by the president and attested by the secretary of the Companies in their own proper persons.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 20th day of March, 2013.



STATE OF WASHINGTON ss
COUNTY OF KING

American Fire and Casualty Company
The Ohio Casualty Insurance Company
Liberty Mutual Insurance Company
West American Insurance Company

By: Gregory W. Davenport
Gregory W. Davenport, Assistant Secretary

On this 20th day of March, 2013, before me personally appeared Gregory W. Davenport, who acknowledged himself to be the Assistant Secretary of American Fire and Casualty Company, Liberty Mutual Insurance Company, The Ohio Casualty Company, and West American Insurance Company, and that he, as such, being authorized so to do, execute 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 have hereunto subscribed my name and affixed my notarial seal at Seattle, Washington, on the day and year first above written.



By: KD Riley
KD Riley, Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-laws and Authorizations of American Fire and Casualty Company, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company which resolutions are now in full force and effect reading as follows:

ARTICLE IV – OFFICERS – Section 12. Power of Attorney. Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and execution of any such instruments and to attach thereto the seal of the Corporation. When so executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

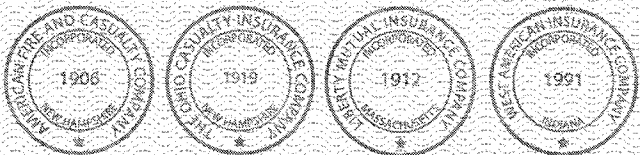
ARTICLE XIII – Execution of Contracts – SECTION 5. Surety Bonds and Undertakings. Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

Certificate of Designation – The President of the Company, acting pursuant to the Bylaws of the Company, authorizes Gregory W. Davenport, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

Authorization – By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

I, David M. Carey, the undersigned, Assistant Secretary, of American Fire and Casualty Company, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy of the Power of Attorney executed by said Companies, 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 7th day of October, 2013.



By: David M. Carey
David M. Carey, Assistant Secretary

To confirm the validity of this Power of Attorney call
1-610-832-8240 between 9:00 am and 4:30 pm EST on any business day.



**Chubb
Surety**

**POWER
OF
ATTORNEY**

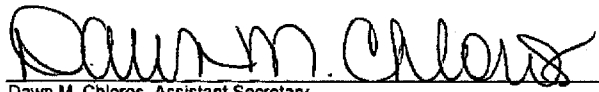
**Federal Insurance Company
Vigilant Insurance Company
Pacific Indemnity Company**

**Attn: Surety Department
15 Mountain View Road
Warren, NJ 07059**


Know All by These Presents, That FEDERAL INSURANCE COMPANY, an Indiana corporation, VIGILANT INSURANCE COMPANY, a New York corporation, and PACIFIC INDEMNITY COMPANY, a Wisconsin corporation, do each hereby constitute and appoint Walter Caldwell, Carol S. Card, Jennifer B. Gullett, Catherine Thompson, Matthew W. Varner and Amy R. Waugh of Charlotte, North Carolina

each as their true and lawful Attorney- in- Fact to execute under such designation in their names and to affix their corporate seals to and deliver for and on their behalf as surety thereon or otherwise, bonds and undertakings and other writings obligatory in the nature thereof (other than bail bonds) given or executed in the course of business, and any instruments amending or altering the same, and consents to the modification or alteration of any instrument referred to in said bonds or obligations.

In Witness Whereof, said FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY have each executed and attested these presents and affixed their corporate seals on this **3rd** day of June, 2013.



Dawn M. Chloros, Assistant Secretary



David B. Norris, Jr., Vice President

STATE OF NEW JERSEY

ss.

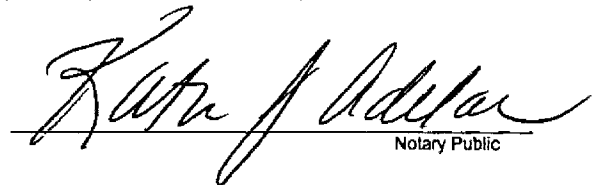
County of Somerset

On this **3rd** day of **June, 2013** before me, a Notary Public of New Jersey, personally came Dawn M. Chloros, to me known to be Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY, the companies which executed the foregoing Power of Attorney, and the said Dawn M. Chloros, being by me duly sworn, did depose and say that she is Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY and knows the corporate seals thereof, that the seals affixed to the foregoing Power of Attorney are such corporate seals and were thereto affixed by authority of the By- Laws of said Companies; and that she signed said Power of Attorney as Assistant Secretary of said Companies by like authority; and that she is acquainted with David B. Norris, Jr., and knows him to be Vice President of said Companies; and that the signature of David B. Norris, Jr., subscribed to said Power of Attorney is in the genuine handwriting of David B. Norris, Jr., and was thereto subscribed by authority of said By- Laws and in deponent's presence.

Notarial Seal



**KATHERINE J. ADELAAR
NOTARY PUBLIC OF NEW JERSEY
No. 2316685
Commission Expires July 16, 2014**



Notary Public

CERTIFICATION

Extract from the By- Laws of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY:

"All powers of attorney for and on behalf of the Company may and shall be executed in the name and on behalf of the Company, either by the Chairman or the President or a Vice President or an Assistant Vice President, jointly with the Secretary or an Assistant Secretary, under their respective designations. The signature of such officers may be engraved, printed or lithographed. The signature of each of the following officers: Chairman, 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 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 upon the Company with respect to any bond or undertaking to which it is attached."

I, Dawn M. Chloros, Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY (the "Companies") do hereby certify that

- (i) the foregoing extract of the By- Laws of the Companies is true and correct,
- (ii) the Companies are duly licensed and authorized to transact surety business in all 50 of the United States of America and the District of Columbia and are authorized by the U.S. Treasury Department; further, Federal and Vigilant are licensed in the U.S. Virgin Islands, and Federal is licensed in American Samoa, Guam, Puerto Rico, and each of the Provinces of Canada except Prince Edward Island; and
- (iii) the foregoing Power of Attorney is true, correct and in full force and effect.

Given under my hand and seals of said Companies at Warren, NJ this **7th** day of October 2013





Dawn M. Chloros, Assistant Secretary

IN THE EVENT YOU WISH TO NOTIFY US OF A CLAIM, VERIFY THE AUTHENTICITY OF THIS BOND OR NOTIFY US OF ANY OTHER MATTER, PLEASE CONTACT US AT ADDRESS LISTED ABOVE, OR BY Telephone (908) 903- 3493 Fax (908) 903- 3656

e-mail: surety@chubb.com