

CONTRACTING AGENCY
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH, NORTH CAROLINA

Request For Proposals For:

Bridge Replacement With
Prestressed Cored Slabs and
Prestressed Box Beams
Haywood County
Bridge Number 47

Proposals subject to the conditions made a part hereof will be received until 2:00 P.M., Tuesday, July 28, 2009, and then publicly opened for furnishing the services as described herein.

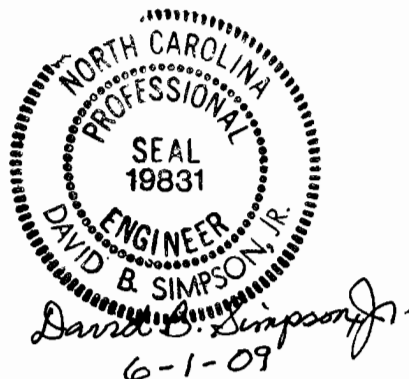
Opening of proposals to be in the Conference Room (N. C. Department of Transportation, Bridge Maintenance Unit), 4809 Beryl Road, Raleigh, N. C.

Send all proposals directly to the issuing agency:

N. C. DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT UNIT
4809 BERYL ROAD
RALEIGH, NORTH CAROLINA 27606

ATTENTION: Mr. Dan Holderman, P.E.

NOTE: Please indicate project number, bridge number and opening date on the bottom left hand corner of your envelope.



6-1-09

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PRE-QUALIFYING TO BID

In order to qualify to bid on this contract, all prospective Bidders must attend the Pre-Bid Conference.

All prospective Bidders shall be pre-qualified with the Department of Transportation prior to submitting a bid. Contractors who are not pre-qualified may obtain information and forms for pre-qualifying from:

Contractual Services Unit
State Contractual Services Engineer:
Greg Keel, PE
Tel .(919) 733-7174
Fax (919) 715-7378

All required pre-qualification statements and documents shall be filed with the State Contractual Services Engineer at least two weeks prior to the date of opening bids.

PRE-BID CONFERENCE

All prospective Bidders shall attend a Pre-Bid Conference at the location indicated below. This Conference will be conducted by Department personnel for the purpose of providing additional information about the project and to give Bidders an opportunity to ask any questions they may have. Only bids received from Bidders who have attended and properly registered at the Pre-Bid Conference will be considered.

No questions concerning the project will be answered by any Department personnel at any time except at the Pre-Bid Conference.

Attendance at the Pre-Bid Conference will not meet the requirements of proper registration unless the individual attending has registered at the Conference in accordance with the following:

1. The individual signs his or her name on the official roster;
2. The individual writes in the name and address of the company he or she represents; and
3. Only one company is shown as being represented by the individual attending.
4. The individual must be an officer or permanent employee of the firm they represent.

Bidders are to meet for the Pre-Bid Conference, at 9:00 a.m., Wednesday, June 24, 2009 at the Bridge Maintenance Office located on 178 Henry Bird Road in Whittier, Haywood County, North Carolina 28789. (SEE PRE-BID LOCATION MAP)

SPECIAL PROVISION - GENERAL

AVAILABILITY OF FUNDS - TERMINATION OF CONTRACTS

Payments made on this contract are subject to availability of funds as allocated by the General Assembly. If The General Assembly fails to allocate adequate funds, the Department reserves the right to terminate this contract.

In the event of termination, the Contractor shall be given a written notice of termination at least 60 days before completion of schedule 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.

PREPARATION AND SUBMISSION OF BIDS

All bids shall be prepared and submitted in accordance with the following listed requirements.

1. The proposal form furnished by the Department shall be used and shall not be taken apart or altered.
2. All entries including signatures shall be written in ink.
3. The amount bid shall be written in figures in the proper place in the proposal form.
4. Changes in any entry shall be made by marking through the entry in ink and making the correct entry adjacent thereto in ink. A representative of the Bidder shall initial the change in ink.
5. The bid shall be properly executed. In order to constitute proper execution, the bid shall show the Contractor's name, address, and Federal Identification Number and shall be signed by an authorized representative. If a corporation, the corporate seal shall be affixed. The bid execution shall be notarized by a notary public whose commission is in effect on the date of execution.
6. The bid shall not contain any unauthorized additions, deletions, or conditional bids.
7. The Bidder shall not add any provision reserving the right to accept to reject an award, or to enter into a contract pursuant to an award.
8. The bid shall be accompanied by a bid bond on the form furnished by the Department or by a bid deposit. The bid bond shall be completely and properly executed in accordance with the requirements of "Bid Bond or Bid Deposit". The

bid deposit shall be a certified check or cashiers check in accordance with "Bid Bond or Bid Deposit".

9. The bid shall be placed in a sealed envelope (complete proposal) and shall have been delivered to and received by the Department prior to the time specified in the invitation to bid.

REJECTION OF BIDS

Any bid submitted which fails to comply with any of the requirements contained herein shall be considered irregular and may be rejected.

AWARD OF CONTRACT

The award of the contract, if it be awarded, will be made to the lowest responsible Bidder. The lowest responsible Bidder will be notified that his bid has been accepted and that he has been awarded the contract.

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 grounds of race, color, or national origin.

BID BOND OR BID DEPOSIT

Each bid shall be accompanied by a corporate bid bond or a bid deposit of a certified or cashiers check in the amount of at least 5% of the total amount bid for contract. No bid will be considered or accepted unless accompanied by one of the foregoing securities. The bid bond shall be executed by a Corporate Surety licensed to do business in North Carolina and the certified check or cashiers check shall be drawn on a bank or trust company insured by the Federal Deposit Insurance Corporation and made payable to the Department of Transportation in an amount of at least 5% of the total amount bid for the contract. The condition of the bid bond or bid deposit is: the Principal shall not withdraw its bid within 60 days after the opening of the same, and if the contract is awarded to the Principal, the Principal shall within 14 days after the prescribed contract documents are mailed to him for signature, execute such contractual documents as may be required by the terms of the bid and give payment and performance bonds with good and sufficient surety as required for the faithful performance of the contract and for the protection of all persons supplying labor and materials in the prosecution of the work; in the event of the failure of the Principal to enter into such contract and execute such documents as may be required, then the amount of the bid bond shall be immediately paid to the Department as liquidated damages or, in the case of a bid deposit, the deposit shall be forfeited to the Department.

When a bid is secured by a bid bond, the bid bond shall be on the form furnished by the Department. The bid bond shall be executed by both the Bidder and a Corporate Surety licensed under the laws of North Carolina to write such bonds.

The execution by the Bidder shall be in the same manner as required under "Preparation and Submission of Bids" for the proper execution of the bid. The execution by the

Corporate Surety shall be the same as is provided for under "Preparation and Submission of Bids" for the execution of the bid by a corporation. The seal of the Corporate Surety shall be affixed to the bid bond. The bid bond form furnished is for execution of the Corporate Surety by a General Agent or Attorney in Fact. A certified copy of the Power of Attorney shall be attached if the bid bond is executed by a General Agent or Attorney in Fact. The Power of Attorney shall contain a certification that the Power of Attorney is still in full effect as of the date of the execution of the bid bond by the General Agent or Attorney in Fact. If the bid bond is executed by the Corporate Surety by the President, Vice President, or Assistant Vice President, and attested to by the Secretary or Assistant Secretary, then the bid bond form furnished shall be modified for such execution, instead of execution by the Attorney in Fact or the General Agent.

When a bid is secured by a bid deposit (certified check or cashiers check), the execution of a bid bond will not be required.

All bid bonds will be retained by the Department until the contract is executed by the successful Bidder, after which all such bid bonds will be returned to the Bidder or the Surety.

PERFORMANCE BOND AND PAYMENT BOND REQUIREMENTS

(This provision is not applicable if the contract amount is less than \$300,000.)

(A) The successful Bidder, at the time of the execution of the contract, shall provide a contract performance bond in the amount of one hundred percent (100%) of the contract amount, conditioned upon the faithful performance of the contract in accordance with the plans, specifications and conditions of the contract. Such bond shall be solely for the protection of the contracting body which awarded the contract.

(B) The successful Bidder, at the time of the execution of the contract, shall provide a contract payment bond in the amount of one hundred percent (100%) of the contract amount, conditioned upon the prompt payment for all labor or materials for which a contractor or sub-contractor is liable. The payment bond shall be solely for the protection of the persons furnishing materials or performing labor for which a contractor or subcontractor is liable.

The performance bond and the payment bond shall be executed by one or more surety companies legally authorized to do business in the State of North Carolina and shall become effective upon the awarding of the construction contract.

Before an award is made, the apparent low bidder will be notified in writing to submit to the Purchasing Section, a performance bond and payment bond each in the amount of 100% of the contract.

DELIVERY OF BIDS

All bids (complete proposal) shall be placed in a sealed envelope having the name and address of the Bidder, and the Statement:

“Bid for State Highway Project WBS Element 14B.204414.3 for Bridge No. 47 in Haywood County.”

on the outside of the envelope. If delivered by mail, the sealed envelope shall be placed in another sealed envelope and the outer envelope addressed to:

N. C. DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT UNIT
4809 BERYL ROAD
RALEIGH, N. C. 27606

ATTENTION: DAN HOLDERMAN, PE

The outer envelope shall also bear the statement:

“Bid for State Highway Project WBS Element 14B.204414.3 for Bridge No. 47 in Haywood County.”

If delivered in person, the sealed envelope shall be delivered to the office of North Carolina Department of Transportation, Bridge Management Unit, 4809 Beryl Road, Raleigh, NC (South of the NC State Fairgrounds, directly south from Dorton Arena). All bids shall be delivered prior to the time specified in the invitation to bid. Bids received after 2:00 p.m., Tuesday, July 28, 2009 will not be accepted.

PROJECT SPECIAL PROVISIONS

I. GENERAL REQUIREMENTS

A. SCOPE OF WORK

This work shall consist of furnishing and installing a prestressed cored slab and box beam bridge; removal of the existing structure; clearing and grubbing; grubbing; excavation and embankment; installation of guardrail; roadway base course and pavement; construction of substructure and superstructure; grading within limits of the project; placement of rip rap; temporary erosion control; seeding and mulching; drainage; and all other incidental items necessary to complete the project as specified and shown on the plans. The Department will be responsible for placement of final pavement markings.

Only the construction centerline, control points with a reference station and benchmark location shall be furnished by the Bridge Management Unit on an initial one time basis. All other engineering, surveying, layout and measurements shall be the responsibility of the contractor.

B. LOCATION AND DESCRIPTION

The existing bridge consists of three spans for a total length = 121'; 1.5" asphalt wearing surface; on 4"x 8" timber deck on steel I-Beams; on timber end bent caps; on timber posts and sills with a clear roadway width of 24.6'; is located on SR 1318 (Grindstone Road) across Jonathan Creek, 0.1 miles west of junction SR 1321. This bridge shall be replaced by a cored slab/box beam bridge with three spans (one @ 30' (21" cored slab), one @ 70' (27" box beam), and one @ 35' (21" cored slab)) with an overall length of 135' on a 105 degree skew angle and 36' clear roadway width. (SEE BRIDGE LOCATION MAP)

C. CONTRACT TIME AND LIQUIDATED DAMAGES

The date of availability for this contract is the date the Contractor begins work but not before the issuance of the purchase order or later than August 17, 2009.

The completion date for this contract is 90 consecutive calendar days after the contractor begins work. No "in-stream" work can take place after October 15, 2009.

The liquidated damages for this contract time are Three Hundred Fifty Dollars (\$350.00) per calendar day. After award of the project, the Contractor shall notify the Engineer of his expected date for beginning work. Should the Contractor desire revise this date, he shall notify the

Engineer in writing at least thirty (30) days prior to the revised date.

D. CONSTRUCTION METHODS

The contractor shall perform all construction activities in accordance with the applicable requirements of the NCDOT Standard Specifications for Roads and Structures dated July 2006, except as otherwise specified herein.

Wherever reference is made in the Specifications to information shown in the plans, such information will be furnished by the Engineer.

E. SITE INVESTIGATION AND REPRESENTATION

The Contractor acknowledges that he has satisfied himself as to the nature of the work, and general and local conditions; particularly those bearing on transportation, availability of labor, State Regulations for safety and security of property, roads, and facilities required for the prosecution of the work and all matters which can in any way affect the work or cost thereof under this contract. Any failure by the Contractor to acquaint himself with all the available information concerning these conditions will not relieve him from the responsibility for estimating properly the difficulty of cost of successfully performing the work.

F. CONTROL OF EROSION, SILT AND POLLUTION

Control of erosion, siltation and pollution shall meet the requirements of section 107-13 of the Standard Specifications for Roads and Structures dated July 2006, and as shown on the plans.

The Contractor may, at his option, submit an alternate plan and sequence by submitting 3 copies of the proposed alternate to the Engineer for approval. Approval must be obtained before construction is started on the alternate plan.

In the event the erosion and sedimentation control plan is not followed or properly maintained, all other work shall be suspended until corrections are made.

G. WETLAND BUFFER FENCING

The outside buffer, wetland or water boundary located within the construction corridor shall be clearly marked by highly visible fencing prior to any land activities. Construction shall not exceed these areas.

H. MATERIALS AND TESTING

The Engineer reserves the right to perform all sampling and testing in Accordance with Section 106 of the Standard Specifications and the Department's "Material and Tests Manual". However, the Engineer may reduce the frequency of sampling and testing where he deems it appropriate for the project under construction. All material must be approved by the Engineer prior to being used.

I. TRAFFIC CONTROL

The Contractor will be required to give the Engineer a minimum of two (2) weeks written notice before starting work. The Department will be responsible for erection and maintenance of all traffic control devices except for the traffic barricades at the immediate site which shall be erected by the Department and maintained by the Contractor. The Department will be responsible for striping and all pavement markings.

J. INDEMNIFICATION

The Contractor shall indemnify, defend and save harmless, the State, the Department, and all of its officers, agents and employees from all damages, suits, actions or claims brought of any injuries or damages sustained by any person or property on account of the Contractor's operations in connection with the contract. It is specifically understood and agreed that this indemnification agreement does not cover or indemnify the Department for its own negligence, breach of contract, equipment failure or other circumstance of operation beyond the control of the Contractor. The Contractor shall be responsible for and indemnify and save the Department harmless for any and all damages to its property caused by the negligence of the Contractor, its employees or agents in carrying out this contract.

K. PROOF OF COVERAGE

Pursuant to N.C.G.S. § 97-19, all contractor/subcontractors of the Department of Transportation are required to show proof of coverage issued by a workers' compensation insurance carrier, or a certificate of compliance issued by the Department of Insurance for self-insured contractor/subcontractors stating that it has complied with N.C.G.S. § 97-93 irrespective of whether contractor/subcontractors have regularly in service fewer than three employees in the same business within the State of North Carolina, and contractor/subcontractors shall be hereinafter liable under the Workers' Compensation Act for payment of compensation and other benefits to its employees for any injury or death due to an occupational disease or injury-by-

accident arising out of and in the course and scope of performance of the work insured by the contractor or subcontractor. Proof is to be obtained prior to services beginning.

L. COMPENSATION

The Department agrees to pay the Contractor the total project bid cost including any bid item overruns, minus any liquidated damages, when he has satisfactorily completed the scheduled work described herein.

M. ADDITIONAL COMPENSATION and/or EXTENSION OF COMPLETION DATE

Any claims for additional compensation and/or extensions of the completion date shall be submitted to the Engineer with detailed justification within thirty (30) days after receipt of final invoice payment. The failure on the part of the Contractor to submit the claim(s) within thirty (30) days shall be a bar to recovery.

N. BASIS OF PAYMENT

Monthly partial payments will be made in accordance with Section 109-4 of the NCDOT Standard Specifications dated July 2006.

O. WORK PROCEDURES AND ASSIGNMENTS

1. ENGINEER

The Engineer for this project through issuance of a purchase order shall be the State Bridge Management Engineer, Division of Highways, North Carolina Department of Transportation, acting directly or through his duly authorized representatives.

After a purchase order is issued, the Engineer for this project shall be the Resident Engineer, Division of Highways, North Carolina Department of Transportation, acting directly or through his duly authorized representatives.

2. AUTHORITY OF THE ENGINEER

The Engineer will decide all questions which may arise as to the quality and acceptability of work performed and as to the rate of progress of the work; all questions which may arise as to the interpretation of the contract; and all questions as to the acceptable fulfillment of the contract on the part of the Contractor. His

decision shall be final and he shall have executive authority to enforce and make effective such decisions and orders as the Contractor fails to carry out promptly.

3. CONTRACTOR SUPERVISION

The Contractor shall have a responsible Supervisor for the purpose of supervising, scheduling and coordinating this contract with the Engineer.

4. AVAILABILITY

Provisions shall be made so that a Supervisor can be contacted at any time during the work day during the length of the contract.

P. COMPETITIVE PROPOSALS

Pursuant to the provisions of G.S. 143-54 under penalty of perjury, the signer of this proposal certifies this proposal has not been arrived at collusively nor otherwise in violation of Federal or North Carolina Anti-Trust Laws. All proposals must be signed by the owner or an officer of the firm.

Q. ACCEPTANCE AND REJECTION

The right is reserved by the Contracting Agency to accept or reject all proposals or to waive any informality in the proposals.

R. REMOVAL OF EXISTING STRUCTURE

The Contractor shall be responsible for complete removal of any remaining portion of the existing structures. The Contractor's attention is directed to Article 402-2 of the Standard Specifications.

S. UTILITY CONFLICTS

The Department will be responsible for the adjustment of any utility at the bridge site prior to the date of availability.

T. ASPHALT CONCRETE, TYPE B 25.0B & TYPE I 19.0B, & TYPE SF 9.5A

The quantity of Asphalt Concrete, Type B 25.0B and Type I 19.0B and Type SF 9.5A, measured as provided in Sections 610, including furnishing all materials placement, shall be paid for at the contract unit price per ton for "Asphalt Concrete Base Course and Surface Course; Types B 25.0B, I 19.0B

and SF 9.5A”.

The above price and payment shall be full compensation for completing the item in place. No other separate measurement of payment will be made.

U. CLASS II RIP RAP & CLASS B RIP RAP

Placement of all rip rap shall be in accordance with the Specifications. Compensation for filter fabric used in conjunction with rip rap will be included in the Contract unit price for Class II Rip Rap and Class B Rip Rap.

V. STEEL BM GUARDRAIL

Furnish all labor, equipment, materials and incidentals necessary to install guardrail as indicated on the plans, the Roadway Standard Drawings dated July 2006 and the Standard Specifications.

All work covered by this special provision shall be paid for at the unit bid price for “Steel BM Guardrail”.

The cost of guardrail delineators and the concrete barrier rails delineators shall be included in the unit bid price for “Steel BM Guardrail.”

II. EXCAVATION AND EMBANKMENT

Description:

Furnish all labor, equipment, materials, and incidentals necessary to complete applicable items of work defined in Division 2, Division 5, Section 410, Section 412, Section 414, and Section 416 of the July 2006 Standard Specifications for Roads and Structures.

Revise the *Standard Specifications* as follows:

Page 2-22, Article 235-4(B) Embankment Formation, add the following:

- 16) Do not place rock or broken pavement in embankment areas where piles or drilled shaft foundations are to be constructed. This shall include but not be limited to piles and foundations for structures, metal signal poles, overhead sign structures, and high mount lighting.

Materials:

All material shall conform to the Specifications or any applicable contract special provision.

Construction Methods:

All work shall be performed in accordance with the Specifications or any applicable contract special provision.

Basis of Payment:

All work covered by this section will be paid for at the contract lump sum price for "Excavation and Embankment".

III. CLEARING AND GRUBBING

Clearing and grubbing at the site shall have been performed in accordance with Article 200-3, 200-4 and 200-5 of the Standard Specifications. Perform clearing on this project to the limits established by Method "II" shown on Standard No. 200.02 of the *Roadway Standard Drawings*.

Payment for "Clearing and Grubbing" will be included at the lump sum bid price For "Excavation and Embankment". This price shall be full compensation for all materials, tools, equipment, labor, and for all incidentals necessary to complete the work.

IV. CONSTRUCTION OF SUBSTRUCTUREDescription:

The work covered by this special provision consists of furnishing all labor, equipment, materials, and incidentals necessary to complete the construction of the substructure as is defined in Article 101-3 of the July 2006 Standard Specifications for Roads and Structures.

Materials:

All material shall conform to the Specifications or any applicable contract special provision.

Construction Methods:

All work shall be performed in accordance with the contract plans and the Standard Specifications or any applicable contract special provision.

Basis of Payment:

All work covered by this section will be paid for at the contract lump sum price for “Construction of Substructure” except as noted below.

“HP 12 x 53 Steel Piles (Galvanized)” will be paid for in accordance with other provisions in this Contract.

V. CONSTRUCTION OF SUPERSTRUCTURE

Furnish and erect prestressed concrete cored slabs, prestressed concrete box beams, elastomeric bearings, precast concrete barrier rails on the bridge and applicable grouting.

Complete all work in accordance with the contract plans and the Standard Specifications except payment for these items will be as described below.

No measurement will be made for these items. The price and payment below will be full compensation for all work covered by this provision including but not limited to furnishing all materials, labor, tools, equipment and all incidentals necessary to complete the work.

Payment will be made under:

Construction of Superstructure.....Lump Sum

VI. GALVANIZING STEEL PILES 10-3-02

The provisions of Section 450 & 1076 of the 2006 Standard Specifications shall apply with the following exception:

Basic of Payment

The work covered by this provision will be included in the contract bid price per linear foot for “HP 12x53 Galvanized Steel Piles”. This compensation includes the galvanizing of pile bracing when required. The above prices and payments will be full compensation for all work covered by this provision including but not limited to furnishing all materials, labor, tools, equipment and all incidentals necessary to complete the work.

VII. PILES 3-6-09

Remove Section 450 of the *Standard Specifications* and replace with the following.

Description

Furnish and install steel and prestressed concrete piles with the required resistance, penetration into natural ground and embedment in the cap or footing in accordance with the contract and accepted submittals. Drive and drill in piles and use pile tips and

accessories as shown on plans. Preauger through embankments, galvanize, restrrike, redrive, splice, cut off and build up piles and perform pile driving analyzer (PDA) testing as necessary or required.

Materials

Refer to Division 10 of the *Standard Specifications*:

Item	Section
Flowable Fill, Non-Excavatable	340
Portland Cement Concrete	1000
Reinforcing Steel	1070
Steel Plates	1072
Steel and Prestressed Concrete Piles	1084

For drilled-in piles, use Class A Concrete in accordance with Article 1000-4 of the *Standard Specifications* except as modified herein. Provide concrete with a slump of 6 to 8 inches (150 to 200 mm). Use an approved high-range water reducer to achieve this slump.

For galvanized steel piles, see Section 1076 of the *Standard Specifications*. Use approved steel pile points and pile splicers. Obtain a list of approved pile points and splicers from: <https://apps.dot.state.nc.us/vendor/approvedproducts/>

Pile Lengths

The estimated pile lengths shown on the plans are for bid purposes only. Provide piles of sufficient lengths for the required resistance, penetration into natural ground and embedment in the cap or footing. At the Contractor's option and no additional cost to the Department, make investigations as necessary to determine required pile lengths.

Construction Methods

A. Handling and Storing Piles

Handle, transport and store piles so that piles are kept clean and undamaged. Do not use chains, cables or hooks that can damage or scar piles. Do not damage coatings on steel piles. When handling prestressed concrete piles, support piles at pick-up points as shown on the plans.

Protect steel piles as far as practicable from corrosion. Store piles above ground upon platform skids, or other supports, and keep free from dirt, grease, vegetation and other foreign material. Damaged, bent or cracked piles will be rejected.

B. Pile Installation

If applicable, completely excavate for caps and footings before installing piles. If applicable and unless noted otherwise on the plans, construct embankments to bottom of cap or footing elevations for a horizontal distance of 50 ft (15 m) from any pile except where fill slopes are within 50 ft (15 m) of a pile.

Install piles with the following tolerances.

1. Axial alignment within $\frac{1}{4}$ inch per foot (21 mm per meter) of vertical or batter shown on the plans
2. Horizontal alignment within 3" (75 mm) of plan location, longitudinally and transversely
3. Pile embedment in the cap or footing within 3" (75 mm) more and 2" (50 mm) less of the embedment shown on the plans

No additional payment will be made for increased cap or footing dimensions due to piles installed out of position.

If necessary, build up prestressed concrete piles or splice steel piles as shown on the plans. Do not use more than 3 sections (2 splices) of steel piling per pile. Cut off piles at required elevations along a plane normal to the axis of the pile as necessary. Do not damage or spall piles when cutting off prestressed concrete piles.

C. Pile Accessories

If required, use pile accessories including steel pile points, pipe pile plates and pile splicers as shown on the plans. Perform any welding in accordance with Article 1072-20 of the *Standard Specifications* and the accepted submittals. Weld steel plates with the specified dimensions to pipe piles as shown on the plans.

Attach steel pile points to steel piles in accordance with the manufacturer's instructions. The minimum weld length is twice the flange width for H piles.

Use steel pile tips with prestressed concrete piles as shown on the plans. Use pile splicers for splicing steel pile tips and attach pile splicers in accordance with the manufacturer's instructions.

D. Driven Piles

Drive piles in accordance with the accepted submittals and this provision. Unless otherwise approved, do not drive piles within 50 ft (15 m) of cast-in-place concrete until the concrete cures for at least 3 days.

When preaugering before driving piles or using a vibratory hammer to install the initial portions of steel piles, submit these pile installation methods with the proposed pile driving methods and equipment for review and acceptance. The Engineer will approve the preaugering depth, auger diameter and depth of pile installation with the vibratory hammer. Do not use vibratory hammers to install prestressed concrete piles.

Limit driving stresses in accordance with the *AASHTO LRFD Bridge Design Specifications*. If a tip elevation is noted on the plans, drive piles to the minimum required driving resistance and tip elevation. Otherwise, drive piles to the minimum required driving resistance and a penetration into natural ground of at least 10 ft (3 m). Also, drive piles to the required tip elevation or penetration into natural ground, whichever is lower, in a continuous operation unless stopped due to exceeding the maximum blow count or driving stresses, insufficient pile length or other approved reasons. Natural ground within an area of a new embankment is defined as the bottom of the embankment or footings, whichever is lower.

Protect coatings in an approved manner when driving steel piles through templates. Redrive piles raised or moved laterally due to driving adjacent piles.

1. Driving Equipment

Submit the proposed pile driving methods and equipment (pile driving equipment data form) including the pile driving hammer, hammer cushion, pile helmet and cushion for review and acceptance. Do not submit more than two pile driving hammers per pile type per submittal. Submit this information for review and acceptance at least 30 calendar days before driving piles. All equipment is subject to satisfactory field performance.

Drive piles with accepted driving equipment using air, steam or diesel hammers. Use pile driving hammers that will not overstress piles and provide the required driving resistance at a blows per foot ranging from 30 to 180. Use a variable energy hammer to drive prestressed concrete piles.

Operate air and steam hammers within the manufacturer's specified ranges and 10% of the manufacturer's rated speed in blows per minute or a rate approved by the Engineer. Use a plant and equipment for air or steam hammers with sufficient capacity to maintain, under working conditions, the volume and pressure specified by the manufacturer. Equip the plant and equipment with accurate pressure gauges that are easily accessible. Provide striking parts of air and steam hammers that weigh at least one-third the weight of the pile helmet and pile, with a minimum weight of 2,750 lbs.

Equip open-end (single acting) diesel hammers with a graduated scale (jump stick) extending above the ram cylinder, graduated rings or grooves

on the ram or an electric sound activated remote measuring instrument to determine the hammer stroke during driving. Equip closed-end (double acting) diesel hammers with a calibrated bounce chamber pressure gauge mounted near the ground and provide a current calibrated chart or graph equating bounce chamber pressure and gauge hose length to equivalent energy. Submit this chart or graph with the proposed pile driving methods and equipment for closed-end diesel hammers.

Hold pile heads in position with pile helmets that closely fit over the pile heads and extend down the sides of piles a sufficient distance. Protect pile heads of prestressed concrete piles from direct impact with accepted pile cushions. Use pile cushions made of pine plywood with a minimum thickness of 4" (100 mm). Unless otherwise approved, provide a new pile cushion for each prestressed concrete pile. Replace pile cushions during driving when a cushion is compressed more than one-half its original thickness or begins to burn.

The Engineer may inspect the hammer cushion before beginning driving and periodically throughout the project. Expose the hammer cushion for inspection as directed by the Engineer. Replace or repair any hammer cushion that is less than 25% of its original thickness.

2. Required Driving Resistance

The Engineer will determine the acceptability of the proposed pile driving methods and equipment and provide the blows per foot and equivalent set for 10 blows for the required driving resistance. The minimum required driving resistance is equal to the factored resistance noted on the plans plus any additional resistance for downdrag and scour, if applicable, divided by a resistance factor. When performing PDA testing in accordance with the *AASHTO LRFD Bridge Design Specifications*, the resistance factor is 0.75. Otherwise, the resistance factor for the wave equation analysis is 0.60.

Unless otherwise approved, stop driving piles when refusal is reached. Refusal is defined as 240 blows per foot or any equivalent set.

3. Redriving Piles

Once the required pile penetration is achieved, the Contractor may choose to or the Engineer may require the Contractor to stop driving, wait and restrike or redrive piles to achieve the required driving resistance. If the Contractor chooses to restrike or redrive piles, no payment will be made for restrikes or redrives. If the Engineer requires the Contractor to restrike or redrive piles, payment will be made in accordance with this provision. When the Engineer requires restrikes or redrives, the Engineer will

determine the number of restrikes or redrives and the time to wait after stopping driving and between restrikes and redrives. The time to wait will range from 4 to 24 hours.

Use the same pile driving methods, equipment and compressed pile cushion from the previous driving to restrike or redrive the pile unless the cushion is unacceptable due to deterioration. Do not use a cold diesel hammer for a restrike or redrive, unless it is impractical to do otherwise as determined by the Engineer. In general, warm up the hammer by applying at least 20 blows to a previously driven pile or timber mats on the ground.

4. Pile Driving Analyzer

If required, test piles with a pile driving analyzer (PDA) manufactured by Pile Dynamics, Inc., analyze data and provide PDA reports. Perform PDA testing in accordance with ASTM D4945. Either the Engineer will perform the PDA testing and analysis or use a PDA Consultant prequalified by the NCDOT Contractual Services Unit for Pile Driving Analyzer Work (work code 3060) to perform the PDA testing and analysis and provide a PDA report.

The Engineer will determine the number of piles and which piles to be tested with a PDA. Do not drive piles with a PDA until the proposed pile driving methods and equipment has been preliminarily accepted. Notify the Engineer of the pile driving schedule a minimum of 7 calendar days in advance.

The Engineer will complete the review and acceptance of the proposed pile driving methods and equipment and provide the blows per foot and equivalent set for 10 blows for the required driving resistance within 10 calendar days after the Engineer receives the PDA report or the Engineer finishes PDA testing. A PDA report for or PDA testing on multiple piles may be required as determined by the Engineer before the 10 day time period begins.

a. Preparation

Provide piles for PDA testing that are 5 ft (1.5 m) longer than the estimated pile lengths shown on the plans. Supply an AC electrical power source of a voltage and frequency suitable for computer equipment.

Provide a shelter to protect the PDA equipment and operator from conditions of sun, water, wind and temperature. The shelter should have a minimum floor size of 6 ft by 6 ft (1.8 m by 1.8 m) and a minimum roof height of 8 ft (2.4 m). If necessary, heat or cool the

shelter to maintain a temperature between 50 and 85 degrees F (10 and 30 degrees C). Place the shelter within 75 ft (23 m) of the pile such that the PDA cables reach the computer and the operator can clearly observe the pile. The Engineer may waive the shelter requirement if weather conditions allow.

Drill up to a total of 16 bolt holes in either 2 or 4 sides of the pile, as directed by the PDA Consultant or Engineer, at an approximate distance equal to 3 times the pile diameter below the pile head. If the PDA Consultant or Engineer chooses to drill the bolt holes, provide the necessary equipment, tools and assistance to do so. A hammer drill is required for concrete piles. Allow for 2 hours per pile to drill holes.

Lift, align and rotate the pile to be tested with a PDA as directed by the PDA Consultant or Engineer. Place the pile in the leads and template so that the PDA instruments and their accompanying wires will not be damaged. Attach PDA instruments as directed by the PDA Consultant or Engineer after the pile is placed in the leads and the template.

b. Testing

If required, reattach the PDA instruments and restrike or redrive the pile in accordance with this provision. Obtain the required stroke and at least 6" (150 mm) of penetration as directed by the PDA Operator or Engineer. Dynamic measurements will be recorded during restriking and redriving. The Engineer will determine when PDA testing has been satisfactorily completed.

The Contractor is responsible in terms of both actual expense and time delays for any damage to the PDA instruments and supporting equipment due to the Contractor's fault or negligence. Replace any damaged equipment at no additional cost to the Department.

c. Analysis

When using a PDA Consultant, analyze data with the CAsE Pile Wave Analysis Program (CAPWAP), version 2006 or later. At a minimum, analysis is required for a hammer blow near the end of initial drive and for each restrike and redrive. Additional CAPWAP analysis may be required as determined by the PDA Consultant or Engineer.

d. Report

When using a PDA Consultant, submit three hard copies and an electronic copy (PDF on CD or DVD) of PDA reports sealed by a Professional

Engineer registered in North Carolina within 7 calendar days of completing field testing. Include the following in the PDA Report:

- i. Title Sheet
 - NCDOT TIP number and WBS element number
 - Project description
 - County
 - Bridge station number
 - Pile location
 - Personnel
 - Report date
- ii. Introduction
- iii. Site and Subsurface Conditions (including water table elevation)
- iv. Pile Details
 - Pile type and length
 - Required driving resistance and resistance factor
 - Concrete compressive strength and/or steel pile yield strength
 - Pile splice type and locations
 - Pile batter
 - Installation methods including use of jetting, preaugering, spudding, vibratory hammer, template, barge, etc.
- v. Driving Details
 - Hammer make, model and type
 - Hammer and pile cushion type and thickness
 - Pile helmet weight
 - Hammer efficiency and operation data including fuel settings, bounce chamber pressure, blows per minute, equipment volume and pressure
 - Ground or mud line elevation and template reference elevation at the time of driving
 - Final pile tip elevation
 - Driving data (ram stroke, blows per foot (0.3 meter) and set for last 10 hammer blows)
 - Restrike and redrive information

vi. PDA Field Work Details

vii. CAPWAP Analysis Results

- Table showing percent skin and tip, skin and toe damping, skin and toe quake and match quality

viii. Summary/Conclusions

ix. Attachments

- Boring log(s)
- Pile driving equipment data form (from Contractor)
- Field pile driving inspection data (from Engineer)
- Accelerometer and strain gauge locations
- Accelerometer and strain gauge serial numbers and calibration information
- PDA hardware model and CAPWAP software version information
- Electronic copy of all PDA data and executable CAPWAP input and output files

E. Drilled-in Piles

If required, perform pile excavation to specified elevations shown on the plans. Excavate holes with diameters that will result in at least 3" (75 mm) of clearance all around piles. Before filling holes, support and center piles in excavations and when noted on the plans, drive piles to the required driving resistance. Remove any fluid from excavations, and at the Contractor's option, fill holes with either concrete or flowable fill unless required otherwise in the contract.

1. Pile Excavation

Use equipment of adequate capacity and capable of drilling through soil, rock, boulders, debris, man-made objects and any other materials encountered. Blasting is not permitted to advance excavations. Blasting for core removal is only permitted when approved by the Engineer. Dispose of drilling spoils in accordance with Section 802 of the *Standard Specifications* and as directed by the Engineer. Drilling spoils consist of all excavated materials including fluids removed from excavations by pumps or drilling tools.

If unstable, caving or sloughing soils are anticipated or encountered, stabilize excavations with either slurry or steel casing. When using slurry, submit slurry details including product information, manufacturer's recommendations for use, slurry equipment details and written approval

from the slurry supplier that the mixing water is acceptable before beginning drilling. When using steel casing, use either the sectional type or one continuous corrugated or non-corrugated piece. Steel casings should consist of clean watertight steel of ample strength to withstand handling and driving stresses and the pressures imposed by concrete, earth and backfill. Use steel casings with an outside diameter equal to the hole size and a minimum wall thickness of ¼ inch (6 mm).

2 .Filling Holes

Check the water inflow rate at the bottom of holes after all pumps have been removed. If the inflow rate is less than 6” (150 mm) per half hour, remove any fluid and free fall concrete or flowable fill into excavations. Ensure that concrete or flowable fill flows completely around piles. If the water inflow rate is greater than 6” (150 mm) per half hour, propose and obtain acceptance of a procedure for placing concrete or flowable fill before filling holes. Place concrete or flowable fill in a continuous manner and remove all casings.

Basic of Payment

The work covered by this provision will be included in the contract bid price “Construction of Substructure”.

VIII. GROUT FOR STRUCTURES 7-12-07

Description:

This special provision addresses grout for use in structures, including continuous flight auger (CFA) piles, micropiles, soil nail and anchored retaining walls and backfilling crosshole sonic logging (CSL) tubes or grout pockets, shear keys, dowel holes and recesses for cored slabs and box beams. This provision does not apply to grout placed in post-tensioning ducts for bridge beams, girders, or decks. Provide grout composed of portland cement, water and at the Contractor’s option, fine aggregate and/or pozzolan. If necessary, use set controlling admixtures. Proportion, mix and place grout in accordance with the plans, the applicable section of the *Standard Specifications* or special provision for the application and this provision.

Materials

Refer to Division 10 of the *Standard Specifications*:

Item	Article
Portland Cement	1024-1
Water	1024-4

Fine Aggregate	1014-1
Fly Ash	1024-5
Ground Granulated Blast Furnace Slag	1024-6
Admixtures	1024-3

At the Contractor's option, use an approved packaged grout in lieu of the materials above with the exception of the water. Contact the Materials and Tests (M&T) Unit for a list of approved packaged grouts. Consult the manufacturer to determine if the packaged grout selected is suitable for the application and meets the compressive strength and shrinkage requirements.

Requirements

Unless required elsewhere in the Contract, provide non-metallic grout with minimum compressive strengths as follows:

Property	Requirement
Compressive Strength @ 3 days	2500 psi (17.2 MPa)
Compressive Strength @ 28 days	4500 psi (31.0 MPa)

For applications other than micropiles, soil nails and ground anchors, use non-shrink grout with shrinkage of less than 0.15%.

When using approved packaged grout, a grout mix design submittal is not required. Submit grout mix designs in terms of saturated surface dry weights on M&T Form 312U in accordance with the applicable section of the *Standard Specifications* or special provision for the structure. Use an approved testing laboratory to determine the grout mix proportions. Adjust proportions to compensate for surface moisture contained in the aggregates at the time of mixing. Changes in the saturated surface dry mix proportions will not be permitted unless a revised grout mix design submittal is accepted.

For each grout mix design, provide laboratory test results for compressive strength, density, flow and if applicable, aggregate gradation and shrinkage. Submit compressive strength for at least 3 cube and 2 cylinder specimens at the age of 3, 7, 14 and 28 days for a total of at least 20 specimens tested. Perform laboratory tests in accordance with the following:

Property	Test Method
Compressive Strength	AASHTO T106 and T22
Density	AASHTO T133
Flow for Sand Cement Grout	ASTM C939 (as modified below)
Flow for Neat Cement Grout (no fine aggregate)	Marsh Funnel and Cup API RP 13B-1, Section 2.2
Aggregate Gradation for Sand Cement Grout	AASHTO T27

Shrinkage for Non-shrink Grout	ASTM C1090
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When testing grout for flow in accordance with ASTM C939, modify the flow cone outlet diameter from $\frac{1}{2}$ to $\frac{3}{4}$ inch (13 to 19 mm).

When grout mix designs are submitted, the Engineer will review the mix designs and notify the Contractor as to their acceptability. Do not use grout mix designs until written acceptance has been received. Acceptance of grout mix designs or use of approved packaged grouts does not relieve the Contractor of responsibility to furnish a product that meets the Contract requirements.

Upon written request from the Contractor, a grout mix design accepted and used satisfactorily on a Department project may be accepted for use on other projects.

Sampling and Placement

The Engineer will determine the locations to sample grout and the number and type of samples collected for field and laboratory testing. Use API RP 13B-1 for field testing grout flow and density of neat cement grout. 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.

Do not place grout if the grout temperature is less than 50°F (10°C) or more than 90°F (32°C) or if the air temperature measured at the location of the grouting operation in the shade away from artificial heat is below 40°F (4°C).

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. Place grout before the time between adding the mixing water and placing the grout exceeds that in the table below.

ELAPSED TIME FOR PLACING GROUT (with continuous agitation)		
Air or Grout Temperature Whichever is Higher	Maximum Elapsed Time	
	No Set Retarding Admixture Used	Set Retarding Admixture Used
90°F (32°C) or above	30 min.	1 hr. 15 min.
80°F (27°C) through 89°F (31°C)	45 min.	1 hr. 30 min.
79°F (26°C) or below	60 min.	1 hr. 45 min.

Miscellaneous

Comply with Articles 1000-9 through 1000-12 of the *Standard Specifications* to the extent applicable for grout in lieu of concrete.

IX. PRESTRESSED CONCRETE MEMBERS 4-2-07

The 2006 Standard Specifications shall be revised as follows:

In Section 1078-1 “General” of the Standard Specifications, add the following after the second paragraph:

(A) Producer Qualification

Producers of precast, prestressed concrete members are required to establish proof of their competency and responsibility in accordance with the Precast/Prestressed Concrete Institute’s (PCI) Plant Certification Program in order to perform work for the project. Certification of the manufacturing plant under the PCI program and submission of proof of certification to the State Materials Engineer is required prior to beginning fabrication. Maintain certification at all times while work is being performed for the Department. Submit proof of certification following each PCI audit to the State Materials Engineer for continued qualification. These same requirements apply to producers subcontracting work from the producer directly employed by the Contractor.

Employ producers PCI certified in Product Group B, Bridge Products, and in one of the appropriate categories as listed below:

- B2 Prestressed Miscellaneous Bridge Products: Includes solid piles, sheet piles and bent caps.
- B3 Prestressed Straight-Strand Bridge Members: Includes all box beams, cored slabs, straight-strand girders and bulb-tees, bridge deck panels, hollow piles, prestressed culverts and straight strand segmental components.

- B4 Prestressed Deflected-Strand Bridge Members: Includes deflected strand girders and bulb-tees, haunched girders, deflected strand segmental superstructure components and other post-tensioned elements.

Categories for other elements will be as required by the project special provision or plans.

X. DRILLED PIERS 3-6-09

GENERAL

A. Description

A drilled pier consists of a reinforced concrete section cast-in-place against in situ material or permanent steel casing. A drilled pier is constructed by drilling a borehole, placing reinforcement in the excavation and filling the hole with concrete. Construct drilled piers with the required resistance and dimensions in accordance with the contract and accepted submittals. For this provision, "pier" refers to a drilled pier.

B. Prequalification and Experience Requirements

Use a Drilled Pier Contractor prequalified by the NCDOT Contractual Services Unit for drilled pier work (work code 3090).

Submit documentation that the Drilled Pier Contractor has successfully completed at least 5 drilled pier projects within the last 3 years with diameters, lengths and subsurface conditions similar to those anticipated for this project. Documentation should include the General Contractor and Owner's name and current contact information with descriptions of each past project. Also, submit documentation of experience with dry and wet placement of concrete and the use of temporary casing or slurry.

Provide verification of employment with the Drilled Pier Contractor for the Superintendent, Drill Rig Operators and Project Manager assigned to this project. Submit documentation that these personnel each have a minimum of 5 years experience in drilled pier construction with past projects of scope and complexity similar to that anticipated for this project. Documentation should include resumes, references, certifications, project lists, experience descriptions and details, etc. Perform work with the personnel submitted and accepted. If personnel changes are required during construction, suspend drilled pier construction until replacement personnel are submitted and accepted.

C. Construction Sequence Plan

Submit two hard copies and an electronic copy (PDF format on CD or DVD) of a drilled pier construction sequence plan for all the drilled piers 30 calendar days before

beginning drilled pier construction. Provide detailed project specific information in this plan including:

1. Experience documentation in accordance with Section 1.0, Item B
2. List and size of equipment including: cranes, kelly bars, drill rigs, vibratory hammers, augers, core barrels, cleanout buckets, airlifts and/or submersible pumps, tremies and/or concrete pumps, casing (diameters, thicknesses and lengths), desanding equipment (for slurry construction), etc.
3. Order of drilled pier construction
4. Casing installation and temporary casing removal methods including the order of telescoped casing removal
5. Drilled pier excavation and bottom cleaning methods
6. Reinforcement placement methods including how the cage will be supported and centered in the excavation
7. Concrete placement procedures including how the tremie or pump will be controlled and what type of discharge control will be used to prevent concrete contamination when the tremie or pump is initially placed in the excavation
8. Concrete mix design in accordance with Section 1000 of the Standard Specifications
9. Slurry details (if applicable) including intended purpose, product information, manufacturer's recommendations for use, slurry equipment information and written approval from the slurry supplier that the mixing water is acceptable
10. Procedures for handling drilling spoils and slurry overflow including environmental controls to prevent the loss of concrete, slurry and spoils
11. Methods of how the slurry level will be maintained above the highest piezometric head (if applicable)
12. Crosshole sonic logging (CSL) submittals (if applicable) in accordance with the Crosshole Sonic Logging Special Provision
13. Other information shown on the plans or requested by the Engineer

Do not begin drilled pier construction until the construction sequence plan is accepted. If alternate drilled pier construction procedures are proposed or necessary, a revised submittal may be required. If the work deviates from the accepted submittal without prior approval, the Engineer may suspend drilled pier construction until a revised drilled pier construction sequence plan is submitted and accepted.

D. Preconstruction Meeting

Before starting drilled pier construction, conduct a preconstruction meeting to discuss the installation, monitoring and testing of the drilled piers. Schedule this meeting after all drilled pier submittals have been accepted and the Drilled Pier Contractor has mobilized to the site. The Resident or Bridge Maintenance Engineer, Bridge Construction Engineer, Geotechnical Operations Engineer, Contractor and Drilled Pier Contractor Superintendent, Drill Rig Operators and Project Manager will attend this preconstruction meeting.

E. Definition of Rock

For the purposes of this provision, "rock" is defined as a continuous intact natural material in which the penetration rate with a rock auger is less than 2" (50 mm) per 5 minutes of drilling at full crowd force. This definition excludes discontinuous loose natural materials such as boulders and man-made materials such as concrete, steel, timber, etc. This definition of rock is not for pay purposes; see Section 8.0 for method of measurement for drilled piers.

F. Rock Socket

When required by a note on plans, provide a minimum penetration into rock as directed by the Engineer.

EXCAVATION

Perform the excavations required for the drilled piers to the dimensions and elevations shown on the plans or otherwise required by the Engineer, including any miscellaneous grading or excavation to install the pier.

Excavate with a drill rig of adequate capacity. Use a rig that is capable of drilling through soil, rock, boulders, timbers, man-made objects and any other materials encountered. Blasting is not permitted to advance the excavation. Blasting for core removal is only permitted when approved by the Engineer.

Use a drill rig capable of drilling a minimum of 25% deeper than the deepest drilled pier shown on the plans. Use drilling tools equipped with vents designed to stabilize the hydrostatic pressure above and below the tool during extraction from the excavation. For drilled piers constructed with slurry, monitor the rate at which the drilling tools are inserted and extracted so as to minimize sidewall suction action in the excavation. Drilling below the tip elevations shown on the plans may be required to achieve adequate resistance.

A drilling log signed by the Drilled Pier Contractor that includes material descriptions and depths and drilling times and tools used for each material is required for each pier.

Dispose of drilling spoils in accordance with Section 802 of the Standard Specifications and as directed by the Engineer. Drilling spoils consist of all excavated material including water removed from the excavation either by pumping or drilling tools. Construct drilled piers at the locations shown on the plans and within the tolerances specified herein. If tolerances are exceeded, the Engineer may require corrective measures to meet the tolerances specified. Construct the drilled piers such that the axis at the top of the piers is no more than 3" (75 mm) in any direction from the position shown in the plans. Construct drilled piers within 2% of plumb for the total length of the piers. Verify plumbness of drilled pier excavations with an approved method such as an inclinometer on the kelly bar. Unless a plan note requires the construction joint to be moved below the ground line, construct the finished top of pier elevation between 1 inch (25 mm) above and 3" (75 mm) below the top of pier elevation shown on the plans.

When drilling from a barge, use a fixed template that maintains pier position and alignment during all excavation and concrete placement operations. Floating templates (attached to a barge) are not allowed.

Stabilize all drilled pier excavations with steel casing and/or slurry except, as approved by the Engineer, the portions of the excavations in rock as defined by Section 1.0, Item E. Stabilize excavations at all times from the beginning of drilling through concrete placement. When using multiple casings in a telescoped arrangement, overlap subsequent casings a minimum of 24" (600 mm). Provide casing or slurry in rock if unstable material is anticipated or encountered during drilling. When slurry is used, a partially excavated pier is subject to the time requirements in Section 2.0, Item C, Number 1. When slurry is not used, do not leave a drilled pier excavation open overnight unless it is cased to rock.

If a note on plans does not prohibit dewatering and the tip of the drilled pier excavation is in rock as defined by Section 1.0, Item E, dewater the excavation to the satisfaction of the Engineer. The minimum diameter of a drilled pier excavation in rock or an excavation constructed with slurry may be 2" (50 mm) less than the design drilled pier diameter shown on the plans.

In order to remove a casing and substitute a larger diameter or longer casing through unstable or caving material, either backfill the excavation, stabilize the excavation with slurry before removing the casing to be replaced or insert the larger casing around the casing to be replaced before removal.

A. Permanent Steel Casing

Use permanent steel casings as directed by the Engineer and/or as required by a note on plans. Use permanent casings that are clean smooth non-corrugated watertight steel of ample strength to withstand handling and driving stresses and the pressures imposed by concrete, earth or backfill. Provide permanent steel casings conforming to ASTM A252, Grade 2 and the following minimum wall thickness requirements.

CASING WALL THICKNESS

Casing Diameter	Minimum Wall Thickness
Less than or equal to 48" (1220 mm)	3/8 inch (9 mm)
Greater than 48" (1220 mm) and less than or equal to 78" (1982 mm)	1/2 inch (12 mm)
Greater than 78" (1982 mm)	5/8 inch (16 mm)

Provide permanent casings with an outside diameter not less than the specified size of the drilled pier. If approved by the Engineer, a permanent casing larger in diameter than the drilled pier design diameter is permitted. However, no payment will be made for any costs associated with larger permanent casings. Extend the permanent casings from the top of pier elevation or top of permanent casing elevation, if shown on the plans, to a depth no deeper than the permanent casing tip elevation shown on the plans or the revised permanent casing tip elevation approved by the Engineer. Do not extend permanent casings below the permanent casing tip elevation shown on the plans without prior approval from the Engineer. Additional drilled pier length and reinforcement may be required if permanent casings are extended below the permanent casing tip elevation shown on the plans. No payment will be made for the resulting additional drilled pier length, reinforcement and permanent casing unless the Engineer approves the revised permanent casing tip elevation. Install permanent casings in one continuous unit. If splices are necessary for the casing, use an approved method of splicing. Splices are considered incidental and no additional compensation will be made.

Remove any portion of the permanent steel casing that extends above the top of the drilled pier after the Drilled Pier Concrete has achieved a compressive strength of 3000 psi (20.7 MPa).

B. Temporary Steel Casing

Provide temporary steel casing to stabilize drilled pier excavations, protect personnel and prevent caving or sloughing, that is clean smooth non-corrugated watertight steel of ample strength to withstand handling and driving stresses and the pressures imposed by concrete, earth or backfill. Use temporary steel casings with a minimum wall thickness of 3/8 inch (9 mm) and an outside diameter not less than the specified size of the drilled pier.

Temporary steel casings that become bound or fouled during construction and cannot be practically removed may constitute a defect in the drilled pier. Improve defective piers to the satisfaction of the Engineer by removing the concrete and extending the pier deeper, providing a replacement drilled pier or other acceptable means. Complete all corrective measures including any additional design work to the satisfaction of the Engineer without additional compensation or an extension of the completion date of the project.

C. Slurry

When slurry use is not noted on the plans, slurry construction is an option. If slurry use is required or an option, polymer slurry use may either be required or prohibited as noted on the plans. If slurry use is required or an option and polymer slurry use is not noted on the plans, polymer slurry use is an option.

If polymer slurry is required or an option, use one of the following polymers listed in the table below:

PRODUCT	MANUFACTURER
SlurryPro CDP	KB Technologies Ltd. 3648 FM 1960 West, Suite 107 Houston, TX 77068 (800) 525-5237
Super Mud	PDS Company 105 West Sharp Street El Dorado, AR 71730 (800) 243-7455
Shore Pac	CETCO Construction Drilling Products 1500 West Shure Drive, 5 th Floor Arlington Heights, IL 60004 (800) 527-9948
Novagel Polymer	Geo-Tech Drilling Fluids 220 North Zapata Hwy, Suite 11A Laredo, TX 78043 (210) 587-4758

Use polymer slurry and associated additives in accordance with the manufacturer's guidelines and recommendations unless otherwise approved by the Engineer. The Drilled Pier Contractor should be aware that polymer slurry might not be appropriate for a given site. Polymer slurry should not be used for excavations in soft or loose soils as determined by the Engineer. When using polymer slurry, provide a representative employed by the slurry manufacturer to assist and guide the Drilled Pier Contractor on-site during the construction of the first 3 drilled piers unless otherwise approved. If problems are encountered during construction, the Engineer may require the manufacturer representative to return to the site for a time period determined by the Engineer at no additional cost to the Department.

If mineral slurry is required or an option, use mineral slurry composed of bentonite having a mineral grain size that remains in suspension and sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system to minimize bottom sedimentation. Provide bentonite slurry to maintain the stability of the excavation and allow for proper concrete placement. The Drilled Pier Contractor should be aware that salt water with salt concentrations in excess of 500 ppm may adversely affect bentonite slurry.

When slurry is used and permanent steel casing is not required, use temporary casing a minimum of 10 ft (3 m) long at the top of the excavation. Maintain the top

of the temporary casing a minimum of 12" (300 mm) above the ground surface surrounding the casing.

Maintain the slurry in the pier excavation at a level not less than 5 ft (1.5 m) or the drilled pier diameter (whichever is greater) above the highest piezometric head along the depth of the pier. It is anticipated that the highest piezometric head is the static water or groundwater elevation (elevation head). However, the Drilled Pier Contractor is responsible for determining the highest piezometric head. The use of steel casing to maintain the required slurry level is permitted; however, no payment will be made for casing that is used for this purpose. If the slurry level in the excavation suddenly changes or cannot be practically maintained, or the slurry construction method does not produce the desired result, stop the pier construction until an alternate construction procedure is accepted by the Engineer.

Thoroughly premix the slurry with water in tanks before introducing the slurry into the excavation. Submit written approval from the slurry supplier that the mixing water is acceptable. Allow bentonite slurry to hydrate 24 hours in tanks before use. Slurry tanks of adequate capacity are required for slurry circulation, storage and treatment. Excavated slurry pits are not allowed in lieu of slurry tanks without prior approval from the Engineer. Take all steps necessary to prevent the slurry from "setting up" in the excavation. Such methods include, but are not limited to agitation, circulation and/or adjusting the properties of the slurry. Perform desanding operations as necessary to achieve the acceptable sand contents before placing reinforcing steel.

1. Time

Adjust the excavation operations so that the maximum time the slurry is in contact with the sidewalls of the uncased portions of the drilled pier excavation (from time of drilling to concrete placement) does not exceed 36 hours. Do not work on more than two drilled piers per drill rig below the steel casing at any time.

Agitate bentonite slurry in the drilled pier excavations a minimum of every 4 hours. If the bentonite slurry is not agitated a minimum of every 4 hours, the Engineer may require the excavation to be overreamed beneath the steel casing a minimum of 1 inch (25 mm) and a maximum of 3" (75 mm) before performing any other operations in the excavation. Overream with a grooving tool, overreaming bucket or other approved equipment at a minimum spacing of 12" (300 mm).

If concrete placement is not completed within 3 calendar days of beginning drilling, enlarge the design drilled pier diameter by a minimum of 6" (150 mm), or as required by the Engineer, the entire length of the pier at no additional cost to the Department. Enlarging the drilled pier includes replacing the steel casing with steel casing the same size to which the drilled pier is enlarged at no additional cost to the Department.

2. Sampling

Collect all slurry samples using an approved sampling tool. Test slurry samples to determine density, viscosity, pH and sand content to establish an acceptable working pattern during slurry use. Test a minimum of 4 samples during each 8 hours of slurry use for each drilled pier. Take the first sample for the first 8 hours from the slurry tank before introducing slurry into the excavation. Collect the remaining samples from the bottom of the pier excavation. When the test results are acceptable and consistent, a decrease in the testing frequency to one sample per 4 hours of slurry use is permitted.

Before placing reinforcing steel in the drilled pier excavation, extract slurry samples from the bottom of each excavation and at intervals not exceeding 10 ft (3 m) up the excavation, until two consecutive samples produce acceptable values for density, viscosity, pH and sand content.

3. Testing

Have qualified personnel conduct slurry tests to determine density, viscosity, pH and sand content. The following tables show the acceptable range of values for the slurry properties:

BENTONITE SLURRY
Sodium Montmorillonite (Commercial Bentonite)
Acceptable Range of Values

Property (units)	At Time of Slurry Introduction	In Excavation Immediately Before Concrete Placement	Test Method
Density, pcf (kg/m ³)	64.3 – 69.1 (1030- 1107)	64.3 – 75.0 (1030- 1201)	Mud Weight (Density) API 13B-1 Section 1
Viscosity, sec./quart (sec./0.95 liters)	28 – 45	28 – 45	Marsh Funnel and Cup API 13B-1 Section 2.2
pH	8 – 11	8 – 11	pH Paper or Glass Electrode pH Meter
Sand Content (percent)	Less than or equal to 4	Less than or equal to 2	Sand API 13B-1 Section 5

Notes:

1. Perform tests when the slurry temperature is above 40°F (4.4°C).
2. Increase density by 2 pcf (32 kg/m³) in saltwater.

SLURRYPRO CDP
KB Technologies Ltd.
Acceptable Range of Values

Property (units)	At Time of Slurry Introduction	In Excavation Immediately Before Concrete Placement	Test Method
Density, pcf (kg/m^3)	Less than or equal to 67 (1073)	Less than or equal to 64 (1025)	Mud Weight (Density) API 13B-1 Section 1
Viscosity, sec./quart (sec./0.95 liters)	50 – 120	Less than or equal to 70	Marsh Funnel and Cup API 13B-1 Section 2.2
pH	6 – 11.5	6 – 11.5	pH Paper or Glass Electrode pH Meter
Sand Content (percent)	Less than or equal to 0.5	Less than or equal to 0.5	Sand API 13B-1 Section 5

Notes:

1. Perform tests when the slurry temperature is above 40°F (4.4°C).
2. Increase density by 2 pcf (32 kg/m^3) in saltwater.

SUPER MUD
PDS Company
Acceptable Range of Values

Property (units)	At Time of Slurry Introduction	In Excavation Immediately Before Concrete Placement	Test Method
Density, pcf (kg/m ³)	Less than or equal to 64 (1025)	Less than or equal to 64 (1025)	Mud Weight (Density) API 13B-1 Section 1
Viscosity, sec./quart (sec./0.95 liters)	32 – 60	Less than or equal to 60	Marsh Funnel and Cup API 13B-1 Section 2.2
pH	8 – 10	8 – 10	pH Paper or Glass Electrode pH Meter
Sand Content (percent)	Less than or equal to 0.5	Less than or equal to 0.5	Sand API 13B-1 Section 5

Notes:

1. Perform tests when the slurry temperature is above 40°F (4.4°C).
2. Increase density by 2 pcf (32 kg/m³) in saltwater.

SHORE PAC
CETCO Construction Drilling Products
Acceptable Range of Values

Property (units)	At Time of Slurry Introduction	In Excavation Immediately Before Concrete Placement	Test Method
Density, pcf (kg/m ³)	Less than or equal to 64 (1025)	Less than or equal to 64 (1025)	Mud Weight (Density) API 13B-1 Section 1
Viscosity, sec./quart (sec./0.95 liters)	32 – 98	Less than or equal to 75	Marsh Funnel and Cup API 13B-1 Section 2.2
pH	8 – 10	8 – 10	pH Paper or Glass Electrode pH Meter
Sand Content (percent)	Less than or equal to 0.5	Less than or equal to 0.5	Sand API 13B-1 Section 5

Notes:

1. Perform tests when the slurry temperature is above 40°F (4.4°C).
2. Increase density by 2 pcf (32 kg/m³) in saltwater.

NOVAGEL POLYMER
Geo-Tech Drilling Fluids
Acceptable Range of Values

Property (units)	At Time of Slurry Introduction	In Excavation Immediately Before Concrete Placement	Test Method
Density, pcf (kg/m ³)	Less than or equal to 67 (1073)	Less than or equal to 64 (1025)	Mud Weight (Density) API 13B-1 Section 1

Viscosity, sec./quart (sec./0.95 liters)	45 – 104	Less than or equal to 104	Marsh Funnel and Cup API 13B-1 Section 2.2
pH	6.5 – 11.5	6.5 – 11.5	pH Paper or Glass Electrode pH Meter
Sand Content (percent)	Less than or equal to 0.5	Less than or equal to 0.5	Sand API 13B-1 Section 5

Notes:

1. Perform tests when the slurry temperature is above 40°F (4.4°C).

2. Increase density by 2 pcf (32 kg/m³) in saltwater.

When any slurry samples are found to be unacceptable, take whatever action is necessary to bring the slurry within specification requirements. Do not place reinforcing steel until resampling and testing produce acceptable results.

Sign and submit reports of all slurry tests required above to the Engineer upon completion of each drilled pier. The Department reserves the right to perform comparison slurry tests at any time.

4. Slurry Disposal

Comply with all applicable local, state and federal regulations, as well as with the environmental permits of the project when disposing of excavated materials contaminated with slurry. Keep all excavated materials, spoils from the desanding unit and slurry out of the water and contain them at all times.

CLEANING

Excavate the bottom of the drilled pier to a level plane or stepped with a maximum step height of 12" (300 mm). Clean the bottom of the excavation of loose material using a technique accepted in the construction sequence plan. When the drilled pier excavation is not hand cleaned, clean the bottom of the excavation with a cleanout bucket and an airlift or submersible pump.

INSPECTION METHODS AND REQUIREMENTS

After the drilled pier excavation is complete and immediately before placing reinforcing steel and concrete, demonstrate the proper condition of the drilled pier excavation to the Engineer. Provide bosun chairs, gas meters, safety equipment, lights, mirrors, weighted tape measures, steel probes, personnel and all assistance required for the Engineer to inspect the drilled pier excavations.

A. Tip Resistance

If the required tip resistance is not satisfied, increase the drilled pier length as directed by the Engineer. Payment for the additional drilled pier length to achieve adequate resistance will be made per the drilled pier pay items.

One or more of the following tests may be used to verify the conditions and continuity of the material below the tip elevation before placing reinforcing steel.

1. Visual Inspection

The drilled pier excavation may be inspected either by entering the excavation or visually from the top of the excavation.

2. Test Hole

If the tip of the drilled pier excavation is in rock as defined by Section 1.0, Item E, drill a 1-1/2 inch (38 mm) diameter test hole in each drilled pier to a depth at least 6 ft (1.8 m) below the tip elevation.

3. Standard Penetration Test (SPT)

When noted on the plans that an SPT is required, drive a split barrel sampler a minimum of 18" (450 mm) below the drilled pier tip elevation or to refusal in accordance with ASTM D1586, "Penetration Test and Split-Barrel Sampling of Soils". Complete the SPT using NW rods through casing or another stabilizing method as approved by the Engineer. Extend the SPT rods from the top of the drilled pier excavation to the drilled pier tip elevation. Firmly support the SPT casing at the top of the drilled pier excavation and rest it on the bottom of the excavation. Conduct the SPT a minimum of 12" (300 mm) away from the sidewalls of the excavation and be sure not to scrape the sidewalls of the excavation while inserting or withdrawing the SPT equipment. Have the SPT device on-site before reaching the drilled pier tip elevation. Report the number of blows for each 6 inch (150 mm) increment driven and a description of the recovered soil sample to the Engineer. The Engineer determines the number of blows required.

B. Bottom Cleanliness

The pier excavation bottom is considered clean if a minimum of 50% of the bottom area has less than 1/2" (13 mm) of sediment and no portion of the bottom area has more than 1-1/2" (38 mm) of sediment as determined by the Engineer.

One or more of the following inspection procedures may be used to inspect the cleanliness of the pier excavation bottom before placing the reinforcing steel and concrete.

1. Visual Inspection

The cleanliness of the drilled pier excavation bottom may be observed either by entering the excavation or from the top of the excavation.

2. Steel Probe

If the excavation is not dewatered or if the Engineer requires it, lower a steel probe to the bottom of the drilled pier excavation to ensure that cleaning has been satisfactorily completed. Supply a steel probe that is 24" (600 mm) long with a flat tip on the sounding end, weighs approximately 9 lbs, #10 rebar (4 kg, #32 rebar), and is suspended from the opposite end with a non-stretch cable.

3. Shaft Inspection Device (SID)

The Engineer may use the SID to take sediment measurements and observe the bottom conditions of the drilled pier excavation at a minimum of five locations selected by the Engineer. The SID is a remotely operated camera capable of observing bottom conditions and measuring sediment underwater and slurry. Each SID inspection (including all 5 locations) takes approximately 1 hour after the equipment has been set up. The Engineer provides the SID and the personnel to operate the device. Notify the Engineer a minimum of 2 calendar days before beginning the drilled pier excavation so the Engineer can arrange for the transportation of the SID to the site and the personnel to perform the inspections. SID inspections are required until the cleanliness of the drilled pier excavation bottom is acceptable in accordance with Section 4.0, Item B of this provision. Do not conduct operations that interfere with the SID inspections. Remove all cleaning and drilling equipment from the drilled pier excavation during any SID inspection. Provide a working area large enough for the SID equipment and within reach of the cabling supplied and clear sight distance of the drilled pier excavation. Assist the Engineer in the transportation and handling of the SID and all the associated equipment and in supporting the electric hoist and/or hoisting tripod for the SID. If required, provide a safe and secure location to park the trailer for the SID while it is unattended on the project site. The Contractor is responsible in terms of both actual expense and time delays for any damage to the SID equipment due to the Contractor's fault or negligence. Replace any damaged equipment at no additional cost to the Department.

REINFORCING STEEL

Use reinforcing steel in accordance with Section 1070 of the Standard Specifications. Completely assemble a cage of reinforcing steel, consisting of longitudinal and spiral bars and place it in the drilled pier excavation as a unit immediately after the proper condition of the excavation is demonstrated to the Engineer. When concrete placement does not follow immediately after cage placement, remove the steel from the pier excavation unless the Engineer directs otherwise. If the cage is removed, recheck pier excavation cleanliness in accordance with this provision before reinstalling the cage.

If the drilled pier excavation is cased down to rock, immediate placement of the reinforcing steel and the concrete is not required. If electing to delay placement of the

reinforcing steel and concrete due to the presence of rock, recheck the excavation for proper cleanliness immediately before placing reinforcing steel.

A. Construction, Placement, Support and Alignment

If a longer drilled pier than that shown on the plans is required, adequate reinforcement may be required in the extended length as directed by the Engineer. Lift the cage so racking and cage distortion does not occur. Keep the cage plumb during concrete operations and casing extraction. Check the position of the cage before and after placing the concrete. Position the splice length of the drilled pier cage so that the column or footing has the minimum concrete cover shown on the plans.

Securely cross-tie the vertical and spiral reinforcement at each intersection with double wire. Support or hold down the cage so that the vertical displacement during concrete placement and casing extraction does not exceed 6" (150 mm).

B. Bolsters and Spacers

Set the rebar cage directly on the bottom of the drilled pier excavation with plastic bolsters under each vertical reinforcing bar. Ensure that spacers are tall enough to raise the rebar cage off the bottom of the drilled pier excavation a minimum of 3" (75 mm). If approved by the Engineer, the rebar cage may be hung in the excavation provided the mechanisms supporting the cage are left in place until the Drilled Pier Concrete strength has achieved 3000 psi (20.7 MPa).

In order to ensure the minimum required concrete cover and achieve concentric spacing of the cage within the pier, attach plastic spacer wheels at five points around the cage perimeter. Use spacer wheels that provide a minimum of 4" (100 mm) "blocking" from the outside face of the spiral bars to the outermost surface of the drilled pier except in rock as defined by Section 1.0, Item E and when using slurry construction. Use spacer wheels for slurry construction or in rock that provide a minimum of 2" (50 mm) "blocking". Tie spacer wheels that snap together with wire and allow them to rotate. Use spacer wheels that span at least two adjacent vertical bars. Start placing spacer wheels at the bottom of the cage and continue up along its length at maximum 10 ft (3 m) intervals.

CONCRETE

Use Drilled Pier Concrete in accordance with Section 1000 of the Standard Specifications. Begin concrete placement immediately after inserting reinforcing steel into the drilled pier excavation.

A. Concrete Mix

As an option, use Type IP blended cement with a minimum cement content of 665 lbs/yd³ (395 kg/m³) and a maximum cement content of 833 lbs/yd³ (494 kg/m³). Use No. 78M coarse aggregate in the mix.

Use an approved water-reducer, water-reducing retarder, high-range water-reducer or high-range water-reducing retarder to facilitate placement of the concrete if necessary. Do not use a stabilizing admixture as a retarder in Drilled Pier Concrete without approval of the Engineer. Use admixtures that satisfy AASHTO M194 and add them at the concrete plant when the mixing water is introduced into the concrete. Redosing of admixtures is not permitted.

B. Concrete Placement

Place concrete such that the drilled pier is a monolithic structure. Vibration is only permitted in the top 10 ft (3 m) of the drilled pier. Remove any contaminated concrete from the top of the drilled pier at the time of concrete placement. Contain and remove all wasted concrete that spills over the casing.

Do not twist, move or otherwise disturb temporary casings until the concrete depth in the casing is in excess of 10 ft (3 m) or half the head, whichever is greater, above the bottom of the casing being disturbed. The head is defined as the difference between the highest piezometric head along the depth of the pier and the static water elevation inside the excavation.

Maintain the required concrete depth above the bottom of the innermost casing during casing removal, except when the concrete level is at or above the top of drilled pier elevation. Sustain a sufficient concrete depth above the bottom of casing to overcome outside soil and water pressure. As the casing is withdrawn, exercise care in maintaining an adequate concrete depth within the casing so that fluid trapped behind the casing is displaced upward and discharged at the ground surface without contaminating or displacing the Drilled Pier Concrete. Exerting downward pressure, hammering and/or vibrating the temporary casing is permitted to facilitate removal.

Use the water inflow rate to determine the concrete placement procedure after any pumps have been removed from the excavation. If the inflow rate is less than 6" (150 mm) per half hour, the concrete placement is considered dry. If the water inflow rate is greater than 6" (150 mm) per half hour, the concrete placement is considered wet.

Keep a record of the volume of concrete placed in each drilled pier excavation and make it available to the Engineer. For drilled piers constructed with slurry or as directed by the Engineer, record a graphical plot of the depth versus theoretical concrete volume and actual measured concrete volume for each drilled pier and provide it to the Engineer when finished placing concrete.

1. Dry Placement

Before concrete placement, make certain the drilled pier excavation is dry so the flow of concrete around the reinforcing steel can be verified by visual inspection. If the concrete free fall does not exceed 60 ft (18.3 m), placing the concrete by a central drop method where the concrete is chuted directly down the center of the excavation is permitted.

For drilled piers exceeding 60 ft (18.3 m) in length, use a tremie or a pump to place concrete unless otherwise approved by the Engineer. Support the tremie or pump pipe so that the concrete free fall is less than 60 ft (18.3 m) at all times.

2. Wet Placement

Maintain a static water or slurry level in the excavation before placing concrete underwater. When temporary casing is used as the method to stabilize the excavation, place concrete with a sectional tremie or pump (no continuous tremie).

Once the concrete in the excavation reaches the same elevation as the static water level, placing concrete with the dry method is permitted. Before changing to the dry method of concrete placement, remove the water above the concrete and clean the concrete surface of all scum and sediment to expose clean, uncontaminated concrete.

3. Pump and Tremie

Pump concrete in accordance with Article 420-5 of the Standard Specifications. Use a steel tremie with watertight joints and a minimum diameter of 10" (250 mm). Use a discharge control to prevent concrete contamination when the tremie tube or pump pipe is initially placed in the excavation. Extend the tremie tube or pump pipe into the concrete a minimum of 5 ft (1.5 m) at all times except when the concrete is initially introduced into the pier excavation. If the tremie tube or pump pipe pulls out of the concrete for any reason after the initial concrete is placed, restart concrete placement with a steel capped tremie tube or pump pipe.

4. Placement Time

Place concrete within the time frames specified in Table 1000-2 of the Standard Specifications for Class AA Concrete. Do not place concrete so fast as to trap air, slurry, water, fluids, soil or any other deleterious materials in the vicinity of the reinforcing steel and the annular zone between the rebar cage and the excavation walls.

SCHEDULING AND RESTRICTIONS

If caving or sloughing occurs, compensation will not be provided for additional concrete to fill the resulting voids.

For the first 16 hours after a drilled pier has achieved its initial concrete set (as determined by the Engineer), do not drill adjacent piers, do not install adjacent piles, and do not allow any equipment wheel loads or damaging vibrations within 20 ft (6 m) of the drilled pier.

In the event that the procedures described herein are performed unsatisfactorily, the Engineer may suspend drilled pier construction in accordance with Article 108-7 of the Standard Specifications. If the integrity of a drilled pier is in question, the Engineer may reject the pier and require remediation. Remedial measures are proposed by the Contractor and require approval of the Engineer. No compensation will be paid for losses or damage due to remedial work or any investigation of drilled piers found defective or not in accordance with this provision or the plans.

MEASUREMENT AND PAYMENT

48" Dia. Drilled Piers in Soil and 48" Dia. Drilled Piers Not in Soil will be measured and paid for in linear feet (meters). Not in soil is defined as material with a rock auger penetration rate of less than 2" (50 mm) per 5 minutes of drilling at full crowd force. Once not in soil is encountered, seams, voids and weathered rock less than 3 ft (1 m) thick with a rock auger penetration rate of greater than 2" (50 mm) per 5 minutes of drilling at full crowd force will be paid for at the contract unit price bid for 48" Dia. Drilled Piers Not in Soil. Seams, voids and weathered rock greater than 3 ft (1 m) thick will be paid for at the contract unit price bid for 48" Dia. Drilled Piers in Soil where not in soil is no longer encountered. Drilled piers through air or water will be paid for at the contract unit price bid for 48" Dia. Drilled Piers in Soil. The contract unit price bid for 48" Dia. Drilled Piers in Soil and 48" Dia. Drilled Piers Not in Soil will also be full compensation for spoils and slurry containment and disposal, any concrete removal, miscellaneous grading and excavation and slurry construction including site assistance and overreaming and enlarging piers. Reinforcing steel will be measured and paid for in accordance with Section 425 of the Standard Specifications.

Permanent Steel Casing for 48" Dia. Drilled Pier will be measured and paid for in linear feet (meters). Permanent casings will only be paid for when required by the Engineer or as shown on the plans. Permanent casings will be measured as the difference between the top of casing or pier elevation, whichever is lower, and the permanent casing tip elevation. If a permanent casing can not be installed to the tip elevation shown on the plans, up to 3 ft (1 m) of casing cut-off will be paid for at the contract unit price bid for Permanent Steel Casing for 48" Dia. Drilled Pier. The contract unit price bid for Permanent Steel Casing for 48" Dia. Drilled Pier will also be full compensation for any permanent casing removal. No payment will be made for temporary steel casings that become stuck, bound or fouled and cannot be practically removed.

SID Inspection will be measured and paid for in units of each. SID Inspection will be measured as one per pier. The contract unit price bid for SID Inspection will be full compensation for the Engineer to perform SID inspections until the bottom cleanliness is in accordance with this provision.

Pay Item	Pay Unit
<u>48"</u> Dia. Drilled Piers in Soil	Linear Foot
<u>48"</u> Dia. Drilled Piers Not in Soil	Linear Foot
Permanent Steel Casing for <u>48"</u> Dia. Drilled Piers	Linear Foot
SID Inspection	Each

XI. CROSSHOLE SONIC LOGGING

GENERAL

Use the non-destructive testing method crosshole sonic logging (CSL) to verify the integrity of the drilled pier and quality of concrete. The CSL test method is described in ASTM D6760, "Integrity Testing of Concrete Deep Foundations by Ultrasonic Crosshole Testing". The Engineer will determine the number of CSL tests and which drilled piers will be CSL tested. Drilled piers are referred to as piers in this special provision.

The CSL test measures the time for an ultrasonic pulse to travel from a signal source in one tube to a receiver in another tube. In uniform, good quality concrete, the travel time between equidistant tubes should yield relatively consistent arrival times and correspond to a reasonable pulse velocity, signal amplitude and energy from the bottom to the top of the pier. Longer travel times, decrease in pulse velocity and lower amplitude/energy signals indicate the presence of irregularities such as poor quality concrete, voids, honeycombing, cracking and soil intrusions. The signal may be completely lost by the receiver and CSL recording system for severe defects such as voids.

Retain a CSL Consultant to perform CSL testing on the selected drilled piers. The CSL Consultant shall supply the Contractor with technical assistance and guidance during preparation and testing. Provide suitable access to the site and to the top of piers to be tested. Follow instructions from the CSL Consultant unless directed otherwise by the Engineer.

Place CSL tubes in all drilled piers. Perform CSL testing after concrete achieves a minimum compressive strength of 3000 psi (20.7 MPa) and within 7 to 30 days after concrete placement. After CSL test results have been reviewed and the Engineer has accepted the drilled pier, dewater the tubes and core holes, if any, and fill with an approved grout. If the Engineer elects not to CSL test a pier, obtain approval from the Engineer to dewater the tubes and fill them with an approved grout. Provide, mix and place grout in accordance with the Grout for Structures Special Provision.

PREQUALIFICATION AND EXPERIENCE REQUIREMENTS

Use a CSL Consultant prequalified by the Contractual Services Unit of the Department for Non-Destructive Foundation Testing work (work code 3070).

Submit documentation that the CSL Consultant has successfully completed at least 5 CSL testing projects within the last 3 years of a scope and complexity similar to that anticipated for this project. Documentation should include the General Contractor and Owner's name and current contact information with descriptions of each past project.

Provide the name of the Project Engineer that will be assigned to this project. Submit documentation for the Project Engineer verifying employment with the CSL Consultant, registration as professional engineer in North Carolina and a minimum of 5 years experience in CSL testing with past projects of scope and complexity similar to that anticipated for this project. Documentation should include resumes, references, certifications, project lists, experience descriptions and details, etc.

PREPARATION FOR CSL

Submit grout mix design or packaged grout type, CSL Consultant experience documentation, CSL tube size and Type 7 Contractor's Certification, cap details, couplings or joint details and the method for attaching the tubes. Provide this information with the drilled pier construction sequence plan.

Install 4 tubes in each drilled pier with a diameter of 5 ft (1524 mm) or less and 6 tubes in each pier with a diameter of greater than 5 ft (1524 mm). Provide 2 in (50 mm) inside diameter Schedule 40 steel pipe conforming to ASTM A53, Grade A or B, Type E, F or S. The tubes shall have a round, regular internal diameter free of defects or obstructions, including any at tube joints, in order to permit the free, unobstructed passage of source and receiver probes. The tubes shall provide a good bond with the concrete and be watertight.

Fit the tubes with a watertight threaded cap on the bottom and a removable threaded cap on the top. Securely attach the tubes to the interior of the reinforcing cage. Install the tubes in each drilled pier in a regular, symmetric pattern such that each tube is equally spaced from the others around the perimeter of the cage. Place tubes such that large vertical reinforcing bars do not block the direct line between adjacent tubes. The tubes are typically wire-tied to the reinforcing cage every 3 ft (1 m) or otherwise secured such that the tubes remain in position during placement of the cage and concrete. Install tubes as near to vertical and as parallel as possible, **as non-vertical tubes can adversely affect data analysis**. Extend the tubes from 6 in (150 mm) above the pier tip to at least 3 ft (1 m) above the top of the pier. If the pier top elevation is below ground elevation, extend tubes at least 2 ft (610 mm) above ground surface. If the drilled pier tip elevation is excavated more than 1 ft (305 mm) below the tip elevation shown on the plans, extend the tubes using proper threaded mechanical couplings to within 6 in (150 mm) of the revised pier tip elevation.

Before placing the reinforcing cage, record the tube lengths and positions along the length of the cage. After concrete placement, measure the stickup of the tubes above the top of the drilled piers and verify tube spacing.

After placing reinforcement and before placing concrete, fill the CSL tubes with clean water and cap them to keep out debris. CSL tubes that are not filled with water and capped will be rejected. When removing the caps, use care not to apply excess torque, force or stress, which could break the bond between the tubes and the concrete.

CSL EQUIPMENT

The minimum requirements of the CSL equipment are as follows:

- A microprocessor based CSL system for display of individual CSL records, analog-digital conversion and recording of CSL data, analysis of receiver responses and printing of report quality CSL logs
- Ultrasonic source and receiver probes which can travel through 2 in (50 mm) I.D. steel pipe
- An ultrasonic voltage pulser to excite the source with a synchronized triggering system to start the recording system
- A depth measurement device to electronically measure and record the source and receiver depths associated with each CSL signal
- Appropriate filter/amplification and cable systems for CSL testing
- An acquisition system that stores each log in digital format, with drilled pier identification, date, time and test details, including the source and receiver gain and displays arrival time data graphically during data acquisition
- 3D tomographic imaging software or source for completing the work

CSL TEST PROCEDURE

Perform CSL testing between each adjacent perimeter CSL tube pair and opposite tube pairs along the cross section diameter. Maintain the source and receiver probes in the same horizontal plane unless test results indicate defects or poor concrete zones, in which case, further evaluate the defect zones with angle tests (source and receiver vertically offset at greater than 1.5 ft (460 mm) in the tubes). Report any defects indicated by decreased signal velocity and lower amplitude/energy signals at the time of testing and conduct angle tests in the zones of the defects as defined by the Concrete Condition Rating Criteria (CCRC) in Section 6.0 of this provision. Make CSL measurements at depth intervals of 2.5 in (65 mm) or less from the bottom of the tubes to the top of each pier. Pull the probes simultaneously, starting from the bottom of the tubes, using a depth-measuring device to electronically measure and record the depths associated with each CSL signal. Remove any slack from the cables before pulling to provide for accurate depth measurements of the CSL records. In the event defects are detected, conduct additional logs at no additional cost to the Department.

If CSL probes will not pass through the entire length of the CSL tubes, core a 2 in (50 mm) diameter hole through the concrete the full length of the drilled pier for each inaccessible tube. If the CSL tubes debond from the concrete, core a 2 in (50 mm) diameter hole through the concrete to the depth of the debonding for each debonded tube. Locate core holes approximately 9 in (230 mm) inside the reinforcement as directed by the Engineer. Fill core holes with clean water and cover to keep out debris. No additional payment will be made for coring due to inaccessible or debonded tubes.

CSL RESULTS AND REPORTING

Submit two hard copies and an electronic copy (pdf or jpeg format on CD or DVD) of a CSL report sealed by the Project Engineer within 5 calendar days after field testing is complete. The CSL report should include but not limited to the following:

Title Sheet

- NCDOT TIP number and WBS element number
- Project description
- County
- Bridge station number
- Pier location
- Personnel
- Report date

Introduction

Site and Subsurface Conditions (including water table elevation)

Pier Details

- Pier and casing diameters, lengths and elevations
- Concrete compressive strength
- Installation methods and details including use of casing, slurry, pump, tremie, dry or wet placement of concrete, etc.

CSL Logs

Results/Conclusions

Attachments

- Boring log(s)
- Field Drilled Pier Inspection Forms, Drilling Logs, SID Inspection Forms and Concrete Curves (from Engineer)
- CSL tube locations, elevations, lengths and identifications
- CSL hardware model
- Electronic copy of all CSL raw data

Include CSL logs for each tube pair tested with analysis of the initial pulse arrival time, velocity, relative pulse energy/amplitude and stacked waveform plotted versus depth. List all zones defined by the CCRC in a tabular format including the percent velocity reduction and the velocity values used from the nearby zone of good quality concrete. Discuss each zone defined by the CCRC in the CSL report as appropriate. Base the results on the percent reduction in velocity value from a nearby zone of good quality concrete with good signal amplitude and energy as correlated to the following:

Concrete Condition Rating Criteria (CCRC)			
CCRC	Rating Symbol	Velocity Reduction	Indicative Results
Good	G	≤ 10 %	Good quality concrete
Questionable Defect	Q	>10 % & < 20 %	Minor concrete contamination or intrusion and questionable quality concrete
Poor	P/D	≥ 20 %	Defects exist, possible water/slurry contamination, soil intrusion and/or poor quality concrete
No Signal	NS	No Signal received	Soil intrusion or other severe defect absorbed the signal (assumes good bond of the tube-concrete interface)
Water	W	V = 4750 fps (1450 mps) to 5000 fps (1525 mps)	Water intrusion or water filled gravel intrusion with few or no fines present

The following are a few examples of types and causes of defects:

- Necking or arching of the concrete on withdrawal of the temporary casing.
- Necking or contamination of the concrete due to collapse of the side walls.
- Soft toe due to incomplete cleaning or collapse of the side walls.
- Horizontal lenses of silt/mud/slurry due to the tremie pipe rising above the concrete.
- Voids due to the use of low-slump concrete.
- Honeycombing due to washout of fines.
- Trapping of contaminants due to pumping concrete to fast.

The Engineer will require 5 working days to evaluate the CSL test results and determine whether or not the drilled pier is acceptable. Evaluation of CSL test results, with ratings other than good (G) per the CCRC may require further investigation and additional time for review and analysis of the data. Do not grout the CSL tubes or perform any further work on the CSL tested drilled pier until the Engineer determines whether the drilled pier is acceptable.

Perform tomography in order to further investigate and delineate the boundaries of any defective/unconsolidated zones with 20% or more reduction in velocity value as correlated to the CCRC. Process CSL data to construct easy to understand 2D/3D (2D cross-sections between tubes and 3D volumetric images for the entire pier) color-coded tomographic images indicating velocity variations along the pier. Identify the location and geometry of defective/unconsolidated zones in 3D color images with detailed discussion in the CSL report. Any further tests deemed necessary by the Engineer in order to determine the

acceptability of the drilled pier will be determined after reviewing the CSL report. Additional test or analysis options include 3D tomographic imaging, single-hole sonic testing, sonic echo or impact response tests and concrete coring.

The Engineer determines the depth, location, diameter (PQ or NQ size) and number of core holes when concrete coring is required. If the Engineer is concerned about concrete strength or requires the use of a borehole camera for inspection, large diameter cores (PQ size) are required. Drill a minimum of 2 core holes to intercept the suspected defect zones. Use a coring method that provides maximum core recovery and minimizes abrasion and erosion. Provide concrete cores properly marked in a wooden crate labeled with the drilled pier depth at each interval of core recovery to the NCDOT Materials and Test Unit for evaluation and testing. Submit coring records, signed by the Contractor that include NCDOT project number, name of the Drilling Contractor, date cored and percent core recovery. Allow 5 working days after submitting the core records for the Department's review.

CORRECTION OF UNACCEPTABLE DRILLED PIER

When the Engineer determines a drilled pier is unacceptable, submit remedial measures to the Department for approval. No compensation will be made for remedial work or losses or damage due to remedial work of drilled piers found defective or not in accordance with the Drilled Piers Special Provision or the plans. Modifications to the drilled pier design or any load transfer mechanisms required by the remedial action shall be designed by a Registered North Carolina Professional Engineer. Include supporting calculations and drawings sealed by a Registered North Carolina Professional Engineer for all foundation elements affected. Do not begin remedial action work until the Department has reviewed and accepted the remedial action plan. Allow 5 working days after submitting the remedial work plan for the Department's review and acceptance. Furnish all materials and work necessary to correct defective drilled piers.

MEASUREMENT AND PAYMENT

The complete and accepted CSL will be paid for at the unit bid price for "Crosshole Sonic Logging" per each. The Department will only pay for the initial CSL test on a drilled pier; no additional payment will be made for subsequent CSL tests performed on the same drilled pier. Include in this unit bid price all costs incurred for procurements, conducting the CSL testing, reporting of results and incidentals necessary to complete the work including any other test required to determine the acceptability of the drilled pier.

Include the cost of the crosshole sonic logging tubes in the unit bid price for drilled piers. No separate payment will be made for the CSL tubes. The unit bid price for the drilled piers will include full compensation for furnishing, installing, extending tubes, dewatering and grouting of all CSL tubes and core holes, if applicable, and all materials, labor, tools, equipment and incidentals necessary to complete the work.

XII. REINFORCED BRIDGE APPROACH FILL 3-18-03 (REV. 9-16-06) SP4 R01B**Description**

This work consists of all work necessary to construct reinforced bridge approach fills in accordance with these provisions and the plans, and as directed by the Engineer.

Materials**(A) Geomembrane**

Provide geomembrane that is impermeable, composed of polyethylene polymers or polyvinyl chloride, and meets the following physical requirements:

Property	Requirements	Test Method
Thickness	25 mils Minimum	ASTM D1593
Tensile Strength at Break	100 lb/inch Minimum	ASTM D638
Puncture Strength	40 lbs Minimum	ASTM D 4833
Moisture Vapor Transmission Rate	0.018 oz/yd ² per Day Maximum	ASTM E96

(B) Fabric

Refer to Section 1056 for Type 2 Engineering Fabric and the following:

Use a woven fabric consisting of strong rot-proof synthetic fibers such as polypropylene, polyethylene, or polyester formed into a stable network such that the filaments or yarns retain their relative positions to each other.

Fabric Property	Requirements	Test Method
Minimum Flow Rate	2 gallons/min/square foot	ASTM D 4491

Lamination of fabric sheets to produce the physical requirements of a fabric layer will not be accepted. Furnish letters of certification from the manufacturer with each shipment of the fabric and geomembrane attesting that the material meets the requirements of this provision; however, the material is subject to inspection, test, or rejection by the Engineer at any time.

During all periods of shipment and storage, wrap the geomembrane and fabric in a heavy-duty protective covering to protect the material from ultraviolet rays. After the protective wrapping has been removed, do not leave the material uncovered under any circumstances for longer than 4 days.

(C) Select Material

Provide select material meeting the requirements of Class III, Type 1 or Type 2, or Class V select material of Section 1016 of the *2006 Standard Specifications*. When select material is required under water, use select material class V only, up to one foot above the existing water elevation.

(D) 4 inch Diameter Corrugated Drainage Pipe and Fittings

Provide pipe and fittings that meet all the applicable requirements of Section 815 or 816 of the *2006 Standard Specifications*.

Construction Methods

Place the geomembrane and fabric as shown on the plans or as directed by the Engineer. Perform the excavation for the fabric reinforced fill to the limits shown on the plans. Provide an excavated surface free of obstructions, debris, pockets, stumps, and cleared of all vegetation. The geomembrane or fabric will be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation, handling or storage. Lay all layers smooth, and free from tension, stress, folds, wrinkles or creases. Place all the fabric layers with the machine direction (roll direction) parallel to the centerline of the roadway. A minimum roll width of 10.0 feet for the fabric is required. Overlap geomembrane or fabric splices parallel to the centerline of the roadway a minimum of 18 inches. Geomembrane or fabric splices parallel to the backwall face will not be allowed.

Deposit and spread select material in successive, uniform, approximately horizontal layers of not more than 10 inches in depth, loose measurement, for the full width of the cross section, and keep each layer approximately level. Place and compact each layer of select material fill no more than 10 inches thick with low ground pressure equipment. Use hand operated equipment to compact the fill material within three feet of the backwall and wingwalls as directed by the Engineer. Compact select material to a density equal to at least 95% of that obtained by compacting a sample of the material in accordance with AASHTO T99 as modified by the Department. Compact the top eight inches of select material to a density to at least 100% of that obtained by compacting a sample of the material in accordance with AASHTO T99 as modified by the Department. Density requirements are not applicable to select material, class V; however compact the fill with at least four passes of low ground pressure equipment on the entire surface as directed by the Engineer. The compaction of each layer of select material shall be inspected and approved by the Department prior to the placement of the next fill layer. No equipment will be allowed to operate on the drainage pipe or any geomembrane/fabric layer until it is covered with at least six inches of fill material. Compaction shall not damage the drainage pipe, geomembrane, or fabric under the fill. Cover the geomembrane/fabric with a layer of fill material within four days after placement of the geomembrane/fabric. Geomembrane and fabric that are damaged as a result of installation will be replaced as directed by the Department at no additional cost.

Place the geomembrane on the ground, and attach and secure it tightly to the vertical face of the backwall and wingwalls with adhesives, duct-tape, nails or any other method approved by the Engineer. Place the first fabric layer on the surface of the geomembrane with the same dimensions of the geomembrane. No material or void is allowed between the geomembrane and the first fabric layer. Place and fold the remaining fabric layers on the edges as shown on the plans or as directed by the Engineer. Provide vertical separation between fabric layers as specified on the plans. The number of fabric layers will be shown in the plans.

Place four inch diameter perforated drainage pipe along the base of the backwall and sloped to drain as shown on the plans. Completely wrap perforated drainage pipe and #78M stone with Type 2 Engineering Fabric as shown on the plan detail. Install a pipe sleeve through the bottom of or under the wing wall prior to placing concrete for the wing wall. The pipe sleeve shall be of adequate strength to withstand the wingwall load. Place the pipe sleeve in position to allow the drainage pipe to go through the wing wall with a proper slope. Connect four-inch diameter nonperforated (plain) drainage pipe with a coupling to the perforated pipe near the inside face of the wingwall. Place the nonperforated drainage pipe through the pipe sleeve, extend down to the toe of the slope and connect, to a ditch or other drainage systems as directed by the Engineer. For bridge approaches in cut sections where no side slope is available, direct the drainage pipe outlet to the end slope down to the toe using elbows as directed by the Engineer.

Measurement and Payment

Payment for Reinforced Bridge Approach Fill shall be included in the contract lump sum price for Approach Slab. Such price and payment will be full compensation for both approach fills at each bridge installation, including but not limited to furnishing, placing and compacting select material, furnishing and placing geomembrane and woven fabric, furnishing and placing pipe sleeve, drainage pipe, and stone, furnishing and installing concrete pads at the end of outlet pipes, excavation and any other items necessary to complete the work.

XIII. ACT OF GOD 12-19-06

Revise the 2006 Standard Specifications as follows:

Page 1-69, 107-18 Contractor's Responsibility for Work, in the first paragraph, last sentence, replace the word *legally* with the word **contractually**.

IVX. ASPHALT PAVEMENTS - SUPERPAVE: 07-18-06
Rev. 12-18-07

The Quality Management System for asphalt pavement shall be in accordance with the revised Division 6 of the 2006 Standard Specifications dated 12/18/07. A copy of the revised section is available for review in the Division Office or under Contracts Office, Standard Specifications, 2006 Special Provisions – Roadway Provisions and SP6R01 of the Departments website at:
<http://www.ncdot.org/doh/preconstruct/ps/contracts/sp/2006spr.html>

XV. GUARDRAIL ANCHOR UNITS, TYPE 350:

(4-20-04)

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 *Standard Specifications*, and at locations shown in the plans.

Materials

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

Guardrail anchor unit (ET-2000) 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 Section 106-2 of the Standard Specifications.

(B) Certified working drawings and assembling instructions from the manufacturer for each guardrail anchor unit in accordance with Section 105-2 of the 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 Section 1088-3 of the *Standard Specifications* and is incidental to the cost of the “Steel BM Guardrail.”

Measurement and Payment

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

Payment will be made under:

Pay Item	Pay Unit
Guardrail Anchor Units, Type 350	Each

XVI. SEEDING AND MULCHING

Seed Mixes for Bridge Maintenance P.O. Contracts ONLY

Seed Mix East

Divisions:

Counties:

- 1 Currituck, Dare, Hyde, Bertie, Camden, Chowan, Gates, Hertford, Martin, Northampton, Pasquotank, Perquimans, Tyrell, Washington
- 2 Beaufort, Carteret, Craven, Pamlico, Greene, Jones, Lenoir, Pitt
- 3 Brunswick, New Hanover, Onslow, Pender, Duplin, Sampson
- 4 Edgecombe, Halifax, Johnston, Nash, Wayne, Wilson
- 5 Durham, Franklin, Granville, Person, Vance, Wake, Warren
- 6 Bladen, Columbus, Cumberland, Harnett, Robeson

8 Hoke, Lee, Montgomery, Moore, Richmond, Scotland

10 Anson

Seed Mix West

Divisions:

Counties:

7 Alamance, Caswell, Guilford, Orange, Rockingham

8 Chatham, Randolph

9 Davidson, Davie, Forsyth, Rowan, Stokes

10 Cabarrus, Mecklenburg, Stanly, Union

11 Alleghany, Ashe, Avery, Caldwell, Surry, Watauga, Wilkes, Yadkin

12 Alexander, Catawba, Cleveland, Gaston, Iredell, Lincoln

Seed Mix WestEd

13 Burke, McDowell, Rutherford, Buncombe, Madison, Mitchell, Yancey

14 Polk, Cherokee, Clay, Graham, **Haywood**, Henderson, Jackson, Macon Swain, Transylvania

Seed Mix East

SEEDING AND MULCHING:

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

50# Tall Fescue

10# Centipede

25# Bermudagrass (hulled)

September 1 - February 28

50# Tall Fescue

10# Centipede

35# Bermudagrass (unhulled)

500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Waste and Borrow Locations

March 1 – August 31

75#	Tall Fescue
25#	Bermudagrass (hulled)
500#	Fertilizer
4000#	Limestone

September 1 - February 28

75#	Tall Fescue
35#	Bermudagrass (unhulled)
500#	Fertilizer
4000#	Limestone

Note: 50# of Bahiagrass may be substituted for either Centipede or Bermudagrass only upon Engineer's request.

Approved Tall Fescue Cultivars

Adventure	Bonanza II	Inferno	Rendition
Adventure II	Bulldog 51	Jaguar	Renegade
Airlie	Chapel Hill	Jaguar III	Safari
Amigo	Chesapeake	Kentucky 31	Shelby
Anthem	Chieftain	Kitty Hawk	Shenandoah
Anthem II	Coronado	Kitty Hawk 2000	Southern Choice II
Apache	Covenant	Monarch	South Paw
Apache II	Crossfire II	Montauk	Tempo
Arid	Debutante	Mustang	Titan
Arid II	Duster	Mustang III	Titan Ltd.
Arid III	Escalade	Olympic	Tomahawk
Aztec II	Falcon	Pacer	Tacer
Barlexas	Falcon III	Paraiso	Trailblazer
Barlexas II	Finelawn	Pixie	Tribute
Barrera	Finelawn I	Pyramid	Trooper
Barrington	Finelawn Petite	Quest	Wolfpack
Bingo	Genesis	Rebel	Wrangler
Bravo	Grande	Rebel Jr	
Brookstone	Guardian	Rebel II	
Bonanza	Houndog	Red Coat	

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. Upon written approval of the Engineer, 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.

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. Upon written approval of the Engineer, a different analysis of fertilizer may be used provided grade and shall be applied at the rate of 500 pounds per acre. Upon 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.

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. Upon written approval of the Engineer, 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.

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.

Seed Mix West

SEEDING AND MULCHING:

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

Shoulder and Median Areas

August 1 - June 1

20#	Kentucky Bluegrass
75#	Hard Fescue
25#	Rye Grain
500#	Fertilizer
4000#	Limestone

May 1 - September 1

20#	Kentucky Bluegrass
75#	Hard Fescue
10#	German or Browntop Millet
500#	Fertilizer
4000#	Limestone

Areas Beyond the Mowing Pattern, Waste and Borrow Areas:

August 1 - June 1

100#	Tall Fescue
15#	Kentucky Bluegrass
30#	Hard Fescue
25#	Rye Grain
500#	Fertilizer
4000#	Limestone

May 1 - September 1

100#	Tall Fescue
15#	Kentucky Bluegrass
30#	Hard Fescue
10#	German or Browntop Millet
500#	Fertilizer
4000#	Limestone

Approved Tall Fescue Cultivars

Adventure	Bonanza II	Inferno	Rendition
Adventure II	Bulldog 51	Jaguar	Renegade
Airlie	Chapel Hill	Jaguar III	Safari
Amigo	Chesapeake	Kentucky 31	Shelby
Anthem	Chieftain	Kitty Hawk	Shenandoah
Anthem II	Coronado	Kitty Hawk 2000	Southern Choice II
Apache	Covenant	Monarch	South Paw
Apache II	Crossfire II	Montauk	Tempo
Arid	Debutante	Mustang	Titan
Arid II	Duster	Mustang III	Titan Ltd.
Arid III	Escalade	Olympic	Tomahawk
Aztec II	Falcon	Pacer	Tacer
Barlexas	Falcon III	Paraiso	Trailblazer
Barlexas II	Finelawn	Pixie	Tribute
Barrera	Finelawn I	Pyramid	Trooper
Barrington	Finelawn Petite	Quest	Wolfpack
Bingo	Genesis	Rebel	Wrangler
Bravo	Grande	Rebel Jr	
Brookstone	Guardian	Rebel II	
Bonanza	Hounddog	Red Coat	

Approved Kentucky Bluegrass Cultivars:

Adelphi	Brilliant	Kenblue	Princeton
Apollo	Bristol	Liberator	Ram I
Bariris	Challenger	Merit	Rugby
Baron	Columbia	Nuglade	Sydsport
Baronie	Fylking	Odyssey	Touchdown
Bartitia	Glade	Plush	Vantage

Approved Hard Fescue Cultivars:

Aurora	Minotaur	Scaldis	Waldina
Bardur	Nordic	Spartan	Warwick
Crystal	Reliant	Valda	

On cut and fill slopes 2:1 or steeper add 20# Sericea Lespedeza January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. Upon written approval of the Engineer, 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.

TEMPORARY SEEDING:

Fertilizer shall be the same analysis as specified for *Seeding and Mulching* and applied at the rate of 400 pounds and seeded at the rate of 50 pounds per acre. German Millet, or Browntop Millet shall be used in summer months and rye grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

FERTILIZER TOPDRESSING:

Fertilizer used for topdressing shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre. Upon written approval of the Engineer, 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.

SUPPLEMENTAL SEEDING:

The kinds of seed and proportions shall be the same as specified for *Seeding and Mulching*, and the rate of application may vary from 25# to 75# per acre. The actual rate per acre will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre, total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a sod seeder shall be used for incorporating seed into the soil as to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

Seed Mix WestEd

SEEDING AND MULCHING:

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

Shoulder and Median Areas

August 1 - June 1

20#	Kentucky Bluegrass
75#	Hard Fescue
25#	Rye Grain
500#	Fertilizer
4000#	Limestone

May 1 - September 1

20#	Kentucky Bluegrass
75#	Hard Fescue
10#	German or Browntop Millet
500#	Fertilizer
4000#	Limestone

Areas Beyond the Mowing Pattern, Waste and Borrow Areas:

August 1 - June 1

100#	Tall Fescue
15#	Kentucky Bluegrass
30#	Hard Fescue
25#	Rye Grain
500#	Fertilizer
4000#	Limestone

May 1 - September 1

100#	Tall Fescue
15#	Kentucky Bluegrass
30#	Hard Fescue
10#	German or Browntop Millet
500#	Fertilizer
4000#	Limestone

Approved Tall Fescue Cultivars

Adventure	Bonanza II	Inferno	Rendition
Adventure II	Bulldog 51	Jaguar	Renegade
Airlie	Chapel Hill	Jaguar III	Safari
Amigo	Chesapeake	Kentucky 31	Shelby
Anthem	Chieftain	Kitty Hawk	Shenandoah
Anthem II	Coronado	Kitty Hawk 2000	Southern Choice II
Apache	Covenant	Monarch	South Paw
Apache II	Crossfire II	Montauk	Tempo
Arid	Debutante	Mustang	Titan
Arid II	Duster	Mustang III	Titan Ltd.
Arid III	Escalade	Olympic	Tomahawk
Aztec II	Falcon	Pacer	Tacer
Barlexas	Falcon III	Paraiso	Trailblazer
Barlexas II	Finelawn	Pixie	Tribute
Barrera	Finelawn I	Pyramid	Trooper
Barrington	Finelawn Petite	Quest	Wolfpack
Bingo	Genesis	Rebel	Wrangler
Bravo	Grande	Rebel Jr	
Brookstone	Guardian	Rebel II	
Bonanza	Houndog	Red Coat	

Approved Kentucky Bluegrass Cultivars:

Adelphi	Brilliant	Kenblue	Princeton
Apollo	Bristol	Liberator	Ram I
Bariris	Challenger	Merit	Rugby
Baron	Columbia	Nuglade	Sydsport
Baronie	Fylking	Odyssey	Touchdown
Bartitia	Glade	Plush	Vantage

Approved Hard Fescue Cultivars:

Aurora	Minotaur	Scaldis	Waldina
Bardur	Nordic	Spartan	Warwick
Crystal	Reliant	Valda	

On cut and fill slopes 2:1 or steeper add 20# Sericea Lespedeza and 15# Crown Vetch
January 1 - December 31.

The Crown Vetch Seed should be double inoculated if applied with a hand seeder. Four times the normal rate of inoculant should be used if applied with a hydroseeder. If a fertilizer-seed slurry is used, the required limestone should also be included to prevent fertilizer acidity from killing the inoculant bacteria. Caution should be used to keep the inoculant below 80° F to prevent harm to the bacteria. The rates and grades of fertilizer and limestone shall be the same as specified for *Seeding and Mulching*.

Fertilizer shall be 10-20-20 analysis. Upon written approval of the Engineer, 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.

TEMPORARY SEEDING:

Fertilizer shall be the same analysis as specified for *Seeding and Mulching* and applied at the rate of 400 pounds and seeded at the rate of 50 pounds per acre. German Millet, or Browntop Millet shall be used in summer months and rye grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

FERTILIZER TOPDRESSING:

Fertilizer used for topdressing shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre. Upon written approval of the Engineer, 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.

SUPPLEMENTAL SEEDING:

The kinds of seed and proportions shall be the same as specified for *Seeding and Mulching*, and the rate of application may vary from 25# to 75# per acre. The actual rate per acre will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre, total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a sod seeder shall be used for incorporating seed into the soil as to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

BASIS OF PAYMENT:

Payment for "Seeding and Mulching" will be included in the lump sum bid price for "Excavation and Embankment". This price shall be full compensation for all materials, tools, equipment, labor, and for all incidentals necessary to complete the work.

XVII. EROSION & SEDIMENT CONTROL/STORMWATER CERTIFICATION:

1-16-07 (Rev 1-15-08)

SPI 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 Pollutant 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 & Sediment Control Stormwater Supervisor to manage the Contractor and subcontractor(s) operations, insure compliance with Federal, State and Local ordinances and regulations, and to 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 & Sediment Control Stormwater Supervisor* - The Certified Supervisor shall be responsible for ensuring erosion and sediment/stormwater control is adequately implemented and maintained on the project and conducting the quality control program. The Certified Supervisor shall be on the project within 24 hours from initial exposure of an erodible surface to the project's final acceptance when questions or concerns arise with Erosion and Sedimentation Control/Stormwater issues. Perform the following duties:

- (1) Manage Operations - Coordinate and schedule the work of subcontractors so that erosion and sediment/stormwater control 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/stormwater control preventive measures are conformed to at each stage of the work.
 - (b) Prepare the required weekly erosion control punchlist 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/stormwater control site plans requested.
 - (e) Provide for erosion and sediment/stormwater control methods 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/stormwater control work in a timely and workmanlike manner.
 - (h) Fully install erosion and sediment/stormwater control work prior to suspension of the work.
 - (i) Coordinate with Department, Federal, State and Local Regulatory agencies on resolution of erosion and sediment/stormwater control issues due to the Contractor's operations.
 - (j) Ensure that proper cleanup occurs from vehicle tracking on paved surfaces and/or any location where sediment leaves the Right-of-Way.
 - (k) Have available a set of erosion control plans that has been 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 permit 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 E&SC Program. 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. construction materials, concrete washout, chemicals, litter, fuels, lubricants, coolants, hydraulic fluids, any other petroleum products, and sanitary waste).
 - (b) Inspect E&SC/Stormwater devices at least once every 7 calendar days, twice weekly for 303(d) impaired streams, and within 24 hours after a significant rainfall event of 0.5 inches within 24 hours.
 - (c) Maintain an onsite rain gauge and a record of rainfall amounts and dates.
 - (d) Maintain E&SC/Stormwater inspection records for review by Department and Regulatory personnel upon request.
 - (e) Implement approved reclamation plans on all borrow pits and waste sites.
 - (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 E&SC/Stormwater awareness, the NPDES Permit requirements, and the requirements of the *General Permit, NCG010000*.
 - (i) Report violations of the NPDES permit to the Engineer who will notify the DWQ Regional Office within 24 hours.
- (3) Quality Control Program - Maintain a quality control program to control erosion, prevent sedimentation and follow provisions 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/or subcontractor(s) on site have the proper erosion and sediment/stormwater control certification.
 - (c) Notify the Engineer when the required certified erosion and sediment/stormwater control 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) Maintain temporary erosion and sediment control devices.
 - (h) Remove temporary erosion or sediment control devices when they are no longer necessary as agreed upon by the Engineer.
 - (i) 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 or sediment/stormwater control 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 *Certified Installer* is not onsite, the Contractor may substitute a Level I Installer with a Level II Foreman, 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 & 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 - Operations to the certification entity, certification for *Supervisor*, *Certified Foremen*, *Certified Installers* and *Certified Designer*

may be revoked or suspended with the issuance of a *Continuing Immediate Corrective Action (Continuing ICA)*, *Notice of Violation*, or *Cease and Desist Order* for erosion and sediment control/stormwater related issues.

Should any of the following circumstances occur, the Chief Engineer may suspend or permanently revoke such certification.

- (A) Failure to adequately perform the duties as defined within the certification program
- (B) Issuance of a continuing 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 within another state

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

A registrant 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 - Operations
1537 Mail Service Center
Raleigh, NC 27699-1537

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 registrant 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 registrant.

If a certification is temporarily suspended, the registrant 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 & 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.

XVIII. CRANE SAFETY

(8-15-05)

Comply with the manufacturer specifications and limitations applicable to the operation of any and all cranes and derricks. Prime contractors, sub-contractors, and fully operated rental companies shall comply with the current Occupational Safety and Health Administration regulations (OSHA).

Submit all items listed below to the Engineer prior to beginning crane operations involving critical lifts. A critical lift is defined as any lift that exceeds 75 percent of the manufacturer's crane chart capacity for the radius at which the load will be lifted or requires the use of more than one crane. Changes in personnel or equipment must be reported to the Engineer and all applicable items listed below must be updated and submitted prior to continuing with crane operations.

Crane Safety Submittal List

- A. **Competent Person:** Provide the name and qualifications of the "Competent Person" responsible for crane safety and lifting operations. The named competent person will have the responsibility and authority to stop any work activity due to safety concerns.
- B. **Riggers:** Provide the qualifications and experience of the persons responsible for rigging operations. Qualifications and experience should include, but not be limited to, weight calculations, center of gravity determinations, selection and inspection of sling and rigging equipment, and safe rigging practices.
- C. **Crane Inspections:** Inspection records for all cranes shall be current and readily accessible for review upon request.
- D. **Certifications:** By July 1, 2006, crane operators performing critical lifts shall be certified by NC CCO (National Commission for the Certification of Crane Operators), or satisfactorily complete the Carolinas AGC's Professional Crane Operator's Proficiency Program. Other approved nationally accredited programs will be considered upon request. All crane operators shall also have a current CDL medical card. Submit a list of anticipated critical lifts and corresponding crane operator(s). Include current certification for the type of crane operated (small hydraulic, large hydraulic, small lattice, large lattice) and medical evaluations for each operator.

IXX. SHOULDER AND FILL SLOPE MATERIAL

(5-21-02)

SP2 R45 A

Description

Perform the required shoulder and slope construction for this project in accordance with the applicable requirements of Section 226 of the *2006 Standard Specifications* except as follows:

Construct the top 6 inches of shoulder and fill slopes with soils capable of supporting vegetation.

Provide soil with a P.I. greater than 6 and less than 25 and with a pH ranging from 5.5 to 6.8. Remove stones and other foreign material 2 inches or larger in diameter. All soil is subject to test and acceptance or rejection by the Engineer.

Obtain material from within the project limits or approved borrow source.

Measurement and Payment

No direct payment will be made for this work, as the cost of this work will be considered to be a part of the work being paid for at the contract lump sum price for *Grading*.

XX. SPECIAL SEDIMENT CONTROL FENCE**Description**

This work consists of the construction, maintenance, and removal of *Special Sediment Control Fence*. Place special sediment control fence as shown on the plans or as directed.

Materials**(A) Posts**

Steel posts shall be at least 5 ft. in length, approximately 1 3/8" wide measured parallel to the fence, and have a minimum weight of 1.25 lb/ft of length. The post shall be equipped with an anchor plate having a minimum area of 14.0 square inches, and shall have a means of retaining wire in the desired position without displacement.

(B) 1/4" Hardware Cloth

Hardware cloth shall have 1/4" openings constructed from #24 gauge wire. Install hardware cloth in accordance with Standard Drawing No. 1606.01.

(C) Sediment Control Stone

Sediment Control Stone shall meet the requirements of Section 1005 of the *Standard Specifications*. Install stone in accordance with Standard Drawing No. 1606.01.

Construction Methods

The Contractor shall maintain the special sediment control fence until the project is accepted or until the fence is removed, and shall remove and dispose of silt accumulations at the fence when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

Measurement and Payment

$\frac{1}{4}$ " *Hardware Cloth* will be measured and paid for in accordance with Article 1632-5 of the *Standard Specifications*.

Sediment Control Stone will be measured and paid for in accordance with Article 1610-4 of the *Standard Specifications*.

MINORITY AND WOMEN BUSINESS:

7-17-01R

POLICY

It is the policy of the North Carolina Department of Transportation that minority and women businesses shall have the maximum opportunity to participate in the performance of contracts financed by Non-Federal Funds.

The Contractor is also encouraged to give every opportunity to allow MBE/WBE participation in Supplemental Agreements.

OBLIGATION

The Contractor and any subsequent Subcontractor shall ensure that minority and women businesses have the maximum opportunity to participate in the performance of the work included in this contract. The Contractor and any subsequent Subcontractor shall take all necessary and reasonable steps to ensure that minority and women businesses have the maximum opportunity to compete for and perform a portion of the work included in this contract and shall not discriminate on the basis of race, color, national origin or sex. Failure on the part of the Contractor to carry out the requirements set forth herein shall constitute a breach of contract and after proper notification, may result in award disqualification, termination of the contract, disqualification from bidding, or other appropriate remedy.

GOALS

Pursuant to the requirements of North Carolina General Statute 136-28.4, the following goals for participation are established for this contract:

Minority Business Enterprises 3%
Women Business Enterprises 4%

The Contractor shall exercise all necessary and reasonable steps to ensure that Minority Businesses (MB) and Women Businesses (WB) participate in at least the percents of the contract as set forth above as goals for this contract.

LISTING OF MB AND WB SUBCONTRACTORS

All bidders, at the time the bid proposal is submitted, must also submit a listing of MB and WB participation on the appropriate form (or facsimile thereof) contained elsewhere in this proposal in order for the bid to be considered responsive. Bidders must indicate the total dollar value of MB and WB participation of the contract. In the event the bidder has no MB and WB participation, he is still required to indicate this on the forms by entering the word or number zero. Blank forms will not be deemed to represent zero participation. BIDS SUBMITTED WHICH DO NOT HAVE MB AND WB PARTICIPATION INDICATED ON THE APPROPRIATE FORM WILL NOT BE READ PUBLICLY DURING THE OPENING OF BIDS. These bids will not be considered for award by the Department and they will be returned to the bidder. Bidders have the option of submitting their MB and WB participation in an abbreviated format as required in Paragraph A below, or the bidders may submit their MB and WB participation in the additional detail required by Paragraph B below. In the event the bidder elects to submit MB and WB participation in accordance with Paragraph A and is determined to be the apparent lowest responsive bidder, that bidder must deliver to the Department no later than 12:00 noon of the sixth day following the opening of bids, a detailed MB and WB submittal as required by Paragraph B below.

Only those MB and WB firms with current certification by the Department will be considered acceptable for listing in the bidders submittal of MB and WB participation.

A. The contractor shall indicate on the form for listing of MB and WB Subcontractors the following required information:

REQUIRED INFORMATION

- (1) The names of MB and WB firms committed to participate in the contract;
- (2) The Contract Item Numbers of work to be performed by each MB and WB firm;
and
- (3) The total dollar amount to be paid to each MB and WB based on agreed upon unit prices.

Failure to indicate the required information on the specified form will cause the bid to be considered nonresponsive and it may be rejected.

B. In lieu of submitting the information required by (A) above, the bidder may submit the detailed information required below along with the bid proposal form.

REQUIRED INFORMATION

- (1) The names of MB and WB firms committed to participate in the contract;
- (2) The Contract Item Numbers and Contract Item Descriptions and agreed upon unit prices of work to be performed by each MB and WB firm; and
- (3) The total dollar amount to be paid to each MB and WB based on agreed upon unit prices.

Failure to indicate the required information on the specified form will cause the bid to be considered nonresponsive and it may be rejected.

The Department will not allow any substitutions, deletions, or other alterations to the listing of firms committed for MB and WB participation and/or the respective listed contract item numbers after opening of bids. The Department will not allow adjustments to total dollar amount of MB and/or WB participation after the opening of bids which would result in the MB and/or WB participation being less than the contract goal. The only exceptions to the requirements of this paragraph will be: (1) to allow for replacement of a MB or WB firm that had been decertified after opening of bids, and (2) to allow alteration of the listed contract item numbers subject to the Bidder submitting sufficient documentation to verify an obvious error in the initial submittal.

- C. If the bid of the lowest responsive bidder exceeds \$500,000 and if the MB and/or WB participation submitted in response to Paragraph B exceeds the algebraic sum of the MB and WB goals by \$1000 or more, the excess will be placed on deposit by the Department for future use by the bidder. Separate accounts will be maintained for MB and WB participation and these may accumulate for a period not to exceed 24 months.

If the MB and WB participation submitted in response to Paragraph A/B does not meet or exceed the MB and WB contract goals, the apparent lowest responsive bidder must submit information to satisfy the North Carolina Department of Transportation that sufficient reasonable efforts have been made to meet the contract goals. One complete set and nine (9) copies of this information must be received in the office of the State Contractual Services Engineer no later than 12:00 noon of the sixth day following opening of bids. Where the information submitted includes repetitious solicitation letters it will be acceptable to submit a sample representative letter along with a distribution list of the firms being solicited. Documentation of MB and WB quotations shall be a part of the good faith effort submittal as necessary to demonstrate compliance with the factors listed below which the Department considers in judging good faith efforts. This documentation may include written subcontractor quotations, telephone log notations of verbal quotations, or other types of quotation documentation.

Where the bidder fails to provide this information by the deadline, the Department may impose the following sanctions: (1) disqualify the contractor and any affiliated companies from further bidding for a period of time of no more than 90 days from the date of disqualification as established in notification by certified mail; and (2)

disqualify the Contractor and any affiliated companies for award of all contracts for which bids have been received and opened.

The following factors are what the Department will consider in judging whether or not the bidder has made adequate good faith effort:

- (1) Whether the bidder attended any pre-bid meetings that were scheduled by the Department to inform MBs and WBs of subcontracting opportunities;
- (2) Whether the bidder provided written notice to a reasonable number of specific MBs and WBs that their interest in the contract is being solicited and whether the firms solicited could have reasonably been expected to quote the work in the contract;
- (3) Whether the bidder followed up on initial solicitations of interests by contacting MBs and WBs to determine with certainty whether they were interested;
- (4) Whether the bidder selected portions of the work to be performed by MBs and WBs in order to increase the likelihood of meeting the contract goals;
- (5) Whether the bidder provided interested MBs and WBs with adequate information about the plans, specifications and requirements of the contract;
- (6) Whether the bidder negotiated in good faith with interested MBs and Wbs not rejecting them as unqualified without sound reasons based on a thorough investigation of their capabilities;
- (7) Whether quotations were received from interested MB and WB firms but rejected as unacceptable without sound reasons why the quotations were considered unacceptable;
- (8) Whether the bidder made efforts to assist interested MBs and WBs in obtaining any required insurance or bonding that may be required by the bid proposal or by the bidder;
- (9) Whether the bidder specifically negotiated with Subcontractors to assume part of the responsibility to meet the contract MB and WB goal when the work to be sublet includes potential for MB and WB participation.

In the event one bidder is the apparent low bidder on two non-federally funded projects within the same letting located in the same geographic area of the state, as a part of the good faith effort the Department will consider allowing the bidder to combine the MB participation on the two projects so long as the overall MB goal value of both projects is achieved.

In the event one bidder is the apparent low bidder on two non-federally funded projects within the same letting located in the same geographic area of the state, as a part of the good faith effort the Department will consider allowing the

bidder to combine the WB participation on the two projects so long as the overall WB goal value of both projects is achieved.

Where the apparent lowest responsive bidder fails to submit sufficient participation by MB firms to meet the contract goal, as part of the good faith effort the Department will consider allowing the bidder to withdraw funds to meet the MB goal so long as there are adequate funds available from the bidders MB bank account.

Where the apparent lowest responsive bidder fails to submit sufficient participation by WB firms to meet the contract goal, as part of the good faith effort the Department will consider allowing the bidder to withdraw funds to meet the WB goal so long as there are adequate funds available from the bidders WB bank account.

Where the apparent lowest responsive bidder fails to submit sufficient participation by MB and WB firms to meet the contract goal and upon a determination by the Goal Compliance Committee based upon the information submitted that the apparent lowest responsive bidder failed to make sufficient reasonable efforts to meet the contract goal, the Department may reject the bid.

In the event that 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 the Department that the contract goal can be met or that adequate good faith efforts have been made to meet the goal.

DIRECTORY OF CERTIFIED BUSINESSES

Included with this Proposal Form is a list of Businesses which have been certified by the North Carolina Department of Transportation. Only those MB firms with current certification may be used to meet the contract MB goal. Only those firms with current certification may be used to meet the contract WB goal.

The listing of an individual firm certified by the Department shall not be construed as an endorsement of the firms capability to perform certain work.

REPLACEMENT OF MBs AND WBs

(A) Performance Related

If any MB or WB Subcontractor indicated on the form for listing of MB and WB Subcontractors, contained elsewhere in this proposal form, does not perform satisfactorily to the extent indicated or anticipated, the Contractor shall take all necessary, reasonable steps to replace the MB Subcontractor with another MB Subcontractor and/or the Contractor shall take all necessary, reasonable steps to replace the WB Subcontractor with another WB Subcontractor.

Any substitution of MB or WB firms after award of the contract shall be approved by the Department. The Contractor shall submit any requests for substitutions through the Resident Engineer and the request must provide a valid basis or reason for the proposed substitution.

To demonstrate necessary, reasonable efforts, the Contractor shall document the steps he has taken to replace any MB or WB Subcontractor that is unable to perform successfully with another MB or WB Subcontractor. Such documentation shall include but not be limited to the following:

- (a) Copies of written notification to MBs/WBs that their interest is solicited in subcontracting the work defaulted by the previous MB or WB Subcontractor or in subcontracting other items of work in the contract.
- (b) Efforts to negotiate with MBs and WBs for specific subbids including at a minimum:
 - (1) The names, addresses, and telephone numbers of MBs and WBs that were contacted;
 - (2) A description of the information provided to MBs and WBs regarding the plans and specifications for portions of the work to be performed; and
 - (3) A statement of why additional agreements with MBs and WBs were not reached.
- (c) For each MB or WB contacted but rejected as unqualified, the reasons for the Contractor's conclusion.
- (d) Efforts made to assist the MBs and WBs contacted, if needed, in obtaining bonding or insurance required by the Contractor.

Failure of the Contractor to demonstrate reasonable efforts to replace a MB or WB firm that does not perform as intended or anticipated, shall be just cause to disqualify the Contractor from further bidding for a period of up to 6 months after notification by certified mail.

(B) Decertification

1. If the Department has approved a Request for Subcontract for a particular MB or WB Subcontractor and that MB or WB Subcontractor is subsequently decertified by the Department; then the Department will not require the Prime Contractor to solicit replacement MB or WB participation equal to the remaining work to be performed by the decertified firm.
2. If a Prime Contractor has listed a MB or WB firm in his low bid submittal and the MB or WB firm is decertified prior to the Department approving a Request for Subcontract for the named MB or WB firm, the Prime Contractor may be required to make a good faith effort to:

- (a) Replace the decertified firm with a certified firm, or
- (b) To obtain replacement MB or WB participation in other areas of work.

DEFINITIONS

For purposes of this provision, the following definition will apply:

Minority Business or MB means a small business concern, which is owned and controlled by one or more minorities. Except that such term shall not include any concern or group of concerns controlled by the same minority or minorities which has average annual gross receipts over the preceding 3 fiscal years in excess of \$14,000,000, as adjusted by the Department for inflation. For the purposes of this part, owned and controlled means a business:

- (a) Which is at least 51 percent owned by one or more minorities or in the case of a publicly owned business, at least 51 percent of the stock of which is owned by one or more minorities; and
- (b) Whose management and daily business operations are controlled by one or more such individuals.

Minority is defined as a citizen or lawful permanent resident of the United States and who is:

- (1) Black (a person having origins in any of the black racial groups of Africa);
- (2) Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);
- (3) Asian American (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands);
- (4) American Indian

Women Business or WB means a small business concern, which is owned and controlled by one or more women. Except that such term shall not include any concern or group of concerns controlled by the same woman or women which has average annual gross receipts over the preceding 3 fiscal years in excess of \$14,000,000, as adjusted by the Department for inflation. For the purposes of this part, owned and controlled means a business:

- (a) Which is at least 51 percent owned by one or more women or in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and
- (b) Whose management and daily business operations are controlled by one or more of the women who own it.

COUNTING MB/WB PARTICIPATION TOWARD MEETING THE MB/WB GOAL

- (1) If a firm is determined to be an eligible MB or WB firm and certified by the Department, the total dollar value of the participation by the MB or WB will be counted toward the appropriate MB or WB goal. The total dollar value of participation by a certified MB or WB will be based upon unit prices agreed upon by the Prime Contractor and MB or WB Subcontractor.
- (2) The Contractor may count toward its MB or WB goal a portion of the total dollar value of participation with a joint venture, eligible under the standards of this provision, equal to the percentage of the ownership and controls of the MB or WB partner in the joint venture.
- (3)
 - (a) The Contractor may count toward its MB or WB goal only expenditures to MBs or WBs that perform a commercially useful function in the work of a contract. A MB or WB is considered to perform a commercially useful function when it is responsible for execution of a distinct element of the work of a contract and carrying out its responsibilities by actually performing, managing, and supervising the work involved. To determine whether a MB or WB is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, and other relevant factors.
 - (b) Consistent with normal industry practices, a MB or WB may enter into subcontracts. If a MB or WB Contractor or Subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of normal industry practices, the MB or WB shall be presumed not to be performing a commercially useful function. The MB or WB may present evidence to rebut this presumption to the Department. The Departments decision on the rebuttal of this presumption shall be final.
- (4) A Contractor may count toward its MB or WB goal 60 percent of its expenditures for materials and supplies required to complete the contract and obtained from MB or WB regular dealer and 100 percent of such expenditures to a MB or WB manufacturer.
 - (a) For purposes of this provision, a manufacturer is a firm that operates or maintains a factory or establishment that produces on the premises the materials or supplies obtained by the Contractor.
 - (b) For purposes of this provision, a regular dealer is 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. To be a regular dealer, the firm must engage in, as its principal business and in its own name, the purchase and sale 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 or operates distribution equipment. Brokers and packagers shall not be regarded as manufacturers or regular dealers within the meaning of this section.

- (5) A contractor may count toward its MB or WB goal the following expenditures to MB or WB firms that are not manufacturers or regular dealers:
- (a) The fees or commissions charged for providing a bona fide service, such as professional, technical, consultant or managerial services and assistance in the procurement of essential personnel, facilities, equipment, materials or supplies required for performance of the contract, provided that the fee or commission is determined by the Department to be reasonable and not excessive as compared with fees customarily allowed for similar services.
 - (b) The fees charged for delivery of materials and supplies required on a job site (but not the cost of the materials and supplies themselves) when the hauler, trucker, or delivery service is not also the manufacturer of or a regular dealer in the materials and supplies, provided that the fee is determined by the Department to be reasonable and not excessive as compared with fees customarily allowed for similar services.
 - (c) The fees or commissions charged for providing any bonds or insurance specifically required for the performance of the contract provided that the fee or commission is determined by the Department to be reasonable and not excessive as compared with fees customarily allowed for similar services.

REPORTS

Within 30 days after receipt of materials, supplies, or services from MBs or WBs, not otherwise documented by Request for Subcontracts (RS-1A/RS-1B), the Contractor shall furnish to the Engineer appropriate documentation (canceled checks, paid invoices, etc.) to verify expenditures with MB and WB concerns. The documentation should also indicate the percentage (60% or 100%) of expenditures claimed for MB or WB credit.

All requests for subcontracts involving MB or WB Subcontractors shall be accompanied by a certification executed by both the Prime Contractor and the MB or WB Subcontractor attesting to the agreed upon unit prices and extensions for the affected contract items. This document shall be on the Departments Form RS-1-D, or in lieu of using the Departments Form, copies of the actual executed agreement between the Prime Contractor and the MB or WB Subcontractor may be submitted. In any event, the Department reserves the right to require copies of actual subcontract agreements involving MB and WB Subcontractors.

The RS-1-D certification forms may be obtained from the Departments Resident Engineer.

These certifications shall be considered a part of the project records, and consequently will be subject to any penalties under State Law associated with falsifications of records related to projects.

REPORTING MINORITY BUSINESS ENTERPRISE OR WOMEN BUSINESS ENTERPRISE PARTICIPATION

When payments are made to Minority Business Enterprise firms or Women Business Enterprise firms, including material suppliers, contractors at all levels (prime, subcontractor, or second tier subcontractor) shall provide the Engineer with an accounting of said payments. This accounting shall be furnished the Engineer for any given month by the end of the following month. Failure to submit this information accordingly may result in (1) withholding of money due in the next partial pay estimate; or (2) removal of an approved Contractor from the prequalified bidders list or the removal of other entities from the approved subcontractors list. The accounting shall list for each payment made to a MB/WB Enterprise firm the following:

DOT Project Number

Payee Contractor Name

Receiving Contractor or Material Supplier

MB/WB Certification Basis, e.g., Woman Owned, Native American, African American, etc.

Amount of Payment

Date of Payment

A responsible fiscal officer of the payee contractor, subcontractor, or second tier subcontractor who can attest to the date and amounts of the payments shall certify that the accounting is correct. A copy of an acceptable report may be obtained from the Engineer.

LISTING OF MB & WB SUBCONTRACTORS

ADDRESS FIRM NAME ABD	MB OR WB	ITEM NO.	ITEM DESCRIPTION	(*) AGREED UPON UNIT PRICE	DOLLAR VOLUME OF ITEM

PROJECT NO. _____ COUNTY _____ FIRM _____

LISTING OF MB & WB SUBCONTRACTORS

ADDRESS FIRM NAME ABD	MB OR WB	ITEM NO.	ITEM DESCRIPTION	AGREED UPON UNIT PRICE (*)	DOLLAR VOLUME OF ITEM

Dollar Volume of MB Subcontractor \$ _____
MB Percentage of Total Contract Bid Price _____ %
Dollar Volume of WB Subcontractor \$ _____
WB Percentage of Total Contract Bid Price _____ %

(*) The Dollar Volume Shown in this Column Shall
 Be Actual Price Agreed Upon by the Prime Contractor
 And the MB and/or WB Subcontractor, and These Prices
 Will Be Used to Determine The Percentage of the
 MB and/or WB Participation in the Contract.

PROJECT NO. _____ **COUNTY** _____ **FIRM** _____

MINIMUM WAGES

Federal: The Fair Labor Standards Act provides that with certain exceptions every employer must pay wages at the rate of not less than SIX DOLLARS AND FIFTY FIVE CENTS (\$6.55) per hour.

State: The North Carolina Minimum Wage Act provides that every employer shall pay to each of his employees wages at a rate of not less than SIX DOLLARS AND FIFTY FIVE CENTS (\$6.55) per hour.

The minimum wage paid to all skilled labor employed on this contract shall be SIX DOLLARS AND FIFTY FIVE CENTS (\$6.55) per hour.

The minimum wage paid to all intermediate labor employed on this contract shall be SIX DOLLARS AND FIFTY FIVE CENTS (\$6.55) per hour.

The minimum wage paid to all unskilled labor employed on this contract shall be SIX DOLLARS AND FIFTY FIVE CENTS (\$6.55) per hour.

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

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

STANDARD SPECIAL PROVISION

AWARD OF CONTRACT

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 grounds of race, color, or national origin.

BID SHEET**CONTRACT COST PROPOSAL**

The contractor agrees to provide the services outlined in this proposal for the following fixed price:

BRIDGE REPLACEMENT WITH PRESTRESSED CORED SLABS / BOX BEAMS

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY AND UNIT</u>	<u>UNIT BID PRICE</u>	<u>AMOUNT BID</u>
1.	Mobilization	L.S.	L.S.	_____
2.	Erosion Control	L.S.	L.S.	_____
3.	Temporary Silt Fence	475 _____ Lin. Ft.	_____ _____ Lin. Ft.	_____
4.	Sediment Control Stone	50 _____ Tons	_____ _____ Tons	_____
5.	Safety Fence	400 _____ Lin. Ft.	_____ _____ Lin. Ft.	_____
6.	¼" Hardware Cloth	250 _____ Lin. Ft.	_____ _____ Lin. Ft.	_____
7.	Special Stilling Basins	12 _____ Ea.	_____ _____ Ea.	_____
8.	Excavation and Embankment	L.S.	L.S.	_____
9.	Structure Removal @ Sta. 19+57.70 -L-	L.S.	L.S.	_____
10.	HP 12 x 53 Steel Piles (Galvanized)	625 _____ Lin. Ft.	_____ _____ Lin. Ft.	_____
11.	48" Drilled Pier in Soil @ Sta. 19+57.70 -L-	342.0 _____ Lin. Ft.	_____ _____ Lin. Ft.	_____
12.	48" Drilled Pier Not in Soil @ Sta. 19+57.70 -L-	12.0 _____ Lin. Ft.	_____ _____ Lin. Ft.	_____
13.	48" Permanent Steel Casing @ Sta. 19+57.70 -L-	159.0 _____ Lin. Ft.	_____ _____ Lin. Ft.	_____

14.	Crosshole Sonic Logging	<u>2</u> Ea.	<u>Ea.</u>	<u> </u>
15.	SID Inspection	<u>2</u> Ea.	<u>Ea.</u>	<u> </u>
16.	Construction of Substructure @ Sta. 19+57.70 -L-	L.S.	L.S.	<u> </u>
17.	Construction of Superstructure @ Sta. 19+57.70 -L-	L.S.	L.S.	<u> </u>
18.	Class II Rip Rap	<u>248</u> Tons	<u>Tons</u>	<u> </u>
19.	Asphalt Concrete Base Course, Type B 25.0 B	<u>715</u> Tons	<u>Tons</u>	<u> </u>
20.	Asphalt Intermediate Course, Type I 19.0B	<u>440</u> Tons	<u>Tons</u>	<u> </u>
21.	Asphalt Concrete Surface Course, Type SF 9.5 A	<u>565</u> Tons	<u>Tons</u>	<u> </u>
22.	Asphalt Binder, PG64-22	<u>89</u> Tons	<u>Tons</u>	<u> </u>
23.	Steel BM Guardrail	<u>162.5</u> Lin. Ft.	<u>Lin. Ft.</u>	<u> </u>
24.	Guardrail Anchor Unit, Type B-77	<u>3</u> Ea.	<u>Ea.</u>	<u> </u>
25.	Guardrail Anchor Unit, Type 350	<u>2</u> Ea.	<u>Ea.</u>	<u> </u>
26.	Guardrail Anchor Unit, Type AT-1	<u>1</u> Ea.	<u>Ea.</u>	<u> </u>
27.	Bridge Approach Slabs, Sta. 19+57.70 -L-	L.S.	L.S.	<u> </u>
28.	Masonry Drainage Structure	<u>4</u> Ea.	<u>Ea.</u>	<u> </u>
29.	15" RC Pipe Culvert, Class III	<u>20</u> Lin. Ft.	<u>Lin. Ft.</u>	<u> </u>

30.	18" RC Pipe Culvert, Class III	<u>216</u> Lin. Ft.	<u> </u> Lin. Ft.	<u> </u>
31.	Frame with Two Grates Std. 840.29	<u>2</u> Ea.	<u> </u> Ea.	<u> </u>
32.	Frame with Cover Std. 840.54	<u>2</u> Ea.	<u> </u> Ea.	<u> </u>
33.	Foundation Conditioning Material	<u>28</u> Tons	<u> </u> Tons	<u> </u>
34.	Shoulder Berm & Gutter	<u>210</u> Lin. Ft.	<u> </u> Lin. Ft.	<u> </u>

TOTAL PROJECT BID

AWARD LIMITS ON MULTIPLE PROJECTS

It is the desire of the Proposer to be awarded contracts, the value of which will not exceed a total of \$ _____, for those projects indicated below on which bids are being opened on the same date as shown in the Proposal Form. Individual projects shall be indicated by placing the project number and county in the appropriate place below. Projects not selected will not be subject to an award limit.

(Project Number)

(County)

(Project Number)

(County)

(Project Number)

(County)

(Project Number)

(County)

*If a Proposer desires to limit the total amount of work awarded to him in this letting, he shall state such limit in the space provided above in the second line of this form.

It is agreed that in the event that I am (we are) the successful bidder on indicated projects, the total value of which is more that the above stipulated award limits, the Board of Transportation will award me (us) projects from among those indicated which have a total value not exceeding the award limit and which will result in the best advantage to the Department of Transportation.

**Signature of Authorized Person

**Only those persons authorized to sign bids under the provisions of Article 102-8, Item 7, shall be authorized to sign this form.

EXECUTION OF PROPOSAL

DATE: _____

In compliance with the foregoing request for proposals and subject to all terms and conditions thereof, the undersigned offers and agrees, if this proposal is accepted, to furnish the services for the prices quoted.

CONTRACTOR: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP CODE: _____ PHONE: _____

BY: _____ TITLE: _____
(SIGNATURE)

(TYPED OR PRINTED NAME)

CONTRACTOR'S FEDERAL SOCIAL SECURITY IDENTIFICATION NO. _____

CONTRACTOR'S LICENSE NUMBER: _____

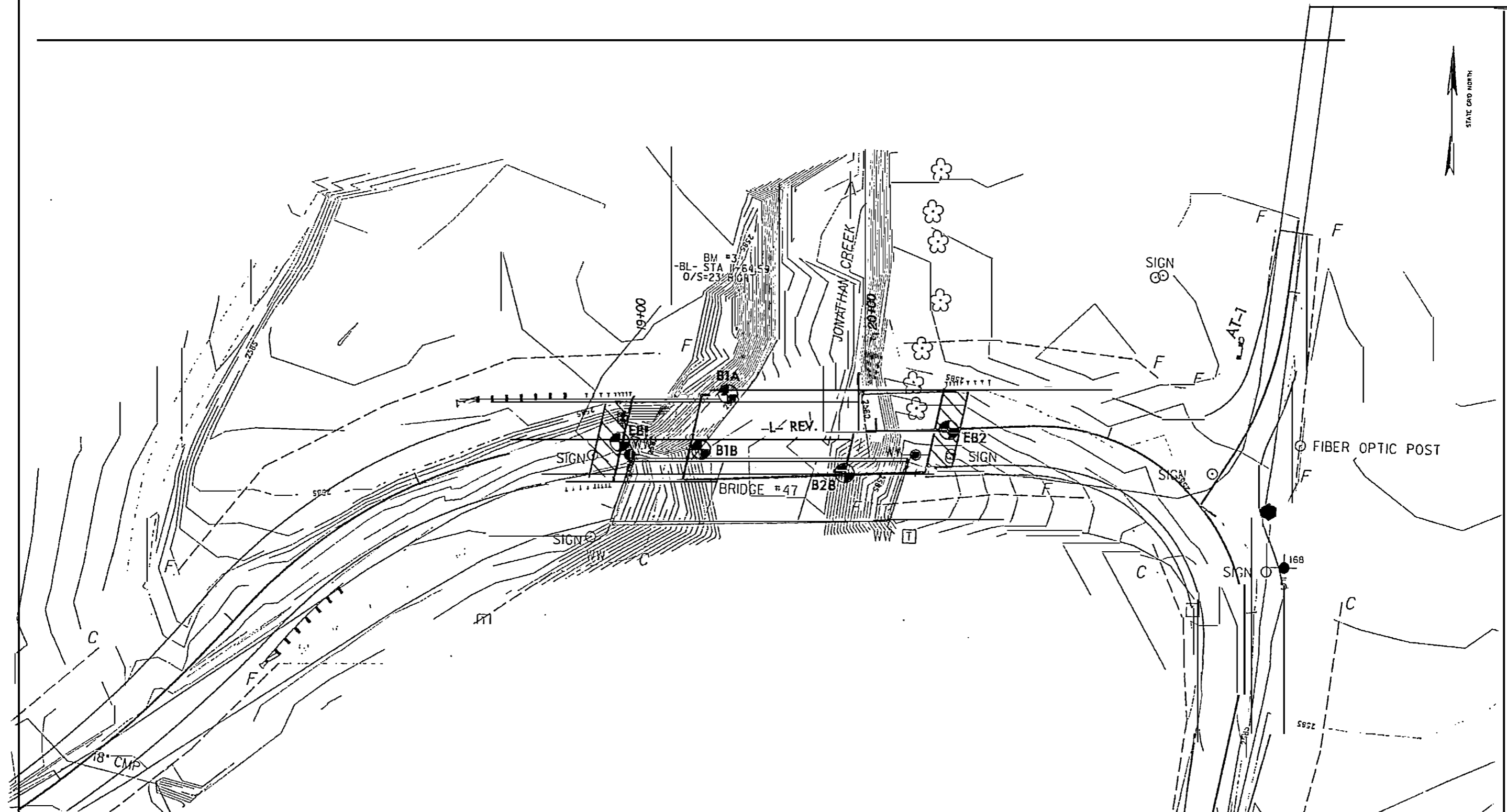
ACCEPTANCE OF PROPOSAL

AGENCY: N. C. DEPARTMENT OF TRANSPORTATION CITY AND STATE:
RALEIGH, NORTH CAROLINA

BY: _____ TITLE: _____
(SIGNATURE)


GEOTECHNICAL ATTACHMENT B :

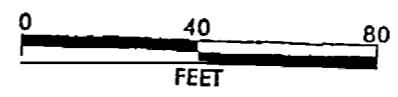
The following Geotechnical Bore Holes Sections are for information only and are not a part of this contract. These information are for investigation only and no accuracy is implied or guaranteed. No claim will be allowed as a result of the use of this information.



NOTES:

PLANS ADOPTED FROM ELECTRONIC FILES RECEIVED FROM SIMPSON ENGINEERS & ASSOCIATES, DATED MARCH 2009.

 APPROXIMATE SPT BORING LOCATION.

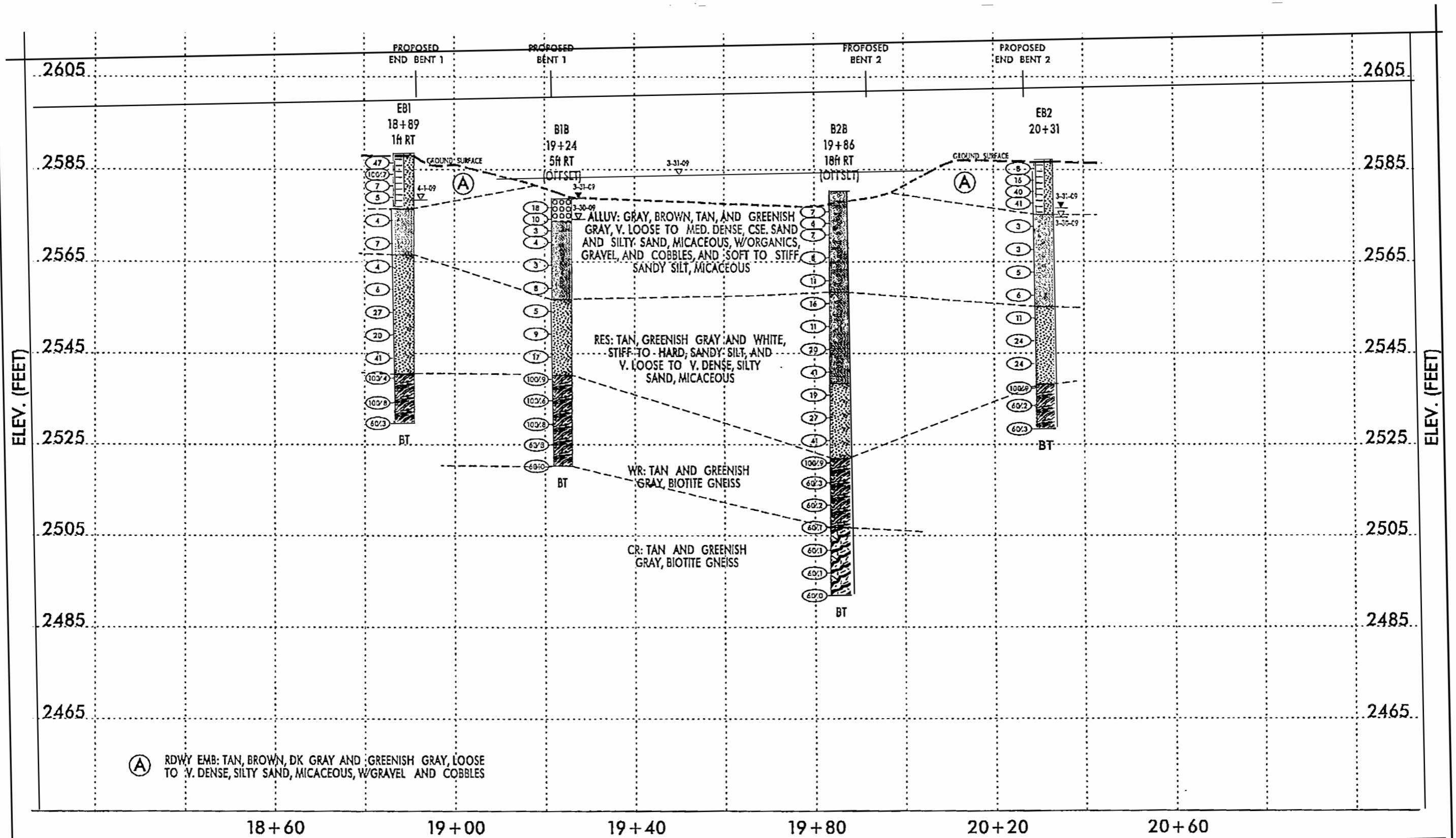


BORING LOCATION PLAN

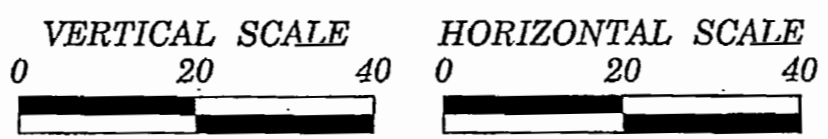
BRIDGE #47 ON SR 1318 OVER JONATHAN CREEK
 HAYWOOD COUNTY, NORTH CAROLINA
 PROJECT NO.: G6029.00



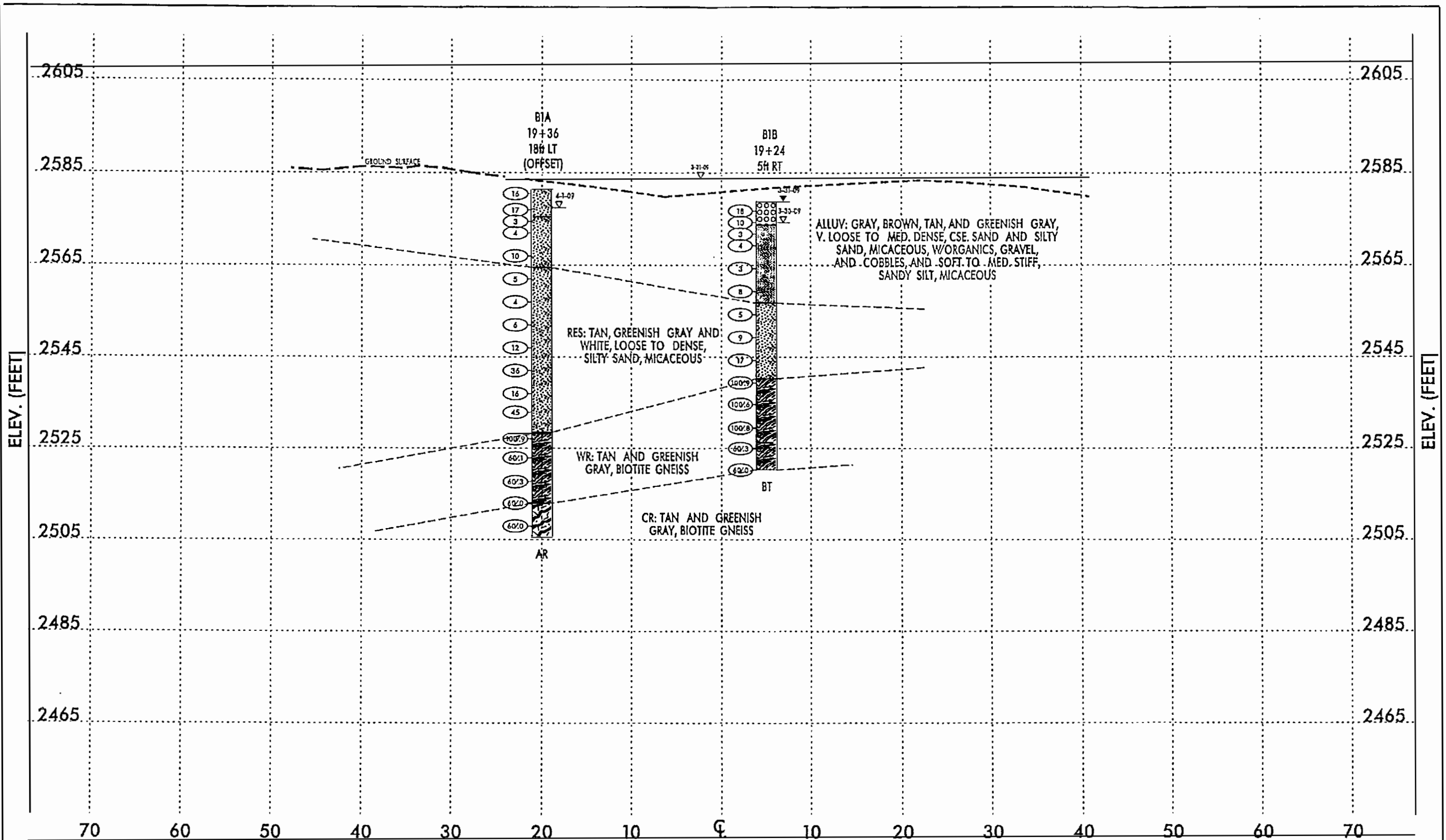
FALCON ENGINEERING, INC.
 2726 EDWARD RD
 RALEIGH, NC 27615
 P.O. # 161300
 FAX # 919 877 0423



NOTES:
 PLANS ADOPTED FROM ELECTRONIC FILES RECEIVED FROM SIMPSON ENGINEERS & ASSOCIATES, DATED MARCH 2009
 PROPOSED BRIDGE SKEW: 105°

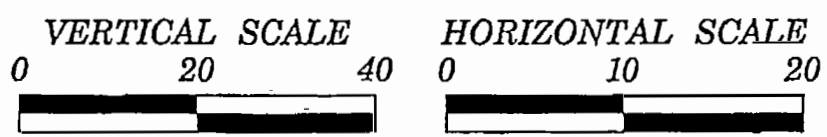


SUBSURFACE PROFILE ALONG -L- REV.
 BRIDGE # 47 OVER JONATHAN CREEK
 HAYWOOD COUNTY, NORTH CAROLINA
 PROJECT NO.: G6029.00



NOTES:

- PLANS ADOPTED FROM ELECTRONIC FILES RECEIVED FROM SIMPSON ENGINEERS & ASSOCIATES, DATED MARCH 2009
- PROPOSED BRIDGE SKEW: 105°.



CROSS SECTION BENT 1

BRIDGE # 47 OVER JONATHAN CREEK
 HAYWOOD COUNTY, NORTH CAROLINA
 PROJECT NO.: G6019.00



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

SHEET

PROJECT NO. G5029.00	ID. N/A	COUNTY HAYWOOD	GEOLOGIST P. ZHANG
SITE DESCRIPTION BRIDGE #47 ON SR 1318 OVER JONATHAN CREEK			
BORING NO. B1A	STATION 19+36	OFFSET 18R LT	ALIGNMENT -L-REV.
COLLAR ELEV. 2,582.0 ft	TOTAL DEPTH 76.0 ft	NORTHING 685,304	EASTING 803,994
DRILL MACHINE CME-550	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 04/01/09	COMP. DATE 04/01/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 68.5 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2585															
2580	2578.5	3.5													
2575	2576.0	6.0	6	9	8										
2570	2573.5	8.5	1	1	2										
2565	2568.5	13.5													
2560	2563.5	18.5	3	4	6										
2555	2558.5	23.5	2	3	2										
2550	2553.5	28.5	2	2	2										
2545	2548.5	33.5	3	3	3										
2540	2543.5	38.5	6	5	7										
2535	2538.5	43.5	9	15	21										
2530	2533.5	48.5	3	5	11										
2525	2528.5	53.5	13	21	24										
2520	2523.5	58.5	32	68/4											
2515	2518.5	63.5													
2510	2513.5	68.5													
2505	2508.5	73.5													
2500															
2495															
2490															

NCDOT BORE SINGLE HAYWOOD BR 47.GPJ NC_DOT.GDT 4/30/09



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

SHEET

PROJECT NO. G5029.00	ID. N/A	COUNTY HAYWOOD	GEOLOGIST P. ZHANG
SITE DESCRIPTION BRIDGE #47 ON SR 1318 OVER JONATHAN CREEK			
BORING NO. B1B	STATION 19+24	OFFSET 5R RT	ALIGNMENT -L-REV.
COLLAR ELEV. 2,579.0 ft	TOTAL DEPTH 58.5 ft	NORTHING 685,280	EASTING 803,983
DRILL MACHINE CME-550	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 03/30/09	COMP. DATE 03/30/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2580															
2575	2575.5	3.5	6	8	10										
2570	2573.0	6.0	3	3	7										
2565	2570.5	8.5	2	2	1										
2560	2565.5	13.5	1	2	2										
2555	2560.5	18.5													
2550	2555.5	23.5	3	3	5										
2545	2550.5	28.5	2	2	3										
2540	2545.5	33.5	3	4	5										
2535	2540.5	38.5	4	6	11										
2530	2535.5	43.5	26	74/4											
2525	2530.5	48.5	70	30/1											
2520	2525.5	53.5	7	93/3											
2515	2520.5	58.5													
2510															
2505															
2500															
2495															
2490															
2485															

NCDOT BORE SINGLE HAYWOOD BR 47.GPJ NC_DOT.GDT 4/30/09

Boring Terminated at Elevation 2,520.5 ft IN CR: BIOTITE GNEISS



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

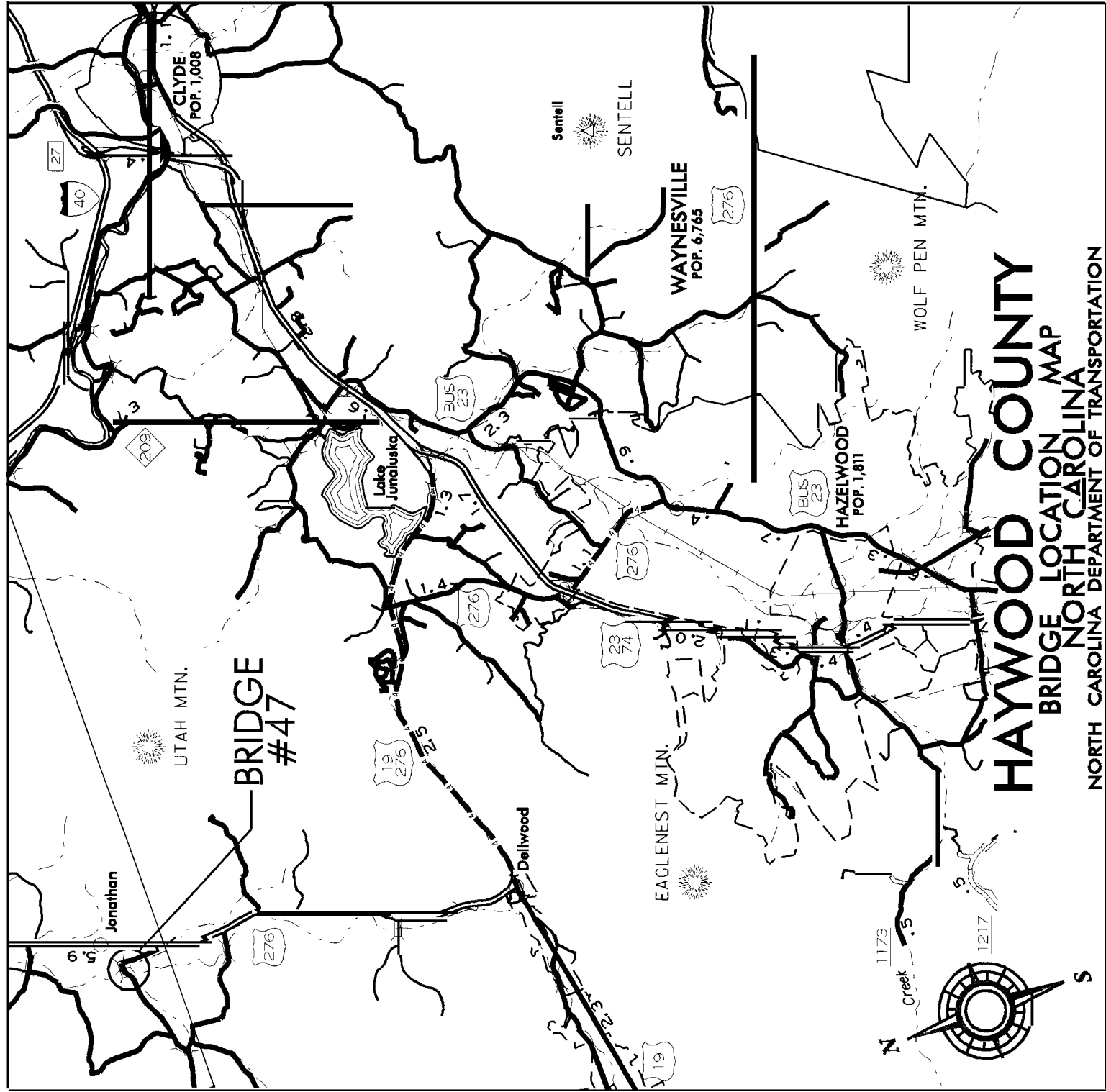
PROJECT NO. G6029.00	ID. N/A	COUNTY HAYWOOD	GEOLOGIST P. ZHANG
SITE DESCRIPTION BRIDGE #47 ON SR 1318 OVER JONATHAN CREEK			
BORING NO. B2B	STATION 19+86	OFFSET 17ft RT	ALIGNMENT -L- REV.
COLLAR ELEV. 2,580.0 ft	TOTAL DEPTH 88.5 ft	NORTHING 685,272	EASTING 804,046
DRILL MACHINE CME-550	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 03/31/09	COMP. DATE 03/31/09	SURFACE WATER DEPTH 3.5 ft	DEPTH TO ROCK 73.5 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2580															
2579.5	2576.5	3.5												W	2,580.0 WATER SURFACE (03/31/09)
2579.0	2574.0	6.0	3	4	3								W	TAN AND GREENISH GRAY, MED. STIFF TO STIFF, SANDY SILT (A-4), MICACEOUS	
2578.5	2571.5	8.5	2	3	3								W		
2578.0			4	4	3								SS-4	29%	
2577.5	2566.5	13.5	3	3	5								W		
2577.0	2561.5	18.5	3	5	6								W		
2576.5	2556.5	23.5	3	7	9								W	2,558.0	
2576.0	2551.5	28.5	5	5	6								W	RESIDUAL TAN AND GREENISH GRAY, STIFF TO HARD, SANDY SILT (A-4), MICACEOUS	
2575.5	2548.5	33.5	6	9	11								W		
2575.0	2541.5	38.5	15	20	21								W		
2574.5	2536.5	43.5	7	9	10								W	2,533.0	
2574.0	2531.5	48.5	10	12	15								M	RESIDUAL TAN, GREENISH GRAY AND WHITE, MED. DENSE TO DENSE, SILTY SAND (A-2-4), MICACEOUS	
2573.5	2526.5	53.5	21	20	21								M		
2573.0	2521.5	58.5	30	70/4										2,521.5	
2572.5	2516.5	63.5												WEATHERED ROCK TAN AND GREENISH GRAY, BIOTITE GNEISS	
2572.0	2511.5	68.5													
2571.5	2506.5	73.5												2,506.5	
2571.0	2501.5	78.5												CRYSTALLINE ROCK TAN AND GREENISH GRAY, BIOTITE GNEISS	
2570.5	2496.5	83.5													
2570.0	2491.5	88.5												2,491.5	
2569.5														Boring Terminated at Elevation 2,491.5 ft IN CR: BIOTITE GNEISS	

NCDOT BORE SINGLE HAYWOOD BR 47, GPJ NC, DOT, GDT 4/20/09

ATTACHMENT 'C'

Environmental Permit



CLYDE
POP. 1,008

Sentell
SENTELL

WAYNESVILLE
POP. 6,765

HAZELWOOD
POP. 1,811

UTAH MTN.

BRIDGE
#47

EAGLENEST MTN.

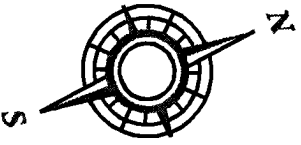
WOLF PEN MTN.

HAYWOOD COUNTY

BRIDGE LOCATION MAP NORTH CAROLINA

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

178 HENRY BIRD RD.
WHITTIER, NC, 28789



JACKSON COUNTY
DIV. 14 - BRIDGE MAINT. OFFICE-

