STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

Division 10 District 2 & Division 12 District 1

CONTRACT PROPOSAL

WBS ELEMENT:	**50061.3.8**	**COUNTY:**	**Mecklenburg & Gaston**
TIP#:	**C-5600G**		
FA#:	**CMAQ-1229 (016)**		
LOCATION:	**I-85 from I-485 to Groves St. and along Groves St from I-85 to the US 29/74 Intersection**		
TYPE OF WORK:	**Fiber Optic Cable and Conduit Routing, Wireless Communication, CCTV Camera Installation and Dynamic Message Sign Integration**		
BID OPENING:	**Wednesday October 5, 2016 @ 2:00 PM**		
DATE OF AVAILABILITY:	**October 31, 2016**		
COMPLETION DATE:	**August 12, 2017**		

NOTICE:

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

NAME OF BIDDER _____ **N.C. CONTRACTOR'S LICENSE NUMBER** _____

ADDRESS OF BIDDER _____

*****DO NOT SEPARATE THE BID SHEET FROM THE PROPOSAL!*****

RETURN BIDS TO:

Mr. Terry Burleson
NC Department of Transportation
716 West Main Street
Albemarle, NC 28001

5% Bid Bond or Bid Deposit Required

INSTRUCTIONS TO BIDDERS

PLEASE READ ALL INSTRUCTIONS CAREFULLY BEFORE PREPARING AND SUBMITTING YOUR BID.

All bids shall be prepared and submitted in accordance with the following requirements. Failure to comply with any requirement shall cause the bid to be considered irregular and may be grounds for rejection of the bid.

TRADITIONAL PAPER BIDS:

1. Download the entire proposal from the Connect NCDOT website and return the entire proposal with your bid.
2. All entries on the bid sheet, including signatures, shall be written in ink.
3. The Bidder shall submit a unit price for every item on the bid form. The unit prices for the various contract items shall be written in figures. *****Unit prices shall be limited to FOUR decimal places.*****
4. An amount bid shall be entered on the bid sheet for every item. The amount bid for each item shall be determined by multiplying each unit bid by the quantity for that item, and shall be written in figures in the "Amount Bid" column of the sheet.
5. The total amount bid shall be written in figures in the proper place on the bid sheet. The total amount shall be determined by adding the amounts bid for each item.
6. 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.
7. The bid shall be properly executed. All bids shall show the following information:
   a. Name of individual, firm, corporation, partnership, or joint venture submitting bid.
   b. Name of individual or representative submitting bid and position or title.
   c. Name, signature, and position or title of witness.
   d. Federal Identification Number
   e. Contractor's License Number
8. Bids submitted by corporations shall bear the seal of the corporation.
9. The bid shall not contain any unauthorized additions, deletions, or conditional bids.
10. The bidder shall not add any provision reserving the right to accept or reject an award, or to enter into a contract pursuant to an award.
11. **THE ENTIRE PROPOSAL WITH THE BID SHEET STILL ATTACHED SHALL BE PLACED IN A SEALED ENVELOPE AND SHALL HAVE BEEN DELIVERED TO AND RECEIVED IN THE DIVISION OFFICE AT 716 WEST MAIN ST, ALBEMARLE, NC 28001 BY 2:00 PM ON WEDNESDAY OCTOBER 5, 2016.**
12. If delivered by mail, the sealed envelope shall be addressed as follows:

Mr. Terry Burleson
NC Department of Transportation
716 West Main Street
Albemarle, NC 28001

13. The sealed bid must display the following statement on the bottom left-hand corner of the sealed envelope:

QUOTATION FOR WBS# 50061.3.8 I-85 ITS INSTALLATION TO BE OPENED OCTOBER 5, 2016 AT 2:00 P.M.

OPTIONAL COMPUTER BID PREPARATION:

1. All instructions given above for completing and returning TRADITIONAL PAPER BIDS apply, except as modified by the provision “Electronic Bidding”, if applicable.
2. Expedite software necessary for electronic bid preparation may be downloaded from the Connect NCDOT website at: https://connect.ncdot.gov/letting/Pages/EBS-Information.aspx

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PROJECT SPECIAL PROVISIONS (GENERAL)

This contract is for the installation of Fiber Optic Cable and Conduit Routing, Wireless Communication, CCTV Camera Installation and Dynamic Message Sign Integration along I-85 from I-485 to Groves St. and along Groves St from I-85 to the US 29/74 Intersection in Mecklenburg & Gaston Counties.

All work and materials shall be in accordance with the provisions of the General Guidelines of this contract, the Project Special Provisions, the North Carolina Department of Transportation Standard Specifications for Roads and Structures 2012, the North Carolina Department of Transportation Roadway Standards Drawings 2012, the current edition of the Manual on Uniform Traffic Control Devices (MUTCD).

The Contractor shall keep himself/herself fully informed of all Federal, State and local laws, ordinances, and regulations, and shall comply with the provisions of Section 107 of the Standard Specifications.

CONTRACT TIME AND LIQUIDATED DAMAGES

The date of availability for this project is October 31, 2016. If the Contractor has not received written authorization by this date, he shall contact the Department representative for verbal authorization. Any ensuing delay in issuance of the purchase order or division contract number shall not constitute a valid reason for extending the completion date. The Contractor may begin work prior to the date of availability upon approval of the Engineer or his duly authorized representative. If such approval is given, and the Contractor begins work prior to the date of availability, the Department of Transportation will assume no responsibility for any delays caused prior to this date by any reason whatsoever, and such delays, if any, will not constitute a valid reason for extending the completion date.
No work will be permitted and no authorization will be issued until all required bonds and prerequisite conditions and certifications have been satisfied.

The completion date for this project is August 12, 2017. No extensions will be authorized except as authorized by Article 108-10 of the Standard Specifications.

Liquidated damages for this contract are Seven Hundred Fifty Dollars ($750.00) per calendar day.

INTERMEDIATE CONTRACT TIME #1 AND LIQUIDATED DAMAGES

The Contractor shall complete the required work of installing, maintaining and removing the traffic control devices for lane closures and restoring traffic to its normal pattern. The Contractor shall not close or narrow a lane of traffic on **I-85 and Ramps** during the following day and time restrictions:

DAY AND TIME RESTRICTIONS	
Lane Closures	**Monday thru Friday 6:00 a.m. to 9:00 p.m. Saturday and Sunday 9:00 a.m. to 6:00 p.m.**
Shoulder Closures	**Monday thru Friday 6:00 a.m. to 9:00 a.m. 4:00 p.m. to 7:00 p.m.**

The Contractor shall complete the required work of installing, maintaining and removing the traffic control devices for lane closures and restoring traffic to its normal pattern. The Contractor shall not close or narrow a lane of traffic on **Groves St, NC 7/Main St, SR 2093 (Belmont-Mt Holly Road), NC 273 (Beatty Dr), SR 1601 (Moores Chapel Rd), SR 1625 (Sam Wilson Rd) and I-485 Ramps** during the following day and time restrictions:

DAY AND TIME RESTRICTIONS	
Lane Closures & Shoulder Closures	**Monday thru Friday 6:00 a.m. to 9:00 a.m. 4:00 p.m. to 7:00 p.m.**

In addition, the Contractor shall not close or narrow a lane of traffic on **I-85 and Ramps, Groves St, NC 7/Main St, SR 2093 (Belmont-Mt Holly Road), NC 273 (Beatty Dr), SR 1601 (Moores Chapel Rd), SR 1625 (Sam Wilson Rd) and I-485 Ramps**, detain and/or alter the traffic flow on or during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy, including the following schedules:

HOLIDAY AND HOLIDAY WEEKEND LANE CLOSURE RESTRICTIONS

- For any **unexpected occurrence** that creates unusually high traffic volumes, as directed by the Engineer.
- For **New Year's Day**, between the hours of 6:00 a.m. December 31st and 9:00 p.m. January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until 9:00 p.m. the following Tuesday.
- For **Easter**, between the hours of 6:00 a.m. Thursday and 9:00 p.m. Monday.
- For **Memorial Day**, between the hours of 6:00 a.m. Friday and 9:00 p.m. Tuesday.

- For **Independence Day**, between the hours of 6:00 a.m. the day before Independence Day and 9:00 p.m. the day after Independence Day.

  If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of 6:00 a.m. the Thursday before Independence Day and 9:00 p.m. the Tuesday after Independence Day.

- For **Labor Day**, between the hours of 6:00 a.m. Friday and 9:00 p.m. Tuesday.

- For **Thanksgiving Day**, between the hours of 6:00 a.m. Wednesday and 9:00 p.m. Monday.

- For **Christmas**, between the hours of 6:00 a.m. the Friday before the week of Christmas Day and 9:00 p.m. the following Tuesday after the week of Christmas Day.

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

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

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

The liquidated damages are ONE THOUSAND DOLLARS ($1000.00) per hour or any portion thereof.

INTERMEDIATE CONTRACT TIME #2 AND LIQUIDATED DAMAGES

The Contractor shall not close or narrow a lane of traffic on **NC 7/Main St and or I-85 and Ramps at the NC 7 Interchange**, detain and/or alter the traffic flow on or during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy, including the following schedules:

HOLIDAY AND HOLIDAY WEEKEND LANE CLOSURE RESTRICTIONS

- For **the Month of December,** between the hours of **4:00 P.M.** and **11:00 P.M.**

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

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

The liquidated damages are ONE THOUSAND DOLLARS ($1000.00) per hour or any portion thereof.

DIVISION LET CONTRACT PREQUALIFICATION

(07-01-14) SPD 01-410

Any firm that wishes to bid as a prime contractor shall be prequalified as a Bidder or PO Prime Contractor prior to submitting a bid. Information regarding prequalification can be found at: https://connect.ncdot.gov/business/Prequal/Pages/default.aspx.

The prime contractor shall be prequalified for the type of work advertise in this proposal prior to submitting his bid. If the contractor is not prequalified for the type of work advertised, the bid may be rejected and not considered for award.

In addition, the prime contractor and/or subcontractor(s) shall be prequalified in the work code(s) for which they identify as work items in the prime contractor's construction progress schedule that they will complete themselves. Any contractor identified as working outside their expertise may be considered in default of contract.

BOND REQUIREMENTS

(06-01-16) 102-8, 102-10 SPD 01-420A

A Bid Bond is required in accordance with Article 102-10 of the 2012 Standard Specifications for Roads and Structures.

Contract Payment and Performance Bonds are required in accordance with Article 103-7 of the 2012 Standard Specifications for Roads and Structures.

ELECTRONIC BIDDING (DIVISION CONTRACTS)

(05-13-16) 102 SPI 1 G24

The bidder has the option to prepare and submit bids by one of three methods; electronically using the on-line system Bid Express®, electronic bid preparation with manual delivery, or traditional paper bid. All bids shall be prepared and submitted in accordance with the following requirements. Failure to comply with any requirement may cause the bid to be considered irregular and may be grounds for rejection of the bid.

(A) Electronic On-Line Bids thru Bid Express®

For preparing and submitting the bid electronically using the on-line system Bid Express®, refer to Article 102-8(B) of the *2012 Standard Specifications.*

Bidders that bid electronically on Raleigh Central-Let projects will need a separate Digital Signature from Bid Express® for Division Contracts.

(B) Electronic Bid Preparation with Manual Delivery

For electronic bid preparation with manual delivery, the bidder shall download the Expedite program from the NCDOT "Project Letting" website and download the appropriate .ebs electronic file of line items and quantities unique to each project from the Division Office's website. The only entries into the program which will be permitted by the bidder are the applicable unit or lump sum prices for those items which must be bid in order to provide a complete bid for the project, and any MBE/WBE or DBE participation in the appropriate section of the Expedite program. The computer generated itemized proposal sheets shall be printed and signed by a duly authorized representative in accordance with Subarticle 102-8(A)(8) of the *2012 Standard Specifications*. The computer generated itemized proposal sheets (.ebs bid file) shall also be copied to an external device (i.e. compact disk (CD), USB flash drive) furnished by the bidder and shall be submitted to the Department with the bid. This set of itemized proposal sheets, MBE/WBE or DBE information, external device and the correct proposal, will constitute the bid and shall be delivered to the contracting Division Office or location specified in the INSTRUCTIONS TO BIDDERS. If the bidder submits their bid on computer generated itemized proposal sheets, bid prices shall not be written on the itemized proposal sheets bound in the proposal.

In the case of discrepancy between the unit or lump sum prices submitted on the itemized proposal sheets and those contained on the CD furnished by the bidder, the unit or lump sum prices submitted on the printed and signed itemized proposal sheets shall prevail. Changes to any entry on the computer generated itemized proposal sheets shall be made in accordance with the requirements of the INSTRUCTIONS TO BIDDERS.

(C) Traditional Paper Bids

Bids may also be submitted by paper means per the INSTRUCTIONS TO BIDDERS.

AUTHORITY OF THE ENGINEER

The Engineer for this project shall be the Division Engineer, Division 10, Division of Highways, North Carolina Department of Transportation, acting directly or through his duly authorized representatives.

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.

The Contractor will be required to obtain written approval from the Engineer for any subcontract work performed on this project prior to the subcontracted work being performed in accordance with Article 108-6 of the NCDOT Standard Specifications for Roads and Structures.

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 "Materials 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 steel products which are permanently incorporated into this project shall be domestically produced. The Contractor shall furnish a notarized certification certifying that steel products conform to this requirement.

The Contractor shall furnish the applicable certifications and documentation for all materials as required by the Standard Specifications. Material which is not properly certified will not be accepted.

Delivery tickets for all material paid by weight, shall be furnished in accordance with Section 106-7 of the Standard Specifications and shall include the following information:

1. NCDOT Work Order Number
2. Date
3. Time issued
4. Type of material
5. Gross weight
6. Tare weight
7. Net weight of material
8. Plant location
9. Truck number
10. Contractor's name
11. Public weighmaster's stamp or number
12. Public weighmaster's signature or initials in ink
13. Job mix formula number

PRECONSTRUCTION CONFERENCE

In accordance with Section 108-3 of the Standard Specifications, a preconstruction conference will be required prior to beginning work.

BASIS OF PAYMENT AND CLAIMS

The quantity of unit or lump sum prices and payment will be full compensation for all work, including, but not limited to supervision, labor, transportation, fuels, lubricants, repair parts,

equipment, machinery and tools, materials necessary for the prosecution and completion of the work. The quantities contained herein are estimated only and the quantity to be paid for shall be the actual quantities which were used on the project.

The Contractor may submit a request for partial payment on a monthly basis, or other interval as approved by the Engineer. All invoices for payment shall be completely and legibly filled out with all appropriate information supplied and shall be signed by an authorized representative of the Contractor. Disadvantaged Business Enterprise (DBE) participation shall be listed in the appropriate spaces on all requests for payment. If there is no participation the word "None" or the figure "0" shall be entered.

Payment to the Contractor will be made only for the actual quantities of the various items that are completed and accepted in accordance with the terms of the contract. Unless otherwise specified, all contract pay items will be produced, placed and paid in accordance with the Standard Specifications. In no case will the total amount paid to the contractor exceed the total contract quote by more than ten percent without prior written request from the Division Engineer to Fiscal Section.

CLAIMS FOR ADDITIONAL COMPENSATION OR EXTENSION OF TIME

The Contractor's attention is directed to the fact that Article 104-5 pertaining to revised contract unit prices will not apply to this contract. Any claims for additional compensation and/or extension of the completion date shall be submitted to the Division Engineer with detailed justification with the final invoice. The failure to submit the claim(s) with the final invoice may be a bar to recovery. Please be advised that General Statute 136-29 of the Road and Highway Laws of North Carolina provides that a contractor who has not received the amount he claims he is due under the contract may submit a written verified claim to the State Highway Administrator within sixty (60) days after receipt of the final statement. The mailing address for the State Highway Administrator is: N. C. Department of Transportation, 1536 Mail Service Center, Raleigh, NC 27699-1536.

SUPERVISION BY CONTRACTOR

At all times during the life of the project the Contractor shall provide one permanent employee who shall have the authority and capability for overall responsibility of the project and who shall be personally available at the work site within 24 hours notice. Such employee shall be fully authorized to conduct all business with the subcontractors, to negotiate and execute all supplemental agreements, and to execute the orders or directions of the Engineer.

At all times that work is actually being performed, the Contractor shall have present on the project one competent individual who is authorized to act in a supervisory capacity over all work on the project, including work subcontracted. The individual who has been so authorized shall be experienced in the type of work being performed and shall be fully capable of managing, directing, and coordinating the work; of reading and thoroughly understanding the contract, and plans; and receiving and carrying out directions from the Engineer or his authorized

representatives. He shall be an employee of the Contractor unless otherwise approved by the Engineer.

The Contractor may, at his option, designate one employee to meet the requirements of both positions. However, whenever the designated employee is absent from the work site, an authorized individual qualified to act in a supervisory capacity on the project shall be present.

DEFAULT OF CONTRACT

The Department of Transportation shall have the right to declare a default of contract for breach by the Contractor of any material term or condition of the contract. Default of contract shall be in accordance with the terms, conditions, and procedures of Article 108-9 of the Standard Specifications.

BANKRUPTCY

The Department of Transportation, at its option, may terminate the contract upon filing by the Contractor of any petition for protection under the provisions of the Federal Bankruptcy Act.

BIDS

In accordance with GS 136-28.1(b), if the total bid amount of the contract exceeds $5,000,000,

the bid will not be considered for award.

EXTENSION OF CONTRACT TIME

Failure on the part of the Contractor to furnish bonds or certifications, or to satisfy preliminary requirements necessary to issue the purchase order will not constitute grounds for extension of the contract time. If the Contractor has fulfilled all preliminary requirements for the issuance of a purchase order, and the purchase order authorization is not available by the date of availability, the Contractor shall be granted an extension equal to the number of calendar days the purchase order authorization is delayed after the date of availability.

NOTIFICATION OF OPERATIONS

The Contractor shall notify the Engineer 48 hours in advance of beginning work on this project. The Contractor shall give the Engineer sufficient notice of all operations for any sampling, inspection or acceptance testing required.

NIGHT OPERATIONS

Verification of any city or county permits, required for night work, shall be provided to the Engineer if the contractor wants to work at night. Also, before the contractor begins his operations during night hours, he shall submit in writing, a full and complete plan for traffic control and construction lighting which shall be approved by the engineer prior to construction.

All traffic control devices used outside of closure areas shall meet the requirements for night use as set forth in the North Carolina Department of Transportation Standard Specifications for Roads and Structures, North Carolina Department of Transportation Roadway Standard Drawings, and the current Manual of Uniform Traffic Control Devices (MUTCD).

PROSECUTION OF WORK

The Contractor will be required to prosecute the work in a continuous and uninterrupted manner from the time he begins the work until completion and final acceptance of the project. The Contractor will not be permitted to suspend his operations except for reasons beyond his control or except where the Engineer has authorized a suspension of the Contractor's operations in writing.

It is further the intent that the Contractor shall pursue the work diligently with workmen in sufficient numbers, abilities, and supervision, and with the equipment, materials, and methods of construction as may be required to complete the work described in the contract, or as may be amended, by the completion date.

In the event that the Contractor's operations are suspended in violation of the above provisions, the sum of **$500.00** will be charged to the contractor for each and every calendar day that such suspension takes place. The said amount is hereby agreed upon as liquidated damages. Liquidated damages chargeable due to suspension of the work will be additional to any liquidated damages that may become chargeable due to failure to complete the work by the completion date.

SAFETY AND ACCIDENT PROTECTION

In accordance with Article 107-21 of the Standard Specifications, the Contractor shall comply with all applicable Federal, State, and local laws, ordinances, and regulations governing safety, health, and sanitation, and shall provide all safeguards, safety devices, and protective equipment, and shall take any other needed actions, on his own responsibility that are reasonably necessary to protect the life and health of employees on the job and the safety of the public, and to protect property in connection with the performance of the work covered by the contract.

NO MAJOR CONTRACT ITEMS

(2-19-02) (Rev. 8-21-07) 104 SP1 G31

None of the items included in this contract will be major items.

SPECIALTY ITEMS

(7-1-95)(Rev. 1-17-12) 108-6 SP1 G37

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

Line #	Description
2 - 7	Guardrail

DISADVANTAGED BUSINESS ENTERPRISE (DIVISIONS)

(10-16-07)(Rev.4-19-16) 102-15(J) SP1 G62

Description

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

Definitions

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

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

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

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

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

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

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

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

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

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

Forms and Websites Referenced in this Provision

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

DBE-IS *Subcontractor Payment Information* - Form for reporting the payments made to all DBE firms working on the project. This form is for paper bid projects only. http://www.ncdot.org/doh/forms/files/DBE-IS.xls

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

1. SAF *Subcontract Approval Form* - Form required for approval to sublet the contract. http://connect.ncdot.gov/projects/construction/Construction%20Forms/Subcontract%20Approval%20Form%20Rev.%202012.zip
2.
JC-1 *Joint Check Notification Form* - Form and procedures for joint check notification. The form acts as a written joint check agreement among the parties providing full and prompt disclosure of the expected use of joint checks.
http://connect.ncdot.gov/projects/construction/Construction%20Forms/Joint%20Check%20Notification%20Form.pdf

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

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

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

DBE Goal

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

Disadvantaged Business Enterprises **3.0** %

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

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

Directory of Transportation Firms (Directory)

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

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

Listing of DBE Subcontractors

At the time of bid, bidders shall submit all DBE participation that they anticipate to use during the life of the contract. Only those identified to meet the DBE goal will be considered

committed, even though the listing shall include both committed DBE subcontractors and additional DBE subcontractors. Additional DBE subcontractor participation submitted at the time of bid will be used toward the Department's overall race-neutral goal. Only those firms with current DBE certification at the time of bid opening will be acceptable for listing in the bidder's submittal of DBE participation. The Contractor shall indicate the following required information:

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

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

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

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

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

DBE Prime Contractor

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

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

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

Written Documentation – Letter of Intent

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

The documentation shall be received in the office of the Engineer no later than 12:00 noon of the sixth calendar day following opening of bids, unless the sixth day falls on Saturday, Sunday or an official state holiday. In that situation, it is due in the office of the Engineer no later than 12:00 noon on the next official state business day.

If the bidder fails to submit the Letter of Intent from each committed DBE to be used toward the DBE goal, or if the form is incomplete (i.e. both signatures are not present), the DBE participation will not count toward meeting the DBE goal. If the lack of this participation drops the commitment below the DBE goal, the Contractor shall submit evidence of good faith efforts, completed in its entirety, to the Engineer no later than 12:00 noon on the eighth calendar day following opening of bids, unless the eighth day falls on Saturday, Sunday or an official state holiday. In that situation, it is due in the office of the Engineer no later than 12:00 noon on the next official state business day.

Submission of Good Faith Effort

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

One complete set and (6) copies of this information shall be received in the office of the Engineer no later than 12:00 noon of the sixth calendar day following opening of bids, unless the sixth day falls on Saturday, Sunday or an official state holiday. In that situation, it is due in the office of the Engineer no later than 12:00 noon on the next official state business day.

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

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

Adequate good faith efforts mean that the bidder took all necessary and reasonable steps to achieve the goal which, by their scope, intensity, and appropriateness, could reasonably be expected to obtain sufficient DBE participation. Adequate good faith efforts also mean that the

bidder actively and aggressively sought DBE participation. Mere *pro forma* efforts are not considered good faith efforts.

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

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

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

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

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

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

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

(2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration.

However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidding contractors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.

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

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

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

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

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

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

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

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

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

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

Non-Good Faith Appeal

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

Counting DBE Participation Toward Meeting DBE Goal

(A) Participation

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

(B) Joint Checks

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

(C) Subcontracts (Non-Trucking)

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

(D) Joint Venture

When a DBE performs as a participant in a joint venture, the Contractor may count toward its contract goal requirement a portion of the total value of participation with the

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

(E) Suppliers

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

(F) Manufacturers and Regular Dealers

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

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

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

Commercially Useful Function

(A) DBE Utilization

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

(B) DBE Utilization in Trucking

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

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

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

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

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

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

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

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

DBE Replacement

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

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

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

(A) Performance Related Replacement

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

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

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

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

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

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

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

(B) Decertification Replacement

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

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

Changes in the Work

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

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

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

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

Reports and Documentation

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

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

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

Reporting Disadvantaged Business Enterprise Participation

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

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

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

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

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

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

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

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

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

Failure to Meet Contract Requirements

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

CERTIFICATION FOR FEDERAL-AID CONTRACTS

(3-21-90) SP1 G85

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

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

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

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

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

U.S. DEPARTMENT OF TRANSPORTATION HOTLINE

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

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

The U.S. Department of Transportation (DOT) operates the above toll-free hotline Monday through Friday, 8:00 a.m. to 5:00 p.m. eastern time. Anyone with knowledge of possible bid

rigging, bidder collusion, or other fraudulent activities should use the hotline to report such activities.

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

CARGO PREFERENCE ACT

(2-16-16)

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

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

> "(1) To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.
>
> (2) To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b) (1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.
>
> (3) To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract."

LOCATING EXISTING UNDERGROUND UTILITIES

(3-20-12) 105 SP1 G115

Revise the *2012 Standard Specifications* as follows:

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

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

RESOURCE CONSERVATION AND ENVIRONMENTALLY SUSTAINABLE PRACTICES

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

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

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

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

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

DOMESTIC STEEL

(4-16-13) 106 SP1 G120

Revise the *2012 Standard Specifications* as follows:

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

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

COOPERATION BETWEEN CONTRACTORS

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

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

- Project I-5893, Pavement Rehabilitation on I-85 from MM-13.9 to MM-22. This project was awarded to Lane Construction Corp. and has a scheduled completion date of November 1, 2017.
- Project I-5894, Interstate Maintenance project on I-85 from MM-22 to the Gaston/Mecklenburg County Line. This project is scheduled for a February 2017 let with an August 2018 completion.

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

TWELVE MONTH GUARANTEE

(7-15-03) 108 SP1 G145

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

(B) Where items of equipment or material carry a manufacturer’s guarantee for any period in excess of twelve months, then the manufacturer’s guarantee shall apply for that particular piece of equipment or material. The Department’s first remedy shall be through the

manufacturer although the Contractor is responsible for invoking the warranted repair work with the manufacturer. The Contractor's responsibility shall be limited to the term of the manufacturer's guarantee. NCDOT would be afforded the same warranty as provided by the Manufacturer.

This guarantee provision shall be invoked only for major components of work in which the Contractor would be wholly responsible for under the terms of the contract. Examples would include pavement structures, bridge components, and sign structures. This provision will not be used as a mechanism to force the Contractor to return to the project to make repairs or perform additional work that the Department would normally compensate the Contractor for. In addition, routine maintenance activities (i.e. mowing grass, debris removal, ruts in earth shoulders,) are not parts of this guarantee.

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

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

IRAN DIVESTMENT ACT

(5-17-16) SP01 G151

As a result of the Iran Divestment Act of 2015 (Act), Article 6E, N.C. General Statute § 147-86.55, the State Treasurer published the Final Divestment List (List) which includes the Final Divestment List-Iran, and the Parent and Subsidiary Guidance-Iran. These lists identify companies and persons engaged in investment activities in Iran and will be updated every 180 days. The List can be found at https://www.nctreasurer.com/inside-the-department/OpenGovernment/Pages/Iran-Divestment-Act-Resources.aspx

By submitting the Offer, the Contractor certifies that, as of the date of this bid, it is not on the then-current List created by the State Treasurer. The Contractor must notify the Department immediately if, at any time before the award of the contract, it is added to the List.

As an ongoing obligation, the Contractor must notify the Department immediately if, at any time during the contract term, it is added to the List. Consistent with § 147-86.59, the Contractor shall not contract with any person to perform a part of the work if, at the time the subcontract is signed, that person is on the then-current List.

During the term of the Contract, should the Department receive information that a person is in violation of the Act as stated above, the Department will offer the person an opportunity to respond and the Department will take action as appropriate and provided for by law, rule, or contract.

GIFTS FROM VENDORS AND CONTRACTORS

(12-15-09) RG 152

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

(1) have a contract with a governmental agency; or
(2) have performed under such a contract within the past year; or
(3) anticipate bidding on such a contract in the future.

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

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

LIABILITY INSURANCE

(5-20-14) SP1 G160

Revise the *2012 Standard Specifications* as follows:

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

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

EMPLOYMENT

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

Revise the *2012 Standard Specifications* as follows:

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

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

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

STATE HIGHWAY ADMINISTRATOR TITLE CHANGE

(9-18-12) SP1 G185

Revise the *2012 Standard Specifications* as follows:

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

SUBLETTING OF CONTRACT

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

Revise the *2012 Standard Specifications* as follows:

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

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

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

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

PROJECT SPECIAL PROVISIONS (ROADWAY)

SCOPE OF WORK

This contract is for the installation of Fiber Optic Cable and Conduit Routing, Wireless Communication, CCTV Camera Installation and Dynamic Message Sign Integration along I-85 from I-485 to Groves St. and along Groves St from I-85 to the US 29/74 Intersection in Mecklenburg & Gaston Counties.

GUARDRAIL ANCHOR UNITS, TYPE 350 (TL-3)

(4-20-04) (Rev. 7-21-15) 862 SP08 R065

Description

Furnish and install guardrail anchor units in accordance with the details in the plans, the applicable requirements of Section 862 of the *2012 Standard Specifications*, and at locations shown in the plans.

Materials

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

Prior to installation the Contractor shall submit to the Engineer:

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

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

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

Construction Methods

Guardrail end delineation is required on all approach and trailing end sections for both temporary and permanent installations. Guardrail end delineation consists of yellow reflective sheeting applied to the entire end section of the guardrail in accordance with Article 1088-3 of the *2012 Standard Specifications* and is incidental to the cost of the guardrail anchor unit.

Measurement and Payment

Measurement and payment will be made in accordance with Article 862-6 of the *2012 Standard Specifications*.

Payment will be made under:

Pay Item	Pay Unit
Guardrail Anchor Units, Type 350	Each

MATERIALS

(2-21-12) (Rev. 3-15-16) 1000, 1002, 1005, 1016, 1018, 1024, 1050, 1074, 1078, 1080, 1081, 1086, 1084, 1087, 1092 SP10 R01

Revise the *2012 Standard Specifications* as follows:

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

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

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

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

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

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

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

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

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

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

Item	Section
Type IL Blended Cement	1024-1

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

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

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

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

TABLE 1000-1
REQUIREMENTS FOR CONCRETE

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

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

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

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

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

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

(H) Handling and Storing Test Panels

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

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

TABLE 1005-1
AGGREGATE GRADATION - COARSE AGGREGATE

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

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

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

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

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

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

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

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

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

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

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

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

TABLE 1024-1
POZZOLANS FOR USE IN PORTLAND CEMENT CONCRETE

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

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

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

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

All fencing material and accessories shall meet Section 106.

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

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

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

TABLE 1078-1
REQUIREMENTS FOR CONCRETE

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

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

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

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

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

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

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

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

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

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

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

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

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

TABLE 1081-1
PROPERTIES OF MIXED EPOXY RESIN SYSTEMS

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

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

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

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

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

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

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

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

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

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

1081-4 EPOXY RESIN ADHESIVE FOR BONDING TRAFFIC MARKINGS

(A) General

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

(B) Classification

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

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

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

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

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

(C) Requirements

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

(D) Prequalification

Refer to Subarticle 1081-1(E).

(E) Acceptance

Refer to Subarticle 1081-1(F).

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

Steel sheet piles detailed for permanent applications shall be hot rolled and meet ASTM A572 or ASTM A690 unless otherwise required by the plans. Steel sheet piles shall be coated as required

by the plans. Galvanized sheet piles shall be coated in accordance with Section 1076. Metallized sheet piles shall be metallized in accordance to the Project Special Provision "Thermal Sprayed Coatings (Metallization)" with an 8 mil, 99.9% aluminum alloy coating and a 0.5 mil seal coating. Any portion of the metallized sheet piling encased in concrete shall receive a barrier coat. The barrier coat shall be an approved waterborne coating with a low-viscosity which readily absorbs into the pores of the aluminum thermal sprayed coating. The waterborne coating shall be applied at a spreading rate that results in a theoretical 1.5 mil dry film thickness. The manufacturer shall issue a letter of certification that the resin chemistry of the waterborne coating is compatible with the 99.9% aluminum thermal sprayed alloy and suitable for tidal water applications.

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

The epoxy shall meet Article 1081-4.

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

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

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

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

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

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

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

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

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

DocuSigned by:
Harvey L. Winstead, Jr.
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6/29/2016

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

C-5600G

INTELLIGENT TRANSPORTATION SYSTEMS CCTV INSTALLATION AND DMS INTEGRATION

PROJECT SPECIAL PROVISIONS

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Contents

1. GENERAL REQUIREMENTS

1.1. DESCRIPTION

(A) General

Conform to these Project Special Provisions, the Project Plans, the *2012 Standard Specifications for Roads and Structures* (also referred to hereinafter as the "*Standard Specifications*") and the *2012 Roadway Standard Drawings* (also referred hereinafter as the "*Standard Drawings*"). The current edition of these specifications and publications in effect on the date of advertisement will apply.

In the event of a conflict between these Project Special Provisions and the *Standard Specifications*, these Project Special Provisions govern.

Conform to the NCDOT and NC Statewide IT Policies and Standards as described at http://it.nc.gov. The architecture of the IT modules must be approved by NCDOT IT and the NC Office of Information Technology architecture groups.

(B) Scope

The scope of this project includes the installation of new fiber-optic communications cable, new wireless Ethernet communications, six (6) new IP (Internet Protocol) based, closed circuit television (CCTV) cameras with lowering devices, integration of two (2) existing DMSs (currently dial-up) into the new fiber network and the creation of an Ethernet-based video sharing link between the City of Gastonia Traffic Operations Center (GTOC) and the NCDOT Metrolina Regional Transportation Management Center (MRTMC). The video sharing link shall transmit and receive video and data from a minimum of eight (8) CCTV cameras in each direction simultaneously.

New fiber-optic cables will be installed in both new and existing underground conduit and junction boxes. Wireless Ethernet antennas will be installed on metal poles both with and without CCTV cameras. Electrical power will be furnished by the installation of new electrical services, modifications to existing services and new solar panel assemblies. The Contractor shall coordinate with the appropriate electric utility company in the area to establish new service.

Note that the locations of each proposed device shown in the Project Plans are an approximation. Locate and mark proposed device locations in the field and receive approval from the Regional ITS Engineer before performing any soil borings, foundation design and construction.

Perform a detailed wireless path analysis in conjunction with the selection of sites that will communicate wirelessly to determine the optimal location for the device.

Do not construct any conduits or junction boxes to proposed devices until the device locations are approved by the Regional ITS Engineer. The Regional ITS Engineer can be contacted at (704) 347-6601.

Integrate the new fiber-optic cables and wireless Ethernet equipment with existing communications infrastructure so that the new CCTV and existing DMS devices are accessible

and controlled by the existing computer and network hardware and software at the MRTMC located at 2327 Tipton Drive in Charlotte.

Integrate the new fiber-optic cables and wireless Ethernet equipment with existing communications infrastructure so that the new video sharing link is accessible and controlled by the computers and network hardware and software at both the MRTMC and the GTOC located at 1300 North Broad Street in Gastonia.

Conduct device and system tests as described in these Project Special Provisions.

1.2. MATERIALS

(A) Qualified Products

Furnish new equipment, materials, and hardware unless otherwise required. Inscribe manufacturer's name, model number, serial number, and any additional information needed for proper identification on each piece of equipment housed in a case or housing.

Furnish factory assembled cables without adapters, unless otherwise approved by the Engineer, for all cables required to interconnect any field or central equipment.

Certain equipment listed in these Project Special Provisions must be pre-approved on the Department's ITS & Signals Qualified Products List (QPL) by the date of installation. Equipment, material, and hardware not pre-approved when required will not be allowed for use on the project.

The QPL is available on the Department's website. The QPL website is:

https://connect.ncdot.gov/resources/safety/Pages/ITS-and-Signals-Qualified-Products.aspx

(B) Information Technology Compliance

Conform to the State of North Carolina Information Technology (IT) policy and standards as described at http://it.nc.gov. The architecture of the IT modules must be approved by the NC-DOT IT and NC Office of Information Technology architecture groups.

1.3. PLAN OF RECORD DOCUMENTATION

Comply with all requirements of Article 1098-1(F) of the *Standard Specifications* for providing plan of record documentation for all work performed under this Project.

1.4. WARRANTIES

Comply with all requirements of Article 1098-1(D) of the *Standard Specifications* for providing manufacturer's warranties on Contractor-furnished equipment.

2. TEMPORARY TRAFFIC CONTROL

2.1. DESCRIPTION

The Contractor shall provide all traffic control for this project in accordance with the *Standard Drawings* and *Standard Specifications*.

2.2. CONSTRUCTION METHODS

The Contractor shall maintain traffic during construction and furnish, install, remove, secure, and maintain all traffic control devices.

2.3. MEASUREMENT AND PAYMENT

Temporary traffic control will be paid on a lump sum basis. The lump sum bid price for Temporary Traffic Control as required in this contract, as shown in the *Standard Drawings* and as directed by the Engineer includes, but is not limited to providing Portable Work Zone Signs, Flashing Arrow Boards (FAB), Drums, Cones, Flagging Devices, Temporary Crash Cushion (TCC), Truck Mounted Attenuators (TMA), Skinny Drums, Temporary GRAU-350, Law Enforcement, Portable Lighting, and Remove & Reset existing guardrail / barrier.

Payment will be made under:

Pay Item	**Pay Unit**
Temporary Traffic Control	Lump Sum

3. LAW ENFORCEMENT

3.1. DESCRIPTION

Furnish Law Enforcement Officers and marked Law Enforcement vehicles to direct traffic in accordance with the contract.

3.2. CONSTRUCTION METHODS

Use uniformed Law Enforcement Officers and marked Law Enforcement vehicles with blue lights mounted on top of the vehicles, and Law Enforcement vehicle emblems to direct or control traffic as required by the Project Plans or by the Engineer.

3.3. MEASUREMENT AND PAYMENT

There will be no direct payment for uniformed Law Enforcement Offices and marked Law Enforcement vehicles as these are included in the Temporary Traffic Control lump sum pay item.

4. UNDERGROUND CONDUIT

4.1. DESCRIPTION

Furnish and install conduit for underground installation with tracer wire, miscellaneous fittings, all necessary hardware, marker tape, backfill, graded stone, paving materials, and seeding and mulching in accordance with Section 1715 of the *Standard Specifications.*

4.2. MATERIALS

Material, equipment, and hardware furnished under this section shall be pre-approved on the Department's QPL.

Refer to Articles 1091-3 (Conduit), 1091-4 (Duct and Conduit Sealer), 1018-2 (Backfill), and 545-2 and 545-3 (Graded Stone) of the *Standard Specifications*.

Furnish conduits in the following colors according to contents and quantity:

Conduit Contents	Number of Conduits	Conduit Colors
Electrical Power	1	Red
	2	Red and Black w/ Red Stripes
Communications	1	Orange
	2	Orange and Black
	4	Orange, Black, White and Blue

Furnish underground PVC and HDPE conduits as shown in the Project Plans. All vertical conduits (entrance to electrical service and equipment disconnect and pole mounted cabinet) must be rigid galvanized steel.

4.3. CONSTRUCTION METHODS

Install underground conduit in compliance with all requirements of Section 1715-3 of the *Standard Specifications*.

Do not install conduits or junction boxes to ITS devices (CCTV cameras and DMSs) until the location of the ITS devices has been confirmed by the Regional ITS Engineer.

4.4. MEASUREMENT AND PAYMENT

Tracer wire will be measured along the horizontal linear feet of tracer wire furnished, installed, and accepted. Measurement will be along the approximate centerline of the conduit system. Payment will be made in linear feet. No payment will be made for excess tracer wire in junction boxes and/or cabinets.

Unpaved Trenching (qty) (size) & (qty) (size) will be measured horizontal linear feet of trenching for underground conduit installation of each type furnished, installed, and accepted. Measurement will be along the approximate centerline of the conduit system. Payment will be in linear feet.

Directional Drill (qty)(size)&(qty)(size) will be measured horizontal linear feet of directional drill for underground conduit installation furnished, installed, and accepted. Measurement will be along the approximate centerline of the conduit system. Payment will be in linear feet.

No measurement will be made of vertical segments, non-metallic conduit, metallic conduit, conduit sealing material, backfill, graded stone, paved materials, miscellaneous fittings, non-detectable marker tape, pull lines, seeding and mulching as these will be considered incidental to conduit installation.

Payment will be made under:

Pay Item	**Pay Unit**
Tracer Wire	Linear Foot
Unpaved Trenching (1) (2”)	Linear Foot
Unpaved Trenching (2) (2”)	Linear Foot
Directional Drill (1) (2”)	Linear Foot
Directional Drill (2) (2”)	Linear Foot

5. JUNCTION BOXES

5.1. DESCRIPTION

Furnish and install junction boxes (pull boxes) with covers, graded stone, grounding systems, and all necessary hardware. Comply with Section 1716 of the *Standard Specifications*.

5.2. MATERIALS

(A) General

Material, equipment, and hardware furnished under this section shall be pre-approved on the Department's QPL, with the exception of "Junction Box (Special Oversized Heavy-Duty) and "Junction Box (Bridge-Mounted)."

Refer to Article 1098-5 (Junction Boxes) and Section 545 (Graded Stone) of the *Standard Specifications*.

(B) Special Oversized Heavy-Duty Junction Boxes

Provide special oversized heavy-duty junction boxes and covers with minimum inside dimensions of 36" x 36" x 24" (length x width x depth).

(C) Bridge-Mounted Junction Boxes

Furnish and install 20" x 20" x 8" bridge-mounted junction boxes that are open in the back. Fabricate bridge-mounted junction boxes from 0.125" aluminum. Furnish the aluminum door with stainless steel draw latches with pad lock hasps and a continuous stainless steel hinge. Refer to the Project Plans for details of the bridge-mounted junction boxes.

5.3. CONSTRUCTION METHODS

(A) General

Install junction boxes in compliance with all requirements of Section 1716-3 of the *Standard Specifications*.

Do not install conduits or junction boxes to new ITS devices (CCTV cameras and wireless repeaters) until the location of the ITS devices has been confirmed by the Regional ITS Engineer.

Provide real world coordinates for all junction boxes and equipment cabinets installed or used under this project. Provide the coordinates in feet units using the North Carolina State Plane coordinate system (1983 North American Datum also known as NAD '83). Furnish coordinates that do not deviate more than 1.7 ft in the horizontal plane and 3.3 ft in the vertical plane. Global positioning system (GPS) equipment able to obtain the coordinate data within these tolerances may be used. Submit cut sheets on the GPS unit proposed to collect the data for approval by the Engineer.

Provide both a digital copy and hard copy of all information regarding the location (including, but not limited to, manufacturer, model number, and NCDOT inventory number) in the Microsoft® spreadsheet provided by the Department, shown by example in Figure 1716-1 of the *Standard Specifications*.

(B) In-Ground Junction Boxes

Install standard size junction boxes for electrical conductors.

Install oversized heavy-duty junction boxes for storage of fiber-optic cable.

Install special oversized heavy-duty junction boxes for underground splice enclosures and storage of fiber-optic cable.

Inspect all existing junction boxes within the project limits and prior to beginning the installation of fiber-optic cable. Report any identified existing junction box damage to the Engineer, who will determine if the damage is sufficient for the junction box(es) to be replaced.

(C) Bridge-Mounted Junction Boxes

Remove existing bridge-mounted junction boxes.

Verify the size and spacing of existing anchor bolts prior to final fabrication of new bridge-mounted junction boxes.

Attach new bridge-mounted junction boxes to existing stainless steel anchor bolts using new stainless steel hex nuts and washers.

Seal new bridge-mounted junction boxes to bridge with silicone caulk. Seal the door with a neoprene gasket strip.

5.4. MEASUREMENT AND PAYMENT

Junction Box (_____) will be measured and paid as the actual number of junction boxes of each size and type furnished, installed, and accepted.

Measurement and payment will also be made for the replacement of existing damaged junction boxes where such damage was reported to the Engineer in advance of work by the Contractor and where approved for replacement by the Engineer.

No measurement will be made of covers, graded stone, and grounding systems as these will be considered incidental to furnishing and installing junction boxes.

No measurement will be made to capture and report the GPS coordinates for all new equipment cabinets installed on the project and for all new and existing junction boxes (including replaced junction boxes) within the project limits, as this is considered incidental to furnishing and installing equipment cabinets and junction boxes.

Payment will be made under:

Pay Item	Pay Unit
Junction Box (Standard Size)	Each
Junction Box (Oversized Heavy-Duty)	Each
Junction Box (Special Oversized Heavy-Duty)	Each
Junction Box (Bridge-Mounted)	Each

6. WOOD POLE

6.1. DESCRIPTION

Furnish and install wood poles with grounding systems and all necessary hardware in accordance with Section 1720 of the *Standard Specifications*.

6.2. MATERIALS

(A) General

Material, equipment, and hardware furnished under this section shall be pre-approved on the Department's QPL.

Refer to Articles 1082-3 (Treated Timber and Lumber), 1082-4 (Preservative Treatment), 1091-2 (Wire), and 1091-6 (Grounding Electrodes) of the *Standard Specifications*.

(B) Wood Pole

Furnish 40' Class 4 or better wood poles for attaching messenger cable and communications cable or for mounting electrical service equipment as shown in the Project Plans.

6.3. CONSTRUCTION METHODS

Install wood poles and wood pedestals in compliance with all requirements of Section 1720-3 of the *Standard Specifications*.

6.4. MEASUREMENT AND PAYMENT

Wood pole will be measured and paid as the actual number of 40' wood poles furnished, installed, and accepted.

No measurement will be made for installing grounding systems as these will be incidental to furnishing and installing poles.

Payment will be made under:

Pay Item	**Pay Unit**
Wood Pole	Each

7. GUY ASSEMBLIES

7.1. DESCRIPTION

Furnish and install guy assemblies with all necessary hardware.

7.2. MATERIALS

Material, equipment, and hardware furnished under this section shall be pre-approved on the Department's QPL.

Refer to 1098-6 (Pole Line Hardware) and 1098-7 (Guy Assembly) of the *Standard Specifications*.

7.3. CONSTRUCTION METHODS

When installing messenger cable for supporting only communications cable, use approved one-bolt attachment method for attaching messenger cable and guy assembly.

Bond guy assembly to existing pole ground using parallel groove clamp or equivalent. If existing poles do not have a grounding system, install new grounding system for bonding guy assembly that complies with Article 1720-3 of the *Standard Specifications*.

Do not attach to existing guy assemblies unless specifically approved by owner.

7.4. MEASUREMENT AND PAYMENT

Guy Assembly will be measured and paid as the actual number of guy assemblies furnished, installed and accepted.

No measurement will be made of guy cable, guy guards, anchors, clamps, grounding systems or fittings as these will be incidental to furnishing and installing guy assemblies.

Payment will be made under:

Pay Item	**Pay Unit**
Guy Assembly	Each

8. RISER ASSEMBLIES

8.1. DESCRIPTION

Furnish and install riser assemblies with clamp-on, aluminum weatherheads or heat shrink tubing, galvanized pole attachment fittings and all necessary hardware.

8.2. MATERIALS

Material, equipment, and hardware furnished under this section shall be pre-approved on the Department's QPL.

Refer to 1091-2 (Wire), 1091-3 (Rigid Metallic Conduit), 1091-6 (Grounding Electrodes), 1098-4 (Riser Sealing Devices), and 1098-6 (Pole Line Hardware) of the *Standard Specifications*.

8.3. CONSTRUCTION METHODS

Install riser assemblies in compliance with all requirements of Section1722-3 of the *Standard Specifications*.

8.4. MEASUREMENT AND PAYMENT

__" Riser with ____ will be measured and paid as the actual number of risers of each type and size furnished, installed and accepted. No measurement will be made of weatherheads, heat shrink tubing or pole attachment fittings as these will be incidental to furnishing and installing risers.

No measurement will be made for vertical conduit segments (i.e., short risers) extending from an entrance in the bottom of a pole-mounted equipment cabinet to ground level below the cabinet to tie directly onto an underground conduit as such vertical conduits will be considered incidental to the pole-mounted equipment cabinet.

Payment will be made under:

Pay Item	**Pay Unit**
1¼" Riser with Weatherhead	Each
2" Riser with Heat Shrink Tubing	Each

9. MESSENGER CABLE

9.1. DESCRIPTION

Furnish and install messenger cable (spanwire) with cable clamps, machine bolts, eye bolts, 3-bolt clamps, eye nuts, split-bolt connectors and all necessary hardware.

9.2. MATERIALS

Material, equipment, and hardware furnished under this section shall be pre-approved on the Department's QPL.

Refer to 1091-2 (Wire), 1091-6 (Grounding Electrode), 1098-3 (Messenger Cable), and 1098-6 (Pole Line Hardware) of the *Standard Specifications*.

9.3. CONSTRUCTION METHODS

Comply with Section 1710-3 of the *Standard Specifications*.

9.4. MEASUREMENT AND PAYMENT

Messenger Cable (____) will be measured and paid as actual horizontal linear feet of messenger cable furnished, installed and accepted. Measurement will be point to point with no allowance for sag.

No measurement will be made of cable clamps, machine bolts, eye bolts, 3-bolt assemblies, eye nuts, split bolt connectors and pole grounding systems as these will be incidental to furnishing and installing messenger cable.

Payment will be made under:

Pay Item	**Pay Unit**
Messenger Cable (1/4")	Linear Foot

10. FIBER-OPTIC CABLE

10.1. DESCRIPTION

Furnish and install single mode fiber-optic (SMFO) communications cable, fiber-optic cable storage racks (snow shoes), communications cable identification markers, lashing wire and all necessary hardware.

10.2. MATERIALS

Refer to Division 10 of the *Standard Specifications*.

Item	Section
o Cable Identification Markers	1098-10
o Fiber-Optic Cable	1098-10
o Lashing Wire and Hardware	1098-6
o Storage Racks	1098-10

Furnish material, equipment, and hardware under this section that is pre-approved on the Department's QPL.

Provide communications cable identification markers with **704-342-6814** as the contact telephone number.

10.3. CONSTRUCTION METHODS

Install fiber-optic cable in compliance with all requirements of Section 1730-3 of the *Standard Specifications*.

Do not install any communications cables in the same conduit or junction box as power cables.

Store 30 feet of each fiber-optic cable entering a junction box. Store 100 feet of each fiber-optic cable being spliced in an underground splice enclosure located in a junction box. Coil all stored cable in the bottom of the junction box and in a manner that does not violate the maximum bending radius of the cable.

10.4. MEASUREMENT AND PAYMENT

Communications cable (____-fiber) will be measured and paid as the actual linear feet of fiber-optic cable of each fiber count furnished, installed, and accepted. Measurement will be made by calculating the difference in length markings located on outer jacket from start of run to end of run for each run. Terminate all fibers before determining length of cable run.

No measurement will be made for terminating, splicing and testing fiber-optic cable, communications cable identification markers or fiber-optic cable storage racks, as these will be incidental to the installation of fiber-optic cable.

Payment will be made under:

Pay Item	**Pay Unit**
Communications Cable (12-Fiber)	Linear Foot
Communications Cable (144-Fiber)	Linear Foot

11. REMOVE EXISTING FIBER-OPTIC CABLE

11.1. DESCRIPTION

Remove existing fiber-optic communications cable.

11.2. CONSTRUCTION METHODS

Removal of existing underground communications cable includes proper disposal of communications cable and junction boxes, if required. Where junction boxes have been removed, backfill hole to 95% of surrounding density.

Do not reuse any removed communications cable, messenger cable, junction boxes, pole attachment hardware or abandoned risers on the project, unless otherwise specified. In the event that any of the removed communications cable, junction boxes or pole attachment hardware is to be returned to the Engineer, it will be so noted in the Project Plans.

11.3. MEASUREMENT AND PAYMENT

Remove Existing Communications Cable will be measured in horizontal linear feet of existing communications cable removed and accepted. Payment will be in linear feet. Sag, vertical segments or spare segments of communications cable will not be paid as these distances will be incidental to the removal of existing communications cable.

No additional measurement will be made for multiple cables being removed from the same conduit or same pole. Where multiple adjacent conduits exist (each containing multiple cables), each conduit will be measured and paid separately. No payment will be made for cable that cannot be removed and is abandoned in place.

No measurement will be made of the removal of messenger cable, pole attachment hardware and junction boxes, as these will be incidental to removing existing communications hardware.

Payment will be made under:

Pay Item	**Pay Unit**
Remove Existing Communications Cable	Linear Foot

12. DELINEATOR MARKERS

12.1. DESCRIPTION

Furnish and install delineator markers with all necessary hardware.

12.2. MATERIALS

Material, equipment, and hardware furnished under this section shall be pre-approved on the Department's QPL. Refer to Article 1098-13 (Delineator Markers) of the *Standard Specifications*.

Provide delineator markers with **704-342-6814** as the contact telephone number.

12.3. CONSTRUCTION METHODS

Install delineator markers in compliance with all requirements of Section 1733-3 of the *Standard Specifications*.

Install delineator markers at new and existing junction boxes as shown in the Project Plans. If necessary, use electronic locating equipment to locate existing junction boxes shown of the Project Plans.

12.4. MEASUREMENT AND PAYMENT

Delineator marker will be measured and paid as the actual number furnished, installed, and accepted.

No measurement will be made for the use of electronic locating equipment to locate existing junction boxes shown on the Project Plans as this is considered incidental to furnishing and installing delineator markers.

Payment will be made under:

Pay Item	**Pay Unit**
Delineator Marker	Each

13. FIBER-OPTIC SPLICE CENTERS

13.1. DESCRIPTION

Furnish and install fiber-optic interconnect centers, fiber-optic splice enclosures and all necessary hardware.

Refer to manufacturer's recommendations for opening, modifying and re-sealing the existing fiber-optic interconnect center and/or fiber-optic splice enclosures.

13.2. MATERIALS

(A) Interconnect Centers

Furnish compact, modular interconnect centers designed to mount inside equipment cabinets. Design and size interconnect centers to accommodate all fibers entering cabinets.

Provide splice trays that hold, protect, and organize optical fibers, and secure fibers inside splice tray. Design and size splice trays to be dielectric, to accommodate all fibers entering splice tray, and to provide sufficient space to prevent microbending of optical fibers. Provide connector panels with LC-type connectors.

Furnish SMFO pigtails with each interconnect center. Provide connector panels containing pigtails that are no more than 6 ft in length with a factory assembled PC-LC connector on panel end. Ensure SMFO pigtails meet the operating characteristics of the SMFO cable with which it is to be coupled.

Furnish SMFO jumpers that are at least 3 ft in length with factory assembled PC-LC connectors on each end. Ensure SMFO jumpers meet the operating characteristics of the SMFO cable with which it is to be coupled.

(B) Splice Enclosures

Material, equipment, and hardware furnished under this section for splice enclosures shall be pre-approved on the Department's QPL.

Refer to Article 1098-11 (B) Splice Enclosure of the *Standard Specifications*.

(C) Modify Interconnect Center

Modify existing fiber-optic interconnect centers as shown in the Project Plans. Install additional patch panels, splice trays and pigtails where necessary and fusion splice connections and perform OTDR testing as required by the Project Plans. Install new fiber-optic jumpers and make connections to equipment and/or patch panels as necessary.

13.3. CONSTRUCTION METHODS

Install fiber-optic splice centers, perform termination and splicing, and test in compliance with all requirements of Section 1731-3 of the *Standard Specifications*.

13.4. MEASUREMENT AND PAYMENT

Splice enclosure will be measured and paid as the actual number of fiber-optic splice enclosures furnished, installed, and accepted. No measurement will be made between aerial, underground, manhole, or junction box installation of the fiber-optic splice enclosure.

Modify splice enclosure will be measured and paid as the actual number of existing splice enclosures modified and accepted.

Interconnect center (____-fiber) will be measured and paid as the actual number of fiber-optic interconnect centers of the type specified furnished, installed, and accepted.

Modify interconnect center will be measured and paid as the actual number of interconnect centers modified and accepted.

No measurement will be made of splice trays, pigtails, jumpers, connector panels, testing and any corrective actions, repairs and replacements needed for exceeding maximum allowable attenuation or other defects, as these will be considered incidental to furnishing and installing fiber-optic splice enclosures and interconnect centers.

Payment will be made under:

Pay Item	**Pay Unit**
Splice Enclosure	Each
Modify Splice Enclosure	Each
Interconnect Center (12-Fiber)	Each
Interconnect Center (144-Fiber)	Each
Modify Interconnect Center	Each

14. ELECTRICAL SERVICE

14.1. DESCRIPTION

Install new electrical service equipment as shown in the Project Plans. Comply with the National Electrical Code (NEC), the National Electrical Safety Code (NESC), the *Standard Specifications*, the Project Special Provisions, and all local ordinances. All work involving electrical service shall be coordinated with the appropriate utility company and the Engineer.

14.2. MATERIALS

(A) Meter Base/Disconnect Combination Panel

Furnish and install new meter base/disconnect combination panels as shown in the Project Plans. Provide meter base/disconnect combination panels that have a minimum of eight (8) spaces in the disconnect. Furnish a single pole 15A circuit breaker at each CCTV location. Furnish each with a minimum of 10,000 RMS symmetrical amperes short circuit current rating in a lockable NEMA 3R enclosure. Ensure meter base/disconnect combination panel is listed as meeting UL Standard UL-67 and marked as being suitable for use as service equipment. Ensure circuit breakers are listed as meeting UL-489. Fabricate enclosure from galvanized steel and electrostatically apply dry powder paint finish, light gray in color, to yield a minimum thickness of 2.4 mils. All exterior surfaces must be powder coated steel. Provide ground bus and neutral bus with a minimum of four terminals and a minimum wire capacity range of number 12 through number 2/0 AWG.

Furnish NEMA Type 3R combinational panel rated 200 Ampere minimum that meets the requirements of the local utility. Provide meter base with sockets' ampere rating based on sockets being wired with a minimum of 167°F insulated wire. Furnish 4 terminal, 600 volt, single phase, 3-wire meter bases that comply with the following:

- Line, Load, and Neutral Terminals accept 2/0 AWG and smaller Copper/Aluminum wire,
- With or without horn bypass,
- Made of galvanized steel,
- Listed as meeting UL Standard US-414,
- Overhead or underground service entrance specified.

At overhead service locations, furnish 1.5" watertight hub for threaded rigid conduit with meter base.

At the main service disconnect, furnish and install UL-approved lightning arrestors that meet the following requirements:

- Type of design.....Silicon Oxide Varistor
- Voltage.....120/240 Single Phase, 3 wire
- Maximum current.....100,000 amps
- Maximum energy.....3,000 joules per pole

- Maximum number of surges .....Unlimited
- Response time one milliamp test .....5 nanoseconds
- Response time to clamp 10,000 amps.....10 nanoseconds
- Response time to clamp 50,000 amps.....25 nanoseconds
- Leak current at double the rated voltage.....None
- Ground wire .....Separate

(B) Modify Existing Electrical Service Equipment

At CCTV-1 and 3, modify the existing electrical service by installing an additional 15A, single pole circuit breaker in an existing service disconnect enclosure. Furnish circuit breakers with a minimum of 10,000 RMS symmetrical amperes short circuit current rating. Ensure circuit breakers are listed as meeting UL-489. Install conduit between the existing service disconnect enclosure and an adjacent junction box as shown in the Project Plans.

(C) Equipment Cabinet Disconnect

Provide new equipment cabinet disconnects at the locations shown in the Project Plans. Furnish single pole 15A circuit breaker at CCTV locations. Furnish panels that have a minimum of four (4) spaces in the disconnect. Furnish circuit breakers with a minimum of 10,000 RMS symmetrical amperes short circuit current rating in a lockable NEMA 3R enclosure. Ensure circuit breakers are listed as meeting UL-489. Fabricate enclosure from galvanized steel and electrostatically apply dry powder paint finish, light gray in color, to yield a minimum thickness of 2.4 mils. All exterior surfaces must be powder coated steel. Provide ground bus and neutral bus with a minimum of four terminals and a minimum wire capacity range of number 8 through number 1/0 AWG.

(D) 3-Wire Copper Service Entrance Conductors

Furnish 3-wire, 3 AWG stranded copper service entrance conductors with THWN rating. Provide conductors with black, red, and white insulation that are intended for power circuits at 600 Volts or less and comply with the following:

- Listed as meeting UL Standard UL-83,
- Meets ASTM B-3 and B-8 or B-787 standards.

(E) 3-Wire Copper Feeder Conductors

Furnish 3-wire stranded copper feeder conductors with THWN rating for supplying power to CCTV field equipment cabinets. Provide conductors with black or red, white, and green insulation that are intended for power circuits at 600 Volts or less and comply with the following:

- Listed as meeting UL Standard UL-83,
- Meets ASTM B-3 and B-8 or B-787 standards.

See the Project Plans for wire sizes and quantities.

(F) Grounding System

Furnish 5/8"x10' copper clad steel grounding electrodes (ground rods), #4 AWG solid bare copper conductors, and exothermic welding kits for grounding system installations. Comply with the NEC, *Standard Specifications*, these Project Special Provisions, and the Project Plans.

14.3. CONSTRUCTION METHODS

Permanently label cables at all access points using nylon tags labeled with permanent ink. Ensure each cable has a unique identifier. Label cables immediately upon installation. Use component name and labeling scheme approved by the Engineer.

(A) Meter Base/Disconnect Combination Panel

Install meter base/disconnect combination panels with lightning arrestors as called for in the Project Plans. At all new CCTV locations, route the feeder conductors from the meter base/disconnect to the CCTV and DMS equipment cabinet in conduit. Provide rigid galvanized conduit for above ground and either PVC or HDPE for below ground depending on the installation method required by the Project Plans.

(B) Modify Existing Electrical Service Equipment

Coordinate with the Engineer and the utility company to de-energize the existing service temporarily prior to starting the modification.

Measure the existing grounding system for ground resistance. If the ground resistance is greater than 20 ohms, abandon the existing grounding system and install a new grounding system as described in this section. Ensure the existing grounding electrode conductor is removed or disconnected from the system.

Install a new conduit system between the existing service disconnect and the new cabinet or equipment cabinet disconnect as shown in the Project Plans. All above ground conduits, conduit bodies and fittings must be rigid galvanized steel. Underground conduits and fittings can be PVC or HDPE. Transition from rigid galvanized steel to PVC using rigid galvanized steel sweeping elbows or in junction boxes. Install stranded copper feeder conductors from the service disconnect to the new cabinet or equipment cabinet disconnect sized as shown in the Project Plans.

(C) Equipment Cabinet Disconnect

Install equipment cabinet disconnects and circuit breakers as called for in the Project Plans. Install THWN stranded copper feeder conductors as shown in Project Plans between the electrical service disconnect and the equipment cabinet disconnect. Route the conductors from the equipment cabinet disconnect to the equipment cabinet in rigid galvanized steel conduit. Bond the equipment cabinet disconnect in accordance with the NEC. Ensure that the grounding system complies with the grounding requirements of these Project Special Provisions, the *Standard Specifications* and the Project Plans.

(D) 3-Wire Copper Service Entrance Conductors

At locations shown in the Project Plans, furnish and install 3-wire THWN stranded copper service entrance conductors in 1.25 inch rigid galvanized risers as shown in the Project Plans.

Install a waterproof hub on top of the electrical service disconnect for riser entrance/exit. Size the conductors as specified in the Project Plans. Comply with the *Standard Specifications,* the *Standard Drawings* and all applicable electrical codes.

(E) 3-Wire Copper Feeder Conductors

At locations shown in the Project Plans, install 3-wire THWN stranded copper feeder conductors to supply 120 VAC to the CCTV field equipment cabinets. Size the conductors as specified in the Project Plans. Comply with the *Standard Specifications,* the *Standard Drawings* and all applicable electrical codes.

(F) Grounding System

Install ground rods as indicated in the Project Plans. Connect the #4 AWG grounding conductor to ground rods using an exothermic welding process. Test the system to ensure a ground resistance of 20-ohms or less is achieved. Drive additional ground rods as necessary or as directed by the Engineer to achieve the proper ground resistance.

Submit to the Engineer a completed Inductive Loop & Grounding Test Form available on the Department's website at:

https://connect.ncdot.gov/resources/safety/Pages/ITS-and-Signals.aspx

14.4. MEASUREMENT AND PAYMENT

Meter base/disconnect combination panel (_____) will be measured and paid as the actual number of complete and functional meter base/disconnect combination panel service locations furnished, installed and accepted. Breakers, lightning arrestors, exposed vertical conduit runs to the cabinet, and any remaining hardware, fittings, and conduit bodies to connect the electrical service to the cabinet will be considered incidental to meter base/disconnect combination panels. All other required feeder conductors will be paid for separately.

Modify existing electrical service equipment will be measured and paid as the actual number of complete and functional modified existing electrical service equipment furnished, installed and accepted. New electrical service disconnect, breakers, lightning arresters, new conduit between the meter base and new service disconnect, new stranded copper conductors between the meter base and new service disconnect, above ground rigid galvanized steel conduit from the new service disconnect to below ground, and any remaining hardware and conduit bodies to modify the existing service are considered incidental to modifying existing electrical service equipment.

Equipment cabinet disconnect will be measured and paid as the actual number of complete and functional equipment cabinet disconnects furnished, installed and accepted. Breakers, exposed vertical conduit runs to the cabinet and any remaining hardware and conduit to connect the equipment cabinet disconnect to the cabinet will be considered incidental to the equipment cabinet subpanel.

3-Wire copper service entrance conductors will be measured and paid as the actual linear feet of 3-wire, #3 gauge stranded copper service entrance conductors with THWN rating furnished, installed and accepted. Payment is for all three conductors. Measurement will be for the actual linear footage of combined conductors after all terminations are complete. No separate payment will be made for each individual conductor.

3-Wire copper feeder conductors will be measured and paid as the actual linear feet of 3-wire THWN stranded copper feeder conductors furnished, installed and accepted. Payment is for all three conductors. Measurement will be for the actual linear footage of combined conductors after all terminations are complete. No separate payment will be made for each individual conductor. No separate payment will be made for different wire sizes. No payment will be made for excess wire in the cabinets.

5/8" X 10' grounding electrode (ground rod) will be measured and paid as the actual number of 5/8" copper clad steel ground rods furnished, installed and accepted. No separate payment will be made for exothermic welding kit as they will be considered incidental to the installation of the ground rod.

#4 solid bare grounding conductor will be measured and paid as the actual linear feet of #4 AWG solid bare copper grounding conductor furnished, installed and accepted. Measurement will be along the approximate centerline from the base of the electrical service disconnect to the last grounding electrode.

Payment will be made under:

Pay Item	**Pay Unit**
Meter Base/Disconnect Combination Panel (Wood Pole Mount)	Each
Modify Existing Electrical Service Equipment	Each
Equipment Cabinet Disconnect	Each
3-Wire Copper Service Entrance Conductors	Linear Foot
3-Wire Copper Feeder Conductors	Linear Foot
5/8" X 10' Grounding Electrode	Each
#4 Solid Bare Grounding Conductor	Linear Foot

15. SOLAR POWER ASSEMBLY

15.1. DESCRIPTION

Furnish and install new solar power assembly equipment in a NEMA Type 3R enclosure and all necessary hardware in accordance with these Project Special Provisions and the Project Plans. Comply with the provisions of Section 1700 of the Standard Specifications.

Furnish material and workmanship conforming to the National Electrical Code (NEC), the National Electrical Safety Code (NESC), Underwriter's Laboratories (UL) or a third-party listing agency accredited by the North Carolina Department of Insurance, and all local safety codes in effect on the date of advertisement.

15.2. MATERIALS

(A) General

Furnish a Solar Power Assembly consisting of the following:

- Solar Array
- Solar Charge Controller
- Batteries
- NEMA 3R Equipment Cabinet
- Concrete Cabinet Pad

Ensure that DC disconnects are supplied between the solar array and the solar charge controller, and between the solar charge controller and the batteries, and between the batteries and any other equipment.

(B) Solar Power System Design Requirements

Provide to the Engineer for approval, a submittal package with Engineering Calculations consisting of, as a minimum, schematic drawing, technical data sheets, and supporting documentation. Ensure the documentation demonstrates, in theory, that the batteries will provide for continuous operation for a minimum of ten (10) consecutive days with no additional charging.

Provide drawings showing dimension, location of required equipment, cabinet electrical diagrams, part numbers and descriptions of required equipment and accessories to the Engineer.

(C) Solar Array

Furnish solar modules made in North America and have a minimum 20 year factory warranty. The solar array should have a minimum peak output of 135 Watts. Solar modules must be UL listed, FM Class I, Div. II, Group C&D approved. For the solar array, power wiring should be 10-2, stranded copper, double insulated, sunlight resistant, 600V 90C rated cable. Ensure the solar array mount is manufactured from an aluminum alloy or stainless steel and is capable of withstanding 125 mph winds.

(D) Solar Charger Controller

Furnish a Pulse Width Modulation (PWM) solar charge controller that is UL listed, with a minimum 20A solid state, low voltage disconnect. The solar charge controller must be sealed with internal temperature compensation, lightning protection, reverse polarity protection, and LED indicators. Furnish controllers with the capability of 3 functions: battery charging, load control, and diversion regulation. Controllers must be furnished with fully adjustable DIP switches and RS-232 communications port to adjust the unit's operational modes. Ensure the solar charge controller is listed as a FM Class I, Div. II, Groups ABCD device and has the CE mark.

(E) Batteries

Provide a 12V gel electrolyte, non-spillable, maintenance free battery. The batteries should be able to provide power for 10 days without being charged by the Solar Array. Furnish batteries with a minimum operating temperature of -76 F to 140 F.

(F) NEMA 3R Equipment Cabinet

Provide a NEMA 3R type equipment cabinet enclosure that is of a base mount design, with compartments to house the batteries and electronic components separately. Ensure that the equipment installed inside the cabinet does not occupy more than 60% of the total cabinet volume.

Ensure that the battery compartment and the electronic equipment compartments are ventilated with a screen and louvered vents. Equip vents with standard-size, replaceable furnace type vent filters. Size the filter tray to adequately house and secure the filter in place. Ensure there are no obstructions on the interior face of the door to interfere with easy removal and replacement of filter.

Provide an enclosure that is fabricated with unpainted, natural, aluminum that complies with Section 7 of NEMA TS-2-1998. Ensure the equipment cabinet enclosure shell is fitted with one (1) Corbin Number 2 Key, lifting handles, and exhaust ports. Provide all necessary hardware to secure the battery cabinet to the base of the CCTV metal pole. Provide hardware that is stainless steel or a Department approved non-corrosive alternate including the hinges and lifting handle.

Provide roof with slope (from front to back) at a minimum ratio of 1" drop per 2 feet. Ensure roof is flush with front of the door. Ensure each exterior cabinet plane surface is constructed of a single sheet of seamless aluminum.

Provide a handle and three point latching mechanism designed to be disassembled using hand tools. Provide a shaft connecting the latching plate to the door handle by passing through the door within a bushing, bearing, or equivalent device. Provide a latching plate at least 1/8 inch thick and that mates securely with the lock bolt. Provide a lock bolt with a flat end (no bevel) and that has at least 1/4 inch of length in contact with the latching plate.

Ensure that the handle and lock are positioned so that the lock does not lie in the path of the rotating handle as the door is unlatched and that the handle points down in the latched position.

Provide a main door opening that encompasses the full frontal area of the cabinet shell. Ensure that the cabinet shell is sturdy and does not exhibit noticeable flexing, bending or distortion under normal conditions, except that a minor amount of flexing is permitted in the main door when the cabinet is open. In such case, the flexing must not result in permanent deformation of the door.

A police panel door is not required for these cabinets.

Equipment in the equipment cabinet enclosure will be shelf mounted. Provide one equipment shelf in the cabinet that extends the practical width of the cabinet. Ensure that the shelf can be moved up and down within the cabinet. Do not locate permanently mounted equipment in such a way that will restrict access to terminals. Ensure all components are arranged for easy access during servicing. When modular in construction, provide guides and positive connection devices to ensure proper pin alignment and connection.

Arrange equipment and terminals within the cabinet so that they will not interfere with the entrance, tracing and connection of conductors or other cables. Ensure all incoming and outgoing conductors are connected to terminal blocks. Ensure all field terminals are readily accessible without having to remove equipment to gain access. Ensure terminals are not located on the underside of shelf or at any other place where they are not readily visible or where they may present a hazard to personnel who might inadvertently touch them.

Provide terminal blocks that are made of electrical grade thermoplastic or thermosetting plastic. Ensure each terminal block is of closed back design and has recessed-screw terminals with molded barriers between terminals. Ensure each terminal consists of two terminal screws with removable shorting bar between them. Ensure all terminal blocks and terminals are labeled with their intended functions. Provide labels that are visible and easy to read when the terminal blocks are wired.

15.3. CONSTRUCTION METHODS

Furnish and install new solar power assemblies. Install solar power equipment as shown in the Project Plans. Provide wiring, disconnect, and all other required equipment as required by Article 690 of the NEC.

Mount the cabinet on a concrete pad. Do not obstruct the sight distance of vehicles when locating and installing the equipment cabinet.

Ensure that the equipment cabinet along with solar array(s) and its mounting hardware are capable of surviving sustains winds of 125 MPH. Ensure the solar array(s) does not obstruct the view of traffic and that the array(s) are arranged for optimal sunlight exposure for charging of the batteries. Mount the array(s) at a minimum height of 25 feet above ground level.

Run field wiring from the solar power array(s) to the equipment cabinet through 1 inch riser with weatherhead and make connections inside the equipment cabinets as required. Install separate DC disconnects between the solar array and the solar charger controller and between the solar charger controller and the batteries, and between the batteries and any other equipment. Ensure the DC disconnect allows personnel working on the system to safely isolate critical items from each other while performing maintenance and trouble shooting. Ensure that all wiring including grounding of

the solar photovoltaic system meets the requirements of Article 690 of the National Electric Code (NEC) and these Project Special Provisions.

To protect against high voltage power surges, furnish and install one grounding electrode at the equipment cabinet.

Terminate all wires using spade connectors under binding screws on terminal blocks. Label all terminal blocks and terminals for easy identification. Label all wires and harnesses for easy identification. Neatly secure all wiring and harness inside the cabinet in a method approved by the Engineer.

Provide and leave all data interface cables, installation manuals, and specifications and materials used to program any equipment in the equipment cabinet. Program all equipment for operation.

15.4. MEASUREMENT AND PAYMENT

Solar power assembly will be measured and paid as the actual number of solar power assemblies furnished, installed and accepted. No measurement will be made for solar arrays, controllers, solar power assembly equipment cabinet, install breakers, temperature sensors, concrete cabinet pad, mounting system, grounding system, conduits, risers, wiring, and hardware as these will be considered incidental to furnishing and installing the solar power assembly.

Payment will be made under:

Pay Item	**Pay Unit**
Solar Power Assembly	Each

16. CCTV CAMERA ASSEMBLY

16.1. DESCRIPTION

Furnish and install High Definition (1080p) CCTV field equipment described in these Project Special Provisions. Ensure that the equipment is fully compatible with all features of the existing VideoPro video management software currently in use by the Department in this Region.

16.2. MATERIALS

(A) General

Furnish and install new CCTV camera assemblies at the locations shown on the Project Plans. Each assembly consists of the following:

- One Dome CCTV camera that contains, in a single enclosed unit, the following functionality and accessories:
  - CCTV color digital signal processing camera unit with zoom lens, filter, control circuit, and accessories
  - Motorized pan, tilt, and zoom.
  - Pole-mount camera attachment assembly.
  - All necessary cable, connectors and incidental hardware to make a complete and operable system.
  - Built-in video encoder capable of H.264/MPEG-4 compression for video-over-IP transmission.
- A lightning arrestor installed in-line between the CCTV camera and the equipment cabinet components,
- A NEMA Type 4 enclosure constructed of aluminum with a clear acrylic dome or approved equal Camera Unit housing.

(B) Camera and Lens

(1) Camera

Furnish new Complementary Metal-Oxide-Semiconductor (CMOS) sensor-equipped color cameras. Furnish cameras that meet the following minimum requirements:

- Video format: ..... NTSC compatible resolution, user selectable up to a maximum of 1920x1080 (1080p),
- Focus: ..... Automatic with manual override, Electronic Image Stabilization (EIS),
- White balance: ..... Automatic through the lens with manual override,

- Shutter:.....Electronic shutter with manual control from 1/2 of a second to 1/30,000th of a second,
- Overexposure protection:.....The camera must have built-in circuitry or a protection device to prevent any damage to the camera when pointed at strong light sources, including the sun,
- Sensitivity: .....0.6 lux at 90% scene reflectance
- Input/Output Connection: .....Single 10BASE-T/100BASE-T compatible outdoor-rated Cat5e cable for video, control, and Power over Ethernet; IP66-rated RJ45 connector,
- Power: .....High Power over Ethernet (High PoE), 74W max

(2) Zoom Lens

Furnish each camera with a motorized zoom lens that is integrated in a high performance dome system, or approved equivalent, with automatic iris control and manual override. Furnish lenses that meet the following optical specifications:

- Aperture .....f/1.6 – f/2.9,
- Focal length:.....4.45 mm (wide) and 89 mm (tele.), minimum,
- Horizontal viewing angle:.....55.4° (wide) and 2.9° (tele), minimum,
- Zoom.....30X optical, 12X digital, minimum
- Preset positioning:.....64 Presets, minimum.

The lens must be capable of both automatic and remote manual control iris and focus override operation. The lens must be equipped for remote control of zoom and focus, including automatic movement to any of the preset zoom and focus positions. Mechanical or electrical means must be provided to protect the motors from overrunning in extreme positions. The operating voltages of the lens must be compatible with the outputs of the camera control.

(C) Camera Housing

Furnish new dome style enclosure for the CCTV assemblies. Equip each housing with a mounting assembly for attachment to the CCTV lowering system. The enclosures must be equipped with a sunshield and a strip heater, and be fabricated from corrosion resistant aluminum and finished in a neutral color of weather resistant enamel. The enclosure must

meet or exceed NEMA 4X and IP66 ratings. The viewing area of the enclosure must be constructed of clear acrylic, polycarbonate, or an approved equivalent.

Furnish removable dome enclosures that are secured to the camera housing using stainless steel set screws. Ensure that camera housing assembly is completely sealed with a rubber O-ring gasket to prevent dust and moisture intrusion.

Environmental Operating Conditions: -50ºF to 122ºF, 10-100% RH (condensing) humidity.

(D) Pan and Tilt Unit

Equip each new dome style assembly with a pan and tilt unit. The pan and tilt unit must be integral to the high performance integrated dome system. The pan and tilt unit must be rated for outdoor operation, provide dynamic braking for instantaneous stopping, prevent drift, and have minimum backlash. The pan and tilt units must meet or exceed the following specifications:

- Pan: .....Continuous 360 Degrees,
- Tilt:.....Up/down 180 degrees minimum,
- Motors:.....Two-phase induction type, continuous duty, instantaneous reversing,
- Preset Positioning: .....64 PTZ presets per camera.

(E) Video Ethernet Encoder

Furnish cameras with a built-in digital video Ethernet encoder to allow video-over-IP transmission. The encoder units must be built into the camera housing and require no additional equipment to transmit encoded video over IP networks.

Encoders must have the following minimum features:

- Network Interface: .....Ethernet 10/100Base-T (RJ-45 connector)
- Protocols: .....IPv4, IPv6, HTTP, HTTPS, SSL, QoS, FTP, SMTP, UPnP, SNMP v2c/v3, DNS, NTP, RTSP, RTP, TCP, UDP, IGMP, and DHCP,
- Security: .....SSL, SSH, 802.1x, HTTPS encryption with password controlled browser interface
- Video Streams:.....2 simultaneous streams, user configurable
- Compression: .....H.264 (MPEG-4 Part 10/AVC)
- Resolution .....Scalable; NTSC-compatible 320x176 to 1920x1080 (HDTV 1080p, 16:9 aspect ratio)
- Frame Rate:.....1-30 FPS programmable (full motion)
- Bandwidth.....30 kbps – 6 Mbps, configurable depending on resolution
- Edge Storage:.....SD/SDHC/SDXC slot supporting up to 64GB memory card

(F) Ethernet Cable

Provide, at a minimum, Category 5 Enhanced (5e) Ethernet cable that complies with ANSI/TIA-568-B-5 standards for four-pair shielded twisted copper for Ethernet communications. The cable shall meet all of the mechanical requirements of ANSI/ECEA S-80-576. The Ethernet cable must be rated for medium-power, network-powered broadband communications circuits and must be Type BMU network-powered broadband communications medium-power cable.

Provide 4-pair twisted copper Ethernet cable and connectors rated for an ambient operating temperature range of -30º F to 165º F. The cable shall be shielded, outdoor-rated and have a UV-resistant jacket. The void between the insulated copper pairs and the polyethylene outer jacket shall be injected with a water resistant flooding compound.

(G) Surge Suppression

Protect all equipment with metal oxide varistors connecting each power conductor to ground.

16.3. Construction Methods

(A) General

Obtain approval of the camera locations and orientation from the Engineer prior to performing any soil tests, foundation designs, metal pole designs or installing the CCTV camera assemblies.

Mount CCTV cameras on the side of metal poles nearest intended field of view. Avoid occluding the view with the metal pole.

(B) Electrical and Mechanical Requirements

Install Power over Ethernet (PoE) injector in CCTV equipment cabinet, and run an outdoor-rated Cat5e Ethernet cable up the interior of the metal pole to the CCTV assembly. Take all precautions necessary to ensure the Ethernet cable is not damaged during storage and installation. Do not step on the cable nor run over the cable with vehicles or equipment. Do not pull the cable over or around obstructions or along the ground. Install the cables according to the latest version of the manufacturer's cable installation procedures and the industry-accepted installation standards, codes, and practices, or as directed by the Engineer.

Ground all equipment as called for in the *Standard Specifications*, these Special Provisions, and the Project Plans.

Install surge protectors on all ungrounded conductors entering the CCTV enclosure. House the protectors in a small, ventilated weatherproof cabinet attached near the CCTV attachment point in a manner approved by the Engineer.

Furnish all tools, equipment, materials, supplies, and hardware necessary to install a fully operational CCTV camera system as depicted in the Project Plans.

16.4. Measurement And Payment

CCTV camera assembly will be measured and paid as the actual number of CCTV assemblies furnished, installed, integrated, and accepted. No separate measurement will be made for Ethernet

cables, connectors, CCTV camera attachment assemblies, conduit, condulets, risers, grounding equipment, surge protectors, CCTV control software, Power over Ethernet (PoE) injectors, or any other equipment or labor required to install the CCTV assembly.

Furnish CCTV camera assembly will be measured and paid as the actual number of CCTV assemblies furnished and accepted. No separate measurement will be made for Ethernet cables, connectors, CCTV camera attachment assemblies, surge protectors, Power over Ethernet (PoE) injectors, or any other equipment that is an integral part of the CCTV camera assembly.

Payment will be made under:

Pay Item	**Pay Unit**
CCTV Camera Assembly	Each
Furnish CCTV Camera Assembly	Each

17. FIELD EQUIPMENT CABINET

17.1. DESCRIPTION

Furnish 336S pole mounted cabinets to house CCTV communication equipment and wireless repeater communication equipment. The cabinets must consist of a cabinet housing, 19-inch EIA mounting cage, and power distribution assembly (PDA #3 as described in the CALTRANS TSCES).

The cabinet housing must conform to sections 6.2.2 (Housing Construction), 6.2.3 (Door Latches and Locks), 6.2.4 (Housing Ventilation), and 6.2.5 (Hinges and Door Catches) of the CALTRANS TSCES. Do not equip the cabinet housings with a police panel.

The cabinet cage must conform to section 6.3 of the CALTRANS TSCES.

Terminal blocks on the PDA #3 Assembly have internal wiring for the Model 200 switch pack sockets. Do not use terminal blocks on PDA #3 as power terminals for cabinet devices. Do not furnish cabinet with "Input Panels" described in section 6.4.7.1 of the TSCES. Do furnish cabinet with "Service Panels" as described in section 6.4.7.1 of the TSCES and as depicted on drawing TSCES-9 in the TSCES. Use service panel #2.

Furnish terminal blocks for power for cabinet CCTV and communications devices as needed to accommodate the number of devices in the cabinet.

Do not furnish cabinets with C1, C5, or C6 harness, input file, output file, monitor units, model 208 unit, model 430 unit, or switch packs.

Furnish all conduits, shelving, mounting adapters, and other equipment as necessary to route cabling, mount equipment, and terminate conduit in equipment cabinet.

17.2. MATERIALS

(A) Shelf Drawer

Provide a pull out, hinged-top drawer, having sliding tracks, with lockout and quick disconnect feature, such as a Vent-Rak Retractable Writing Shelf, #D-4090-13 or equivalent in the equipment cabinet. Furnish a pullout drawer that extends a minimum of 14 inches that is capable of being lifted to gain access to the interior of the drawer. Minimum interior dimensions of the drawer are to be 1 inch high, 13 inches deep and 16 inches wide. Provide drawers capable of supporting a 40-pound device or component when fully extended.

(B) Cabinet Light

Furnish two (2) fluorescent lighting fixtures in each cabinet (one front, one back) mounted horizontally inside the top portion of the cabinet. Install 16 watt T-4 cool white lamps in the fluorescent fixtures. Provide a protective diffuser to cover exposed bulbs. The fixtures must be operated by normal power factor UL-listed ballast. Ensure that the fixtures illuminate all terminals, labels, and devices in the cabinet. Conveniently locate the fixtures so as not to interfere with a technician's ability to perform work on any devices or terminals in the cabinet. The lights must be mounted so as to not interfere with the upper door stay. Provide a front and rear door switch to provide power to each fixture when the respective door is open. Wire the fluorescent fixtures to the 15 amp ECB (equipment circuit breaker).

(C) Surge Protection for System Equipment

Each cabinet must be provided with devices to protect the CCTV and communications equipment from electrical surges and over voltages as described below.

(1) Main AC Power Input

Each cabinet must be provided with a hybrid-type, power line surge protection device mounted inside the power distribution assembly. The protector must be installed between the applied line voltage and earth ground. The surge protector must be capable of reducing the effect of lighting transient voltages applied to the AC line. The protector must be mounted inside the Power Distribution Assembly housing facing the rear of the cabinet. The protector must include the following features and functions:

- Maximum AC line voltage: 140 VAC,
- Twenty pulses of peak current, each of which must rise in 8 microseconds and fall in 20 microseconds to ½ the peak: 20000 Amperes,
- The protector must be provided with the following terminals:
  - Main Line (AC Line first stage terminal),
  - Main Neutral (AC Neutral input terminal),
  - Equipment Line Out (AC line second state output terminal, 19 amps),
  - Equipment Neutral Out (Neutral terminal to protected equipment),
  - GND (Earth connection),
- The Main AC line in and the Equipment Line out terminals must be separated by a 200 Microhenry (minimum) inductor rated to handle 10 AMP AC Service,
- The first stage clamp must be between Main Line and Ground terminals,
- The second stage clamp must be between Equipment Line Out and Equipment Neutral,
- The protector for the first and second stage clamp must have an MOV or similar solid state device rated at 20 KA and must be of a completely solid state design (i.e., no gas discharge tubes allowed),
- The Main Neutral and Equipment Neutral Out must be connected together internally and must have an MOV similar solid state device or gas discharge tube rated at 20 KA between Main Neutral and Ground terminals,
- Peak Clamp Voltage: 350 volts at 20 KA. (Voltage measured between Equipment Line Out and Equipment Neutral Out terminals. Current applied between Main Line and Ground Terminals with Ground and Main Neutral terminals externally tied together),
- Voltage must never exceed 350 volts,
- The Protector must be epoxy-encapsulated in a flame-retardant material,

- Continuous service current: 10 Amps at 120 VAC RMS,
- The Equipment Line Out must provide power to cabinet CCTV and communications equipment and to the 24V power supply.

(2) Ground Bus

Provide a neutral bus that is not connected to the earth ground or the logic ground anywhere within the cabinet. Ensure that the earth ground bus and the neutral ground bus each have ten compression type terminals, each of which can accommodate wires ranging from number 14 through number 4 AWG.

(D) Uninterruptible Power Supply (UPS)

Within each CCTV field equipment cabinet to be powered by the Duke Energy system, furnish and install one rack mounted UPS that meets the following minimum specifications:

Output

- Output Power Capacity .....480 Watts / 750 VA,
- Max Configurable Power.....480 Watts / 750 VA,
- Nominal Output Voltage.....120V,
- Output Voltage Distortion.....Less than 5% at full load,
- Output Frequency (sync to mains).....57 - 63 Hz for 60 Hz nominal,
- Crest Factor.....up to 5:1,
- Waveform Type .....Sine wave,
- Output Connections .....(4) NEMA 5-15R,

Input

- Nominal Input Voltage 120V,
- Input Frequency .....50/60 Hz +/- 3 Hz (auto sensing),
- Input Connections .....NEMA 5-15P,
- Cord Length .....6 feet,
- Input voltage range for main operations .....82 - 144V,
- Input voltage adjustable range for main operation .....75 -154 V,

Battery Type

Maintenance-free sealed Lead-Acid battery with suspended electrolyte, leak-proof.

- Typical recharge time .....2 hours,

Communications & Management

- Interface Port(s) .....DB-9 RS-232, USB,
- Control panel.....LED status display with load and battery bar-graphs,

Surge Protection and Filtering

- Surge energy rating.....480 Joules,

Environmental

- Operating Environment.....32 - 104° F,
- Operating Relative Humidity.....0 - 95%,
- Storage Temperature.....5 - 113° F,
- Storage Relative Humidity.....0 - 95%,

Conformance

- Regulatory Approvals .....FCC Part 15 Class A, UL 1778.

(E) DC to AC Inverter

Within each field equipment cabinet to be powered from a solar power assembly, furnish and install a DC to AC pure sine wave inverter to invert 12 VDC from the solar power assembly to 115 VAC, 60 Hz.

Furnish an inverter that is durable, has no internal cooling fan nor other moving parts and which generates good wave form throughout the range of input voltages.

Furnish an inverter that handles a 200% surge during load start-up, up to a maximum of 600 watts.

Furnish an inverter with a self-consumption rating of 450mA or less while powering loads. During no load conditions, the inverter must automatically power down to stand-by mode, thereby reducing self-consumption to 55mA or less.

Furnish an inverter constructed with epoxy encapsulation, conformal coating, stainless steel hardware, and an anodized aluminum enclosure to protect against harsh environments.

Furnish an inverter with LED indicators and digital meter to show system status and any fault conditions.

Furnish the inverter with an AC safety disconnect to shut off AC power from the inverter to the cabinet.

Furnish an inverter with user switches that provide adjustability of system parameters, and with additional user adjustability input/output ports to a PC running software provided by the manufacturer.

Furnish and install inverters that meet the following minimum specifications:

Electrical

▪ Continuous Power Rating	300 Watts @ 25°C
▪ Peak Power Rating (10 minutes)	600 Watts @ 25°C
▪ DC Input Voltage	10.0V – 15.5V
▪ Waveform	Pure sine wave
▪ AC Output Voltage (RMS)*	115V +/– 10%
▪ AC Output Frequency*	60 Hz +/– 0.1%
▪ Peak Efficiency	92%
▪ Total Harmonic Distortion (THD)	< 4%
▪ Self-Consumption	
• Inverter On (no load)	450mA
• Inverter Off	25mA
• Stand-by	55mA
▪ Low Voltage Disconnect (LVD)	11.5 V or 10.5 V**
▪ Low Voltage Reconnect	12.6 V or 11.6 V**
▪ LVD Warning Threshold (buzzer)	11.8 V or 10.8 V**
▪ LVD Delay Period	4 minutes
▪ High Voltage Disconnect	15.5 V
▪ High Voltage Reconnect	14.5 V
▪ Standby On Threshold	~ 8 Watts
▪ Standby Off Threshold	~ 8 Watts
▪ High Temperature Disconnect	95°C
▪ High Temperature Reconnect	80°C

Electronic Protections

- Reverse Polarity (fused)
- AC Short Circuit
- AC Overload
- High Voltage Disconnect
- Low Battery Disconnect
- High Temperature Disconnect

Mechanical	
▪ Dimensions	9.0 x 7.0 x 5.0 in maximum
▪ Weight	12.0 lbs maximum
▪ AC Terminals	
• Max. Wire Size	4 mm2 / 12 AWG
▪ DC Terminals	
• Max. Wire Size	2.5 to 35 mm2 14 to 2 AWG
▪ Enclosure IP20	Cast anodized aluminum
Environmental	
▪ Ambient Operating Temp	–40°C to +45°C
▪ Storage Temperature	–55°C to +85°C
▪ Humidity	100% (non-condensing)
▪ Tropicalization	Conformal coating on printed circuit boards, Epoxy encapsulated transformer and inductors

17.3. CONSTRUCTION METHODS

For each field equipment cabinet installation, use stainless steel banding or other method approved by the Engineer to fasten cabinet to metal pole. Install field equipment cabinets so that the height to the middle of the enclosure is 4 feet from ground level. No risers shall enter the top or sides of the equipment cabinet.

Install all conduits, condulets, and attachments to equipment cabinets in a manner that preserves the minimum bending radius of cables and creates water proof connections and seals.

Within CCTV field equipment cabinets powered by the Duke Energy system, install a UPS and power all CCTV camera PoE injectors and Ethernet field switches from the UPS.

Within CCTV field equipment cabinets to be powered from a solar power assembly, install a DC to AC inverter and power all CCTV camera PoE injectors and Ethernet field switches from the inverter.

Within wireless repeater field equipment cabinets to be powered from a solar power assembly, install a DC to AC inverter and power all wireless repeater equipment from the inverter.

Install a level concrete technician pad measuring a minimum 4 inches thick, 24 inches wide and 36 inches long at the front door of the CCTV equipment cabinet as shown on the Typical Details sheet within the Project Plans.

17.4. MEASUREMENT AND PAYMENT

Field equipment cabinet (with_____) will be measured and paid as the actual number of field equipment cabinets furnished, installed and accepted.

No separate payment will be made for the UPS, inverters, software, cabling, connectors, cabinet attachment assemblies, conduit, condulets, risers, grounding equipment, surge protectors, concrete technician pad or any other equipment or labor required to install the field equipment cabinet and integrate the cabinets with the CCTV and/or wireless repeater equipment.

Payment will be made under:

Pay Item	**Pay Unit**
Field Equipment Cabinet (with UPS)	Each
Field Equipment Cabinet (with Inverter)	Each

18. METAL POLES AND CCTV LOWERING SYSTEM

18.1. DESCRIPTION

(A) Metal Poles

Furnish and install metal poles, grounding systems, and all necessary hardware. The work covered by this Project Special Provision includes requirements for the design, fabrication, and installation of custom-designed metal poles for wireless repeaters, solar power assemblies, and for metal poles with CCTV cameras with camera lowering systems for IP (Internet Protocol) cameras, all with custom-designed foundations.

Provide designs of completed assemblies with hardware that equals or exceeds *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals* 6th Edition, 2013 (hereafter called 6th Edition AASHTO), including the latest interim revisions. Provide assemblies with a round or near-round (18 sides or more) cross-section, or a multi sided cross section with no less than six sides. The sides may be straight, convex, or concave.

Standard Drawings for metal poles and metal pole foundations are available that supplement these project special provisions. These drawings are located on the Department's website:

https://connect.ncdot.gov/resources/safety/pages/ITS-Design-Resources.aspx

(B) CCTV Camera Lowering System

Provide a CCTV camera lowering system for a digital, IP based camera as an integral part of the CCTV metal pole. The lowering system will consist of a support arm, camera connection box, and all necessary cabling and wiring for installation.

(C) Portable CCTV Camera Lowering System

Provide a portable CCTV lowering device to operate the lowering system.

(D) Drilled Pier Foundations

Furnish and install foundations for metal poles with all necessary hardware in accordance with the Project Plans and Project Special Provisions. The work covered by these Project Special Provisions includes requirements for the design, fabrication, and installation of custom designed foundations for metal poles.

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

It is assumed that all foundation designs will be drilled pier foundations unless site-specific soil test information does not allow for a drilled pier foundation design. If an alternative foundation design is required, notify the Engineer immediately. Prior approval from the Engineer is required to receive additional compensation for an alternate foundation design.

Design all metal pole foundations using actual soil conditions at each metal pole location. Perform soil tests in accordance with sub-section (1) (b) Soil Test of these Project Special Provisions.

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

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

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

Skin Friction is to be calculated using the α-method for cohesive soils and the β-method for cohesion-less soils (**Broms method will not be accepted**). Detailed descriptions of the "α" and "β" methods can be found in *FHWA-NHI-10-016*.

Omit first 2.5ft for cohesive soils when calculating skin friction.

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

Design all custom foundations to carry the maximum capacity of each metal pole.

When poor soil conditions are encountered which could create an excessively large foundation design, consideration may be given to allowing an exemption to the maximum capacity design. The contractor must gain approval from the Engineer before reducing a foundation's capacity. Where poor soil is known to be present, it is advisable that the contractor receive approval for foundation designs before releasing metal poles for fabrication.

(1) Soil Test

(a) General

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

The contractor-selected metal pole fabricator is responsible for determining if the addition of wing walls is necessary for the supporting foundations.

(b) Soil Test

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

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

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

Submit completed boring logs collected in accordance with these Project Special Provisions along with metal pole loading diagrams to the contractor-selected metal pole fabricator to assist in the metal pole and foundation design.

Describe each metal pole location along the project corridor in a manner that is easily discernible to both the contractor's designer and NCDOT reviewers. If a metal pole is at an intersection, label the boring the "Intersection of (*Route or SR #*), *(Street Name)* and (*Route or SR #*), *(Street Name)*, _____ County. Label borings with "B- *N, S, E, W, NE, NW, SE or SW*" corresponding to the quadrant location within the intersection.

Metal pole numbers should be made available to the geotechnical drilling Contractor. Include metal pole numbers in the boring label if they are available. If they are not available, ensure the boring labels can be cross-referenced to corresponding pole numbers or pole locations.

For each boring, submit a legible (hand written or typed) boring log signed and sealed by a licensed Geologist or Professional Engineer registered in North Carolina. Include on each boring the SPT blow counts and N-values at each depth, depth of the boring, and a general description of the soil types encountered.

Borings that can't be easily related to their specific metal pole location will be returned to the contractor for clarification, or if approved by the Engineer, the foundation may be designed using the worst case soil condition obtained as part of this project.

(2) Foundation Determination

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

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

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

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

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

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

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

Or

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

Note: If less than 4 N-values are obtained because of criteria listed in Section 2 above, use average of N-values collected for second condition. Do not include the N-value at the deepest boring depth for above calculations if the boring is discontinued at or before the required boring depth because of criteria listed in Section 1 above. Use

N-value of zero for weight of hammer or weight of rod. If N-value is greater than 50, reduce N-value to 50 for calculations.

Submit completed boring logs collected in accordance with sub-section (1) (b) Soil Test above along with metal pole loading diagrams to the Contractor-selected metal pole fabricator to assist in the metal pole and foundation design.

(3) Foundation Design

Design foundations based upon site-specific soil test information collected in accordance with sub-section **(1) (b) Soil Test** above. Design drilled piers for side resistance only in accordance with Section 4.6 of the *AASHTO Standard Specifications for Highway Bridges*.

Use the computer software LPILE version 6.0 or latest version manufactured by Ensoft, Inc. to analyze drilled piers.

Use the computer software gINT V8i or latest manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs.

Provide a drilled pier foundation for each metal pole with a length and diameter that result in a horizontal lateral movement of less than 1 inch at the top of the pier and a horizontal rotational movement of less than 1 inch at the edge of the pier.

Submit foundation designs including drawings, calculations, and soil boring logs to the Engineer for review and approval before construction. Foundations installed without prior approval may be rejected.

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

18.2. MATERIALS AND REQUIREMENTS

(A) Metal Poles

Furnish metal poles that are 50, 60 and 75 feet tall as indicated in the Project Plans.

Provide tapered, tubular shafts fabricated from coil or plate steel to meet the requirements of ASTM A595 Grade A. For structural steel shapes, plates and bars use A572 Gr 50 min or ASTM A709 Gr 50 min. Design tapers for all metal pole shafts that begin at the base with diameters that decrease uniformly at the rate of 0.14 inch per foot of length. Construct shafts from one piece of single ply plate or coil so there are no circumferential weld splices.

Ensure that allowable metal pole deflection does not exceed that allowed per 6th Edition AASHTO. Ensure that maximum deflection at the top of the metal pole does not exceed 2.5 percent of the metal pole height at the maximum wind speed as prescribed for the project area.

Use the submerged arc process or other NCDOT previously approved process suitable for metal pole shafts to continuously weld metal pole shafts along their entire length. Ground or roll smooth and flush any exposed welds flush with the base metal. The longitudinal seam weld

will be finished flush to the outside contour of the base metal. Ensure shafts have no circumferential welds except at the lower end joining the shaft to the metal pole base. Use full penetration groove welds with backing ring for all tube-to-transverse-plate connections in accordance with the 6th Edition AASHTO. Provide welding that conforms to Article 1072-18 of the *Standard Specifications*, except that no field welding on any part of the metal pole will be permitted unless approved by a qualified engineer.

Fabricate anchor bases from plate steel meeting, as a minimum, the requirements of ASTM A572 Gr 50, AASHTO M 270 Gr 50, ASTM A709 Gr50, or an approved equivalent. Conform to the applicable bolt pattern and orientation as shown on Metal Pole Standard Drawing Sheet M2.

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

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

Provide 4 heavy hex nuts and 4 flat washers for each anchor bolt. For nuts, use AASHTO M 291 grade 2H, DH, or DH3 or equivalent material. For flat washers, use AASHTO M 293 or equivalent material. Ensure that anchor bolts have required diameters, lengths and positions, and will develop strengths comparable to their respective metal poles.

Provide a 2 inch hole equipped with an associated coupling and conduit fittings/bodies approximately 18 inches above the base of the metal pole to accommodate passage of cables from the field equipment cabinet to the inside of the metal pole. Refer to Metal Pole Standard Drawing Sheet M3 for fabrication details.

For CCTV metal poles, provide a hand hole access with a watertight cover at a 42" height above the base of the metal pole and of the type and size required by the manufacture of the internal CCTV Camera Lowering System to ensure smooth and efficient operation of the camera lowering system.

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

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

Provide a removable metal pole cap with stainless steel attachment screws for the top of each metal pole. Ensure that the cap is cast aluminum conforming to Aluminum Association Alloy 356.0F. Furnish cap attached to the metal pole with a sturdy chain or cable approved by the

Engineer. Ensure that the chain or cable is long enough to permit the cap to hang clear of the metal pole-top opening when the cap is removed.

Ensure that metal pole designs permit cables to be installed inside the metal poles. For holes in the metal poles used to accommodate cables, provide full-circumference grommets.

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

For each structural bolt and other steel hardware, hot dip galvanizing shall conform to the requirements of AASHTO M 232 (ASTM A153). Ensure end caps for metal poles are constructed of cast aluminum conforming to Aluminum Alloy 356.0F.

After fabrication, have metal poles and all parts used in the assembly hot-dip galvanized per section 1076 of the Standard Specifications. Design structural assemblies with weep holes large enough and properly located to drain molten zinc during galvanization process. Provide hot-dip galvanizing on structures that meets or exceeds ASTM A123. Provide galvanizing on hardware that meets or exceeds ASTM A153. Ensure that threaded material is brushed and retapped as necessary after galvanizing.

Perform repair of damaged galvanizing that complies with Article 1076-7 of the Standard Specifications.

Where ice is present, assume wind loads as shown in Figure 3.9.4.2-3 of the 6th Edition AASHTO Specification for Group III loading.

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

Case 1 Circular or rectangular solid base plate with the upright metal pole welded to the top surface of base plate with full penetration butt weld and where no stiffeners are provided. A base plate with a small center hole, which is less than 1/3 of the upright diameter, and located concentrically with the upright metal pole, may be considered as a solid base plate.

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

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

P = anchoring force of each anchor bolt

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

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

Case 2 Circular or rectangular base plate with the upright metal pole socketed into and attached to the base plate with two lines of fillet weld, and where no stiffeners are provided, or any base plate with a center hole that is larger in diameter than 1/3 of the upright diameter.

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

P = anchoring force of each anchor bolt

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

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

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

The following additional requirements apply to metal pole base plate designs:

- Ensure that whichever case governs as defined above, the anchor bolt diameter is set to match the base plate thickness. If the minimum diameter required for the anchor bolt exceeds the thickness required for the base plate, set the base plate thickness equal to the required bolt diameter.
- Ensure that designs have anchor bolt holes with a diameter 1/4 inch larger than the anchor bolt diameters in the base plate.

Furnish shop drawings for approval. Comply with Article 1098-1B of the *Standard Specifications* for submittal requirements. Furnish necessary details and calculations for the metal poles including the foundation and connections. Ensure that shop drawings include material specifications for each component and identifies welds by type and size on the drawing details, not in table format. Provide an itemized bill of materials for all structural components and associated connecting hardware on the drawings.

Provide the copies and summary of information as summarized below for metal pole and foundation design reviews:

Item	Hardcopy Submittal	Electronic Submittal	Comments / Special Instructions
Sealed, Approved ITS Plan/Loading Diagram	2 sets	1 set	All structure design information needs to reflect the latest approved ITS plans.
Custom Metal Pole Shop Drawings	3 sets	1 set	Submit drawings on 11” x 17” format media. Show NCDOT project number and metal pole number in or above the title block. All drawings must have a unique drawing number for each project and identifier for multiple pages.
Structure Calculations	2 sets	1 set	Submit calculations on 8 ½” x 11” format media. Show NCDOT project number and metal pole number in the upper right corner of each page.

Item	Hardcopy Submittal	Electronic Submittal	Comments / Special Instructions
Custom Foundation Drawings	3 sets	1 set	Submit drawings on 11" x 17" format media. Show NCDOT project number and metal pole number in or above the title block. All drawings must have a unique drawing number for each project and identifier for multiple pages.
Foundation Calculations	2 sets	1 set	Submit copies of LPILE input, output and pile tip deflection graph per Section 14.1 (B) of this specification for each foundation. Submit calculations on 8 ½" x 11" format media. Show NCDOT project number and metal pole number in the upper right corner of each page.
Soil Boring Logs and Report	2 sets	1 set	Report should include a location plan and a soil classification report including soil capacity, water level, hammer efficiency, soil bearing pressure, soil density, etc. for each metal pole.

All shop drawings and custom foundation design drawings must be sealed by a Professional Engineer licensed in the state of North Carolina. All geotechnical information must be sealed by either a Professional Engineer or geologist licensed in the state of North Carolina.

Immediately bring to the attention of the Engineer any structural deficiency that becomes apparent in any assembly or member of any assembly as a result of the design requirements imposed by these Project Special Provisions, the Project Plans, or the typical drawings. Said Professional Engineer is wholly responsible for the design of all metal poles. Review and acceptance of these designs by the Department does not relieve the said Professional Engineer of his responsibility. **Do not fabricate the assemblies until receipt of the Department's approval of the design drawings.**

Include a title block and revision block on the shop drawings and foundation designs showing the NCDOT inventory number.

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

Boring reports should include the following: Engineer's summary, boring location maps, soil classification per AASHTO Classification System, hammer efficiency, and Metal Pole Standard Foundation Selection Form located at the following website:

https://connect.ncdot.gov/resources/Geological/Geotech%20Forms/2012_METAL%20POLES%20-%20Standard%20Foundation%20Selection.pdf

Incomplete submittals will be returned without review. The reviewer has the right to request additional analysis and copies of the calculations to expedite the approval process.

(B) CCTV Camera Lowering System

Provide a CCTV camera lowering system as an integral part of the CCTV metal pole. The lowering system will consist of a support arm, camera connection box, and all necessary cabling and wiring for installation of a digital, IP (Internet Protocol) based camera.

Ensure that the lowering device provides the electrical connections between the control cabinet and the equipment installed on the lowering device without reducing the function or effectiveness of the equipment installed on the lowering device or degrading the overall system in any way.

Locate the stainless steel lowering cable inside conduit within the metal pole to avoid cable twisting and ensure that only the lowering cable is in motion inside the metal pole when the lowering device is operated. The cost to furnish and install this conduit is included in the cost of the metal pole with lowering device. Ensure that all other cables remain stable and secure during lowering and raising operations.

Provide the lowering device with a disconnect unit for electrically connecting the equipment installed on the lowering device's equipment connection box to the power, data, and video cables (as applicable); a divided support arm, and a metal pole adapter for the assembly's attachment to the metal pole.

All of the lowering device's external components must be made of corrosion-resistant materials that are powder-coated, galvanized, or otherwise protected from the environment by industry-accepted coatings that withstand exposure to a corrosive environment.

Ensure that the disconnect unit has a minimum load capacity of 200 pounds with a 4:1 safety factor. Fixed and movable components of the disconnect unit must have a locking mechanism between them. Provide a minimum of two mechanical latches for the movable assembly and, when latched, ensure that all weight is removed from the lowering cable. Provide fixed unit with a heavy-duty cast tracking guide and a means to allow latching in the same position each time.

Provide a disconnect unit that securely holds the lowering device and the equipment installed on the lowering device. The interface and locking components must be stainless steel or aluminum.

The lowering cable shall be a minimum diameter of 0.125 inch and constructed of 7 strands, 19 gauge, stainless steel aircraft cable with a minimum breaking strength of 1,740 pounds. The contractor shall ensure that the prefabricated components for the lift unit support system preclude the lifting cable from contacting the power or video cables.

Provide a connector block as specified by the manufacturer or with the lowering device. The connector block shall be equipped with modular, self-aligning and self-adjusting female and male socket contact halves. The lowering device must be equipped with enough contacts to

permit operation of all required functions of the camera. The lowering device connections must carry the signals, voltages, and current required by the device(s) connected to them under full load conditions. Submit documentation to the Engineer showing pin assignment.

The female socket contacts and the male contact halves must be of heavy-duty construction and the connector blocks made of molded synthetic rubber, molded chlorosulfonated polyethylene, polymer body or approved equal. The connector pins shall be made of brass or gold-plated nickel, or gold-plated copper. The current-carrying male and female contacts shall have a minimum diameter of 0.09 inch.

Provide cored holes in the rubber to create moisture-tight seals when mated with the male connector. All wire leads from both the male and female contacts shall be permanently molded in a body of chlorosulfonated polyethylene, or an approved equal. All current-carrying wires and signal wires shall be minimum #18 AWG stranded copper cable.

All contacts shall be self-wiping with a shoulder at the base of each male contact so that it is recesses in the female block, thereby giving each contact a rain-tight seal when mated.

(C) Portable CCTV Camera Lowering Device

Provide a portable CCTV lowering device to operate the lowering system. Provide a metal-frame lowering tool with winch assembly and a cable with a combined weight less than 35 pounds; a quick release cable connector, and an adjustable safety clutch. The lowering tool shall be powered using a half-inch chuck, variable-speed reversible industrial-duty electric drill to match the manufacturer-recommended revolutions per minute, or be supplied with a drill motor for the lowering tool.

The lowering tool shall support itself and the load. The lowering tool shall be equipped with a positive braking mechanism to secure the cable reel during raising and lowering operations, and to prevent freewheeling.

The lowering tool shall be equipped with gearing that reduces the manual effort required to operate the lifting handle to raise and lower a capacity load. It shall be provided with an adapter for operating the lowering device with the portable half-inch chuck drill using a clutch mechanism.

All lowering equipment, lowering device, pulleys, cables, etc. must be made of durable, corrosion resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry-accepted coatings to withstand exposure to corrosive environment.

18.3. CONSTRUCTION METHODS

(A) Metal Poles

Install anchor rod assemblies in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision (SP09-R005) located on the Department's 2012 Standard Specifications and Provisions website:

https://connect.ncdot.gov/resources/Specifications/Pages/Specifications-and-Special-Provisions.aspx

Erect metal poles only after concrete has attained a minimum allowable compressive strength of 3,000 psi. Connect metal poles to grounding electrodes and bond them to the electrical service grounding electrodes.

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

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

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

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

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

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

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

(B) CCTV Camera Lowering System

Weights and/or counterweights shall be provided to assure the alignment for the camera connection can be raised into position without binding and that it can be lowered properly, unless otherwise approved by the Engineer. Ensure that the divided support arm and receiver brackets self-align the contact unit with the metal pole centerline during installation and that the contact unit cannot twist when subjected to the wind speed requirement as specified by the *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals*, 5th Edition, 2009, including the latest interim specifications. Supply internal conduit in the metal pole for the power and video cabling. The cost to furnish and install this conduit shall be included in the cost of the CCTV metal pole.

All pulleys installed for the lowering device and portable lowering tool must have sealed self-lubricated bearings, oil-tight bronze bearings, or sintered bronze bushings.

Provide 1.25-inch-diameter PVC conduit in the metal pole for the lowering cable. The contractor shall verify that a conduit mount adapter is furnished for the interface between the conduit and the internal back side of the lowering device. The cost to furnish and install this conduit shall be included in the cost of the CCTV metal pole.

(C) Drilled Pier Foundations

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

18.4. MEASUREMENT AND PAYMENT

Metal pole (_____, ____ feet) will be measured and paid as the actual number of metal poles of the size and type specified that are furnished, installed and accepted.

CCTV camera lowering system will be measured and paid as the actual number of CCTV camera lowering systems furnished, installed and accepted.

Portable CCTV camera lowering tool will be measured and paid as the actual number of portable CCTV camera lowering tools furnished and accepted.

Soil test will be measured and paid as the actual number of Soil Tests with SPT borings drilled, furnished and accepted.

Drilled pier foundation will be measured and paid as the actual volume of concrete poured in cubic yards of Drilled Pier Foundation furnished, installed and accepted.

No measurement will be made for metal pole designs and foundation designs, as these will be considered incidental to Metal Poles and Drilled Pier Foundations.

No measurement will be made for conduits inside the CCTV metal pole for the lowering device cables, data cables, and power cables, as these will be considered incidental to CCTV metal poles.

Payment will be made under:

Pay Item	**Pay Unit**
Metal Pole (CCTV, 50 feet)	Each
Metal Pole (CCTV, 60 feet)	Each
Metal Pole (CCTV, 75 feet)	Each
Metal Pole (Wireless Repeater, 50 feet)	Each
CCTV Camera Lowering System	Each
Portable CCTV Camera Lowering Tool	Each
Soil Test	Each
Drilled Pier Foundation	Cubic Yard

19. FOUNDATIONS AND ANCHOR ROD ASSEMBLIES FOR METAL POLES

19.1. DESCRIPTION

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

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

This provision does not apply to materials and anchor rod assemblies for standard foundations for low level light standards. See Section 1405 of the *Standard Specifications* and Standard Drawing No. 1405.01 of the *Standard Drawings* for materials and anchor rod assemblies for standard foundations. For construction of standard foundations for low level light standards, standard foundations are considered footings in this provision.

19.2. MATERIALS

Refer to the *Standard Specifications*.

Item	Section
Conduit	1091-3
Grout, Nonshrink	1003
Polymer Slurry	411-2(B)
Portland Cement Concrete	1000
Reinforcing Steel	1070
Rollers and Chairs	411-2(C)
Temporary Casings	411-2(A)

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

Use conduit type in accordance with the contract. Use Class A concrete for footings and pedestals, Class Drilled Pier concrete for drilled piers and Class AA concrete for grade beams and wings including portions of drilled piers above bottom of wings elevations. Corrugated temporary casings

may be accepted at the discretion of the Engineer. A list of approved polymer slurry products is available from:

www.ncdot.org/doh/preconstruct/highway/geotech/leftmenu/Polymer.html

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

- Straight anchor rods,
- Heavy hex top and leveling nuts and flat washers on exposed ends of rods, and
- Nuts and either flat plates or washers on the other ends of anchor rods embedded in foundations.

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

19.3. CONSTRUCTION METHODS

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

(A) Drilled Piers

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

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

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

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

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

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

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

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

Use polymer slurry and additives to stabilize holes in accordance with the slurry manufacturer's recommendations. Provide mixing water and equipment suitable for polymer slurry. Maintain polymer slurry at all times so slurry meets Table 411-3 of the *Standard Specifications* except for sand content.

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

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

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

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

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

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

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

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

(B) Footings, Pedestals, Grade Beams and Wings

Excavate as necessary for footings, grade beams and wings in accordance with the plans, accepted submittals and Section 410 of the *Standard Specifications*. If unstable, caving or sloughing materials are anticipated or encountered, shore foundation excavations as needed with an approved method. Notify the Engineer when foundation excavation is complete. Do not place concrete or reinforcing steel until excavation dimensions and foundation material are approved.

Construct cast-in-place reinforced concrete footings, pedestals, grade beams and wings with the dimensions shown in the plans and in accordance with Section 825 of the *Standard Specifications*. Use forms to construct portions of pedestals and grade beams protruding above finished grade. Provide a chamfer with a 3/4" horizontal width for pedestal and grade beam edges exposed above finished grade. Backfill and fill in accordance with Article 410-8 of the *Standard Specifications*. Proper compaction around footings and wings is critical for foundations to resist uplift and torsion forces. Place concrete against undisturbed soil and do not use forms for standard foundations for low level light standards.

(C) Anchor Rod Assemblies

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

Protect anchor rod threads from damage during storage and installation of anchor rod assemblies. Before placing anchor rods in foundations, turn nuts onto and off rods past leveling nut locations. Turn nuts with the effort of one workman using an ordinary wrench

without a cheater bar. Report any thread damage to the Engineer that requires extra effort to turn nuts.

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

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

1. Turn leveling nuts onto anchor rods to a distance of one nut thickness between the top of foundation and bottom of leveling nuts. Place washers over anchor rods on top of leveling nuts.
2. Determine if nuts are level using a flat rigid template on top of washers. If necessary, lower leveling nuts to level the template in all directions or if applicable, lower nuts to tilt the template so the metal pole or upright truss will lean as shown in the plans. If leveling nuts and washers are not in full contact with the template, replace washers with galvanized beveled washers.
3. Verify the distance between the foundation and leveling nuts is no more than one nut thickness.
4. Place base plate with metal pole or upright truss over anchor rods on top of washers. High mount luminaires may be attached before erecting metal poles but do not attach cables, mast arms or trusses to metal poles or upright trusses at this time.
5. Place washers over anchor rods on top of base plate. Lubricate top nut bearing surfaces and exposed anchor rod threads above washers with beeswax, paraffin or other approved lubricant.
6. Turn top nuts onto anchor rods. If nuts are not in full contact with washers or washers are not in full contact with the base plate, replace washers with galvanized beveled washers.
7. Tighten top nuts to snug-tight with the full effort of one workman using a 12-inch wrench. Do not tighten any nut all at once. Turn top nuts in increments. Follow a star pattern cycling through each nut at least twice.
8. Repeat (7) for leveling nuts.
9. Replace washers above and below the base plate with galvanized beveled washers if the slope of any base plate face exceeds 1:20 (5%), any washer is not in firm contact with the base plate or any nut is not in firm contact with a washer. If any washers are replaced, repeat (7) and (8).
10. With top and leveling nuts snug-tight, mark each top nut on a corner at the intersection of 2 flats and a corresponding reference mark on the base plate. Mark top nuts and base plate with ink or paint that is not water-soluble. Use the turn-of-nut method for pretensioning. Do not pretension any nut all at once. Turn top nuts in increments for a total of one flat (1/6 revolution) for anchor rod diameters greater than 1-1/2 inches and

2 flats (1/3 revolution) for anchor rod diameters 1-1/2 inches or less. Follow a star pattern cycling through each top nut at least twice.

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

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

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

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

13. Do not grout under base plate.

19.4. MEASUREMENT AND PAYMENT

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

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

20. LOCAL AREA NETWORK EQUIPMENT

20.1. DESCRIPTION

Furnish, install, and fully integrate new local area network (LAN) equipment as called for in the Project Plans and these Project Special Provisions.

20.2. MATERIALS

(A) General

Furnish equipment for the LAN that complies with IEEE standard 802. Furnish Ethernet Switches that comply with the following electrical safety requirements: UL60950 or CSA C22.2 No. 60950 (safety requirements for IT equipment) and FCC Part15 Class A for EMI emissions.

(B) Ethernet Field Switch

Furnish Ethernet field switches fabricated for use in field equipment cabinets that are ruggedized to meet or exceed NEMA TS-2 requirements for temperature, shock, humidity, and vibration.

Furnish Ethernet field Switches that are DIN rail mounted and come equipped with hardware to permit mounting in an EIA 19" equipment rack.

Furnish Ethernet field Switches that weigh no more than 15 lbs. and are no more than 250 cubic inches in volume.

Furnish Ethernet field Switches that are fully functionally compatible with the existing Cisco Catalyst 3750 Series switches, located in the Hub #6 building.

Furnish Ethernet field Switches with the following minimum characteristics and features:

- Four (4) 10/100/1000BaseTX ports,
- Minimum of two (2) 1000BaseFX Optical uplink ports that utilize small form-factor pluggable (SFP) connectors,
- Furnish SFP modules rated to service the Ethernet field to Ethernet field optical uplinks and Ethernet field to Ethernet Core rated for optical attenuation required to service the link. Use SFP modules that are LX and are matched and compatible with the SFP module it is mated with. Furnish attenuators if required to service link without saturation receiving optics,
- Furnish SFP modules rated for use with the existing optical cable integrated under this project,
- SFP modules shall be considered incidental to the Ethernet field switch,
- Management console port.

Furnish Ethernet field switches with the following features:

- 10/100/1000Base TX ports:
  - RJ45 connectors,

- Category 5e, unshielded twisted pair cable,
- Segment Length: 100m,
- Auto-negotiation support (10/100/1000Mbps),
- Auto MDIX crossover capability,
- Full Duplex operation (IEEE 802.3x),
- TVS (transient voltage suppression) between Line +/-, Line +/ground, and Line -ground to protect the circuitry.

Furnish Ethernet field switches with the following networking requirements:

- The switch shall support automatic address learning of up to 8192 MAC addresses.
- The switch shall support the following advanced layer 2 functions:
  - IEEE 802.1Q VLAN, with support for up to 4096 VLANs,
  - IEEE 802.1p priority queuing,
  - IEEE 802.1w rapid spanning tree,
  - IEEE 802.1s multiple spanning tree,
  - IEEE802.1AD link aggregation,
  - IEEE 802.3x flow control,
  - IGMPv2 with 256 IGMP groups,
  - Port Rate Limiting,
  - Configuration via test file which can be modified through standard text editor,
  - Forwarding/filtering rate shall be 14,880 packets per second (PPS) for 10Mps,148,800 for 100Mps, 1,488,000 for 1000Mps, and
  - DHCP Option 82.

Furnish Ethernet field switches with the following network management functionality requirements:

- SNMPv2, SNMPv3,
- RMON,
- GVRP,
- Port Mirroring,
- 802.1x port security,
- Radius Server,
- TACACS+ Server,
- SSL – Secure Socket Layer,
- SSH – Secure Shell,

- TFTP,
- Network Time Protocol (NTP),
- Simple Network Time Protocol (SNTP), and
- Management via web or Telnet.

(C) Ethernet Bridge

Furnish and install Ethernet bridges that are managed Layer 2 switches industrially hardened to operate in uncontrolled environments.

Furnish RuggedCom RSG2100 devices or Department-approved equivalent Ethernet bridges with the following features:

(1) Technical

- 128-bit encryption,
- 3 Gigabit ports minimum (copper and/or fiber),
- 16 Fast Ethernet ports minimum (copper and/or fiber),
- 2 port modules minimum,
- Non-blocking,
- Store and forward switching,
- Single mode fiber support,
- Gigabit transmission distances to 70 km,
- LC (fiber) and RJ45 (copper) connectors,
- Transmission rates 10, 100 and 1,000 Mbits/s
- 8,192 automatically learnable MAC addresses,
- 7.0 µs switch latency period,
- 9.2 Gbit/s switch transfer rate,
- 4 priority channels,
- Command Line Interface
- Web-based management,
- MIB support,
- Remote Network Monitoring (RMON),

(2) Protocols Supported

- Telnet,
- HTTP,
- TFTP,

- SFTP,
- IGMP (snooping/querier)
- SNMP v1,
- SNMP v2c
- SNMP v3

(3) Product Function for MIB Support

- BRIDGE-MIB,
- IF-MIB
- RMON-MIB
- RSTP-MIB,
- SNMP v2-MIB,
- SNMP v2-SMI
- SNMP v2-TC
- TCP-MIB
- UDP-MIB

(4) Product Function for VLAN

- 255 VLANs
- VLAN identification numbers from 1 to 4094,

(5) Product Functions for DHCP

- DHCP client,
- DHCP Option 82,

(6) Product Functions for Redundancy

- STP,
- RSTP,
- MSTP,
- eRSTP,

(7) Product Functions for Security

- IEEE 802.1x (radius),
- TACACS+,
- SSH,
- SSL,
- SSL: 128 bit key length,

- RSA: 1024 bit key length,

(8) Product Functions for Time

- SNTP - client,
- SNTP – server,

(9) Product Conformity

- IEEE 802.3-BaseT,
- IEEE 802.3u-BaseTX,
- IEEE 802.3u-BaseFX,
- IEEE 802.3x-Flow Control,
- IEEE 802.3ab-1000BaseT,
- IEEE 802.3ad-Link Aggregation,
- IEEE 802.1d-MAC Bridges,
- IEEE 802.1d-STP,
- IEEE 802.1p-Class of Service,
- IEEE 802.1Q-2005 (formerly IEEE 802.1s) MSTP,
- IEEE 802.1w-RRST,
- IEEE 802.1x-port based Network Access Control,
- RFC768-UDP
- RFC783-TFTP
- RFC791-IP
- RFC792-ICMP
- RFC793-TCP
- RFC826-ARP
- RFC854-Telnet
- RFC894-IP over Ethernet
- RFC1112-IGMP v1
- RFC1519-CIDR
- RFC1541-DHCP (client)
- RFC2068-HTTP
- RFC2236-IGMP v2
- RFC2284-EAP
- RFC2475-Differentiated Service

- RFC2865-Radius
- RFC3414-SNMP v3-USM
- RFC3415-SNMP v3-VACM

(10) Electrical

- 125 VAC operating voltage,
- 2 Amps maximum,

(11) Physical

- -40 to +85 ℃ operating temperature,
- Fanless operation,
- 19” rack-mounting,
- 1 rack-unit high,
-

(D) Ethernet Hub Switch

Furnish Ethernet hub switches that are fully functionally compatible and interconnectable with the existing Cisco Catalyst 3750-X switch located in Hub Building #6.

Furnish Ethernet hub switches fabricated for use in environmentally controlled areas.

Furnish Ethernet hub Switches that come equipped with hardware to permit mounting in an EIA 19” equipment rack.

Furnish Ethernet hub Switches that are 1 RU (rack unit) in height.

Furnish Ethernet hub switches with the following minimum characteristics and features:

- Furnish twenty-four (24) SFP transceiver modules rated to service the Ethernet hub to Ethernet field optical uplinks rated for optical attenuation required to service the link. Use SFP modules that are matched and compatible with the SFP module it is mated with. Furnish attenuators if required to service link without saturation receiving optics,
- Furnish SFP modules rated for use with the existing optical cable integrated under this project,
- Furnish SFP modules with LC connectors,
- SFP modules shall be considered incidental to the Ethernet hub switch,
- Management console port.

Furnish Ethernet hub switches with the following networking requirements:

- The switch shall support automatic address learning of up to 8192 MAC addresses.
- The switch shall support the following advanced layer 2 functions:
  - IEEE 802.1Q VLAN, with support for up to 4096 VLANs,

- IEEE 802.1p priority queuing,
- IEEE 802.1w rapid spanning tree,
- IEEE 802.1s multiple spanning tree,
- IEEE802.1AD link aggregation,
- IEEE 802.3x flow control,
- IGMPv2 with 256 IGMP groups,
- Port Rate Limiting,
- Configuration via test file which can be modified through standard text editor,
- Forwarding/filtering rate shall be 14,880 packets per second (PPS) for 10Mps,148,800 for 100Mps, 1,488,000 for 1000Mps, and
- DHCP Option 82.

Furnish Ethernet hub switches with the following network management functionality requirements:

- SNMPv2, SNMPv3,
- RMON,
- GVRP,
- Port Mirroring,
- 802.1x port security,
- Radius Server,
- TACACS+ Server,
- SSL – Secure Socket Layer,
- SSH – Secure Shell,
- TFTP,
- Network Time Protocol (NTP),
- Simple Network Time Protocol (SNTP), and
- Management via web or Telnet.

(E) Gigabit Transceiver Modules - ZX

Furnish and install extended distance GLC-ZX-SMD 1000 BASE-ZX SFP transceiver modules for single mode fiber (SMF), 1550 nm wavelength, and dual LC/PC connectors. The gigabit transceiver modules shall support Digital Optical Monitoring (DOM) version 12.2(46)SE and Cisco IOS Release 12.2(25)FZ. Fully compatible equivalent gigabit transceivers may be furnished upon the approval of the Engineer.

20.3. CONSTRUCTION METHODS

(A) General

Furnish media access control (MAC) addresses for all equipment utilized as part of this project. Affix MAC Address label to each device utilized. Furnish IP addresses for all equipment utilized as part of this project. Affix final IP address each device utilized. Use labels that do not smear or fade.

In field equipment cabinets, fully integrate new Ethernet switches with the fiber-optic interconnect centers. Integrate all field equipment as call for.

Fully integrate LAN to accomplish local device failover and fault tolerance.

Fully integrate LAN equipment to provide virus protection, user authentication, and security functions to prevent unauthorized users and data from entering the LAN.

(B) Requirements Definition Document

Prior to commencing work, the Contractor shall develop a Requirements Definition Document (RDD) that will form the basis for the overall network architecture and design that at a minimum includes the following:

- Complete description of the proposed implementation of the access, distribution and core layers for the network as described in the Project Plans and these Project Special Provisions,
- Development of an IP Design Scheme with ranges assigned to each node to be integrated by the Contractor (address ranges, geographic distribution, standards for addresses within each cabinet),
- Proposed IP subnet definition and addressing including any and all masks,
- Proposed IP multicast configuration including multicast routing (i.e., PIM sparse or dense) and Rendezvous Point (RP) designation as necessary,
- Proposed recommendations for failover and redundancy including network device power, supervisor cards, and network ports,
- Proposed configuration and guidelines for L3 routing (OSPF, VRRP, EIGRP, RIP, etc.),
- Proposed configuration and guidelines for Virtual LAN assignments including management VLANs, device VLANs and routing VLANs,
- Proposed configuration and guidelines for L2 broadcast storm prevention, loop prevention and fault tolerance mechanisms. (Spanning Tree diagram with designated, blocking and forwarding ports indicated. Root bridge and backup root bridge must also be specified.) Incorporation of Multiple Spanning Tree Protocol,
- Proposed configuration and guidelines to mitigate common security threats such as denial of service, man in the middle, MAC/IP spoofing and brute force dictionary attacks,

- Proposed configuration and guidelines for 802.1p Class of Service (COS) queue assignments, and
- Proposed configuration and guidelines for specific port assignments on each of the L2 and L3 devices.

The RDD shall be prepared and signed by a qualified networking professional (minimum CCNA or a manufacturer-approved equivalent based on the approved hardware vendor) and will be approved by the Engineer. The Qualified network professional will be present during the installation and testing of the local area network as well as during system testing.

(C) Ethernet Field Switch

Install and integrate all Ethernet field switches at field locations as depicted in the diagrams and tables and called for in these Project Special Provisions. Integrate with equipment cabinet hardware and fiber-optic communications equipment.

Provide inline surge protection for all Ethernet connections in field cabinets.

(D) Ethernet Bridge

Install and integrate all Ethernet bridges at field locations as depicted in the diagrams and tables and called for in these Project Special Provisions. Integrate with equipment cabinet hardware, fiber-optic communications equipment and wireless Ethernet transceiver equipment.

Provide inline surge protection for all Ethernet connections in field cabinets.

(E) Ethernet Hub Switch

Install and integrate all Ethernet hub switches at hub building locations as depicted in the Project Plans and called for in these Project Special Provisions.

Install cross-connect cables for both data and power between the proposed Ethernet hub switch and the existing Cisco Catalyst 3750X switch so that the Ethernet hub switch's communication access to the MRTMC is achieved through the existing Cisco Catalyst 3750X switch.

Integrate the proposed Ethernet hub switch with existing switch(es) and proposed Ethernet field switches.

(F) Gigabit Transceiver Modules – ZX

Install the gigabit transceiver modules in the proposed Ethernet switches in as depicted in the Project Plans.

20.4. MEASUREMENT AND PAYMENT

Ethernet field switch will be measured and paid as the actual number of Ethernet field switches furnished, installed, integrated, and accepted. All SFP modules, optics, cabling, attenuators, configuration, and testing or other labor or materials required to install and integrate the Ethernet field switch will be considered incidental and will not be paid for separately.

Furnish Ethernet field switch will be measured and paid as the actual number of Ethernet field switches furnished and accepted. All SFP modules, optics, cabling, attenuators, configuration,

testing and other materials that are an integral part of the Ethernet field switch will be considered incidental and will not be paid for separately.

Ethernet bridge will be measured and paid as the actual number of Ethernet bridges furnished, installed, integrated and accepted. All SFP modules, optics, cabling, attenuators, configuration, testing and other materials that are an integral part of the Ethernet bridge will be considered incidental and will not be paid for separately.

Ethernet hub switch will be measured and paid as the actual number of Ethernet hub switches furnished, installed, integrated, and accepted. All cabling, attenuators, configuration, and testing or other labor or materials required to install and integrate the Ethernet hub switch will be considered incidental and will not be paid for separately.

Gigabit transceiver module – ZX will be measured and paid as the actual number of gigabit transceiver modules – ZX furnished, installed, tested and accepted. No separate measurement will be made for fiber-optic jumpers as these are considered incidental to furnishing and installing the gigabit transceiver modules.

Payment for all LAN integration, RDD development, cabling, jumpers, adapters, sockets, LAN patch panels, and other hardware shall be considered incidental and no separate payment will be made.

Payment will be made under:

Pay Item	**Pay Unit**
Ethernet Field Switch	Each
Furnish Ethernet Field Switch	Each
Ethernet Bridge	Each
Ethernet Hub Switch	Each
Gigabit Transceiver Module – ZX	Each

21. WIRELESS ETHERNET COMMUNICATIONS

21.1. DESCRIPTION

Furnish, install, and fully integrate a wireless broadband Ethernet radio system as called for in the Project Plans and these Project Special Provisions.

Furnish wireless broadband Ethernet radio systems in four (4) different configurations.

1. Begin/End Site with CCTV – the point on one end of the system at which the wireless broadband Ethernet radio system interfaces with fiber-optic cable through an Ethernet bridge, plus a CCTV camera,
2. Begin/End Site without CCTV – the point on the opposite end of the system at which the wireless broadband Ethernet radio system interfaces with fiber-optic cable through an Ethernet bridge,
3. CCTV Site – a point at which a CCTV camera is inserted into the wireless broadband Ethernet radio system,
4. Repeater Site – a point at which the wireless broadband Ethernet radio stream is repeated due to geometric line of sight restrictions.

21.2. MATERIALS

(A) Programming and Operation Software

For **all** radios furnished under this project, provide radio units with a Windows Based™ software program that uses a GUI (Graphical User Interface) to provide "remote programming, radio configuration, remote maintenance, diagnostics and spectrum analyzer" features. Provide copies of the software to the Department with the materials submittal for review and approval.

Furnish software supplied with drivers to allow easy set-up with all CCTV equipment furnished on the project.

Ensure that installing the wireless radio system with a fully functional field device (i.e. controller) does not require any field device modifications with regards to hardware or software.

(B) 5.8 GHz Broadband (Ethernet)

Furnish 5.8 GHz broadband Ethernet radio transceivers with configuration/diagnostic and system management software.

Furnish material that is certified by Underwriter's Laboratories (UL) or a third-party listing agency accredited by the North Carolina Department of Insurance, and all local safety codes in effect on the date of advertisement.

Furnish 5.8 GHz broadband Ethernet radio transceivers that meet the following minimum specifications:

Wireless Interface	
Frequency Range	5.150 – 5.825 GHz
Modulation	OFDM, BPSK, QPSK, 16QAM, 64QAM
Receiver Sensitivity	-94 to -74 dBm
Peak Transmit Power	28 dBm @ 600 mW OR 30 dBm @ 1000 mW
Channel Widths	20MHz, 40MHz
Wireless Interface Protocols	802.11a/n
Data Rate	Up to 300 Mbps
LED's	RSSI and power LED
Reset	Push Button
Ethernet Link	10/100/1000Base-T
GPS	YES
Wireless Networking	Bursting, / Compression Dynamic Ack Timeout / TLS EAP Method Pass through EAP Method / Hardware Retries Preamble Mode / Periodic Calibration Disconnect Timeout / Onfail Retry CSMA Disable / Station Channel Scan List
Security	801.11i-WPA-PSK / 802.11i-WPA2-PSK 802.11i-WPA-EAP / 802.11i-WPA2-EAP 802.11i-TKIP / 802.11i-AES-CCM 802.11i-802.1x / 802i-RSN Radius Authentication / MAC Access Control List 128/256 Encryption
IEEE Networking Features	802.11e / WMM and QOS 802.11h / DFS and TPC 802.1d / Ethernet Bridging 802.1p / Traffic Prioritization 802.1q / VLAN

	802.1s	Spanning Tree
	801.1w	Rapid Spanning Tree
	802.3-1998	Ethernet
	802.3ab	Gigabit Ethernet
	802.3ac	Extended Frame Size for 801.1q & 802.1p Support
	802.3ad	Link Aggregation/Port Bonding/Port Trunking
	802.3i	10 Mbps Ethernet
	802.3u	100 Mbps Ethernet and Auto-Negotiation
	802.3x	Full Duplex and Flow Control

Additional Networking Features	OSPF	FTP
	Telnet	SSH
	SSH	SNMP
	Firewall/NAT	DHCP Server/Client

Software	IP Discovery Tool	Local or Remote Configuration
	Network-Wide Diagnostics	Bandwidth test Tool
	Spectrum Analysis/AP Scan Tool	Real Time RSSI
	Client Connection Quality	Built-in Audio Aiming Tool
	Configuration File Management	blank

Power	Power over Ethernet (POE) (10/100/1000 injector) with Surge Protector; 10 – 28 VDC: 150 ft, Cat5e or better industrial, outdoor- rated cable with waterproof connector.
Environmental (IP67)	-45°C to +70°C
Antennas	Supports: Omni, Yagi, single panel, parabolic and/or sectoral
Certification	FCC Part 15.247

(C) 5.8 GHz Broadband (Ethernet) Single Radio (Integrated Panel)

Furnish a 5.8 GHz Broadband Ethernet Radio Transceiver with a RJ-45 Ethernet 10/100/1000 BaseTX connector (auto crossover) with an integrated panel antenna. Ensure the Radio is designed to support a second single panel antenna configuration (reference "5.8 GHz Standalone Panel Antenna below) through one (1) additional N-Type-Female coaxial port.

(D) 5.8 GHz Standalone Panel Antenna

Furnish a 5.8 GHZ standalone panel antenna with the following features and equipment:

Applications	5.8 GHz ISM band
IEEE Compliant	802.11a, 802.11b, 802.11g
Uses	Point-to-point; point-to-multipoint
Electrical Specifications	
Frequency	5725 to 5825 MHz
Gain	23 dBi
Polarization	Horizontal or Vertical
-3dB Beamwidth Vertical/Horizontal	10°/10°
Impedance	50 ohms
Max Input Power	30 Watts
VSWR	< 1.5:1 avg.
Lightning Protection	DC ground
Mechanical	
Radome Material	UV-inhibited Polymer /fiberglass/weatherproof
Dimensions	12 ½" * 12 ½" * 1" (approx.)
Mounting	4 bolt pattern to Pelco type bracket
Wind Survival Rating	150 MPH
Connector	N-Female
Mounting	Adjustable hardware (horizontal and vertical tilt capability) included for mount to 1 ½" pipe

(E) Coaxial Cable:

Furnish an antenna coaxial cable (400 series) with **water blocking properties** to provide a link between the antenna and the lightning arrestor that meets the following minimum specifications:

Property	Requirement
Attenuation (dB per 100 feet) @ 900 MHz	3.9 dB
Power Rating @ 900 MHz.	0.58 kW
Center Conductor	0.108" Copper Clad Aluminum
Dielectric: Cellular PE	0.285"
Shield (approx.)	Aluminum Tape – 0.291" Tinned Copper Braid – 0.320"
Jacket	Black UV protected polyethylene
Bend Radius	1"
Impedance	50Ω
Capacitance per foot	23.9 pf/ft
Water Blocking	YES
Supply Coaxial Cable on 500ft Reel	YES

(F) Standard N-Type Male Coaxial Connector:

Furnish Standard N-Type Male Connector(s) of proper sizing to mate with the 400 series coaxial cable and utilize a crimping method to secure the connector to the coaxial cable. Furnish a connector that meets the following minimum specifications:

Description	Requirement
Center Contact	Gold Plated Beryllium Copper-(spring loaded – Non-solder)
Outer Contact	Silver Plated Brass
Body	Silver Plated Brass
Crimp Sleeve	Silver Plated Copper
Dielectric	Teflon PTFE
Water Proofing Sleeve	Adhesive Lined Polyolefin – Heat Shrink
Attachment Size	Crimp Size 0.429" (minimum) hex
Impedance:	50Ω
Working Voltage	1000 VRMS (max)
Insertion loss	0.1 x √ Fghz
VSWR	1.25:1 (max) up to 2.5GHz

(G) Crimping Kit:

Furnish a coaxial cable crimping kit for the series 400 coaxial cable. The crimping kit shall accommodate the coaxial cable and the N-type Male connectors discussed above. Furnish a crimping kit containing, as a minimum, the following items:

- Cable End Flush Cut Tool
- Coaxial Cable Stripping Die/Tool
- Coaxial Cable Mid-Span Jacket Striping Tool for Ground Strap Attachment
- Calibrated Crimp Tool with Hex Dies
- Deburring Tool
- Tool Pouch (Canvas or Leather)

(H) Antenna Mounting Hardware Kit

Furnish an antenna mounting kit to support the antenna when attached to a metal pole, mast arm, or wood pole.

Ensure the Antenna Mounting Hardware Kit includes the following:

Description	Quantity
96” galvanized cable with stainless steel bolt with a nut and lock washer assembly on each end.	1
Pole base plate accepts a 1 ½” NPT aluminum pipe, and provides a surface that is a minimum of 6 ¾ inch long by 4 ¼” to provide contact with the surface of the pole. Ensure the pole base plate is designed to allow both ends of the 96” galvanized cable to be secured and tightened to the base plate. Furnish a stainless steel set screw to secure the 1 ½” NPT aluminum pipe to the base plate.	1
A 90 degree, die cast elbow with internal treads on both ends to accommodate 1 ½” NPT aluminum pipes. Furnish the elbow with a minimum of 1 stainless steel set screw on each end of the elbow for securing the threaded nipple and support pipes.	1
Nipple Pipe: 1 ½” * 18” NPT long aluminum pipe, threaded on both ends	1
Support Pipe: 1 ½” * 24” NPT long aluminum pipe, threaded on 1 end with an end cap.	1

21.3. CONSTRUCTION METHODS

(A) Radio Path Site Survey Test

Perform a radio path site survey test before installing any equipment. Ensure the test evaluates the signal strength (dBm), fade margin (dB), signal-to-noise ratio, data integrity (poll test) and a complete frequency spectrum scan. Ensure the radio path site survey test is performed using the supplied brand of radio equipment to be deployed. During the initial radio path signal strength test it may be determined that a repeater station may be necessary to complete the intended link. Provide the test results to the Engineer for review and approval. Submit copies of the test results and colored copies of the frequency spectrum scan along with an electronic copy of this information. The Engineer will approve final locations of antennas and any necessary repeater stations. Install additional antenna at locations where it is determined that a dual antenna configuration is necessary to accommodate communications in multiple directions.

(B) Installation

Install all wireless broadband Ethernet radio system equipment using materials, installation and attachment methods recommended by the manufacturer.

Install the antenna in such a manner that avoids conflicts with other utilities (separation distances in accordance with the guidelines of the NESC) and as specified in the antenna manufacturer's recommendations. Secure the antenna mounting hardware to the pole and route the cable such that no strain is placed on the connectors.

Where coaxial cable is used, install the coaxial cable shield grounding system by carefully removing the outer jacket of the coaxial cable without damaging the cable shield. Install the shield grounding system following the cable manufacturer's recommendations. Install and weatherproof the connection using the appropriate weatherproofing materials and following the manufacturer's recommendations. Do not exceed the one inch bend radius of the coaxial cable.

Permanently label all cables entering the cabinet. Ensure the PoE injector for the radio system is not connected to the GFCI receptacle circuit located in the cabinet.

Place a copy of all manufacturer equipment specifications and instruction and maintenance manuals in the equipment cabinet.

At certain locations it may be necessary to integrate the radio system with a fiber optic system. Follow the details shown in the fiber optic splice plans.

(C) 5.8 GHz Broadband Ethernet Radio - Training

Provide adequate equipment operation and setup training to the Department prior to final acceptance. The Department will provide classroom facilities for the training.

The training class shall consist of a minimum of eight (8) hours of equipment operation and setup training for a maximum of five (5) people. Provide up to five (5) 5.8 GHz broadband Ethernet Radios of the type being trained on to be used during the training class. Supply all instruction materials, and all teaching aids for each training class. Submit resumes of the

trainers for review and approval and provide a course outline along with a copy of the teaching materials to the Engineer for review and approval prior to the training.

Deliver all software to the Department prior to the scheduled training for loading on Department-owned computer equipment to be used during the training.

21.4. MEASUREMENT AND PAYMENT

Integrated wireless Ethernet assembly (_____) will be measured and paid as the actual number of 5.8 GHz broadband Ethernet radio assemblies of the type specified furnished, installed, integrated, and accepted. This item includes the appropriate sized antenna(s), radio, power supplies, PoE injectors, disconnect switch, data interface cable, coaxial cable, lightning arrestor, coaxial cable connectors, coaxial cable shield grounding system with weatherproofing, labeling and any integration between the radio system and a fiber optic network if necessary, installation materials and configuration software necessary to complete this work, including the radio path site survey test and warranties.

No separate payment will be made for 5.8 GHz broadband Ethernet radio training as training is considered incidental to furnishing and installing 5.8 GHz broadband Ethernet radio assemblies.

Payment will be made under:

Pay Item	**Pay Unit**
Integrated Wireless Ethernet Assembly (Single)	Each
Integrated Wireless Ethernet Assembly (Dual)	Each

22. CENTRAL SYSTEM EQUIPMENT

22.1. DESCRIPTION

Furnish, install, and fully integrate firewalls appliances, central video encoders and decoders, rack-mounted chassis for encoders/decoder units, master distribution amplifier and central media converter, all as called for in the Project Plans and these Project Special Provisions.

22.2. MATERIALS

(A) Firewall

Furnish and install firewall appliances in both the MRTMC and GTOC equipment rooms to provide network security from Internet-based traffic, as well as to provide an IPSec Virtual Private Network (VPN) connectivity.

Furnish a Cisco ASA 5525-X Firewall with FirePOWER with all licenses, or a Department-approved equivalent that complies with the following standards, performance and functional requirements, and physical features.

(1) Standards

Ensure that the firewall appliances comply with all applicable IEEE networking standards for Ethernet communications, including but not limited to:

- RFC 854: Telnet Protocol Specification.
- RFC 2328: Open Shortest Path First (OSPF).
- RFC 2453: Routing Information Protocol (RIP) version 2.
- RFC 2362: Protocol Independent Multicast Sparse Mode (PIM-SM).
- RFC 2236: Internet Group Management Protocol (IGMP) version 2. and

Ensure that the firewall appliances have a minimum mean time between failures (MTBF) of 10 years, or 87,600 hours, as calculated using the Bellcore/Telcordia SR-332 standard for reliability prediction.

(2) Performance Requirements

Ensure that the firewall appliances meet the following minimum performance requirements:

- Maximum Stateful Inspection Firewall Throughput: 2,000 Mbps,
- Maximum Application Control and IPS Throughput: 650 Mbps,
- Advanced Encryption Standard (AES) VPN Throughput: 300 Mbps,
- 3DES Encryption VPN Throughput: 300 Mbps,
- Maximum Concurrent Sessions: 500,000.

Provide sufficient memory to enable optional features such as Intrusion Prevention System (IPS), antivirus, and anti-spam with no additional hardware upgrades.

(3) Functional Requirements

Ensure that the firewall appliances support the following features which shall include, but not be limited to:

- IPsec VPN Capabilities:
  - 750 Concurrent VPN Tunnels.
  - DES, 3DES, and AES.
  - MD-5 and SHA-1 Authentication.
  - Manual Key, Internet Key Exchange (IKE), IKEv2, and EAP Public Key Infrastructure (PKI) (X.509).
  - Remote Access and site-to-site VPN.
- Authentication:
  - Web-based Authentication.
  - RADIUS/TACACS+.
  - Authentication Proxy for Active Directory or RSA SecureID.
- Modes of Operation:
  - Transparent (Layer 2) Mode.
  - Routed (Layer 3) Mode.
- Address Translation:
  - Static Network Address translation (NAT).
  - Dynamic Network Address translation (NAT).
  - Dynamic Port Address Translation (PAT).
- High Availability (HA):
  - Active/Active Failover.
  - Active/Standby Failover.
- Quality of Service / Traffic Management:
  - Policing
  - Priority Queueing
  - Traffic Shaping
- Support for optional subscription services including Advanced Malware Protection, Application Visibility and Control (AVC), Intrusion Prevention System (IPS), Botnet traffic filter
- Network Attack Detection.
- DoS and DDos Protection.

- TCP Reassembly for Fragmented Packet Protection.
- Brute Force Attack Mitigation.
- SYN Cookie Protection.
- Zone-based IP Spoofing, and
- Malformed Packet Protection.

(4) Physical Features

Copper Ports: Provide a firewall appliance that includes a minimum of eight (8) Ethernet 10/100/1000 Base-T copper ports. Provide a firewall appliance that includes one (1) Ethernet 10/100/1000 Base-T copper management interface port. Provide Type RJ-45 copper ports that auto-negotiate speed (i.e., 10/100/1000 Base) and duplex (i.e., full or half). Ensure that all ports meet the specifications detailed in this section and are compliant with the IEEE 802.3 standard pinouts. Ensure that all Category 5e unshielded twisted pair/shielded twisted pair network cables are compliant with the EIA/TIA-568-B standard. Provide auto-negotiation circuitry that will automatically negotiate the highest possible data rate and duplex operation possible with attached devices supporting the IEEE 802.3 Clause 28 auto-negotiation standard.

Furnish a minimum of 8 GB of memory and at least 8 GB of flash memory

(5) Electrical Specifications

Ensure the firewall appliance meets the following electrical requirements:

- Input voltage range: 110 VAC to 130 VAC, auto ranging, and
- Input frequency: 60 Hz.

Ensure that if the firewall appliances require operating voltages other than 120 VAC, supply the required voltage converter. Ensure that the maximum power consumption does not exceed 200 watts.

(6) Management Capabilities

Ensure that the firewall appliance supports all Layer 2 management features and certain Layer 3 features related to multicast data transmission and routing. These features shall include, but not be limited to:

- Support of remote and local setup and management via telnet, Secure Shell (SSHv2) or secure Web-based GUI and command line interfaces, and
- Support of the Simple Network Management Protocol (SNMP).
- Verify that the firewall can be accessed using the resident EIA-232 management port, a telecommunication network, or the Trivial File Transfer Protocol (TFTP).

*Network Capabilities***:** Provide a firewall appliance that supports/complies with the following minimum requirements:

- Provide full implementation of IGMP v2,

- Provide full implementation of SNMPv3,
- Password manageable,
- Telnet/SSHv2,
- HTTP (Embedded Web Server) with Secure Sockets Layer (SSL), and
- Full implementation of RFC 783 (TFTP) to allow remote firmware upgrades.

*Network Security***:** Provide a firewall appliance that supports/complies with the following (remotely) minimum network security requirements:

- Multi-level user passwords,
- RADIUS centralized password management,
- SNMPv3 encrypted authentication and access security,
- Support of the TFTP and SNTP.

(7) Environmental Specifications

Provide a firewall appliance that adheres to the following environmental constraints if located within a climate-controlled environment:

- Operating temperature range: 32°F to 104°F,
- Storage temperature range: 14°F to 158°F, and
- Operating relative humidity range: 10% to 90%, non-condensing.

(8) Software and Licenses

Provide the following licenses and software:

- VPN client software (20 employees),
- FirePOWER Services,
- AnyConnect Client and Security Desktop Software,
- Control license, and
- Strong encryption license.

(B) Central Video Decoder Unit - MRTMC

Furnish central video decoder units to decode the transmission from the built-in digital video Ethernet encoder to analog NTSC video and serial data. Furnish central decoder units that are functionally compatible with the CCTV camera's built-in digital video Ethernet encoder installed under this project. Furnish central decoder units that are card-based and chassis installed.

(C) Central Video Decoder Unit – GTOC

Furnish central video decoder units to decode the Ethernet transmission from the MRTMC to analog NTSC video and serial data. Furnish central decoder units that are functionally

compatible with the Ethernet transmissions from the MRTMC. Furnish central decoder units that are card-based and chassis installed.

(D) Central Video Encoder Unit – GTOC

Furnish central video encoder units to encode the analog NTSC video and serial data transmission from the GTOC to digital Ethernet data. Furnish central video encoder units that are functionally compatible with the analog video and serial data at the GTOC and with the digital Ethernet data at the MRTMC. Furnish central decoder units that are card-based and chassis installed.

(E) Rack-Mounted Video Chassis

Furnish 19" rack-mounted video chassis to accept the respective central video encoder and decoder units furnished under this project.

Furnish rack-mounted video chassis that manufactured by the manufacturer(s) of the central video encoder and decoder units. Rack-mounted video chassis may not necessarily be from the same manufacturer.

Furnish rack-mounted video chassis that have the following minimum requirements:

- Accept 10 (minimum) central video encoder or decoder units (cards),
- Redundant power supply,
- Extended temperature range (-20 degrees C to +70 degrees C),
- 4 RU (7.0) high maximum,
- Input voltage 86-254 VAC, 47-60 Hz,
- Output voltage, 12 or 24 volts DC,
- On/Off power switch,
- Cover plates for empty card slots.

(F) Master Distribution Amplifier

Furnish master distribution amplifiers that accept analog video inputs from the output of the central video decoder units, and provide analog video outputs into the existing Pelco video matrix switch at the MRTMC.

Furnish master distribution amplifiers that are fully compatible with the existing Pelco CM9760-MDA Master Distribution Amplifiers in the MRTMC and satisfy the following minimum requirements.

Features:

- Master time-date titler,
- Distribution amplifier,
- Accepts master time-date strings from CM9700 Series Systems,
- Stand-alone use, with keyboard programming,
- Provides master time-date and title for up to 63 slave units (64 total units),

- Accepts text messages (RS-232/RS-422) from third-party systems for insertion onto any video channel,
- 16 ground-isolated video inputs per unit,
- 4 video outputs per input,
- Outputs selectable for time-date only, time-date and title, or no character generation,
- Includes video amplification,
- Line compensation,

Electrical:

▪ Input voltage	120 VAC, 60 Hz,
▪ Power consumption	25 W,
▪ Fuse	250 mA,

Mechanical:

▪ Video input connectors	BNC (16),
▪ Video output connectors	BNC (4 per input; 64 total),
▪ Communications In	RJ-45,
▪ Communications Out	RJ-45

Video:

▪ Video Input(s)	0.5 to 2 Vp-p, 16 inputs per unit
▪ Video Output(s)	1 Vp-p, 4 outputs per input
▪ Input/Output Impedance	75 ohms, terminated
▪ Gain	Unity ±1 dB
▪ Frequency Response	±1 dB at 8 MHz
▪ Bandwidth	±3 dB at 15 MHz
▪ Crosstalk	-60 dB at 3.58 MHz
▪ Gain	+.88 dB
	+.55 dB with 1,500 feet RG59/U
▪ Video Coaxial Cable	RG59/U 750 feet (229 m)
▪ Requirements	RG6/U 1,000 feet (305 m)
	RG11/U 1,500 feet (457 m)
▪ Video Coaxial Cable	0-1,500 feet (using RG59/U cable)
▪ Compensation Range	Selectable ranges:

- (Inputs Only) – None
  - – 500 feet (152.4 m)
  - – 1,000 feet (304.8 m)
  - – 1,500 feet (457.2 m)
- Differential Gain: Less than 1%
- Differential Phase: Less than 1/2°
- Maximum Output Level: 1.0 Vp-p terminated
- Signal-to-Noise Ratio: -45 dB
- Tilt: Less than 1%
- Inputs: Ground isolated
- Character Size: 7 x 9 TV Lines
- Brightness: Individually adjustable (digital)
- Position: Individually adjustable (digital)

Communication:

- Type: RS-232, RS-422, RS-485
- Data Rate: Selectable; 1200, 2400, 4800 or 9600 baud
- Cable Requirements: 24-gauge shielded twisted pair
  - RS-232: Maximum 50 feet (15.25 m)
  - RS-422: Maximum 4,000 feet (1,219 m)
  - RS-485: Maximum 4,000 feet (1,219 m)

General:

- Construction: Aluminum
- Dimensions: 5.25" H x 19.00" W x 12.90" D
- Mounting Fits: 19-inch EIA Standard rack mount (3 RUs)
- Operating Temperature: 32° to 120°F (0° to 49°C)
- Humidity: 10% to 90%, non-condensing
- Memory Backup: Lithium battery

Certifications/Ratings:

- FCC, Class B (CM9760-MDA)
- Meets NEMA Type 1 standards

(G) Central Media Converter

Furnish a central media converter that serves as a wiring concentrator to provide connectivity of existing central DMS server with serial, EIA-232, compliant ports to the LAN, as shown on the Project Plans.

The central media converters shall have the following features:

- A minimum 10 Base-T port for connectivity to the core Ethernet switch.
- A minimum of four (4) EIA-232 serial ports, each of which shall support data rates up to 115.2 kbps.
- Multi-protocol support of LAT, Novell, IPX, Telnet 3270, and TCP/IP
- TCP/IP support of RLOGIN, Dynamic SLIP, PPP, BOOTP, TFTP and SNMP.
- Minimum 2 MB RAM.
- Standard 19" Equipment Rack-mountable.
- Contain all software and drivers required to support access of serial ports from servers and client workstations.

22.3. CONSTRUCTION METHODS

(A) Firewall

Install the firewall appliances in existing communications racks in the MRTMC and GTOC equipment rooms as shown in the Project Plans. Connect the firewall to the managed Ethernet core switches with Ethernet patch cords. Install the latest General Availability (GA) software release available from the manufacturer. Ensure all firewall appliances are running the same revision of software. Ensure the firewalls are configured for High Availability (HA).

Configure a minimum of two (2) zones. Configure appropriate security policies to protect the respective systems from outside attacks. Configure an IPsec VPN on each firewall to connect to a secure link over the Internet. Configure access to provide shared video between the MRTMC and the GTOC. This VPN connection shall be a site-to-site VPN and shall not require VPN client software. Configure remote access VPN capability to allow MRTMC and GTOC staff to access the network remotely via a secure connection from the Internet. If a VPN client is required for the remote access VPN, provide a sufficient number of licenses for the required client software. If a server license is required, provide all licenses for the server software as well.

Furnish and install proper cables to connect the firewall to the Ethernet core switches, the managed Ethernet switch and the WAN connection. Ensure that the firewall appliance communicates with the Ethernet core switch at Gigabit Ethernet data transmission rates (1000 Mbps).

Ensure that the network administrator will be able to remotely manage each firewall appliance for configuration, performance monitoring, threat detection, and troubleshooting.

Install and configure the firewall appliance to be fully compatible with the Ethernet core switch.

(B) Central Video Decoder Unit - MRTMC

Install the central video decoder units in the rack-mounted video decoder chassis at the MRTMC as shown in the Project Plans. Integrate the decoders with the existing core Ethernet switch. Integrate the central video decoder unit video outputs with the inputs on the master distribution amplifier at the MRTMC as directed by the Engineer.

(C) Central Video Decoder Unit - GTOC

Install the central video decoder units in the rack-mounted video decoder chassis at the GTOC as shown in the Project Plans. Integrate the decoders with the existing LAN Ethernet switch. Integrate the central video decoder unit video outputs with the inputs on the video matrix switch at the GTOC.

(D) Central Video Encoder Unit – GTOC

Install the central video encoder units in the rack-mounted video chassis of the same manufacturer at the GTOC as shown in the Project Plans. Integrate the encoders with the existing LAN Ethernet switch. Integrate the central video encoder unit video inputs with the outputs on the video matrix switch at the GTOC.

(E) Rack-Mounted Video Chassis

Install rack-mounted video chassis into existing 19" racks within the MRTMC and GTOC equipment rooms in a space as directed by the Engineer. Integrate the central video encoder and decoder units with the rack cabinet power supply and UPS.

(F) Master Distribution Amplifier

Install the master distribution amplifier within existing rack space in the MRTMC equipment room as directed by the Engineer. Integrate the master distribution amplifiers with the proposed rack-mounted video decoder chassis and the existing Pelco video matrix switch.

Furnish all necessary interconnecting video and data cables and hardware to properly integrate the master distribution amplifiers into the existing video system.

(G) Central Media Converter

Install one multiple-port central media converter in the existing rack cabinet at the MRTMC. Integrate with the core Ethernet switch and existing DMS server to facilitate communications with the field DMS unit.

22.4. MEASUREMENT AND PAYMENT

Firewall will be measured and paid as the actual number of firewall appliances furnished, installed, integrated, and accepted. All cabling, configuration, and testing or other labor or materials required to install and integrate the firewall appliances will be considered incidental and will not be paid for separately.

No separate payment will be made for all appropriate ports, cabling, grounding, redundancies, labeling and any integration between the firewall appliance and the communications network as necessary to make a fully working installation. All power supplies, power cords, adapters, mounting hardware, DIN rail mounting brackets, DIN rails, connectors, serial cables, signs, decals, disconnect

switches, installation materials, and configuration software necessary to complete this work, will be included and will be incidental.

No separate measurement will be made for fiber-optic ports modules, GBICs and Ethernet ports, and software licenses, as they will be considered incidental to furnishing and installing the managed Ethernet core switch.

Central video decoder unit (_____) will be measured and paid as the actual number of units of the type specified, furnished, installed, integrated, and accepted. All cabling and patch cables, integration, and configuration required to install the central video decoder unit shall be incidental and not be paid for separately.

Central video encoder unit (_____) will be measured and paid as the actual number of units of the type specified, furnished, installed, integrated, and accepted. All cabling and patch cables, integration, and configuration required to install the central video encoder unit shall be incidental and not be paid for separately.

Rack-mounted video chassis will be measured and paid as the actual number of units, furnished, installed, integrated, and accepted. All cabling and patch cables, integration, and configuration required to install the rack-mounted video chassis unit shall be incidental and not be paid for separately.

Master distribution amplifier will be measured and paid as the actual number of units, furnished, installed, integrated, and accepted. All cabling and patch cables, integration, and configuration required to install the master distribution amplifier shall be incidental and not be paid for separately.

Central media converter will be measured and paid for as the actual number of units furnished, installed, integrated, and accepted. All cabling and patch cables, integration, and configuration required to install the media converter shall be incidental and not be paid for separately.

Payment will be made under:

Pay Item	**Pay Unit**
Firewall	Each
Central Video Decoder Unit (MRTMC)	Each
Central Video Decoder Unit (GTOC)	Each
Central Video Encoder Unit (GTOC)	Each
Rack-Mounted Video Chassis	Each
Master Distribution Amplifier	Each
Central Media Converter	Each

23. INTEGRATION AND CONFIGURATION

23.1. DESCRIPTION

Install and fully integrate new central equipment at the MRTMC and GTOC. Fully configure existing central hardware and software at the MRTMC to establish communications with new CCTV and existing DMS devices.

Fully configure new and existing central hardware and software at the MRTMC and GTOC to establish a video sharing link of eight (8) CCTV cameras (plus control data) in each direction simultaneously.

Coordinate the working hours and building access for all central configuration activities with the Engineer.

23.2. CENTRAL INTEGRATION

Furnish media access control (MAC) addresses for all equipment utilized as part of this project. Affix MAC Address label to each device utilized. Furnish IP addresses for all equipment utilized as part of this project. Affix final IP address each device utilized. Use labels that do not smear or fade.

Install firewall, rack-mounted video chassis, central video decoder units, and master distribution amplifier in the existing rack cabinets at the MRTMC as shown on the Network Block Diagram in the Project Plans as directed by the Engineer.

Install firewall, rack-mounted video chassis, central video encoder and decoder units in the existing rack cabinets at the GTOC as shown on the Network Block Diagram in the Project Plans as directed by the Engineer.

Integrate the existing Ethernet core switches with the firewall appliances and existing fiber-optic interconnect centers such that the current communications topology is preserved. Configure the Ethernet core switches and ports as required to maintain existing communications and establish new communications with firewall appliances, Ethernet hub switch, Ethernet bridges, Ethernet field switches, CCTV cameras and DMSs.

Integrate the central video decoder units at the MRTMC with the Ethernet core switch and the new master distribution amplifier. Configure the video matrix switch to add the new CCTV devices as new inputs to the switch.

Configure the existing CCTV servers and video control software (VideoPro) to recognize the new CCTV units and process the video and control data for sharing between the MRTMC and GTOC and to permit the interagency selection and display of a minimum of eight (8) CCTV camera images simultaneously from both control centers.

Configure the existing CCTV servers and video control software (VideoPro) to allow both agencies (MRTMC and GTOC) to set permissions for control (i.e., pan, tilt, zoom) of its cameras by the other agency.

Integrate the serial device servers with the Ethernet core switch and existing DMS server.

Configure the existing DMS server to recognize the new DMS units and process control data for sharing with the MRTMC.

23.3. Central Configuration

The existing DMS central software that controls the DMS units at the MRTMC is Daktronics Vanguard. Modify the existing DMS central software configuration at the MRTMC to display and map the new DMS units in the software GUI. Ensure that the software also allows for full communications and control of the DMS unit.

The existing CCTV central software that controls the existing video matrix switch at the MRTMC is Protronix's VideoPro. This software includes on-screen pan-tilt-zoom controls of each camera in the system. Modify the Protronix CCTV central software configuration at the MRTMC to display and map the new CCTV devices so that the CCTV video can be displayed on the existing monitors and display devices at the MRTMC.

Integrate the new CCTV units with NCDOT's regional video sharing and distribution system to allow for remote users to view and control the new CCTV units that terminate on the NCDOT analog video matrix switch through the Ethernet network connection between the remote user and the NCDOT VideoPro server at the MRTMC.

23.4. Measurement and Payment

Integration and configuration will be measured and paid as a lump sum price. This item shall include the installation, testing, and all materials, equipment, labor, tools, storage, shipping, and incidentals necessary to complete the integration and configuration of CCTV and DMS devices with the existing systems at the MRTMC.

All cabling, labeling, sockets, or other accessories required to configure, integrate, and interconnect computer equipment shall be considered incidental and shall not be paid for separately.

All central equipment installed for communications to new CCTV and DMS units will be measured and paid for under the applicable Section of these Project Special Provisions.

Payment will be made under:

Pay Item	**Pay Unit**
Integration and Configuration	Lump Sum

24. TESTING & ACCEPTANCE

24.1. General Test Procedure

Test the CCTV, DMS and video sharing systems in a series of design approval and functional tests. The results of each test must meet the specified requirements. These tests shall not damage the equipment. The Engineer will reject equipment that fails to fulfill the requirements of any test. Resubmit rejected equipment after correcting non conformities and re-testing; completely document all diagnoses and corrective actions. Modify all equipment furnished under this contract, without additional cost to the Department, to incorporate all design changes necessary to pass the required tests.

Provide 4 copies of all test procedures and requirements to the Engineer for review and approval at least 30 days prior to the testing start date.

Use only approved procedures for the tests. Include the following in the test procedures:

- A step by step outline of the test sequence, showing a test of every function of the equipment or system tested,
- A description of the expected nominal operation, output, and test results, and the pass / fail criteria,
- An estimate of the test duration and a proposed test schedule,
- A data form to record all data and quantitative results obtained during the test, and
- A description of any special equipment, setup, manpower, or conditions required by the test.

Provide all necessary test equipment and technical support. Use test equipment calibrated to National Institute of Standards and Technology (NIST) standards. Provide calibration documentation upon request.

Conform to these testing requirements and the requirements of these specifications. The Engineer will reject all equipment not tested according to these requirements. It is the Contractor's responsibility to ensure the system functions properly even after the Engineer accepts the CCTV and DMS test results.

Provide 4 copies of the quantitative test results and data forms containing all data taken, highlighting any non-conforming results and remedies taken, to the Engineer for approval. An authorized representative of the manufacturer must sign the test results and data forms.

24.2. Design Approval Tests

(A) DMS System

No design approval test is required.

(B) CCTV System

No design approval test is required.

(C) Fiber-Optic Communications

No design approval test is required.

(D) Wireless Ethernet Communication

No design approval test is required.

(E) Central Hardware

No design approval test is required.

24.3. COMPATIBILITY TESTS

(A) DMS System

No compatibility test is required.

(B) CCTV System

Compatibility Tests are applicable to CCTV cameras and video encoders/decoders that the Contractor wishes to furnish but are of a different manufacturer or model series than the existing units in the field or existing units installed at the MRTMC and GTOC. If required, the Compatibility Test shall be completed and accepted by the Engineer prior to approval of the material submittal.

The Compatibility Test shall be performed in a laboratory environment at a facility chosen by the Engineer based on the type of unit being tested. Provide notice to the Engineer with the material submitted that a Compatibility Test is requested. The notice shall include a detailed test plan that will show compatibility with existing equipment. The notice shall be given a minimum of 15 calendar days prior to the beginning of the Compatibility Test.

The Contractor shall provide, install, and integrate a full-functioning unit to be tested. The Department will provide access to existing equipment to facilitate these testing procedures. The Contractor is responsible for configuring proposed equipment at the MRTMC and GTOC and for proving compatibility. The Engineer will determine if the Compatibility Test was acceptable for each proposed device.

(C) Fiber-optic Communications

No compatibility test is required.

(D) Wireless Ethernet Communication

No compatibility test is required.

(E) Central Hardware

Compatibility Tests are applicable to Ethernet communications equipment that the Contractor wishes to furnish but are of a different manufacturer or model series than the existing units in the field or existing units installed at the MRTMC and GTOC. If required, the Compatibility Test shall be completed and accepted by the Engineer prior to approval of the material submittal.

The Compatibility Test shall be performed in a laboratory environment at a facility chosen by the Engineer based on the type of unit being tested. Provide notice to the Engineer with the material submitted that a Compatibility Test is requested. The notice shall include a detailed

test plan that will show compatibility with existing equipment. The notice shall be given a minimum of 15 calendar days prior to the beginning of the Compatibility Test.

The Contractor shall provide, install, and integrate a fully-functioning unit to be tested. The Department will provide access to existing equipment to facilitate these testing procedures. The Contractor is responsible for configuring proposed equipment at the MRTMC and GTOC and for proving compatibility. The Engineer will determine if the Compatibility Test was acceptable for each proposed device.

24.4. OPERATIONAL FIELD TEST (ON-SITE COMMISSIONING)

(A) DMS System

Conduct an Operational Field Test of the DMS system installed on the project to exercise the normal operational functions of the equipment. The Operational Field Test will consist of the following tests as a minimum:

(1) Physical Examination

No physical examination is required.

(2) Continuity Tests

No continuity test is required.

(3) Functional Communication Tests

The following tests are not intended to be a test of the DMS enclosure, controller or local controller software as each of these items are existing. The tests are intended to show that the DMS controller has been properly removed from a dial-up communication system and fully integrated onto the new Ethernet-based, fiber-optic network and is operating properly on the existing DMS Central Control Software system.

Perform the following functional communication tests using the DMS Central Control Software:

- Automatic poll the DMS various intervals and verify the data received from DMS,
- Download and edit messages,
- Execute status request on the DMS controller,
- Observe normal operations during uploading and downloading messages,
- Input and select messages from the sign controller,
- Test sequence activation at chosen intervals,
- Display and verify all stored messages,
- Verify resumption of standard operation upon interruption of electrical power,
- Demonstrate detected failures and response functions,
- Demonstrate proper operation of the Failure Log,

- Set controller clock,
- Execute system shutdown,
- Verify detection of a power failure in the DMS enclosure and the report feature of the failure to the Control Software,
- Display IP address and web settings,
  - Verify that the IP address is not publically accessible. Placing a display on a private network or VPN helps mitigate the lack of security,
  - Disable the telnet, Web Interface, Web LCD, and ICMP (PING) interfaces,
  - Change the default password, and
- Set the controller to enable a controller log file.

Approval of Operational Field Test results does not relieve the Contractor to conform to the requirements in these Project Special Provisions. If the DMS system does not pass these tests, document a correction as approved by the Engineer. Re-test the system until it passes all requirements.

(B) CCTV System

Perform the following local operational field tests at the camera assembly field site in accordance with the test plans. A laptop computer shall provide camera control and positioning. After installing the camera assembly, including the camera hardware, Ethernet field switch, power supply, and connecting cables:

- Furnish all equipment, appliances, and labor necessary to test the installed cable and to perform the following tests before any connections are made,
- Verify that physical construction has been completed,
- Inspect the quality and tightness of ground and surge protector connections,
- Check the power supply voltages and outputs,
- Connect devices to the power sources,
- Verify installation of specified cables and connections between the camera, PTZ, Ethernet field switch, and control cabinet,
- Perform the CCTV assembly manufacturer's initial power-on test in accordance with the manufacturer's recommendation,
- Set the VLAN, IP address, default gateway and subnet mask for the camera and Ethernet field switch,
- Verify the presence and quality of the video image with a portable NTSC-approved monitor,
- Exercise the pan, tilt, zoom, focus, iris opening, and manual iris control selections, and the operation, preset positioning, and power on/off functions,

- Demonstrate the pan and tilt speeds and extent of movement to meet all applicable standards, specifications, and requirements,
- Verify proper voltage of all power supplies,
- Interconnect the communication interface device with the communication network's assigned fiber-optic trunk cable and verify that there is a transmission LED illuminated, and
- Verify that the CCTV camera's built-in digital video Ethernet encoder is properly encoding its video signal.

Approval of Operational Field Test results does not relieve the Contractor to conform to the requirements in these Project Special Provisions. If the CCTV system does not pass these tests, document a correction or substitute a new unit as approved by the Engineer. Re-test the system until it passes all requirements.

(C) Video Sharing

Conduct operational tests on the video sharing link between the MRTMC and the GTOC. Perform the following operational tests:

- Selection from the MRTMC and display of a minimum of eight (8) CCTV camera images from the GTOC,
- Selection from the GTOC and display of a minimum of eight (8) CCTV camera images from the MRTMC,
- Simultaneous transmission of all sixteen (16) images (8 in each direction),
- Setting of permissions for interagency control (i.e., pan, tilt, zoom) of CCTV cameras,
- Demonstrate the ability to control the other agency's cameras where permission has been granted,
- Similarly, demonstrate the inability to control the other agency's cameras where permission has not been granted.

(D) Fiber-optic Communications

Conduct optical time domain reflectometer (OTDR) tests on the cable on the reel and after the cable is installed and terminated. Provide written notification a minimum of ten days before beginning fiber-optic cable testing.

After splicing is completed, perform bi-directional OTDR tests on each fiber, including unused fibers, to ensure the following:

- Fusion splice loss does not exceed 0.05 dB,
- Terminations and connections have a loss of 0.5 dB or less, and
- Reflection loss is 40 dB or greater for each connector.

Install a 1,000-foot pre-tested launch cable between the OTDR and fiber-optic cable to be tested.

If exceeded, remake splices until the loss falls below 0.05 dB. The Department will record each attempt for purposes of acceptance.

Furnish durable labeled plots and electronic copies on a CD or DVD of test results for each fiber including engineering calculations demonstrating that OTDR test results meet or exceed the attenuation requirements and that optical properties of the cable have not been impaired. Include digital photographs that clearly show the workmanship for each splice. Label all test results (plots and discs) with the manufacturer and model number of the OTDR testing equipment.

Provide a tabular summary or spreadsheet detailing and comparing the loss budget and actual loss calculations per link. Provide test results for fiber-optic cable that demonstrates the loss budget where the fiber originates and the point where the fiber meets an electronic device.

If any fiber exceeds the maximum allowable attenuation or if the fiber-optic properties of the cable have been impaired, take approved corrective action including replacement of complete segments of fiber-optic cable if required. Corrective action will be at no additional cost to the Department.

(E) Wireless Ethernet Communication

Perform the following tests on each wireless Ethernet radio link bidirectionally:

- Output power (milliwatts),
- Minimum, maximum and average RSSI (Received Signal Strength Indication),
- Minimum, maximum and average CCQ (Client Connection Quality),
- Minimum, maximum and average VSWR (Voltage Standing Wave Ratio),
- Short and long message polling tests (minimum 100 polls each),

Provide a hard copy print-out of the results of each test listed above to the Engineer. Document each test with the following additional information:

- Test software version number,
- Test date and time,
- MAC address,
- IP address,
- Model number,
- Description of tested link,
- Number of short and long message polls transmitted,

(F) Central Hardware

The Contractor shall perform a Network System Test (NST) on the local area network. During the NST, the Contractor must demonstrate successful local operation of field equipment operating from the Ethernet field switches as well as successful control of the equipment from the MRTMC and GTOC.

In the event of a failed NST, the Contractor, at his expense, must perform all necessary activities required to provide proper operation of the LAN, which can include full replacement of field equipment or cabling.

The Engineer or his representative will witness all NSTs. Documentation of all testing procedures and activities must be provided to the Engineer prior to full acceptance of the system ring.

24.5. 30-Day Observation Period

The 30-Day Observation Period shall not be considered part of work to be completed by the project completion date.

Upon successful completion of all project work, the component tests, the System Test, and the correction of all deficiencies, including minor construction items, the 30-day Observation Period may commence. This observation consists of a 30-day period of normal, day-to-day operations of the new field equipment in operation with the new central equipment without any failures. The purpose of this period is to ensure that all components of the system function in accordance with the Project Plans and these Project Special Provisions.

Respond to system or component failures (or reported failures) that occur during the 30-day Observation Period within twenty-four (24) hours. Correct said failures within forty-eight (48) hours.

Any failure that affects a major system component as defined below for more than forty-eight (48) hours will suspend the timing of the 30-day Observation Period beginning at the time when the failure occurred. After the cause of such failures has been corrected, timing of the 30-day Observation Period will resume.

System or component failures that necessitate a redesign of any component or failure in any of the major system components exceeding a total of three (3) occurrences will terminate the 30-day Observation Period and cause the 30-day Observation Period to be restarted from day zero when the redesigned components have been installed and/or the failures corrected.

The major system components are:

- CCTV Camera, PTZ, and built-in digital video Ethernet encoder,
- Fiber-optic Communications Cables and Splices,
- Wireless Ethernet transceivers including repeaters, and
- Local Area Network including Ethernet switches and bridges.

24.6. Final Acceptance

Final system acceptance is defined as the time when all work and materials described in the Project Plans and these Project Special Provisions have been furnished and completely installed by the Contractor; all parts of the work have been approved and accepted by the Engineer; and the 30-day observation period has been successfully completed.

The project will be ready for final acceptance upon the satisfactory completion of all tests detailed in this Section of the Project Special provisions; the rectification of all punch-list discrepancies; and the submittal of all project documentation.

24.7. MEASUREMENT AND PAYMENT

There will be no direct payment for the work covered in this section.

Payment for this work will be covered in the applicable sections of these Project Special Provisions at the contract unit price for other items furnished on this Project.

TRAFFIC CONTROL AND WORK ZONE SAFETY

The Contractor shall maintain traffic during construction and provide, install, and maintain all traffic control devices in accordance with Divisions 10 and 11 of the January 2012 North Carolina Department of Transportation *Standard Specifications for Roads and Structures*, the January 2012 *Roadway Standard Drawings*, the Project Special Provisions, and the current edition of the *Manual of Uniform Traffic Control Devices (MUTCD).*

The Contractor shall utilize complete and proper traffic controls and traffic control devices during all operations. All traffic control and traffic control devices required for any operation shall be functional and in place prior to the commencement of that operation. Signs for temporary operations shall be removed during periods of inactivity. The contractor is required to leave the project in a manner that will be safe to the traveling public and which will not impede motorists. Perform work only when weather and visibility conditions allow safe operations as directed by the Engineer.

Provide appropriate lighting in accordance with Section 105-14, Standard Specifications for Roads and Structures.

Traffic movements through lane closures on roads with two way traffic shall be controlled by flaggers stationed at each end of the work zone. In situations where sight distance is limited, the Contractor shall provide additional means of controlling traffic, including, but not limited to, two-way radios, pilot vehicles, or additional flaggers. Flaggers shall be competent personnel, adequately trained in flagging procedures, and furnished with proper safety devices and equipment, including, but not limited to, safety vests and stop/slow paddles. Operate equipment and conduct operations in the same direction as the flow of traffic. Do not cross medians with equipment, except at properly designated interchanges.

All personnel when working on highway Right of Way shall wear an approved safety vest, or shirt or jacket which meets the color requirements of the Manual of Uniform Traffic Control Devices (MUTCD).

The Contractor shall comply with all applicable Federal, State, and local laws, ordinances, and regulations governing safety, health, and sanitation, and shall provide all safeguards, safety devices, and protective equipment, and shall take any other needed actions on his own responsibility that are reasonably necessary to protect the life and health of employees on the job and the safety of the public, and to protect property in connection with the performance of the work covered by the contract.

Failure to comply with any of the requirements for safety and traffic control of this contract shall result in suspension of work as provided in subarticle 108-7(2) of the Standard Specifications.

LUMP SUM PAYMENT FOR TRAFFIC CONTROL

(02/06/2013) LS-TC

The Contractor shall maintain traffic on **I-85 and Ramps, Groves St, NC 7/Main St, SR 2093 (Belmont-Mt Holly Road), NC 273 (Beatty Dr), SR 1601 (Moores Chapel Rd), SR 1625 (Sam Wilson Rd) and I-485 Ramps** during construction and shall provide, install and maintain all traffic control devices as shown in the *Roadway Standard Drawings* or as directed by the Engineer.

The lump sum price bid for traffic control shall include but not be limited to providing **Signs (portable, stationary, or barricade), which includes detour signing, Truck Mounted Attenuators (TMA), Changeable Message Signs (CMS), Flashing Arrow Boards (FAB), Pilot Vehicle, Flaggers, Cones, Skinny Drums and Drums** and all labor, tools, equipment and incidentals necessary to furnish, install, maintain and remove traffic control devices when no longer required.

Basis of Payment

Partial payments will be made on each payment estimate based on the following: Fifty percent of the contract lump sum price bid will be paid on the first monthly estimate and the remaining 50% of the contract lump sum price bid will be paid on each subsequent estimate based on the percent of the project completed.

Payment will be made under:

Pay Item	**Pay Unit**
Traffic Control	Lump Sum

STANDARD SPECIAL PROVISIONS

AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS

(5-20-08) Z-2

General Statute 143C-6-11. (h) Highway Appropriation is hereby incorporated verbatim in this contract as follows:

(h) Amounts Encumbered. – Transportation project appropriations may be encumbered in the amount of allotments made to the Department of Transportation by the Director for the estimated payments for transportation project contract work to be performed in the appropriation fiscal year. The allotments shall be multiyear allotments and shall be based on estimated revenues and shall be subject to the maximum contract authority contained in *General Statute 143C-6-11(c).* Payment for transportation project work performed pursuant to contract in any fiscal year other than the current fiscal year is subject to appropriations by the General Assembly. Transportation project contracts shall contain a schedule of estimated completion progress, and any acceleration of this progress shall be subject to the approval of the Department of Transportation provided funds are available. The State reserves the right to terminate or suspend any transportation project contract, and any transportation project contract shall be so terminated or suspended if funds will not be available for payment of the work to be performed during that fiscal year pursuant to the contract. In the event of termination of any contract, the contractor shall be given a written notice of termination at least 60 days before completion of scheduled work for which funds are available. In the event of termination, the contractor shall be paid for the work already performed in accordance with the contract specifications.

Payment will be made on any contract terminated pursuant to the special provision in accordance with Article 108-13(E), of the *North Carolina Department of Transportation Standard Specifications for Roads and Structures*, dated January 1, 2012.

NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY

(5-17-11) Z-3

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

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

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

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

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

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

Seed of Pensacola Bahiagrass shall not contain more than 7% inert matter, Kentucky Bluegrass, Centipede and Fine or Hard Fescue shall not contain more than 5% inert matter whereas a maximum of 2% inert matter will be allowed on all other kinds of seed. In addition, all seed shall not contain more than 2% other crop seed nor more than 1% total weed seed. The germination rate as tested by the North Carolina Department of Agriculture shall not fall below 70%, which includes both dormant and hard seed. Seed shall be labeled with not more than 7%, 5% or 2% inert matter (according to above specifications), 2% other crop seed and 1% total weed seed.

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

FURTHER SPECIFICATIONS FOR EACH SEED GROUP ARE GIVEN BELOW:

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

Sericea Lespedeza
Oats (seeds)

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

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

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

Common or Sweet Sundangrass

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

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

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

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

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

Barnyard Grass
Big Bluestem

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

ERRATA

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

Revise the 2012 Standard Specifications as follows:

Division 2

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

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

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

Division 3

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

Division 4

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

Division 6

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

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

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

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

Division 7

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

Division 8

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

Division 10

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

Division 12

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

Division 15

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

Division 17

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

Revise the 2012 Roadway Standard Drawings as follows:

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

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

(3-18-03) (Rev. 10-15-13) Z-04a

Within Quarantined Area

This project may be within a county regulated for plant and/or pests. If the project or any part of the Contractor's operations is located within a quarantined area, thoroughly clean all equipment prior to moving out of the quarantined area. Comply with federal/state regulations by obtaining a certificate or limited permit for any regulated article moving from the quarantined area.

Originating in a Quarantined County

Obtain a certificate or limited permit issued by the N.C. Department of Agriculture/United States Department of Agriculture. Have the certificate or limited permit accompany the article when it arrives at the project site.

Contact

Contact the N.C. Department of Agriculture/United States Department of Agriculture at 1-800-206-9333, 919-733-6932, or *http://www.ncagr.gov/plantind/* to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

Regulated Articles Include

1. Soil, sand, gravel, compost, peat, humus, muck, and decomposed manure, separately or with other articles. This includes movement of articles listed above that may be associated with cut/waste, ditch pulling, and shoulder cutting.
2. Plants with roots including grass sod.
3. Plant crowns and roots.
4. Bulbs, corms, rhizomes, and tubers of ornamental plants.
5. Hay, straw, fodder, and plant litter of any kind.
6. Clearing and grubbing debris.
7. Used agricultural cultivating and harvesting equipment.
8. Used earth-moving equipment.
9. Any other products, articles, or means of conveyance, of any character, if determined by an inspector to present a hazard of spreading imported fire ant, gypsy moth, witchweed or other noxious weeds.

AWARD OF CONTRACT

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

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

TITLE VI AND NONDISCRIMINATION

I. Title VI Assurance

During the performance of this contract, the contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

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

(2) Nondiscrimination: The Contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

(3) Solicitations for Subcontractors, Including Procurements of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.

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

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

(a) Withholding of payments to the contractor under the contract until the contractor complies, and/or
(b) Cancellation, termination or suspension of the contract, in whole or in part.

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

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

II. Title VI Nondiscrimination Program

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

Nondiscrimination Assurance

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

Obligation

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

FILING OF COMPLAINTS

1. **Applicability** – These complaint procedures apply to the beneficiaries of the NCDOT's programs, activities, and services, including, but not limited to, members of the public, contractors, subcontractors, consultants, and other sub-recipients of federal and state funds.

2. **Eligibility** – Any person or class of persons who believes he/she has been subjected to discrimination or retaliation prohibited by any of the Civil Rights authorities, based upon race, color, sex, age, national origin, or disability, may file a written complaint with NCDOT's Civil Rights office. The law prohibits intimidation or retaliation of any sort. The complaint may be filed by the affected individual or a representative, and must be in writing.

3. **Time Limits and Filing Options** – A complaint must be filed no later than 180 calendar days after the following:

- The date of the alleged act of discrimination; or
- The date when the person(s) became aware of the alleged discrimination; or
- Where there has been a continuing course of conduct, the date on which that conduct was discontinued or the latest instance of the conduct.

Title VI and other discrimination complaints may be submitted to the following entities:

- **North Carolina Department of Transportation**, Office of Equal Opportunity & Workforce Services (EOWS), External Civil Rights Section, 1511 Mail Service Center, Raleigh, NC 27699-1511; 919-508-1808 or toll free 800-522-0453
- **US Department of Transportation**, Departmental Office of Civil Rights, External Civil Rights Programs Division, 1200 New Jersey Avenue, SE, Washington, DC 20590; 202-366-4070

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

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

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

  Federal Aviation Administration, Office of Civil Rights, 800 Independence Avenue, SW, Washington, DC 20591, 202-267-3258
- **US Department of Justice**, Special Litigation Section, Civil Rights Division, 950 Pennsylvania Avenue, NW, Washington, DC 20530, 202-514-6255 or toll free 877-218-5228

4. **Format for Complaints –** Complaints must be in **writing** and **signed** by the complainant(s) or a representative and include the complainant's name, address, and telephone number. Complaints received by fax or e-mail will be acknowledged and processed. Allegations received by telephone will be reduced to writing and provided to the complainant for confirmation or revision before processing. Complaints will be accepted in other languages including Braille.
5. **Discrimination Complaint Form –** Contact NCDOT EOWS at the phone number above to receive a full copy of the Discrimination Complaint Form and procedures.
6. **Complaint Basis –** Allegations must be based on issues involving race, color, national origin, sex, age, or disability. The term "basis" refers to the complainant's membership in a protected group category. Contact this office to receive a Discrimination Complaint Form.

Protected Categories	Definition	Examples	Applicable Statutes and Regulations	
			FHWA	FTA

Race	An individual belonging to one of the accepted racial groups; or the perception, based usually on physical characteristics that a person is a member of a racial group	Black/African American, Hispanic/Latino, Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, White	Title VI of the Civil Rights Act of 1964; 49 CFR Part 21; 23 CFR 200	Title VI of the Civil Rights Act of 1964; 49 CFR Part 21; Circular 4702.1B
Color	Color of skin, including shade of skin within a racial group	Black, White, brown, yellow, etc.		
National Origin	Place of birth. Citizenship is not a factor. Discrimination based on language or a person's accent is also covered.	Mexican, Cuban, Japanese, Vietnamese, Chinese		
Sex	Gender	Women and Men	1973 Federal-Aid Highway Act	Title IX of the Education Amendments of 1972
Age	Persons of any age	21 year old person	Age Discrimination Act of 1975	
Disability	Physical or mental impairment, permanent or temporary, or perceived.	Blind, alcoholic, para-amputee, epileptic, diabetic, arthritic	Section 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act of 1990	

III. Pertinent Nondiscrimination Authorities

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest agrees to comply with the following non-discrimination statutes and authorities, including, but not limited to:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq*., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 *et seq*.), (prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq*.), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq*.), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of

the terms “programs or activities” to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 – 12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- The Federal Aviation Administration’s Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).
- Title VII of the Civil Rights Act of 1964 (42 U.S.C. § 2000e *et seq.*, Pub. L. 88-352), (prohibits employment discrimination on the basis of race, color, religion, sex, or national origin);
- 49 CFR Part 26, regulation to ensure nondiscrimination in the award and administration of DOT-assisted contracts in the Department's highway, transit, and airport financial assistance programs, as regards the use of Disadvantaged Business Enterprises (DBEs);
- Form FHWA-1273, “Required Contract Provisions,” a collection of contract provisions and proposal notices that are generally applicable to *all Federal-aid construction projects* and must be made a part of, and physically incorporated into, *all federally-assisted contracts*, as well as appropriate subcontracts and purchase orders, particularly Sections II (Nondiscrimination) and III (Nonsegregated Facilities).

MINORITY AND FEMALE EMPLOYMENT REQUIREMENTS

Z-7

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

1. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor’s aggregate workforce in each trade on all construction work in the

covered area, see as shown on the attached sheet entitled "Employment Goals for Minority and Female participation".

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

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

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

EMPLOYMENT GOALS FOR MINORITY AND FEMALE PARTICIPATION

Economic Areas

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

Area 024 31.7%
Beaufort County
Carteret County
Craven County
Dare County
Edgecombe County
Green County
Halifax County

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

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

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

Area 0480 8.5%
Buncombe County

Hyde County
Jones County
Lenoir County
Martin County
Nash County
Northampton County
Pamlico County
Pitt County
Tyrrell County
Washington County
Wayne County
Wilson County

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

Warren County

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

Madison County

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

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SMSA Areas

Area 5720 26.6%
Currituck County

Area 9200 20.7%
Brunswick County
New Hanover County

Area 2560 24.2%
Cumberland County

Area 6640 22.8%
Durham County
Orange County
Wake County

Area 1300 16.2%
Alamance County

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

Area 1520 18.3%
Gaston County
Mecklenburg County
Union County

Goals for Female

Participation in Each Trade

(Statewide) 6.9%

REQUIRED CONTRACT PROVISIONS FEDERAL - AID CONSTRUCTION CONTRACTS

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

ATTACHMENTS

I. GENERAL

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

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

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

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

II. NONDISCRIMINATION

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

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

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

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

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

1. **Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.
b. The contractor will accept as its operating policy the following statement:
"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

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

7. **Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:
   a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.
   b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.
   c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.
   d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.
8. **Reasonable Accommodation for Applicants / Employees with Disabilities:** The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.
9. **Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.
   a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.
   b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.
10. **Assurance Required by 49 CFR 26.13(b):**
   a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.
   b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.
11. **Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.
   a. The records kept by the contractor shall document the following:
      (1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;
      (2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and
      (3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;
   b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

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

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

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

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

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

1. **Minimum wages**
   a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the

Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

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

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

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

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

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

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

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

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

3. **Payrolls and basic records**

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

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the

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

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

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

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

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

4. **Apprentices and trainees**

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

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

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

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

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

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

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

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

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

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

5. **Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.
6. **Subcontracts.** The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.
7. **Contract termination:** debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.
8. **Compliance with Davis-Bacon and Related Act requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.
9. **Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.
10. **Certification of eligibility.**
    a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
    b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
    c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

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

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

VI. SUBLETTING OR ASSIGNING THE CONTRACT

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

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).
    a. The term “perform work with its own organization” refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:
    (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

(2) the prime contractor remains responsible for the quality of the work of the leased employees;
(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.
3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.
4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.
5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

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

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.
2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).
3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

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

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

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

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

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

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

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

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

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

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

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

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

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

1. **Instructions for Certification – First Tier Participants:**
   a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.
   b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.
   c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.
   d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
   e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).
   f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.
   g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.
   h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.
   i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
   j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

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2. **Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:**
   a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:
      (1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;
      (2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
      (3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and
      (4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
   b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.
2. **Instructions for Certification - Lower Tier Participants:**
   (Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost $25,000 or more - 2 CFR Parts 180 and 1200)
   a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.
   b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
   c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

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Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.
2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

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XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:
   a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
   b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.
3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

ON-THE-JOB TRAINING

(10-16-07) (Rev. 4-21-15) Z-10

Description

The North Carolina Department of Transportation will administer a custom version of the Federal On-the-Job Training (OJT) Program, commonly referred to as the Alternate OJT Program. All contractors (existing and newcomers) will be automatically placed in the Alternate Program. Standard OJT requirements typically associated with individual projects will no longer be applied at the project level. Instead, these requirements will be applicable on an annual basis for each contractor administered by the OJT Program Manager.

On the Job Training shall meet the requirements of 23 CFR 230.107 (b), 23 USC – Section 140, this provision and the On-the-Job Training Program Manual.

The Alternate OJT Program will allow a contractor to train employees on Federal, State and privately funded projects located in North Carolina. However, priority shall be given to training employees on NCDOT Federal-Aid funded projects.

Minorities and Women

Developing, training and upgrading of minorities and women toward journeyman level status is a primary objective of this special training provision. Accordingly, the Contractor shall make every effort to enroll minority and women as trainees to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

Assigning Training Goals

The Department, through the OJT Program Manager, will assign training goals for a calendar year based on the contractors' past three years' activity and the contractors' anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from 1 to 15 per contractor per calendar year. The Contractor shall sign an agreement to fulfill their annual goal for the year.

Training Classifications

The Contractor shall provide on-the-job training aimed at developing full journeyman level workers in the construction craft/operator positions. Preference shall be given to providing training in the following skilled work classifications:

Equipment Operators	Office Engineers
Truck Drivers	Estimators
Carpenters	Iron / Reinforcing Steel Workers
Concrete Finishers	Mechanics
Pipe Layers	Welders

The Department has established common training classifications and their respective training requirements that may be used by the contractors. However, the classifications established are not all-inclusive. Where the training is oriented toward construction applications, training will be allowed in lower-level management positions such as office engineers and estimators. Contractors shall submit new classifications for specific job functions that their employees are performing. The Department will review and recommend for acceptance to FHWA the new classifications proposed by contractors, if applicable. New classifications shall meet the following requirements:

Proposed training classifications are reasonable and realistic based on the job skill classification needs, and

The number of training hours specified in the training classification is consistent with common practices and provides enough time for the trainee to obtain journeyman level status.

The Contractor may allow trainees to be trained by a subcontractor provided that the Contractor retains primary responsibility for meeting the training and this provision is made applicable to the subcontract. However, only the Contractor will receive credit towards the annual goal for the trainee.

Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman level status or in which they have been employed as a journeyman.

Records and Reports

The Contractor shall maintain enrollment, monthly and completion reports documenting company compliance under these contract documents. These documents and any other information as requested shall be submitted to the OJT Program Manager.

Upon completion and graduation of the program, the Contractor shall provide each trainee with a certification Certificate showing the type and length of training satisfactorily completed.

Trainee Interviews

All trainees enrolled in the program will receive an initial and Trainee/Post graduate interview conducted by the OJT program staff.

Trainee Wages

Contractors shall compensate trainees on a graduating pay scale based upon a percentage of the prevailing minimum journeyman wages (Davis-Bacon Act). Minimum pay shall be as follows:

60 percent	of the journeyman wage for the first half of the training period
75 percent	of the journeyman wage for the third quarter of the training period
90 percent	of the journeyman wage for the last quarter of the training period

In no instance shall a trainee be paid less than the local minimum wage. The Contractor shall adhere to the minimum hourly wage rate that will satisfy both the NC Department of Labor (NCDOL) and the Department.

Achieving or Failing to Meet Training Goals

The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and who receives training for at least 50 percent of the specific program requirement. Trainees will be allowed to be transferred between projects if required by the Contractor's scheduled workload to meet training goals.

If a contractor fails to attain their training assignments for the calendar year, they may be taken off the NCDOT's Bidders List.

Measurement and Payment

No compensation will be made for providing required training in accordance with these contract documents.

NAME CHANGE FOR NCDENR

(1-19-16) Z-11

Wherever in the 2012 Standard Specifications, Project Special Provisions, Standard Special Provisions, Permits or Plans that reference is made to “NCDENR” or “North Carolina Department of Environment and Natural Resources”, replace with “NCDEQ” or North Carolina Department of Environmental Quality” respectively, as the case may be.

MINIMUM WAGES
GENERAL DECISION NC160101 01/08/2016 NC101

Z-101

Date: January 8, 2016

General Decision Number: NC160101 01/08/2016 NC101

Superseded General Decision Numbers: NC20150101

State: North Carolina

Construction Type: HIGHWAY

COUNTIES:

Alamance	Forsyth	Randolph
Anson	Gaston	Rockingham
Cabarrus	Guilford	Stokes
Chatham	Mecklenburg	Union
Davie	Orange	Yadkin
Durham	Person	

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Executive Order (EO) 13658 establishes an hourly minimum wage of $10.15 for calendar year 2016 that applies to all contracts subject to the Davis-Bacon Act for which the solicitation is issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.15 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract for calendar year 2016. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/08/2016

SUNC2014-003 11/14/2014

	Rates	Fringes
BLASTER	18.64	
CARPENTER	13.68	.05
CEMENT MASON/CONCRETE FINISHER	13.93	
ELECTRICIAN		
Electrician	18.79	2.72
Telecommunications Technician	15.19	1.25
IRONWORKER	13.30	
LABORER		
Asphalt Raker and Spreader	12.78	
Asphalt Screed/Jackman	14.50	
Carpenter Tender	12.51	.27

	Rates	Fringes
Cement Mason/Concrete Finisher Tender	11.04	
Common or General	10.40	.01
Guardrail/Fence Installer	13.22	
Pipelayer	12.43	
Traffic Signal/Lighting Installer	15.65	.24
PAINTER		
Bridge	23.77	
POWER EQUIPMENT OPERATORS		
Asphalt Broom Tractor	10.00	
Bulldozer Fine	16.13	
Bulldozer Rough	14.36	
Concrete Grinder/Groover	17.92	
Crane Boom Trucks	18.19	
Crane Other	19.83	
Crane Rough/All-Terrain	19.10	
Drill Operator Rock	14.28	
Drill Operator Structure	20.89	
Excavator Fine	16.95	
Excavator Rough	13.63	
Grader/Blade Fine	19.84	
Grader/Blade Rough	15.47	
Loader 2 Cubic Yards or Less	13.31	
Loader Greater Than 2 Cubic Yards	16.19	
Material Transfer Vehicle (Shuttle Buggy)	15.44	
Mechanic	17.51	
Milling Machine	15.22	
Off-Road Hauler/Water Tanker	11.83	
Oiler/Greaser	14.16	
Pavement Marking Equipment	12.05	
Paver Asphalt	15.97	
Paver Concrete	18.20	
Roller Asphalt Breakdown	12.79	
Roller Asphalt Finish	13.76	
Roller Other	12.08	
Scraper Finish	12.65	
Scraper Rough	11.50	
Slip Form Machine	19.60	
Tack Truck/Distributor Operator	14.82	
TRUCK DRIVER		
GVWR of 26,000 Lbs or Less	11.45	
GVWR of 26,000 Lbs or Greater	13.57	.03

Welders – Receive rate prescribed for craft performing operation to which welding is incidental.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage

determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

LISTING OF DBE SUBCONTRACTORS

Sheet _____ of _____

Firm Name and Address	Item No.	Item Description	* Agreed upon Unit Price	** Dollar Volume of Item
Name Address				
Name Address				
Name Address				
Name Address				
Name Address				
Name Address				
Name Address				

***** The Dollar Volume shown in this column shall be the Actual Price Agreed Upon by the Prime Contractor and the DBE subcontractor, and these prices will be used to determine the percentage of the DBE participation in the contract.

** Dollar Volume of DBE Subcontractor Percentage of Total Contract Bid Price:

If firm is a Material Supplier Only, show Dollar Volume as 60% of Agreed Upon Amount from Letter of Intent.

If firm is a Manufacturer, show Dollar Volume as 100% of Agreed Upon Amount from Letter of Intent.

LISTING OF DBE SUBCONTRACTORS

Sheet _____ of _____

Firm Name and Address	Item No.	Item Description	* Agreed upon Unit Price	** Dollar Volume of Item
Name Address				
Name Address				
Name Address				
Name Address				
Name Address				
Name Address				

***** The Dollar Volume shown in this column shall be the Actual Price Agreed Upon by the Prime Contractor and the DBE subcontractor, and these prices will be used to determine the percentage of the DBE participation in the contract.

**** Dollar Volume of DBE Subcontractor**
$_____

Percentage of Total Contract Bid Price
_____%

** Dollar Volume of DBE Subcontractor Percentage of Total Contract Bid Price:
If firm is a Material Supplier Only, show Dollar Volume as 60% of Agreed Upon Amount from Letter of Intent.
If firm is a Manufacturer, show Dollar Volume as 100% of Agreed Upon Amount from Letter of Intent.

LETTER OF INTENT TO PERFORM AS A SUBCONTRACTOR

CONTRACT:	NAME OF BIDDER:

The undersigned intends to perform work in connection with the above contract upon execution of the bid and subsequent award of contract by the Local Public Agency as:

Name of MBE/WBE/DBE Subcontractor_____

Address_____

City_____State_____Zip_____

Please check all that apply:
Minority Business Enterprise (MBE)____
Women Business Enterprise (WBE)_____
Disadvantaged Business Enterprise (DBE)____

The MBE /WBE /DBE status of the above named subcontractor is certified by the North Carolina Department of Transportation. The above named subcontractor is prepared to perform the described work listed on the attached MBE/WBE/DBE Commitment Items sheet, in connection with the above contract upon execution of the bid and subsequent award of contract by the Local Public Agency. The above named subcontractor is prepared to perform the described work at the estimated Commitment Total for Subcontractor Price identified on the MBE/WBE/DBE Commitment Items sheet and amount indicated below.

Commitment Total based on estimated Unit Prices and Quantities on the "attached" MBE/WBE/DBE Commitment Items sheet:

Amount **$ _____**

The above named bidder and subcontractor mutually accepts the Commitment Total estimated for the Unit Prices and Quantities. This commitment total is based on estimated quantities only and most likely will vary up or down as the project is completed. Final compensation will be based on actual quantities of work performed and accepted during the pursuance of work. The above listed amount represents the entire dollar amount quoted based on these estimated quantities. No conversations, verbal agreements, and/or other forms of non-written representations shall serve to add, delete, or modify the terms as stated.

This document shall not serve in any manner as an actual subcontract between the two parties. A separate subcontractor agreement will describe in detail the contractual obligations of the bidder and the MBE/WBE/DBE subcontractor.

Affirmation

The above named MBE/ WBE/ DBE subcontractor affirms that it will perform the portion(s) of the contract for the estimated dollar value as stated above.

_____	_____
Name of MBE/ WBE/ DBE Subcontractor	**Name of Bidder**
_____	_____
Signature / Title	**Signature / Title**
_____	_____
Date	**Date**

C-5600G **181** Mecklenburg & Gaston

SUBSTITUTE FORM W-9
VENDOR REGISTRATION FORM
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Pursuant to Internal Revenue Service (IRS) Regulations, vendors must furnish their Taxpayer Identification Number (TIN) to the State. If this number is not provided, you may be subject to a 20% withholding on each payment. To avoid this 20% withholding and to insure that accurate tax information is reported to the Internal Revenue Service and the State, please use this form to provide the requested information exactly as it appears on file with the IRS.

INDIVIDUAL AND SOLE PROPRIETOR: ENTER NAME AS SHOWN ON SOCIAL SECURITY CARD
CORPORATION OR PARTNERSHIP : ENTER YOUR LEGAL BUSINESS NAME

NAME: _____

MAILING ADDRESS: STREET/PO BOX: _____

CITY, STATE, ZIP: _____

DBA / TRADE NAME (IF APPLICABLE): _____

☐ INDIVIDUAL (use Social Security No.) ☐ SOLE PROPRIETER (use SS No. or Fed ID No.)
☐ CORPORATION (use Federal ID No.) ☐ PARTNERSHIP (use Federal ID No.)
☐ ESTATE/TRUST (use Federal ID no.) ☐ STATE OR LOCAL GOVT. (use Federal ID No.)
☐ OTHER / SPECIFY _____

SOCIAL SECURITY NO. ___ ___ ___ - ___ ___ - ___ ___ ___ ___ (Social Security #)
OR
FED.EMPLOYER IDENTIFICATION NO. ___ ___ - ___ ___ ___ ___ ___ ___ ___ (Employer Identification #)

COMPLETE THIS SECTION IF PAYMENTS ARE MADE TO AN ADDRESS OTHER THAN THE ONE LISTED ABOVE:

REMIT TO ADDRESS: STREET / PO BOX: _____

CITY, STATE, ZIP: _____

Participation in this section is voluntary. You are not required to complete this section to become a registered vendor. The information below will in no way affect the vendor registration process and its sole purpose is to collect statistical data on those vendors doing business with NCDOT. If you choose to participate, circle the answer that best fits your firm's group definition.

What is your firm's ethnicity? **(☐Prefer Not To Answer, ☐African American, ☐Native American, ☐Caucasian American, ☐Asian American, ☐Hispanic American, ☐Asian-Indian American, ☐ Other:** _____)

What is your firm's gender? (☐Prefer Not to Answer,☐Male, ☐Female**)** **Disabled-Owned Business?** (☐Prefer Not to Answer, ☐Yes,☐ No)

IRS CERTIFICATION

Under penalties of perjury, I certify that:

- ❑ The number shown on this form is my correct taxpayer identification and
- ❑ I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the IRS that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
- ❑ I am a U.S. person (including a U.S. resident alien).

NAME (Print or Type) _____ TITLE (Print or Type) _____

SIGNATURE _____ DATE _____ PHONE NUMBER _____

To avoid payment delays, completed forms should be returned promptly to the Contract Administrator.

EXECUTION OF BID

NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

CORPORATION

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

_____

Full name of Corporation

_____

Address as Prequalified

Attest _____ By _____

Secretary/Assistant Secretary
Select appropriate title

President/Vice President/Assistant Vice President
Select appropriate title

_____ _____

Print or type Signer's name

Print or type Signer's name

CORPORATE SEAL

AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the

_____ day of _____ 20__.

NOTARY SEAL

_____

Signature of Notary Public

of _____County

State of _____

My Commission Expires:_____

EXECUTION OF BID

NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

PARTNERSHIP

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

_____
Full Name of Partnership

_____
Address as Prequalified

_____ By _____
Signature of Witness Signature of Partner

_____ _____
Print or type Signer's name Print or type Signer's name

AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the **NOTARY SEAL**

_____ day of _____ 20__.

_____
Signature of Notary Public

of _____County

State of _____

My Commission Expires:_____

EXECUTION OF BID

NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

LIMITED LIABILITY COMPANY

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

_____
Full Name of Firm

_____
Address as Prequalified

_____ _____
Signature of Witness | Signature of Member/Manager/Authorized Agent
Select appropriate title

_____ _____
Print or type Signer's name | Print or type Signer's Name

AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the **NOTARY SEAL**

_____ day of _____ 20__.

_____
Signature of Notary Public

of _____County

State of _____

My Commission Expires:_____

EXECUTION OF BID
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

JOINT VENTURE (2) or (3)

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

Instructions: **2 Joint Venturers** Fill in lines (1), (2) and (3) and execute. **3 Joint Venturers** Fill in lines (1), (2), (3) and (4) and execute. On Line (1), fill in the name of the Joint Venture Company. On Line (2), fill in the name of one of the joint venturers and execute below in the appropriate manner. On Line (3), print or type the name of the other joint venturer and execute below in the appropriate manner. On Line (4), fill in the name of the third joint venturer, if applicable and execute below in the appropriate manner.

(1) _____
Name of Joint Venture

(2) _____
Name of Contractor

_____
Address as Prequalified

_____		_____
Signature of Witness or Attest	By	Signature of Contractor
_____		_____
Print or type Signer's name		Print or type Signer's name

If Corporation, affix Corporate Seal and

(3) _____
Name of Contractor

_____
Address as Prequalified

_____		_____
Signature of Witness or Attest	By	Signature of Contractor
_____		_____
Print or type Signer's name		Print or type Signer's name

If Corporation, affix Corporate Seal and

(4) _____
Name of Contractor *(for 3 Joint Venture only)*

_____
Address as Prequalified

_____		_____
Signature of Witness or Attest	By	Signature of Contractor
_____		_____
Print or type Signer's name		Print or type Signer's name

If Corporation, affix Corporate Seal

NOTARY SEAL	*NOTARY SEAL*	*NOTARY SEAL*
Affidavit must be notarized for Line (2)	*Affidavit must be notarized for Line (3)*	*Affidavit must be notarized for Line (4)*
Subscribed and sworn to before me this	Subscribed and sworn to before me this	Subscribed and sworn to before me this
_____day of_____ 20___	_____day of _____ 20___	____day of _____ 20_____
_____	_____	_____
Signature of Notary Public	Signature of Notary Public	Signature of Notary Public
of _____County	of _____County	of _____County
State of _____	State of _____	State of _____

My Commission Expires:_____ My Commission Expires:_____ My Commission Expires:_____

EXECUTION OF BID

NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

INDIVIDUAL DOING BUSINESS UNDER A FIRM NAME

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

Name of Contractor _____
Individual name

Trading and doing business as _____
Full name of Firm

_____
Address as Prequalified

_____ _____
Signature of Witness Signature of Contractor, Individually

_____ _____
Print or type Signer's name Print or type Signer's name

AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the

NOTARY SEAL

_____ day of _____ 20__.

_____
Signature of Notary Public

of _____County

State of _____

My Commission Expires:_____

EXECUTION OF BID

NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

INDIVIDUAL DOING BUSINESS IN HIS OWN NAME

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

Name of Contractor _____

Print or type Individual name

_____

Address as Prequalified

_____

Signature of Contractor, Individually

_____

Print or type Signer's Name

_____

Signature of Witness

_____

Print or type Signer's name

AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the

NOTARY SEAL

_____ day of _____ 20__.

_____

Signature of Notary Public

of _____County

State of _____

My Commission Expires:_____

DEBARMENT CERTIFICATION

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Municipality if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation filed with the Municipality, or has become erroneous because of changed circumstances.

2. The terms *covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal,* and *voluntarily excluded*, as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Municipality project representative.

3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in Municipal contracts, unless authorized by the Municipality.

4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal-Aid Provision titled *Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR* 1273) provided by the Municipality, without subsequent modification, in all lower tier covered transactions.

5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.

6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

7. Except as authorized in paragraph 6 herein, the Municipality may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

DEBARMENT CERTIFICATION

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and

d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion affidavit and debarment certification will result in the prequalified bidder's bid being considered non-responsive.

Check here if an explanation is attached to this certification.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH, NC

BID BOND

Principal: _____
Name of Principal Contractor

Surety: _____
Name of Surety

Contract Number: _____ County: _____

Date of Bid: _____

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL CONTRACTOR (hereafter, PRINCIPAL) and SURETY above named, are held and firmly bound unto the Department of Transportation in the full and just sum of five (5) percent of the total amount bid by the Principal for the project stated above, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

NOW, THEREFORE, the condition of this obligation is: the Principal shall not withdraw its bid within sixty (60) days after the opening of the bids, or within such other time period as may be provided in the proposal, and if the Board of Transportation shall award a contract to the Principal, the Principal shall, within fourteen (14) calendar days after written notice of award is received by him, provide bonds with good and sufficient surety, as required for the faithful performance of the contract and for the protection of all persons supplying labor, material, and equipment for the prosecution of the work. In the event the Principal requests permission to withdraw his bid due to mistake in accordance with the provisions of Article 103-3 of the *Standard Specifications for Roads and Structures*, the conditions and obligations of this Bid Bond shall remain in full force and effect until the Department of Transportation makes a final determination to either allow the bid to be withdrawn or to proceed with award of the contract. In the event a determination is made to award the contract, the Principal shall have fourteen (14) calendar days to comply with the requirements set forth above. In the event the Principal withdraws its bid after bids are opened except as provided in Article 103-3, or after award of the contract has been made fails to execute such additional documents as may be required and to provide the required bonds within the time period specified above, then the amount of the bid bond shall be immediately paid to the Department of Transportation as liquidated damages.

IN TESTIMONY WHEREOF, the Principal and Surety have caused these presents to be duly signed and sealed.

This the _____ day of _____, 20 _____

_____
Surety

By _____
General Agent or Attorney-in-Fact Signature

Seal of Surety

_____
Print or type Signer's Name

BID BOND

CORPORATION

SIGNATURE OF CONTRACTOR (Principal)

_____

Full name of Corporation

_____

Address as prequalified

By _____

Signature of **President**, **Vice President**, **Assistant Vice President**
Select appropriate title

_____

Print or type Signer's name

Affix Corporate Seal

Attest _____

Signature of **Secretary**, **Assistant Secretary**
Select appropriate title

_____

Print or type Signer's name

BID BOND

LIMITED LIABILITY COMPANY

SIGNATURE OF CONTRACTOR (Principal)

Name of Contractor _____
Full name of Firm

_____
Address as prequalified

Signature of Member/ Manager/Authorized Agent _____
Individually

_____
Print or type Signer's name

BID BOND

INDIVIDUAL DOING BUSINESS UNDER A FIRM NAME

SIGNATURE OF CONTRACTOR (Principal)

Name of Contractor _____
Individual Name

Trading and doing business as _____
Full name of Firm

_____
Address as prequalified

Signature of Contractor _____
Individually

_____
Print or type Signer's name

_____
Signature of Witness

_____
Print or type Signer's name

BID BOND

INDIVIDUAL DOING BUSINESS IN HIS OWN NAME

SIGNATURE OF CONTRACTOR (Principal)

Name of Contractor _____

Print or type Individual Name

_____

Address as prequalified

Signature of Contractor _____

Individually

_____

Print or type Signer's name

_____

Signature of Witness

_____

Print or type Signer's name

BID BOND

PARTNERSHIP

SIGNATURE OF CONTRACTOR (Principal)

_____

Full name of Partnership

_____

Address as prequalified

By _____

Signature of Partner

_____

Print or type Signer's name

_____

Signature of Witness

_____

Print or type Signer’s name

BID BOND
JOINT VENTURE (2 or 3)

SIGNATURE OF CONTRACTORS (Principal)

Instructions to Bidders: **2 Joint Ventures**, Fill in lines (1), (2) and (3) and execute. **3 Joint Venturers** Fill in lines (1), (2), (3), (4) and execute. Line (1), print or type the name of Joint Venture. On line (2), print or type the name of one of the joint venturers and execute below in the appropriate manner required by Article 102-8 of the *Specifications.* On Line (3), print or type the name of second joint venturer and execute below in the appropriate manner required by said article of the Specifications. On Line (4), print or type the name of the third joint venturer, if applicable and execute below in the appropriate manner required by said article of the Specifications. This form of execution must be strictly followed.

(1) _____
Name of Joint Venture

(2) _____
Name of Contractor

_____
Address as prequalified

_____ By _____
Signature of Witness or Attest — Signature of Contractor

_____ _____
Print or type Signer's name — Print or type Signer's name

If Corporation, affix Corporate Seal

and

(3) _____
Name of Contractor

_____
Address as prequalified

_____ By _____
Signature of Witness or Attest — Signature of Contractor

_____ _____
Print or type Signer's name — Print or type Signer's name

If Corporation, affix Corporate Seal

and

(4) _____
Name of Contractor *(for 3 Joint Venture only)*

_____
Address as prequalified

_____ By _____
Signature of Witness or Attest — Signature of Contractor

_____ _____
Print or type Signer's name — Print or type Signer's name

If Corporation, affix Corporate Seal

ADDENDUM(S)

SPD 25-100

(3-3-2014)

ADDENDUM #1

I, _____ representing _____
(SIGNATURE)

Acknowledge receipt of Addendum #1.

ADDENDUM #2

I, _____ representing _____
(SIGNATURE)

Acknowledge receipt of Addendum #2.

ADDENDUM #3

I, _____ representing _____
(SIGNATURE)

Acknowledge receipt of Addendum #3.

WBS # 50061.3.8 TIP# C-5600G FA# CMAQ-1229(016)

Type of Work Fiber-Optic Cable, Conduit Routing, Wireless Communications, CCTV Camera Installation and DMS Integration

County Gaston and Mecklenburg

Location Intersection of US 29/74 at Groves St, along Groves St to I-85, I-85 from Groves St Overpass to just North of I-85/I-485 Interchange

LINE NO.	MASTER ITEM NO.	SEC. NO.	ITEM DESCRIPTION	EST. QTY.	UNIT	UNIT PRICE	TOTAL AMOUNT
1	0000100000-N	800	MOBILIZATION	1	LS		
2	3030000000-E	862	STEEL BEAM GUARDRAIL	125	LF		
3	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	4	EA		
4	3210000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE CAT-1	1	EA		
5	3270000000-N	SP	GUARDRAIL ANCHOR UNITS, TYPE 350	1	EA		
6	3317000000-N	862	GUARDRAIL ANCHOR UNITS, TYPE B-77	1	EA		
7	3360000000-E	863	REMOVE EXISTING GUARDRAIL	50	LF		
8	4457000000-N	SP	TEMPORARY TRAFFIC CONTROL	1	LS		
9	7252000000-E	1710	MESSENGER CABLE (1/4")	1970	LF		
10	7279000000-E	1715	TRACER WIRE	20740	LF		
11	7300000000-E	1715	UNPAVED TRENCHING (1) (2")	830	LF		
12	7300000000-E	1715	UNPAVED TRENCHING (2) (2")	14220	LF		
13	7301000000-E	1715	DIRECTIONAL DRILL (1) (2")	460	LF		
14	7301000000-E	1715	DIRECTIONAL DRILL (2) (2")	6070	LF		
15	7312000000-N	1716	JUNCTION BOX (BRIDGE-MOUNTED)	5	EA		
16	7312000000-N	1716	JUNCTION BOX (SPECIAL OVERSIZED HEAVY-DUTY)	8	EA		
17	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	16	EA		
18	7348000000-N	1716	JUNCTION BOX (OVERSIZED HEAVY-DUTY)	27	EA		
19	7360000000-N	1720	WOOD POLE	4	EA		
20	7372000000-N	1721	GUY ASSEMBLY	2	EA		
21	7384000000-E	1722	1-1/4" RISER WITH WEATHERHEAD	4	EA		
22	7432000000-E	1722	2" RISER WITH HEAT SHRINK TUBING	1	EA		
23	7516000000-E	1730	COMMUNICATIONS CABLE (12-FIBER)	3260	LF		
24	7516000000-E	1730	COMMUNICATIONS CABLE (144-FIBER)	24700	LF		
25	7540000000-N	1731	SPLICE ENCLOSURE	8	EA		
26	7541000000-N	1731	MODIFY SPLICE ENCLOSURE	1	EA		
27	7566000000-N	1733	DELINEATOR MARKER	33	EA		
28	7575160000-E	1734	REMOVE EXISTING COMMUNICATIONS CABLE	1220	LF		
29	7613000000-N	SP	SOIL TEST	10	EA		
30	7614100000-E	SP	DRILLED PIER FOUNDATION	10	CY		

31	7980000000-N	SP	5/8" X 10' GROUNDING ELECTRODE	49	EA		
32	7980000000-N	SP	CCTV CAMERA ASSEMBLY	6	EA		
33	7980000000-N	SP	CCTV CAMERA LOWERING SYSTEM	6	EA		
34	7980000000-N	SP	CENTRAL MEDIA CONVERTER	1	EA		
35	7980000000-N	SP	CENTRAL VIDEO DECODER UNIT (GTOC)	8	EA		
36	7980000000-N	SP	CENTRAL VIDEO DECODER UNIT (MRTMC)	14	EA		
37	7980000000-N	SP	CENTRAL VIDEO ENCODER UNIT (GTOC)	8	EA		
38	7980000000-N	SP	EQUIPMENT CABINET DISCONNECT	6	EA		
39	7980000000-N	SP	ETHERNET BRIDGE	2	EA		
40	7980000000-N	SP	ETHERNET FIELD SWITCH	8	EA		
41	7980000000-N	SP	ETHERNET HUB SWITCH	1	EA		
42	7980000000-N	SP	FIELD EQUIPMENT CABINET (WITH INVERTER)	4	EA		
43	7980000000-N	SP	FIELD EQUIPMENT CABINET (WITH UPS)	6	EA		
44	7980000000-N	SP	FIREWALL	2	EA		
45	7980000000-N	SP	FURNISH CCTV CAMERA ASSEMBLY	1	EA		
46	7980000000-N	SP	FURNISH ETHERNET FIELD SWITCH	1	EA		
47	7980000000-N	SP	GIGABIT TRANSCEIVER MODULE-ZX	5	EA		
48	7980000000-N	SP	INTEGRATED WIRELESS EHTERNET ASSEMBLY (DUAL)	6	EA		
49	7980000000-N	SP	INTEGRATED WIRELESS ETHERNET ASSEMBLY (SINGLE)	2	EA		
50	7980000000-N	SP	INTERCONNECT CENTER (12-FIBER)	7	EA		
51	7980000000-N	SP	INTERCONNECT CENTER (144-FIBER)	1	EA		
52	7980000000-N	SP	MASTER DISTRIBUTION AMPLIFIER	1	EA		
53	7980000000-N	SP	METAL POLE (CCTV, 50 FEET)	3	EA		
54	7980000000-N	SP	METAL POLE (CCTV, 60 FEET)	2	EA		
55	7980000000-N	SP	METAL POLE (CCTV, 75 FEET)	1	EA		
56	7980000000-N	SP	METAL POLE (WIRELESS, 50 FEET)	4	EA		
57	7980000000-N	SP	METER BASE / DISCONNECT COMBINATION PANEL (WOOD POLE MOUNT)	4	EA		
58	7980000000-N	SP	MODIFY EXISTING ELECTRICAL SERVICE EQUIPMENT	2	EA		
59	7980000000-N	SP	MODIFY INTERCONNECT CENTER	2	EA		
60	7980000000-N	SP	PORTABLE CCTV CAMERA LOWERING TOOL	1	EA		
61	7980000000-N	SP	RACK-MOUNTED VIDEO CHASSIS	4	EA		
62	7980000000-N	SP	SOLAR POWER ASSEMBLY	4	EA		
63	7985000000-N	SP	INTEGRATION AND CONFIGURATION	1	LS		

64	7990000000-E	SP	#4 SOLID BARE GROUNDING CONDUCTOR	980	LF		
65	7990000000-E	SP	3-WIRE COPPER FEEDER CONDUCTORS	1280	LF		
66	7990000000-E	SP	3-WIRE COPPER SERVICE ENTRANCE CONDUCTORS	100	LF		
			Total Cost for Project				

CONTRACTOR _____

ADDRESS _____

_____

Federal ID No. _____

Contr. License No. _____

Telephone No. _____

Vendor No. _____

CORPORATE SEAL

Authorized Agent _____ Title _____

Signature _____ Date _____

Witness _____ Title _____

Signature _____ Date _____