Contract Proposal

TIP NUMBER: U-5522
WBS# 55059.3.1
FA# TCSP-1004(57)
CITY PROJECT NUMBER: 2013-054
COUNTY: Cabarrus
DESCRIPTION: Supply and install one Dynamic Message Sign Assembly for the City of Concord’s Intelligent Transportation System.

DATE OF RE-ADVERTISEMENT: June 26, 2018
REBID OPENING: Tuesday, July 3, 2018, 1:00 pm

*** 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. FOR CONTRACTS $30,000 OR MORE, EXCEPT FOR CERTAIN SPECIALTY WORK AS DETERMINED BY THE LICENSING BOARD, BIDDERS ARE REQUIRED TO BECOME LICENSED BY THE NC LICENSING BOARD. NON-LICENSED BIDDERS ARE PERMITTED 60 DAYS AFTER BID OPENING TO OBTAIN PROPER LICENSING FOR THE TYPE OF PROJECT BEING LET. 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.

________________________________________
NAME OF BIDDER

________________________________________
ADDRESS OF BIDDER

RETURN BIDS TO: City of Concord
Attention: Sue Hyde, PE
Person’s Title: Engineering Director
Physical Address: 850 Warren C. Coleman Blvd, Concord, NC 28026

ALL BIDS MUST BE RECEIVED PRIOR TO THE DATE AND TIME LISTED ABOVE.
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INVITATION TO REBID
Date: May 29, 2018

Sealed Bids will be received by the City of Concord (OWNER) at the Alfred M. Brown Operations Center, 850 Warren C. Coleman Boulevard (Highway 601 South), Concord, North Carolina 28025, Conference Room C until Tuesday, June 26, 2018, 2:00 pm, for TIP Number: U-5522 City Project # 2013-054.

At said place and time, and promptly thereafter, all Bids that have been duly received will be publicly opened and read aloud.

The proposed Work is generally described as follows:

Supply and install one Dynamic Message Sign Assembly for the City of Concord’s Intelligent Transportation System.

All Bids must be in accordance with the Bidding Documents on file with the:

City of Concord Engineering Department

Electronic Copies of the Bidding Documents may be obtained from City of Concord website - http://www.concordnc.gov/Departments/Finance/Purchasing/RFPs-and-Bids.

Bidders are required to be prequalified with NCDOT as a Bidder or PO Prime Contractor. Contractors wishing to become prequalified may obtain information through the NCDOT website at: http://www.ncdot.gov/business/.

Bids will be received on a unit price basis.

A five percent (5%) Bid security must accompany each Bid.

The Successful Bidder will be required to furnish a Construction Performance Bond and a Construction Payment Bond as security for the faithful performance and the payment of all bills and obligations arising from the performance of the Contract.

Contractor and all Subcontractors will be required to conform to the labor standards set forth in the Contract Documents.

Owner reserves the right to reject any or all Bids, including without limitation the rights to reject any or all nonconforming, nonresponsive, unbalanced, or conditional Bids, and will award to lowest responsive and responsible Bidder taking into consideration quality, performance, and time specified in Bid Form for performance of Work. Owner also reserves the right to waive informalities.

By:   Lloyd Payne
City Manager
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 shall be grounds for rejection of the bid.

1. The bid form furnished by the City of Concord with the proposal shall be used and shall not be altered in any manner. **DO NOT SEPARATE THE BID FORM FROM THE PROPOSAL.**

2. All entries on the bid form, 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 must be limited to TWO decimal places.**

4. An amount bid shall be entered on the bid form 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 form.

5. The total amount bid shall be written in figures in the proper place on the bid form. 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. Do not use “White Out” or similar product to make corrections.

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 (If available)

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 PROPOSAL WITH THE BID FORM STILL ATTACHED SHALL BE PLACED IN A SEALED ENVELOPE AND SHALL HAVE BEEN DELIVERED TO AND RECEIVED by THE City of Concord at 850 Warren C. Coleman Blvd, Concord, NC 28026, BY July 3, 2018 at 1:00 pm.

12. The sealed bid must display the following statement on the front of the sealed envelope:

   “BID FOR – Concord Intelligent Transportation Systems Expansion Project TO BE OPENED AT 1:00 pm, July 3, 2018.”

13. If delivered by mail, the sealed envelope shall be placed in another sealed envelope and the outer envelope shall be addressed as follows:

   City of Concord
   Attn: Sue B. Hyde
   1:PO Box 308
   Concord, NC 28026-0308
NCDOT STANDARD NOTES (Federal Aid)

A. NCDOT Standard Specifications – The 2018 North Carolina Department of Transportation Standard Specifications for Roads and Structures, herein referred to as the ‘Standard Specifications’, and the 2018 Roadway Standard Drawings, shall apply to all portions of this project except as may be modified by this document.

B. Bidder Prequalification - Bidders are required to be prequalified with NCDOT for their specific discipline. Contractors wishing to become prequalified may obtain information through the NCDOT website at:
https://connect.ncdot.gov/business/Pages/default.aspx

C. Disadvantaged Business Enterprise References - Since this is a Federal-aid project with DBE participation, only those requirements and goals set forth by NCDOT Goal Setting Committee are applicable. References to any other requirements or to N.C. General Statute 143-128.2 shall not apply to this project. Refer to Special Provision SP1 G63.

D. Award of Contract - The contract will be awarded to the lowest responsible, responsive bidder. Alternate items will not be considered in determining the low bidder and will only be evaluated after the award of the contract is made.

E. Contractor Licensing – On all Federal-aid contracts, non-licensed contractors are permitted to submit bids, however they must be licensed prior to performing any work. Bidders are permitted 60 days, after bid opening, to become licensed by the North Carolina Licensing Board. If they fail to do so within 60 days, their bid will be considered non-responsive and will be rejected. If the successful bidder does not hold the proper license to perform any plumbing, heating, air conditioning, or electrical work in this contract, he will be required to sublet such work to a contractor properly licensed in accordance with Article 2 of Chapter 87 of the General Statutes (licensing of heating, plumbing, and air conditioning contractors) and Article 4 of Chapter 87 of the General Statutes (licensing of electrical contractors).

F. Bonds - Please note that all Bid Bonds, Payment Bonds, and Performance Bonds required for this project, shall be those found on the NCDOT website. The bonds are located at:

Bid Bonds (M-5):
https://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/04%20Bid%20Bonds.doc

Payment Bonds (M-6):
https://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/05%20Payment%20Bonds.doc

Performance Bonds (M-7):
https://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/06%20Performance%20Bonds.doc
G. **Liability Insurance** – In addition to any insurance requirements as may be required by the LGA, the Contractor is obligated to comply with Article 107-15 of the *Standard Specifications* including the dollar limits set forth.

H. **Buy America** – This project shall be governed by the Buy America requirements, for the use of domestic steel and iron products, as outlined in the *Standard Specifications*.

I. **Proprietary Items** - When a proprietary (brand name) product, whether material, equipment or procedure, are specified in the plans or specifications, they are used only to denote the style, type, character, and quality desired of the product. They do not restrict the bidder from proposing other brands, makes, or manufacturers, which are determined to be of equal quality. The approval, or disapproval of those products, will be made by the Engineer prior to allowing those product(s) or material(s) to be incorporated into the work.

J. **Retainage by LGAs** – The LGA for this contract will not retain any amount or percentage from progress payments or final estimates due the contractor.

**Retainage by Contractors** – Contractors are NOT permitted to retain any amount or percentage from monies due their subcontractors or material suppliers on federally funded projects except as permitted by Subarticle 109-4(B) of the *Standard Specifications*.

K. **Traffic Control** – The requirements of the *Manual on Uniform Traffic Control Devices (MUTCD)* – FHWA, as amended by the *NCDOT Supplement to MUTCD*, shall apply. Traffic Control, both vehicular and pedestrian, shall be maintained throughout the project as required by these specifications as modified by the project plans or special provisions.
ALLOWABLE CHANGES TO THE NCDOT 2018 STANDARD SPECIFICATIONS:

1. **Article 102-1 Invitation to Bid, page 1-9**, delete this section in its entirety.

2. **Subarticle 102-8(B) Electronic Bids, page 1-15**, delete this section in its entirety.

3. **Subarticle 102-9(C)2 Electronic Bids, page 1-17**, delete this section in its entirety.

4. **Article 102-10 Bid Bond or Bid Deposit, page 1-17**, line 38, “60” days shall be modified to “90” days.

5. **Subarticle 102-10 Bid Bond or Bid Deposit, page 1-18**, delete lines 16-27.


7. **Subarticle 102-12(A) Paper Bid, page 1-18**, line 37, the reference to “Contract Officer” shall be changed to “Engineering Director”.

8. **Subarticle 102-12(B) Electronic Bid, pages 1-18 and 19**, delete this section in its entirety.

9. **Subarticle 102-13(B)2 Electronic Bids, page 1-19**, delete this section in its entirety.

10. **Subarticle 103-2(B) Electronic Bids, page 1-22**, delete this section in its entirety.


12. **Article 103-7 Contract Bonds, page 1-30**, line 5, modify “14” calendar days to “10” calendar days per G.S.143-129.

13. **Article 103-9, Failure to Furnish Contract Bonds, page 1-30**, line 15, modify “14” calendar days to “10” calendar days per G.S.143-129.

14. **Article 105-9 Construction Stakes, Lines and Grades, page 1-48**, delete this section in its entirety and substitute the following: “The Municipality will not set the stakes, lines or grades for this project.”

15. **Article 108-2, Progress Schedule, page 1-68**, add the following requirement as subarticle (D) on page 1-69: “The municipality may add additional requirements as noted in the bid proposal”.

16. **Article 108-3, Preconstruction Conference, page 1-69, line 20**, change “Division Engineer” to “Engineering Director”.

17. **Article 108-4, Construction Conferences, page 1-69, line 28**, change “Resident Engineer” to “Engineering Director”.

18. **Article 109-8, Fuel Price Adjustments, page 1-87**, delete this article in its entirety and substitute the following: “Fuel Price Adjustments will not apply to this project.”
19. *Article-620-4, Measurement and Payment, page 6-33*, delete lines 38 through line 20 on page 6-34 and substitute the following: “Asphalt Price Adjustments will not apply to this project.”
PROJECT SPECIAL PROVISIONS

GENERAL

CONTRACT TIME AND LIQUIDATED DAMAGES (No Permits):

The date of availability for this contract is the date the Contractor begins work but not before August 1, 2018 or later than September 30, 2018.

The completion date for this contract is the date that is two hundred forty consecutive calendar days after and including the date of availability.

Except where otherwise provided by the contract, observation periods required by the contract will not be a part of the work to be completed by the completion date and/or intermediate contract times stated in the contract. The acceptable completion of the observation periods that extend beyond the final completion date shall be a part of the work covered by the performance and payment bonds.

The liquidated damages for this contract are Seven hundred and fifty Dollars ($750.00) per calendar day. At the preconstruction conference the Contractor shall declare his expected date for beginning work. Should the Contractor desire to revise this date after the preconstruction conference, he shall notify the Engineer in writing at least thirty (30) days prior to the revised date.

INTERMEDIATE CONTRACT TIME NUMBER [ICT number] 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 the existing traffic pattern. The Contractor shall not close or narrow a lane of traffic on ALL ROADS during the following time restrictions:

DAY AND TIME RESTRICTIONS

Monday thru Sunday 7:00 am – 9:00 am and 3:00 pm – 6:00 pm

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

HOLIDAY AND HOLIDAY WEEKEND LANE CLOSURE RESTRICTIONS

1. For unexpected occurrence that creates unusually high traffic volumes, as directed by the Engineer.
2. For **New Year's Day**, between the hours of **3:00 pm** December 31st and **9:00 am** January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until **9:00 am** the following Tuesday.

3. For **Easter**, between the hours of **3:00 pm** Thursday and **9:00 am** Monday.

4. For **Memorial Day**, between the hours of **3:00 pm** Friday and 9:00 am Tuesday.

5. For **Independence Day**, between the hours of **3:00 pm** the day before Independence Day and **9:00 am** the day after Independence Day.

   If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of **3:00 pm** the Thursday before Independence Day and **9:00 am** the Tuesday after Independence Day.

6. For **Labor Day**, between the hours of **3:00 pm** Friday and **9:00 am** Tuesday.

7. For **Thanksgiving Day**, between the hours of **3:00 pm** Tuesday and **9:00 am** Monday.

8. For **Christmas**, between the hours of **3:00 pm** the Friday before the week of Christmas Day and **9:00 am** the following Tuesday after the week of Christmas Day.

9. For special events, between the hours of **3:00 pm** the day of the week of the **special event** and 9:00 am the following day after the week of the special event.

   And/or

   For special events, occurring at the Charlotte Motor Speedway between **eight** hours before the start and eight hours after the end of the **special event**.

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

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

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

The liquidated damages are **[ONE THOUSAND] Dollars ($1,000.00)** per hour.
NO MAJOR CONTRACT ITEMS:

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

DRIVEWAYS AND PRIVATE PROPERTY:

The Contractor shall maintain access to driveways for all residents, businesses, and property owners throughout the life of the project.

The Contractor shall not perform work for private citizens or agencies in conjunction with this project or within the project limits of this contract. Any driveway paved by a Contractor which ties into an NCDOT system road being paved by the Contractor must be paved either prior to the road paving project or after its completion.

DISADVANTAGED BUSINESS ENTERPRISE (LOCAL GOVERNMENT AGENCIES):

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 City of Concord to the bidder confirming the Contractor's approved, committed DBE participation along with a listing of the committed DBE firms.

Local Government Agencies (LGA) - The entity letting the contract.

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.

Standard Specifications - The general term comprising all directions, provisions, and requirements contained or referred to in the North Carolina Department of Transportation Standard Specifications for Roads and Structures and any subsequent revisions or additions to such book.

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

Forms and Websites Referenced in this Provision

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

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

RF-1 DBE Replacement Request Form - Form for replacing a committed DBE. http://connect.ncdot.gov/projects/construction/Construction%20Forms/DBE%20MBE%20Replacement%20Request%20Form.pdf
SAF Subcontract Approval Form - Form required for approval to sublet the contract. http://connect.ncdot.gov/projects/construction/Construction%20Forms/Subcontract%20Approval%20Form%20Rev.%202012.zip

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

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

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

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

**DBE Goal**

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

Disadvantaged Business Enterprises 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 City of Concord.

**Directory of Transportation Firms (Directory)**

Real-time information is available about firms doing business with the NCDOT and firms that are certified through NCUCP in the Directory of Transportation Firms. Only firms identified in the Directory as DBE certified shall be used to meet the DBE goal. The Directory can be found at the following link. https://www.ebs.nc.gov/VendorDirectory/default.html
The listing of an individual firm in the directory shall not be construed as an endorsement of the firm’s capability to perform certain work.

**Listing of DBE Subcontractors**

At the time of bid, bidders shall submit all DBE participation that they anticipate to use during the life of the contract. Only those identified to meet the DBE goal will be considered committed, even though the listing shall include both committed DBE subcontractors and additional DBE subcontractors. Additional DBE subcontractor participation submitted at the time of bid will be used toward the 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. **City of Concord** 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 NCDOT’s form titled Letter of Intent.

The documentation shall be received in the office of the City of Concord no later than 2:00 p.m. of the fifth calendar day following opening of bids, unless the fifth day falls on Saturday, Sunday or an official state holiday. In that situation, it is due in the office of the Director of Engineering, City of Concord no later than 10:00 a.m. on the next official state business day.

If the bidder fails to submit the Letter of Intent from each committed DBE to be used toward the DBE goal, or if the form is incomplete (i.e. both signatures are not present), the DBE participation will not count toward meeting the DBE goal. If the lack of this participation drops the commitment below the DBE goal, the Contractor shall submit evidence of good faith efforts, completed in its entirety, to the Director of Engineering, City of Concord no later than 2:00 p.m. 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 Director of Engineering, City of Concord no later than 10:00 a.m. on the next official state business day.

Submission of Good Faith Effort

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

One complete set and two copies of this information shall be received in the office of the Director of Engineering, City of Concord no later than 2:00 p.m. of the fifth calendar day following opening of bids, unless the fifth day falls on Saturday, Sunday or an official state holiday. In that situation, it is due in the office of the Director of Engineering, City of Concord no later than 10:00 a.m. 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.

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

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

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

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

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

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

(D) 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 NCDOT’s Business Opportunity and Work Force Development Unit at DBE@ncdot.gov to give notification of the bidder's inability to get DBE quotes.

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

In addition, City of Concord 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, City of Concord may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made a good faith effort.

If City of Concord does not award the contract to the apparent lowest responsive bidder, City of Concord reserves the right to award the contract to the next lowest responsive bidder that can satisfy to LGA 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 Director of Engineering City of Concord 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 Director of Engineering City of Concord. 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 NCDOT's Joint Check Procedures.

(C) Subcontracts (Non-Trucking)

A DBE may enter into subcontracts. Work that a DBE subcontracts to another DBE firm may be counted toward the contract goal requirement. Work that a DBE subcontracts to a non-DBE firm does not count toward the contract goal requirement. If a DBE contractor or subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of standard industry practices, it shall be presumed that the DBE is not performing a commercially useful function. The DBE may present evidence to rebut this presumption to City of Concord. City of Concord'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, City of Concord 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 Director of Engineering City of Concord’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 Director of Engineering City of Concord 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 NCDOT after the SAF (Subcontract Approval Form) has been received by City of Concord, City of Concord 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 City of Concord 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 Director of Engineering City of Concord (see A herein for required documentation).

Changes in the Work

When the Director of Engineering City of Concord 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 Director of Engineering City of Concord 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 Director of Engineering City of Concord 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 Director of Engineering City of Concord.

When the Director of Engineering City of Concord 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 Director of Engineering City of Concord.

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. City of Concord 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 Director of Engineering City of Concord 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 Director of Engineering City of Concord 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 Director of Engineering City of Concord 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 Director of Engineering City of Concord can request written verification of subcontractor payments.

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

**Failure to Meet Contract Requirements**

Failure to meet contract requirements in accordance with Subarticle 102-15(J) of the 2018 Standard Specifications may be cause to disqualify the Contractor.
LETTER OF INTENT TO PERFORM AS A SUBCONTRACTOR

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 listed 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 ____________________________________________
Signature / Title __________________________________________________________________
Date ____________________________________________________________________________

Name of Bidder ____________________________________________
Signature / Title __________________________________________________________________
Date ____________________________________________________________________________
CERTIFICATION FOR FEDERAL-AID CONTRACTS:

(3-21-90)  SP1 G85

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

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

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

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

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

CONTRACTOR'S LICENSE REQUIREMENTS:

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

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

U.S. DEPARTMENT OF TRANSPORTATION HOTLINE:

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

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

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

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

CARGO PREFERENCE ACT:

(2-16-16)

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

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

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

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

(3) To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract."
TWELVE MONTH GUARANTEE – LGA Projects

(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 City of Concord. The Contractor will not be responsible for damage due to faulty design, normal wear and tear, for negligence on the part of the City of Concord, 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 City of Concord’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. The City of Concord 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 City of Concord 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.

EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:

General

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

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

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

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

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

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

**Roles and Responsibilities**

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

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

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

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

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

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

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

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

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

   h. Fully perform and install erosion and sediment control/stormwater work prior to any suspension of the work.
(i) Coordinate with Department, Federal, State and Local Regulatory agencies on resolution of erosion and sediment control/stormwater issues due to the Contractor’s operations.

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

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

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

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

(b) Inspect erosion and sediment control/stormwater devices and stormwater discharge outfalls at least once every 7 calendar days and within 24 hours after a rainfall event of 0.5 inch that occurs within a 24 hour period. Additional monitoring may be required at the discretion of Division of Water Resources personnel if the receiving stream is 303(d) listed for turbidity and the project has had documented problems managing turbidity.

(c) Maintain an onsite rain gauge or use the Department’s Multi-Sensor Precipitation Estimate website to maintain a daily record of rainfall amounts and dates.

(d) Maintain erosion and sediment control/stormwater inspection records for review by Department and Regulatory personnel upon request.

(e) Implement approved reclamation plans on all borrow pits, waste sites and staging areas.

(f) Maintain a log of turbidity test results as outlined in the Department's Procedure for Monitoring Borrow Pit Discharge.

(g) Provide secondary containment for bulk storage of liquid materials.

(h) Provide training for employees concerning general erosion and sediment control/stormwater awareness, the Department’s NPDES Stormwater Permit NCS000250 requirements, and the applicable requirements of the General Permit, NCG010000.
(i) Report violations of the NPDES permit to the Engineer immediately who will notify the Division of Water Quality Regional Office within 24 hours of becoming aware of the violation.

(3) Quality Control Program - Maintain a quality control program to control erosion, prevent sedimentation and follow provisions/conditions of permits. The quality control program shall:

(a) Follow permit requirements related to the Contractor and subcontractors’ construction activities.
(b) Ensure that all operators and subcontractors on site have the proper erosion and sediment control/stormwater certification.
(c) Notify the Engineer when the required certified erosion and sediment control/stormwater personnel are not available on the job site when needed.
(d) Conduct the inspections required by the NPDES permit.
(e) Take corrective actions in the proper timeframe as required by the NPDES permit for problem areas identified during the NPDES inspections.
(f) Incorporate erosion control into the work in a timely manner and stabilize disturbed areas with mulch/seed or vegetative cover on a section-by-section basis.
(g) Use flocculants approved by state regulatory authorities where appropriate and where required for turbidity and sedimentation reduction.
(h) Ensure proper installation and maintenance of temporary erosion and sediment control devices.
(i) Remove temporary erosion or sediment control devices when they are no longer necessary as agreed upon by the Engineer.
(j) The Contractor’s quality control and inspection procedures shall be subject to review by the Engineer. Maintain NPDES inspection records and make records available at all times for verification by the Engineer.

(B) Certified Foreman - At least one Certified Foreman shall be onsite for each type of work listed herein during the respective construction activities to control erosion, prevent sedimentation and follow permit provisions:

(1) Foreman in charge of grading activities
(2) Foreman in charge of bridge or culvert construction over jurisdictional areas
(3) Foreman in charge of utility activities

The Contractor may request to use the same person as the Level II Supervisor and Level II Foreman. This person shall be onsite whenever construction activities as described above are taking place. This request shall be approved by the Engineer prior to work beginning.
The Contractor may request to name a single Level II Foreman to oversee multiple construction activities on small bridge or culvert replacement projects. This request shall be approved by the Engineer prior to work beginning.

(C) **Certified Installers** - Provide at least one onsite, Level I Certified Installer for each of the following erosion and sediment control/stormwater crew:

1. Seeding and Mulching
2. Temporary Seeding
3. Temporary Mulching
4. Sodding
5. Silt fence or other perimeter erosion/sediment control device installations
6. Erosion control blanket installation
7. Hydraulic tackifier installation
8. Turbidity curtain installation
9. Rock ditch check/sediment dam installation
10. Ditch liner/matting installation
11. Inlet protection
12. Riprap placement
13. Stormwater BMP installations (such as but not limited to level spreaders, retention/detention devices)
14. Pipe installations within jurisdictional areas

If a Level I *Certified Installer* is not onsite, the Contractor may substitute a Level II Foreman for a Level I Installer, provided the Level II Foreman is not tasked to another crew requiring Level II Foreman oversight.

(D) **Certified Designer** - Include the certification number of the Level III-B Certified Designer on the erosion and sediment control/stormwater component of all reclamation plans and if applicable, the certification number of the Level III-A Certified Designer on the design of the project erosion and sediment control/stormwater plan.

**Preconstruction Meeting**

Furnish the names of the *Certified Erosion and Sediment Control/Stormwater Supervisor*, *Certified Foremen*, *Certified Installers* and *Certified Designer* and notify the Engineer of changes in certified personnel over the life of the contract within 2 days of change.

**Ethical Responsibility**

Any company performing work for the North Carolina Department of Transportation has the ethical responsibility to fully disclose any reprimand or dismissal of an employee resulting from improper testing or falsification of records.
Revocation or Suspension of Certification

Upon recommendation of the Chief Engineer to the certification entity, certification for Supervisor, Certified Foremen, Certified Installers and Certified Designer may be revoked or suspended with the issuance of an Immediate Corrective Action (ICA), Notice of Violation (NOV), or Cease and Desist Order for erosion and sediment control/stormwater related issues.

The Chief Engineer may recommend suspension or permanent revocation of certification due to the following:

(A) Failure to adequately perform the duties as defined within this certification provision.
(B) Issuance of an ICA, NOV, or Cease and Desist Order.
(C) Failure to fully perform environmental commitments as detailed within the permit conditions and specifications.
(D) Demonstration of erroneous documentation or reporting techniques.
(E) Cheating or copying another candidate’s work on an examination.
(F) Intentional falsification of records.
(G) Directing a subordinate under direct or indirect supervision to perform any of the above actions.
(H) Dismissal from a company for any of the above reasons.
(I) Suspension or revocation of one’s certification by another entity.

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

A certificant has the right to appeal any adverse action which results in suspension or permanent revocation of certification by responding, in writing, to the Chief Engineer within 10 calendar days after receiving notice of the proposed adverse action.

Chief Engineer
1536 Mail Service Center
Raleigh, NC 27699-1536

Failure to appeal within 10 calendar days will result in the proposed adverse action becoming effective on the date specified on the certified notice. Failure to appeal within the time specified will result in a waiver of all future appeal rights regarding the adverse action taken. The certificant will not be allowed to perform duties associated with the certification during the appeal process.

The Chief Engineer will hear the appeal and make a decision within 7 days of hearing the appeal. Decision of the Chief Engineer will be final and will be made in writing to the certificant.

If a certification is temporarily suspended, the certificant shall pass any applicable written examination and any proficiency examination, at the conclusion of the specified suspension period, prior to having the certification reinstated.
Measurement and Payment

Certified Erosion and Sediment Control/Stormwater Supervisor, Certified Foremen, Certified Installers and Certified Designer will be incidental to the project for which no direct compensation will be made.

PROCEDURE FOR MONITORING BORROW PIT DISCHARGE:

(2-20-07) (Rev. 3-20-13) 105-16, 230, 801 SP1 G181

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

If during any operating day, the downstream water quality exceeds the standard, the Contractor shall do all of the following:

(A) Either cease discharge or modify the discharge volume or turbidity levels to bring the downstream turbidity levels into compliance, or

(B) Evaluate the upstream conditions to determine if the exceedance of the standard is due to natural background conditions. If the background turbidity measurements exceed the standard, operation of the pit and discharge can continue as long as the stream turbidity levels are not increased due to the discharge.

(C) Measure and record the turbidity test results (time, date and sampler) at all defined sampling locations 30 minutes after startup and at a minimum, one additional sampling of all sampling locations during that 24-hour period in which the borrow pit is discharging.

(D) Notify DWQ within 24 hours of any stream turbidity standard exceedances that are not brought into compliance.

During the Environmental Assessment required by Article 230-4 of the 2012 Standard Specifications, the Contractor shall define the point at which the discharge enters into the State’s surface waters and the appropriate sampling locations. Sampling locations shall include points upstream and downstream from the point at which the discharge enters these waters. Upstream sampling location shall be located so that it is not influenced by backwater conditions and represents natural background conditions. Downstream sampling location shall be located at the point where complete mixing of the discharge and receiving water has occurred.

The discharge shall be closely monitored when water from the dewatering activities is introduced into jurisdictional wetlands. Any time visible sedimentation (deposition of sediment) on the wetland surface is observed, the dewatering activity will be suspended until turbidity levels in the stilling basin can be reduced to a level where sediment deposition does not occur. Staining of wetland surfaces from suspended clay particles, occurring after
evaporation or infiltration, does not constitute sedimentation. No activities shall occur in wetlands that adversely affect the functioning of a wetland. Visible sedimentation will be considered an indication of possible adverse impacts on wetland use.

The Engineer will perform independent turbidity tests on a random basis. These results will be maintained in a log within the project records. Records will include, at a minimum, turbidity test results, time, date and name of sampler. Should the Department’s test results exceed those of the Contractor’s test results, an immediate test shall be performed jointly with the results superseding the previous test results of both the Department and the Contractor.

The Contractor shall use the NCDOT Turbidity Reduction Options for Borrow Pits Matrix, available at [http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/fieldops/downloads/Files/TurbidityReductionOptionSheet.pdf](http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/fieldops/downloads/Files/TurbidityReductionOptionSheet.pdf) to plan, design, construct, and maintain BMPs to address water quality standards. Tier I Methods include stilling basins which are standard compensatory BMPs. Other Tier I methods are noncompensatory and shall be used when needed to meet the stream turbidity standards. Tier II Methods are also noncompensatory and are options that may be needed for protection of rare or unique resources or where special environmental conditions exist at the site which have led to additional requirements being placed in the DWQ’s 401 Certifications and approval letters, Isolated Wetland Permits, Riparian Buffer Authorization or a DOT Reclamation Plan’s Environmental Assessment for the specific site. Should the Contractor exhaust all Tier I Methods on a site exclusive of rare or unique resources or special environmental conditions, Tier II Methods may be required by regulators on a case by case basis per supplemental agreement.

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

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

ROADWAY

STABILIZATION REQUIREMENTS:

(3-11-2016) S-3

Stabilization for this project shall comply with the time frame guidelines as specified by the NCG-010000 general construction permit effective August 3, 2011 issued by the North Carolina Department of Environment and Natural Resources Division of Water Quality. Temporary or permanent ground cover stabilization shall occur within 7 calendar days from the last land-disturbing activity, with the following exceptions in which temporary or permanent ground cover shall be provided in 14 calendar days from the last land-disturbing activity:

- Slopes between 2:1 and 3:1, with a slope length of 10 ft. or less
- Slopes 3:1 or flatter, with a slope of length of 50 ft. or less
- Slopes 4:1 or flatter

The stabilization timeframe for High Quality Water (HQW) Zones shall be 7 calendar days with no exceptions for slope grades or lengths. High Quality Water Zones (HQW) Zones are defined by North Carolina Administrative Code 15A NCAC 04A.0105 (25). Temporary and permanent ground cover stabilization shall be achieved in accordance with the provisions in this contract and as directed.

SEEDING AND MULCHING: (West)

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

Shoulder and Median Areas

<table>
<thead>
<tr>
<th>August 1 - June 1</th>
<th>May 1 - September 1</th>
</tr>
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<tbody>
<tr>
<td>20# Kentucky Bluegrass</td>
<td>20# Kentucky Bluegrass</td>
</tr>
<tr>
<td>75# Hard Fescue</td>
<td>75# Hard Fescue</td>
</tr>
<tr>
<td>25# Rye Grain</td>
<td>10# German or Browntop Millet</td>
</tr>
<tr>
<td>500# Fertilizer</td>
<td>500# Fertilizer</td>
</tr>
<tr>
<td>4000# Limestone</td>
<td>4000# Limestone</td>
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Areas Beyond the Mowing Pattern, Waste and Borrow Areas:

<table>
<thead>
<tr>
<th>August 1 - June 1</th>
<th>May 1 - September 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>100# Tall Fescue</td>
<td>100# Tall Fescue</td>
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<tr>
<td>15# Kentucky Bluegrass</td>
<td>15# Kentucky Bluegrass</td>
</tr>
<tr>
<td>30# Hard Fescue</td>
<td>30# Hard Fescue</td>
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### Approved Tall Fescue Cultivars

<table>
<thead>
<tr>
<th>06 Dust</th>
<th>Escalade</th>
<th>Justice</th>
<th>Serengeti</th>
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<tr>
<td>2nd Millennium</td>
<td>Essential</td>
<td>Kalahari</td>
<td>Shelby</td>
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<tr>
<td>3rd Millennium</td>
<td>Evergreen 2</td>
<td>Kitty Hawk 2000</td>
<td>Sheridan</td>
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<tr>
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<td>Falcon IV</td>
<td>Legitimate</td>
<td>Signia</td>
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<td>Falcon NG</td>
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<td>Falcon V</td>
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<td>Faith</td>
<td>Magellan</td>
<td>Shenandoah Elite</td>
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<td>Fat Cat</td>
<td>Matador</td>
<td>Sidewinder</td>
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<tr>
<td>Barrera</td>
<td>Festnova</td>
<td>Millennium SRP</td>
<td>Skyline</td>
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<td>Fidelity</td>
<td>Monet</td>
<td>Solara</td>
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<tr>
<td>Barrobusto</td>
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<td>Mustang 4</td>
<td>Southern Choice II</td>
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<td>Barvado</td>
<td>Finelawn Xpress</td>
<td>Ninja 2</td>
<td>Speedway</td>
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<tr>
<td>Biltmore</td>
<td>Finesse II</td>
<td>Ol’ Glory</td>
<td>Spyder LS</td>
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<tr>
<td>Bingo</td>
<td>Firebird</td>
<td>Olympic Gold</td>
<td>Sunset Gold</td>
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<tr>
<td>Bizem</td>
<td>Firecracker LS</td>
<td>Padre</td>
<td>Tacco</td>
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<td>Blackwatch</td>
<td>Frenza</td>
<td>Patagonia</td>
<td>Tanzania</td>
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<td>Pedigree</td>
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<td>Focus</td>
<td>Picasso</td>
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<td>Forte</td>
<td>Piedmont</td>
<td>Talladega</td>
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<td>Pure Gold</td>
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<td>Greenkeeper</td>
<td>Raptor II</td>
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Approved Kentucky Bluegrass Cultivars:

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<td>Freedom II</td>
<td>NuGlade</td>
<td>Valor</td>
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<td>Odyssey</td>
<td>Voyager II</td>
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<td>Perfection</td>
<td>Washington</td>
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Approved Hard Fescue Cultivars:

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<thead>
<tr>
<th>Aurora II</th>
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<tr>
<td>Aurora Gold</td>
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<td>Heron</td>
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<tr>
<td>Chariot</td>
<td>Nordic</td>
<td>Rhino</td>
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</tr>
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</table>

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

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

**UTILITY CONTACTS**

The utility contacts for this project are as follows:
<table>
<thead>
<tr>
<th>UTILITY</th>
<th>CONTACT NAME</th>
<th>PHONE</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Concord Electric</td>
<td>Alex Burris</td>
<td>704-920-5335</td>
</tr>
<tr>
<td>City of Concord Water</td>
<td>Jeff Corley</td>
<td>704-920-5372</td>
</tr>
<tr>
<td>PSNC Energy</td>
<td>Bill Norris</td>
<td>704-723-4314</td>
</tr>
</tbody>
</table>
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Project Special Provisions

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1. GENERAL REQUIREMENTS

1.1. DESCRIPTION

A. General

Conform to these Project Special Provisions, Project Plans, the NCDOT Signals and ITS Project Special Provisions, and the NCDOT 2018 Standard Specifications for Roads and Structures (also referred to hereinafter as the “Standard Specifications”). 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 or the Signals and ITS Project Special Provisions, these Project Special Provisions govern.

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

B. Scope

Furnish, install, and fully integrate a pair of Dynamic Message Signs (DMS) installed on a full-span structure at a location designated on the plans and on the I-85 Exit 49 Northbound Ramp for the City of Concord in North Carolina. This work shall include the installation of two (2) DMS, a full-span DMS structure, concrete foundations, ground mounted DMS equipment cabinet, cabinet foundation, cabinet riser, underground power service assembly, underground conduits, oversized junction boxes, and fiber optic communication cable. This work shall also include the installation and integration of the DMS with enterprise server-client DMS configuration software.

The Contractor shall coordinate with the local utility service provider (City of Concord: Electric Department) for the electrical service and installation of service conduits. Service conduits are to be installed within the same trench as the proposed communications cable conduit between the existing communications junction box and the proposed DMS cabinet.

1.2. MATERIAL

A. General

Comply with Section 1098-1 of the Standard Specifications in addition to the following special provisions.

C. Submittal Requirements

The Standard Specifications are revised as follows:

Page 10-208, replace paragraph on line 34 with the following:

Submit for approval catalog cuts and/or shop drawings for materials proposed for use on the project. Allow 40 days for review of each submittal. Do not fabricate or order material until receipt of Engineer’s approval.

Submit 4 copies of each catalog cut and/or drawing and show for each component the material description, brand name, stock-number, size, rating, manufacturing specification and the intended use (identified by labeling all components with the corresponding contract line item number). Present the submittals neatly arranged in the same order as the contract bid items. Upon approval by
the Engineer, electronic submittals of catalog cuts and drawings may be accepted in lieu of hard copies.

Electronic (PDF) copies of reviewed submittals will be returned to the Engineer from the City of Concord and NCDOT ITS and Signals Unit.

D. Observation Period

Prior to final acceptance, all Contractor-furnished equipment and software shall successfully complete a 30-day Observation Period.

The 30-day Observation Period is considered to be part of the work included in the total contract time and must be completed prior to final acceptance of the project.

Final acceptance will occur following the successful completion of the 30-day Observation Period and after all documentation requirements have been fully satisfied.

Refer to the Testing and Acceptance section of these Project Special Provisions for additional requirements.

E. Plan of Record Documentation

Comply with Article 1098-1(F) of the Standard Specifications. Plan of record documentation will be subject to approval by the Engineer before final acceptance.

F. Performance of Warranty Repair and Maintenance

Provide authorization to the City of Concord and the North Carolina Department of Transportation to perform all warranty repairs after project acceptance. The decision to perform warranty work at a City or Department facility by City or Department technicians or to have warranty work performed by the vendor shall be at the discretion of the City of Concord or the North Carolina Department of Transportation. Provide any training required by the manufacturer to authorize the City of Concord and the North Carolina Department of Transportation to perform warranty work and ensure manufacturer will furnish parts to the City of Concord and the North Carolina Department of Transportation for all warranty repairs at no cost to the City or Department. In addition, ensure the manufacturer agrees to provide prompt technical support to the City of Concord and the North Carolina Department of Transportation technicians for a period of one year after the end of the warranty period at no cost to the City or Department. Defective parts replaced under warranty by the City of Concord and the North Carolina Department of Transportation will be returned to the vendor at the vendor’s request. Provide schematics, part lists, and other documentation to perform bench repair to the City of Concord or the North Carolina Department of Transportation within 2 weeks upon request. The City and Department agree not to divulge any proprietary information in the schematics, part lists and other documentation upon request from the vendor. After project acceptance and at the request of the City or Department, manufacturer shall perform warranty repairs to equipment which fails during the warranty period at no cost to the City or Department including freight costs to ship repaired equipment back to Concord. Ensure all equipment is repaired and returned to the City of Concord or the North Carolina Department of Transportation within 21 calendar days of receipt by the manufacturer.
1.3. CONSTRUCTION METHODS

A. General

Comply with Section 1700-3 of the Standard Specifications in addition to the following special provisions.

1.4. MEASUREMENT AND PAYMENT

There will be no direct payment for work covered in this section. Payment at the contract unit prices for the various items in the contract will be full compensation for all work covered by this section.

Repair, removal and replacement of damaged or unacceptable equipment or work under this section will be at no additional cost to the City or Department. The City or Department will deduct the cost of City or Department owned equipment damaged by the Contractor from money due to the Contractor.

If the Department or City of Concord performs maintenance and emergency service necessary to ensure continuous traffic signal operation, all expenses incurred by the Department or City in implementing this option will be deducted from payment due the Contractor, plus $2,500 liquidated damage per occasion, per day or any portion thereof, until corrected.
2. MOBILIZATION

2.1 DESCRIPTION

This work consists of preparatory work and operations, including but not limited to the movement of personnel, equipment, supplies, and incidentals to the project site, for the establishment of offices, buildings, and other facilities necessary for work on the project; the removal and disbandment of those personnel, equipment, supplies, incidentals, or other facilities that were established for the prosecution of work on the project; and for all other work and operations which must be performed for costs incurred prior to beginning work on the various items on the project site.

2.2 MEASUREMENT AND PAYMENT

There will be no direct payment for work covered in this section. Payment at the contract unit prices for the various items in the contract will be full compensation for all work covered by this section.
3. TEMPORARY TRAFFIC CONTROL

3.1 Traffic Control

Maintain traffic in accordance with Divisions 10 and 11 of January 2018 NCDOT Standard Specifications for Roads and Structures, January 2018 Roadway Standard Drawings (RSD), and the following provisions:

Coordinate with the NCDOT Resident Engineer in charge of any project in the vicinity of this project for any work that may affect the construction and the Traffic Control of this project.

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.

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.

Proposed structures and equipment that are within 30 feet of an open travel lane and not protected by either existing guardrail or concrete barrier, the Contractor shall install proposed guardrail prior to beginning construction.

Use lane closures for either right or left lanes, as required, (refer to Roadway Standard Drawings No. 1101.02, Sheet 4 & 5 of 15), or temporary shoulder closures (refer to Roadway Standard Drawings No. 1101.04, sheet 1 of 1). Maintain the existing traffic pattern at all times, except in the immediate work zone where lane closures are allowed per this special provision or as determined by the Engineer.

Changes may be required when physical dimensions in the Roadway Standard Drawings are not attainable to meet field conditions, or result in duplicate or undesired overlapping of devices. Modifications may include: moving, supplementing, covering or removal of devices, as directed by the Engineer.

The following General Notes apply at all time for the duration of the construction project except as directed by the Engineer.

A. Time Restrictions

A) Do not close or narrow travel lanes as follows:

<table>
<thead>
<tr>
<th>Road Name</th>
<th>Day and Time Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>All roads</td>
<td>7:00 am to 9:00 am &amp; 3:00 pm to 6:00 pm Monday through Sunday</td>
</tr>
</tbody>
</table>

B) Do not close or narrow travel lanes during holidays and special events as follows:

<table>
<thead>
<tr>
<th>Road Name</th>
<th>Holiday</th>
</tr>
</thead>
<tbody>
<tr>
<td>All roads</td>
<td>1. For any unexpected occurrence that creates unusually high traffic volumes, as directed by the Engineer.</td>
</tr>
</tbody>
</table>
2. For New Year’s, between the hours of 3:00 p.m. December 31st to 9:00 a.m. January 2nd. If New Year’s Day is on a Friday, Saturday, Sunday, or Monday then until 9:00 a.m. the following Tuesday.

3. For Easter, between the hours of 3:00 p.m. Thursday and 9:00 a.m. Monday.

4. For Memorial Day, between the hours of 3:00 p.m. Friday to 9:00 a.m. Tuesday.

5. For Independence Day, between the hours of 3:00 p.m. the day before Independence Day and 9:00 a.m. the day after Independence Day. If Independence Day is on a Friday, Saturday, Sunday or Monday then between the hours of 3:00 p.m. the Thursday before Independence Day and 9:00 a.m. the Tuesday after Independence Day.

6. For Labor Day, between the hours of 3:00 p.m. Friday and 9:00 a.m. Tuesday.

7. For Thanksgiving Day, between the hours of 3:00 p.m. Tuesday to 9:00 a.m. Monday.

8. For Christmas, between the hours of 3:00 p.m. the Friday before the week of Christmas Day and 9:00 a.m. the following Tuesday after the week of Christmas.

9. For special events, between the hours of 3:00 p.m. the (day) of the week of the special events and 9:00 a.m. the following (day) after the week of the special events.

C) Do not close roads as follows:

<table>
<thead>
<tr>
<th>Road Name</th>
<th>Day and Time Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>All roads</td>
<td>7:00 am to 10:00 pm Monday through Sunday and as approved by the Engineer.</td>
</tr>
</tbody>
</table>

D) Do not stop traffic as follows:

<table>
<thead>
<tr>
<th>Road Name</th>
<th>Day and Time Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>All roads</td>
<td>7:00 am to 10:00 pm Monday through Sunday and as approved by the Engineer.</td>
</tr>
</tbody>
</table>

B. **Lane and Shoulder Closure Requirements**

E) Remove lane closure devices from the lane when work is not being performed behind the lane closure or when a lane closure is no longer needed or as directed by the Engineer.

F) When personnel and/or equipment are working within 15 ft. of an open travel lane, close the nearest open shoulder using Roadway Standard Drawing No. 1101.04 unless the work area is protected by barrier or guardrail or a lane closure is installed.

G) When personnel and/or equipment are working on the shoulder adjacent to an undivided facility and within 5 ft. of an open travel lane, close the nearest open travel lane using Roadway Standard Drawing No. 1101.02 unless the work area is protected by barrier or guardrail. When personnel and/or equipment are working on the shoulder adjacent to a divided facility and within 10 ft. of an open travel lane, close the nearest open travel lane using Roadway Standard Drawing No. 1101.02 unless the work area is protected by barrier or guardrail.

H) When personnel and/or equipment are working within a lane of travel of an undivided or divided facility, close the lane according to the traffic control plans, roadway standard drawings, or as directed by the engineer. Conduct the work so that all personnel and/or equipment remain within the closed travel lane.
I) Do not work simultaneously within 15 ft. on both sides of an open travelway, ramp, or loop within the same location unless protected with guardrail or barrier.

J) Do not install more than 2000 of lane closure on all roads measured from the beginning of the merge taper to the end of the lane closure.

K) Do not install more than 2 simultaneous lane closures in any one direction on all roads.

L) Provide a minimum of 5000 between lane closures, measured from the end of one closure to the first sign of the next lane closure.

C. Traffic Pattern Alterations

M) Notify the engineer twenty one (21) calendar days prior to any traffic pattern alteration.

D. Signing

N) Install advance work zone warning signs when work is within 40 ft. from the edge of travel lane and no more than three (3) days prior to the beginning of construction.

O) Ensure all necessary signing is in place prior to altering any traffic pattern.

E. Traffic Control Devices

P) When lane closures are not in effect space channelizing devices in work areas no greater in feet than twice the posted speed limit (mph) except, 10 ft. on-center in radii, and 3 ft. off the edge of an open travelway. Refer to Standard Specifications for Roads and Structures sections 1130 (drums), 1135 (cones) and 1180 (skinny drums) for additional requirements.

Q) Place additional sets of three channelizing devices drums perpendicular to the edge of travelway on 500 ft. centers when unopened lanes are closed to traffic.

F. Miscellaneous

R) Law enforcement may be used to maintain traffic through the work area and/or intersections as directed by the engineer.

3.2 Construction Methods

G. General

The Contractor shall provide all traffic control for this project in accordance with the January 2018 NCDOT Roadway Standard Drawings (RSD) & Standard Specifications for Roads and Structures. The Contractor shall maintain traffic during construction and furnish, install, remove, secure, and maintain all traffic control devices.

The Temporary Traffic Control as required in this contract, as shown in the Roadway Standard Drawings or as directed by the Engineer includes, but is not limited to providing Stationary & Portable Work Zone Signs, Flashing Arrow Boards (FAB), Portable Changeable Message Signs (CMS), Drums, 'Truck Mounted Attenuator (TMA), Law Enforcement, Skinny Drums and Portable Lighting.

3.3 Measurement and Payment

There will be no direct payment for work covered in this section including, but not limited to furnishing and paying for Law Enforcement. Payment at the contract unit prices for the various items in the contract will be full compensation for all work covered by this section.
4. UNDERGROUND CONDUIT

4.1 DESCRIPTION

Furnish and install conduit for underground installation with 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 MATERIAL

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 underground HDPE conduits as shown in the 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 and the Plans.

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) 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.

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:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracer Wire</td>
<td>Linear Foot</td>
</tr>
<tr>
<td>Unpaved Trenching (1) (2”)</td>
<td>Linear Foot</td>
</tr>
</tbody>
</table>
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 MATERIAL

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

Refer to Article 1098-5 (Junction Boxes) and Section 1005 (#57 or #67 Washed Stone) of the Standard Specifications.

Provide covers engraved with “FIBER OPTIC CABLE” on the top face for junction boxes used for communication cables. Covers will be engraved for junction boxes used for service conductors.

5.3 CONSTRUCTION METHODS

Install standard junction boxes with minimum inside dimensions of 30” x 15” x 24” (length x width x depth) for storage of service entrance power cables.

Install oversized heavy-duty junction boxes with minimum inside dimensions of 36” x 24” x 24” (length x width x depth) to house fiber optic splice enclosures and storage of fiber optic communications cables.

Modify existing junction boxes with minimal impact to internal conduits and cabling for the purpose of installing new conduit into the existing junction box. This item may include the removal and reinstallation of junction boxes as required and the furnishing of drainage stone or dirt as required to complete the work.

5.4 MEASUREMENT AND PAYMENT

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

Junction Box (Modified) will be measured and paid in actual number of junction boxes removed and reinstalled.

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

Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junction Box (Oversized, Heavy Duty)</td>
<td>Each</td>
</tr>
<tr>
<td>Junction Box (Modify)</td>
<td>Each</td>
</tr>
</tbody>
</table>
6. **RISER ASSEMBLIES**

6.1 **Description**

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

6.2 **Material**

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

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

6.3 **Construction Method**

Install riser assemblies in compliance with all requirements of Section 1722-3 of the Standard Specifications.

6.4 **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.

Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>2” Riser with Weatherhead</td>
<td>Each</td>
</tr>
</tbody>
</table>
7. FIBER OPTIC CABLE

7.1 DESCRIPTION

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

7.2 MATERIAL

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

Refer to Articles 1098-10(A) (SMFO Communications Cable), 1098-10(C) (Communications Cable Identification Markers), 1098-10(D) (Fiber-Optic Cable Storage Guides), and 1098-6 (Pole Line Hardware) of the Standard Specifications.

Provide communications cable identification markers with 704-920-5555 as the contact telephone number.

7.3 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 or field equipment. 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.

7.4 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 considered incidental to the installation of fiber-optic cable.

Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications Cable (12-fiber)</td>
<td>Linear Foot</td>
</tr>
</tbody>
</table>
8. FIBER OPTIC SPLICE CENTERS

8.1 DESCRIPTION

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

Modify existing fiber optic interconnect centers and/or splice enclosures as shown in the plans. Refer to manufacturer’s recommendations for opening, modifying and re-sealing the existing fiber optic interconnect center and/or fiber optic splice enclosures.

8.2 MATERIALS

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

Refer to Article 1098-11 (Fiber-Optic Splice Centers) of the Standard Specifications.

For locations where a single drop cable or two 12-fiber cables enter and terminate inside a cabinet, furnish standard-size interconnect centers with 12-position modules. For locations where more than two 12-fiber cables enter and terminate inside a cabinet, furnish oversized interconnect centers with sufficient number of modules.

8.3 CONSTRUCTION METHODS

A. General

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

Contractor is responsible for field verifying existing splicing. The Contractor shall coordinate with the Engineer where existing splicing is not as expected with regards to the number and size of existing cables shown on the Splice Details or the existing connections between cables shown on the Splice Details.

B. Testing

Provide written notification a minimum of 10 days before beginning OTDR tests.

After splicing is completed, perform bi-directional OTDR tests on each fiber, including unused fibers. Install a 1,000-ft pre-tested launch cable between the OTDR and fiber optic cable to be tested and a 1,000-ft pre-tested destination cable on the end of the fiber optic cable to be tested. Ensure each launch cable has been tested and is compatible with the fiber being installed. Provide Engineer with test results of the launch cable before use. Re-test or replace launch cable at Engineer’s request.

Ensure fusion splice losses do not exceed 0.05 dB and connectors have a loss of 0.5 dB or less. If any fiber exceeds maximum allowable attenuation or if fiber properties of the cable have been impaired, take appropriate actions up to and including replacement of the fiber cable.

Clearly label each OTDR trace identifying a starting and ending point for all fibers being tested. Record the attenuation level of each fiber and clearly indicate OTDR trace results in report format. Furnish 2 hard copies of each of the OTDR trace results and electronic copies of all trace results along with digital photographs showing workmanship for each splice on a compact disk. Furnish the manufacturer’s make, model number and software version of the OTDR used for testing.
Furnish to the Engineer 2 copies of the software needed to view the OTDR traces electronically.

### 8.4 Measurement and Payment

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

*Modifying Interconnect Center* will be measured and paid as the actual number of fiber-optic interconnect centers modified and accepted.

No measurement will be made of splice trays, pigtailed 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 interconnect centers and splice enclosures and modifying splice enclosures.

Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interconnect Center (Standard)</td>
<td>Each</td>
</tr>
<tr>
<td>Modify Interconnect Center</td>
<td>Each</td>
</tr>
</tbody>
</table>
9. DELINEATOR MARKERS

9.1 DESCRIPTION

Furnish and install delineator markers with 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 Article 1098-13 (Delineator Markers) of the Standard Specifications.

Provide delineator markers with 704-920-5555 as the contact telephone number.

9.3 CONSTRUCTION METHODS

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

9.4 MEASUREMENT AND PAYMENT

Delineator marker will be paid for by the actual number furnished, installed, and accepted.

Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delineator Marker</td>
<td>Each</td>
</tr>
</tbody>
</table>
10. SIGNAL CABINET FOUNDATIONS

10.1 DESCRIPTION
Furnish and install signal cabinet foundations and all necessary hardware.
Furnish either poured concrete foundations or preformed cabinet pad foundations and all necessary hardware. Obtain approval of foundation type.

10.2 MATERIAL
Furnish preformed cabinet pad foundation material, equipment and hardware under this section that is pre-approved on the ITS and Signals QPL.
Refer to Articles 1000-4 (Portland Cement Concrete) and 1098-15 (Signal Cabinet Foundation) of the Standard Specifications.

10.3 CONSTRUCTION METHODS
Install signal cabinet foundations in compliance with all requirements of Section 1750-3 of the Standard Specifications.

10.4 MEASUREMENT AND PAYMENT
*Signal Cabinet Foundation* will be measured and paid as the actual number furnished, installed and accepted.
Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal Cabinet Foundation</td>
<td>Each</td>
</tr>
</tbody>
</table>
11. CABINET BASE EXTENDER

11.1 DESCRIPTION
Furnish and install cabinet base adapters and extenders with all necessary hardware for Type 170 cabinets.

11.2 MATERIAL
Furnish material, equipment and hardware under this section that is pre-approved on the ITS and Signals QPL.

Refer to Article 1098-16 (Cabinet Base Adapter or Extender) of the Standard Specifications.

11.3 CONSTRUCTION METHODS
Install cabinet base adapters and extenders in compliance with all requirements of Section 1753-3 of the Standard Specifications.

11.4 MEASUREMENT AND PAYMENT
Cabinet Base Extenders will be measured and paid as the actual number furnished, installed and accepted.

Payment will be made under:

Pay Item Pay Unit
Cabinet Base Extender.........................................................................................................................Each
12. ELECTRICAL SERVICE

12.1 DESCRIPTION

Install new electrical service equipment as shown in the Plans. The first item of work on this project is the installation of all electrical service poles and meter base/disconnect panels to expedite the power service connections. 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 Signal Supervisor from the City of Concord Traffic Signal Division.

The Contractor shall coordinate with the utility provider to verify that materials provided meet the requirements set forth by the utility provider.

The Contractor shall coordinate with the local utility service provider (City of Concord: Electric Department) for the electrical service and installation of service conduits. Service conduits are to be installed within the same trench as the proposed communications cable conduit between the existing communications junction box and the proposed DMS cabinet.

12.2 MATERIAL

A. Meter Base/Disconnect Combination Panel

Furnish and install new meter base/disconnect combination panels as shown in the Plans and approved for use by the utility company. Provide meter base/disconnect combination panels that have a minimum of four (4) spaces in the disconnect. Furnish a double pole 50A circuit breakers 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 3 AWG.

All new electrical breakers shall be labeled with the maximum available fault current. The City will obtain this information from the utility company and the Contractor shall request it from the Engineer.

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 degrees 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 4/0 AWG and smaller Copper/Aluminum wire
- With or without horn bypass
- Made of galvanized steel
- Listed as meeting UL Standard US-414Overhead or underground service entrance specified.
Furnish 1.25” 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:

<table>
<thead>
<tr>
<th>Type of design</th>
<th>Silicon Oxide Varistor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>120/240 Single Phase, 3 wire</td>
</tr>
<tr>
<td>Maximum current</td>
<td>100,000 amps</td>
</tr>
<tr>
<td>Maximum energy</td>
<td>3000 joules per pole</td>
</tr>
<tr>
<td>Maximum number of surges</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Response time one milliamp test</td>
<td>5 nanoseconds</td>
</tr>
<tr>
<td>Response time to clamp 10,000 amps</td>
<td>10 nanoseconds</td>
</tr>
<tr>
<td>Response time to clamp 50,000 amps</td>
<td>25 nanoseconds</td>
</tr>
<tr>
<td>Leak current at double the rated voltage</td>
<td>None</td>
</tr>
<tr>
<td>Ground wire</td>
<td>Separate</td>
</tr>
</tbody>
</table>

B. 4-Wire Copper Feeder Conductors

Furnish 4-wire stranded copper feeder conductors with THWN rating for supplying power to DMS field equipment. Provide conductors with black, 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 Plans for wire sizes and quantities.

C. 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 Plans.

12.3 Construction Methods

A. General

Coordinate with the Engineer and the utility company to install new electrical service at the proposed DMS location.

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.
B. Meter Base/Disconnect Combination Panel

Install meter base/disconnect combination panels with lightning arrestors as called for in the Plans. Route the feeder conductors from the meter base/disconnect to the equipment cabinet in conduit. Provide rigid galvanized conduit for above ground and PVC for below ground installations.

C. 4-Wire Copper Feeder Conductors

At locations shown in the Plans, install 4-wire THWN stranded copper feeder conductors to supply 240/120 VAC to the DMS field equipment. Size the conductors as specified in the Plans. Comply with the Standard Specifications and Standard Drawings and all applicable electrical codes.

D. Grounding System

Install ground rods as indicated in the 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.

12.4 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.

4-Wire copper feeder conductors will be measured and paid as the actual linear feet of 4-wire THWN stranded copper feeder conductors furnished, installed and accepted. Payment is for all four 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:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meter Base/Disconnect Combination Panel</td>
<td>Each</td>
</tr>
<tr>
<td>4-Wire Copper Feeder Conductors</td>
<td>Linear Foot</td>
</tr>
<tr>
<td>5/8” X 10’ Grounding Electrode</td>
<td>Each</td>
</tr>
<tr>
<td>#4 Solid Bare Grounding Conductor</td>
<td>Linear Foot</td>
</tr>
</tbody>
</table>
13. OVERHEAD SIGN SUPPORT

13.1 DESCRIPTION

Design, fabricate, furnish and erect a full span overhead sign assembly. Fabricate supporting structures using tubular steel. Cantilevered and monotube (horizontal Truss) DMS structures will not be allowed. The Contractor is responsible for field verifying the S-dimension drawings to the Engineer for approval. Furnish and install full-span overhead DMS structures with a minimum of 20 feet clearance from the high point of the road to the bottom of the DMS enclosure.

13.2 MATERIALS

Refer to Division 10

<table>
<thead>
<tr>
<th>Item</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Steel</td>
<td>1072</td>
</tr>
<tr>
<td>Overhead Sign Structures</td>
<td>1096</td>
</tr>
<tr>
<td>Signing Materials</td>
<td>1092</td>
</tr>
<tr>
<td>Organic Zinc Repair Paint</td>
<td>1080-9</td>
</tr>
<tr>
<td>Reinforcing Steel</td>
<td>1070</td>
</tr>
<tr>
<td>Direct Tension Indicators</td>
<td>440 and 1072</td>
</tr>
</tbody>
</table>

13.3 CONSTRUCTION METHODS

A. General

Fabricate overhead sign assemblies in accordance with the details shown in the approved working drawings and the requirements of these specifications.

No welding, cutting or drilling will be permitted in the field, unless approved by the Engineer.

Drill bolt holes and slots to finished size. Holes may also be punched to finish size, provided the diameter of the punched holes is at least twice the thickness of the metal being punched. Flame cutting of bolt holes and slots is not permitted.

Erect sign panels in accordance with the requirement for Type A or B signs as indicated in the plans or Roadway Standard Drawings. Field drill two holes per connection in the Z bars for attaching signs to overhead structures. Provide two U-bolts at each U-bolt connection such as each truss chord to sign hanger and each truss chord to walkway support or light support.

Provide two U-bolts at each U-bolt connection where ends of truss chords are supported. The minimum diameter of all U-bolts is ½ inch.

For all U-bolt connections of hanger beams to overhead assembly truss chords, provide all U-bolts with a flat washer and double nuts at each end of the U-bolts. All double nuts that are on any U-bolt shall be the same thickness and weight. When assembled, the double nuts shall be brought tight against each other by the use of two wrenches.

Use two coats of a zinc-rich paint to touch up minor scars on all galvanized materials.
For high strength bolted connections, use direct tension indicators. Galvanize bolts, nuts and washers in accordance with the Standard Specifications.

**B. Shop Drawings**

Design the overhead sign supports, including foundations, prior to fabrication. Submit design calculations and working drawings of the designs to the Engineer for review and acceptance.

Have a professional engineer registered in the State of North Carolina perform the computations and render a set of sealed, signed and dated drawings detailing the construction of each structure.

Submit to the Engineer for review and acceptance complete design and fabrication details for each overhead sign assembly, including foundations and brackets for supporting the signs and maintenance walkways, if applicable, electrical control boxes, and lighting luminaires. Base design upon the revised structure line drawings, wind load area and the winds speed shown in the plans, and in accordance with the AASHTO Standard Specifications for Structural Structures for Highway Signs, Luminaires and Traffic Signals, 6th Edition, 2013 and 2015 Interim Revisions.

Submit electronic (.pdf) copies of completely detailed working drawings and the design calculations including all design assumptions for each overhead sign assembly to the Engineer for approval prior to fabrication. Working drawings shall include complete design and fabrication details (including foundations), provisions for attaching signs, maintenance walkways (when applicable), lighting luminaires to supporting structures, applicable material specifications, and any other information necessary for procuring and replacing any part of the complete overhead sign assembly.

Allow 40 days for initial working drawing review after the Engineer receives them. If revisions to working drawings are required, an additional 40 days shall be required for review and approval of the final working drawings.

Approval of working drawings by the Engineer shall not relieve the Contractor of responsibility for the correctness of the drawings, or for the fit of all shop and field connections and anchors.

**C. Design and Fabrication**

The following criteria govern the design of overhead sign assemblies:


Within this Specification, there are several design criteria that are owner specified. They include:

- Overhead cantilever sign structures shall include galloping loads (exclude four-chord horizontal trusses)
- The Yearly Mean Wind Velocity, $V_{\text{mean}}$, in North Carolina shall be assumed to be 11.6 mph.
- The Fatigue Importance Category used in the design, for each type of structure, shall be for:
  - Cantilevered structures with span greater than 50 feet – Fatigue Importance Category I.
Cantilevered structures with span less than or equal to 50 feet – Fatigue Importance Category II.

Non-Cantilevered structures – Fatigue Importance Category II.

The following Specification interpretations or criteria shall be used in the design of overhead sign assemblies:

- For design of supporting upright posts or columns, the effective length factor for columns “K”, as provided for in Appendix B, Section B.5, shall be taken as the following, unless otherwise approved by the Engineer:

  Case 1 For a single upright post of cantilever or span type overhead sign structure, the effective column length factor, “K”, shall be taken as 2.0.

  Case 2 For twin post truss-type upright post with the post connected to one chord of a horizontal truss, the effective column length factor for that column shall be taken as 2.0.

  Case 3 For twin post truss-type upright post with the post connected to two truss chords of a horizontal tri-chord or box truss, the effective column length factor for that column shall be taken as 1.65.

- For twin post truss-type uprights, the unbraced length of the post shall be from the chord to post connection to the top of base plate.

- For twin post truss-type uprights, when the post is subject to axial compression, bending moment, shear, and torsion, the post shall satisfy the AASHTO Standard Specifications for Structural Structures for Highway Signs, Luminaires and Traffic Signals, 6th Edition, 2013 and 2015 Interim Revisions Equations 5.12.2.1-1, 5.12.2.1-2 and 5.12.2.1-5. To reduce the effects of secondary bending, in lieu of Equation 5.12.2.1-2, the following equation may be used:

  \[
  \frac{f_a}{F_a} + \frac{f_b}{F_b} \left(1 - \frac{0.6f_a}{F_{\bar{e}}}ight) + \left(\frac{f_v}{F_v}\right)^2 \leq 1.0
  \]

  Where \( f_a \) = Computed axial compression stress at base of post

- The base plate thickness for all uprights and poles shall be a minimum of 2” but not less than that determined by the following criteria and design.
Case 1  Circular or rectangular solid base plates with the upright pole welded to the top surface of the base plate with full penetration butt weld, and where no stiffeners are provided. A base plate with a small center hole, which is less than 1/5 of the upright diameter, and located concentrically with the upright pole, may be considered as a solid base plate.

The magnitude of bending moment in the base plate, induced by the anchoring force of each anchor bolt shall be calculated as \( M = \frac{P \times D_1}{2} \).

Case 2  Circular or rectangular base plate with the upright pole socketed into and attached to the base plate with two lines of fillet weld, and where no stiffeners are provided, or any base plate with a center hole that is larger in diameter than 1/5 of the upright diameter. The magnitude of bending moment induced by the anchoring force of each anchor bolt shall be calculated as \( M = P \times D_2 \).

Where

- \( M \) = bending moment at the critical section of the base plate induced by one anchor bolt
- \( P \) = anchoring force of each bolt
- \( D_1 \) = horizontal distance between the center of the anchor bolt and the outer face of the upright, or the difference between the radius of the bolt circle and the radius of the upright
- \( D_2 \) = horizontal distance between the face of the upright and the face of the anchor bolt nut

- The critical section shall be located at the face of the anchor bolt and perpendicular to the radius of the bolt circle. The overlapped part of two adjacent critical sections shall be considered ineffective.
- The thickness of Case 1 base plate shall not be less than the calculated based on formula for Case 2.
- Uprights, foundations, and trusses that support overhead signs shall be designed in accordance with the Overhead and Dynamic Message Sign Foundations Project Special Provision for the effects of torsion. Torsion shall be considered from dead load eccentricity of these attachments, as well as for the attachments such as supporting brackets, lights, etc., that add to the torsion in the assembly. Truss vertical and horizontal truss diagonals in particular and any other assembly members shall be appropriately sized for these loads.
- Uprights, foundations, and trusses that support overhead mounted signs shall be designed for the proposed sign wind area as noted in the contract drawings. Truss vertical and
horizontal truss diagonals in particular and any other assembly members shall be appropriately sized for these loads.

For non-cantilevered monotube sign support structures, the following table and figures are considered as a required addition to the AASHTO *Standard Specifications for Structural Structures for Highway Signs, Luminaires and Traffic Signals, 6th Edition, 2013 and 2015 Interim Revisions:*

<table>
<thead>
<tr>
<th>Construction</th>
<th>Detail</th>
<th>Stress Category</th>
<th>Application</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanically Fastened Connections</td>
<td>25. Bolts in tension</td>
<td>D</td>
<td>Beam column connection for monotube structures</td>
<td>16</td>
</tr>
<tr>
<td>Fillet-Welded Connections</td>
<td>26. Fillet weld with one side normal to the applied stress</td>
<td>E'</td>
<td>Beam column connection for monotube structures</td>
<td>16</td>
</tr>
<tr>
<td>Mechanically Fastened Connections</td>
<td>27. High-Strength bolts in tension</td>
<td>D</td>
<td>Monotube or truss-chord splice</td>
<td>17</td>
</tr>
<tr>
<td>Fillet-Welded Connections</td>
<td>28. Fillet weld with one side normal to the applied stress</td>
<td>E'</td>
<td>Monotube or truss-chord splice</td>
<td>17</td>
</tr>
<tr>
<td>Mechanically Fastened Connections</td>
<td>29. U-bolts tied to the transverse truss column to keep the chords in place</td>
<td>D</td>
<td>Horizontal truss connection with the vertical truss</td>
<td>18</td>
</tr>
<tr>
<td>Mechanically Fastened Connections</td>
<td>30. Net section of full-tightened, high-tension bolts in shear</td>
<td>B</td>
<td>Truss-bolted joint</td>
<td>18</td>
</tr>
</tbody>
</table>
Fabricate all overhead sign assemblies, including but not limited to foundations, in accordance with the details shown on the approved shop drawings and with the requirements of these Specifications.

Fabricate the span and cantilever supporting structures using tubular members of either aluminum or steel, using only one type of material throughout the project. Sign support structures that are to be attached to bridges shall be fabricated using other structural shapes.

Horizontal components of the supporting structures for overhead signs may be of a truss design or a design using singular (monotube) horizontal members to support the sign panels.

Truss or singular member centerline must coincide with the centerline of sign design area shown on the structure line drawing.

Provide permanent camber in addition to dead load camber in accordance with the AASHTO Standard Specifications for Structural Structures for Highway Signs, Luminaires and Traffic Signals, 6th Edition, 2013 and 2015 Interim Revisions. Indicate on the shop drawings the amount of camber provided and the method employed in the fabrication of the support to obtain the camber.

* From NCHRP Report 494 dated 2003
Use cantilever sign structures that meet the following design criteria:

a. Do not exceed an L/150 vertical dead load deflection at the end of the arm due to distortions in the arm and vertical support, where L is the length of the arm from the center of the vertical support to the outer edge of the sign.

b. Do not exceed an L/40 horizontal deflection at the end of the arm due to distortions in the arm and vertical support, as a result of design wind load.

Fabricate attachment assemblies for mounting signs in a manner that allows easy removal of sign panels for repair.

13.4 MEASUREMENT AND PAYMENT

*Overhead Sign Support* will be paid for at the contract lump sum for each full span, Overhead Sign Structure. Such price will be full compensation for all work covered by this specification includes all design, fabrication, construction, transportation, and erection of the complete overhead sign structure, supporting structure, hardware, lighting support brackets, preparing and furnishing shop drawings, and attaching the signs to the overhead assembly.

Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead Sign Support</td>
<td>Each</td>
</tr>
</tbody>
</table>
14. OVERHEAD AND DYNAMIC MESSAGE SIGN FOUNDATIONS

14.1 DESCRIPTION

Sign foundations include foundations for overhead and dynamic message signs (DMS) supported by metal poles or upright trusses. Sign foundations consist of footings with pedestals or drilled piers with or without grade beams or wings, conduit and anchor rod assemblies. Construct sign foundations in accordance with the contract and accepted submittals. Define “cantilever sign” as an overhead cantilever sign support in accordance with Figure 1-1 of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

14.2 MATERIALS

Use sign foundation materials that meet the Foundations and Anchor Rod Assemblies for Metal Poles provision.

A. Assumed Subsurface Conditions

Assume the following soil parameters and groundwater elevation for sign foundations unless these subsurface conditions are not applicable to sign locations:

(A) Unit weight (γ) = 120 lb/cf,
(B) Friction angle (ϕ) = 30°,
(C) Cohesion (c) = 0 lb/sf and
(D) Groundwater 7 ft below finished grade.

A subsurface investigation is required if the Engineer determines these assumed subsurface conditions do not apply to a sign location and the sign cannot be moved. Subsurface conditions requiring a subsurface investigation include but are not limited to weathered or hard rock, boulders, very soft or loose soil, muck or shallow groundwater. No extension of completion date or time will be allowed for subsurface investigations.

B. Subsurface Investigations

Use a prequalified geotechnical consultant to perform one standard penetration test (SPT) boring in accordance with ASTM D1586 at each sign location requiring a subsurface investigation. Rough grade sign locations to within 2 ft of finished grade before beginning drilling. Drill borings to 2 drilled pier diameters below anticipated pier tip elevations or refusal, whichever is higher.

Use the computer software gINT version V8i or later manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs. Provide boring logs sealed by a geologist or engineer licensed in the state of North Carolina.

C. Sign Foundation Designs

Design sign foundations for the wind zone and clearances shown in the plans and the slope of finished grade at each sign location. Use the assumed soil parameters and groundwater elevation above for sign foundation designs unless a subsurface investigation is required. For sign locations requiring a subsurface investigation, design sign foundations for the subsurface conditions at each sign location. Design footings, pedestals, drilled piers, grade beams and wings in accordance with

Design footings in accordance with Section 4.4 of the AASHTO *Standard Specifications for Highway Bridges*. Do not use an allowable bearing pressure of more than 3,000 lb/sf for footings.

Design drilled piers for side resistance only in accordance with Section 4.6 of the AASHTO *Standard Specifications for Highway Bridges* except reduce ultimate side resistance by 25% for uplift. Use the computer software LPILE version 6.0 or later manufactured by Ensoft, Inc. to analyze drilled piers. Provide drilled pier designs with a horizontal deflection of less than 1" at top of piers. For cantilever signs with single drilled pier foundations supporting metal poles, use wings to resist torsion forces. Provide drilled pier designs with a factor of safety of at least 2.0 for torsion.

For drilled pier sign foundations supporting upright trusses, use dual drilled piers connected with a grade beam having a moment of inertia approximately equal to that of either pier. The Broms’ method is acceptable to analyze drilled piers with grade beams instead of LPILE. Use a safety factor of at least 3.5 for the Broms’ design method in accordance with C13.6.1.1 of the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*.

Submit boring logs, if any, working drawings and design calculations for acceptance in accordance with Article 105-2 of the 2018 *Standard Specifications*. Submit working drawings showing plan views, required foundation dimensions and elevations and typical sections with reinforcement, conduit and anchor rod assembly details. Include all boring logs, design calculations and LPILE output for sign foundation design submittals. Have sign foundations designed, detailed and sealed by an engineer licensed in the state of North Carolina.

**14.3 CONSTRUCTION METHODS**

Construct footings, pedestals, drilled piers, grade beams and wings and install anchor rod assemblies for sign foundations in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

**14.4 MEASUREMENT AND PAYMENT**

*Overhead Footings* will be measured and paid in cubic yards. Sign foundations will be measured as the cubic yards of foundation concrete for footings, pedestals, drilled piers, grade beams and wings shown on the accepted submittals. The contract unit price for *Overhead Footings* will be full compensation for providing labor, tools, equipment and foundation materials, stabilizing or shoring excavations and supplying concrete, reinforcing steel, conduit, anchor rod assemblies and any incidentals necessary to construct sign foundations. Subsurface investigations required by the Engineer will be paid as extra work in accordance with Article 104-7 of the 2018 *Standard Specifications*.

Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead Footings</td>
<td>Cubic Yard</td>
</tr>
</tbody>
</table>
15. DYNAMIC MESSAGE SIGN ASSEMBLY

15.1 DESCRIPTION

This work shall consist of furnishing, installing, testing, integrating, and making fully operational the new Light Emitting Diode (LED) Dynamic Message Signs (DMS), control equipment, and miscellaneous equipment and services in accordance with these specifications and as shown on the plans or as directed by the Engineer.

Contact the City of Concord - Traffic Engineer at 704-920-5377 to confirm all DMS locations prior to beginning construction.

Furnish operating DMS systems consisting of, but not limited to, the following:

- Two Front access DMS(s)
  - Full Matrix, Full Color, 20 mm, 96 pixels high and 288 pixels wide LED front access DMS
  - Installed on Full Span Sign Bridge type DMS support structures
- One ground mounted DMS equipment cabinet, Two DMS Controllers, Auxiliary controllers, and accessories with DMS controller to DMS interconnect and power cabling
- Enterprise DMS configuration software
- All conduits, couplings, fittings required to interconnect the DMS controller with the DMS
- Branch circuit conductors and related equipment
- All other equipment and incidentals required for furnishing, installing, and testing the DMS system and system components

15.2 MATERIALS

A. General

The DMS shall be front access sign assemblies, and shall be full color, full matrix.

Each sign shall be provided with the mounting hardware necessary to attach the sign assembly to the DMS support structure. All structural components of the DMS and support structure attachment hardware shall be designed, signed and sealed by a Professional Engineer, holding a valid license to practice engineering in the State of North Carolina.

The DMS communications protocol shall be the National Transportation Communication for ITS Protocol (NTCIP) Version 02.35 (1203 v02.35).

The DMS shall meet all applicable electrical, structural and environmental requirements of the State of North Carolina including but not limited to the 2018 Standard Specifications, the Manual on Uniform Traffic Control Devices, the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, the National Electrical Code, and any NCDOT addendums and supplements to these standards.

The terms Dynamic Message Sign (DMS), Changeable Message Sign (CMS), and Variable Message Sign (VMS) have differences and are often used interchangeably within this industry. For
the purposes of this project, the term DMS will be used. If a reference is made to the terms CMS or VMS, it will represent the Dynamic Message Signs specified by these contract documents.

The front face of the sign (display area) shall aluminum mask over clear (non-matte) polycarbonate sheeting.

The removal of any combination of one or more modules shall not alter the structural strength of the sign display assembly or sign case.

The removal of any combination of display modules shall not affect the operation of the remaining functional modules in any way.

All serviceable components (except the Uninterruptible Power Source) shall weigh 50 pounds or less.

Each DMS shall consist of the following minimum components and general requirements:

- Light Emitting Diode (LED), Full Matrix Display technology.
- Structural support to DMS sign case mounting brackets, I-beams, Z bars, bolts, nuts, washers and other hardware required for the installation to the DMS support structure.
- Roadside Control Cabinet, Cabinet mounted DMS Controller Unit, DMS Cabinet mounted Auxiliary Controller Unit, DMS Controller Unit Software, DMS maintenance Software and documentation, Fiber Optic Cable (or approved manufacturers’ cable) for connection between the sign case control and the Roadside Control Cabinet Control.
- All materials shall be new and free of defects and blemishes. Materials shall be handled so that no stress is introduced during the fabrication or assembly process that reduces the strength or durability of the material from the material vendor’s specifications. Protective coatings shall be applied in conformance with the manufacturers’ recommendations to achieve maximum coating life.
- All hardware and fasteners shall be stainless steel with the exception of the DMS sign case lifting eyes which shall be hot dipped galvanized high strength steel. Lifting eyes shall be attached to the DMS sign case with hex nuts and flat washers. Washers shall be placed on each side of the sign case (interior/exterior) and be fabricated of stainless steel or other metal that is compatible with the aluminum sign case material. Lifting eyes shall be left in place. DMS sign case intrusions for lifting eyes shall be sealed to prevent liquid or vapor infiltration. Alternative lifting configurations shall not be used unless approved by the Engineer.
- All electronic components shall be rated for NEMA TS-4 environmental conditions. Electrical / electronic component power, signal, data, board to board, board to connector and grounding connections shall be non-corrosive low loss, vibration resistant points that pass the minimum and maximum current levels without loss levels that reduce the performance of the inter-mating assemblies when subjected to NEMA TS-4 environmental conditions.
- All conduits and electrical conductors installed between the DMS equipment cabinet and the DMS shall meet requirements set forth in the NCDOT 2018 Standard Specification and the NEC. 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.
15.3 DMS MATERIALS

A. DMS Housings Design:

All sign equipment, components, modular assemblies, and other materials located in the sign housing shall be removable, transportable, and capable of being installed by a single technician utilizing a one-person aerial lift truck. Structural members and components thereof are not included in this requirement.

Housings shall have interior non-corrosive, metal cage support frames to mount the display clusters. The cage support frame shall be designed to withstand and minimize vibrational effects to the display and/or electronics.

The lighting fixtures shall be positioned to avoid interference with personnel head room and shall cast light at levels to allow a technician with normal vision to identify the make and model of each component and to locate the fasteners and connections necessary to replace module or assembly.

The sign housing and display panel shall be designed to minimize visible internal light outside the DMS during nighttime maintenance activities.

1. SIGN HOUSINGS, FACES, FRAMING AND MOUNTING MEMBERS:

Sign housings, faces, framing and mounting members shall comply with specifications found herein. The housing top shall be crowned to prevent standing water and shall be constructed so that it is weather resistant under all conditions. Maintenance and repair of the DMS shall be from the outside through either front or back access doors. Front doors and other panels required to be moved out of their normal closed position for maintenance or repair of the DMS shall not impair assess of a maintenance person to the internal components of the DMS from a bucket truck.

Sign housings shall be constructed of aluminum, alloy 5052 H34, and with a minimum thickness of 0.125 inch. Seams shall be continuously welded (chemically bonded only as approved by the Engineer) and smooth except for the KYNAR 500 polyvinylidene fluoride (PVDF) or approved equal coated sign face. All welds shall be neatly formed and free of cracks, blow holes and other irregularities. All exterior cabinet welds shall be made using the gas tungsten arc (TIG) welding method. All internal cabinet welds shall be made using the gas metal arc (MIG) or TIG process. Other welding methods may be used only if approved by the Engineer in advance. All inside and outside edges of the cabinet shall be free of burrs. All edges shall be filled to a radius of 0.03125 inch minimum. ER5356 aluminum alloy bare welding electrodes shall be used and conform to American Welding Society standard AWS A5.10 requirements for welding on aluminum. Procedures, welders and welding operators shall conform to AWS requirements as contained in AWS B3.0 and C5.6 for aluminum. Framing structural shapes shall be constructed of aluminum, alloy 6061-T6. Non-corrosive materials shall be used and corrosion protection shall be provided between dissimilar metals. Sign cases shall be cleaned and de-oxidized after welding. The cases shall have a smooth, uniform finish without rivet holes, visible scratches or gouges on the outer surface. The front of the cases shall be finished matte black. The remaining exterior surfaces shall be natural aluminum finish. Other finishes may be acceptable if approved by the Engineer. The sign case interiors shall be unpainted.

Sign housing, face coverings, framing and mounting members shall be designed to conform to the requirements of AASHTO's Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and the following clarifications:
Regional wind speed shall be used in the designs. Alternate method for wind pressures shall not be used.

When the installation location of the structures being designed lie between isotachs, the basic wind speed shall be determined by using the higher adjacent isotach. Any optional design parameters indicated in the AASHTO specification that are allowed when acceptable to the owner shall not be used for the designs.

Signs shall be constructed to present a clean, neat appearance; and the equipment located within shall be protected from moisture, dust, dirt and corrosion. Sign enclosures shall contain small weep holes for draining moisture that accumulates in the signs from condensation. Weep holes shall be designed to prevent the entrance of insects or roadway debris and vehicle fumes.

Signs shall be attached to the vertical truss of the butterfly and overhead sign structure with I-beams. DMS signs shall be furnished with all required attachments and hardware for attachment to the I-beams on overhead and butterfly sign structures. The number of I-beams needed and the method of attaching the I-beams to the sign housing and the vertical truss of the overhead sign structure shall conform to the requirements of AASHTO's Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and the following:

Any optional design parameters indicated in the AASHTO specification that are allowed when acceptable to the owner shall not be used for the designs.

Lifting eyes or the equivalent shall be provided for moving and mounting signs. Sign housings shall be designed so that the sign(s) can be shipped and temporarily stored without damage or undue stresses prior to installation on the support structure. Signs shall be shipped with a temporary wood support frame that permits the shipping/storage of the sign in an above ground vertical position without damage to the sign housing.

The exterior of sign housing shall not have any manufacturer decals or identification plates of any kind attached to the housing. The interior of the sign housing shall have a permanent label with the date of manufacture, the model number, the serial number and the manufacturer identified. The label data shall match the documentation package provided with each DMS.

2. **FRONT FACE CONSTRUCTION**

The DMS front face shall be constructed with multiple vertically hinged rigid door panels, each of which contains a full-height section of the LED display matrix. The door panels shall be fabricated using aluminum sheeting on the exterior and polycarbonate sheeting on the interior of the panel.

The DMS housing shall provide safe and convenient access to all modular assemblies, components, wiring, and subsystems located within the DMS housing. All of those internal components shall be removable and replaceable by a single technician.

**a. Doors**

One (1) access door shall be provided for each 20 to 30 pixel wide section of the sign housing. These doors shall be vertically hinged and shall contain a section of the sign’s front face. The doors shall swing out from the face to provide access to the cabinet interior. Each door shall extend the full height of the display matrix.
To prevent open doors from blowing in wind, they shall have a retaining latch mechanism to hold the door open at a 90-degree angle.

Each door shall form the face panel for a section of the sign. The LED modules shall be mounted to the door and be removable from the door when in the open position. Other sign components, such as power supplies, wiring, etc. shall be located inside the sign cabinet and be accessible through the door opening. Each door shall cover an opening that is a minimum of 23 inches (584mm) wide and the same height as the display pixel matrix.

Each door shall contain a minimum of two (2) captive type latches to lock them in the closed position. These latches shall be captive to prevent them from falling off. They shall pull the door tight and compress a gasket located around the perimeter of each door. They shall also be capable of providing leverage to easily release the gasket seal when opening the doors. The gasket shall prevent water from entering the cabinet around the door.

The DMS front face shall be constructed with multiple vertically hinged rigid door panels, each of which contains a full-height section of the LED display matrix. The door panels shall be fabricated using aluminum sheeting on the exterior and polycarbonate sheeting on the interior of the panel.

b. Face Panels

Front face panels shall provide a high-contrast background for the DMS display matrix. The aluminum mask of each door panel shall be painted black and shall contain an opening for each pixel. Openings shall be large enough to not block any portion of the viewing cones of the LEDs.

Each door panel shall have a single polycarbonate sheet attached securely to the inside of the aluminum panel. The polycarbonate sheet shall cover all of the pixel openings. The polycarbonate shall be sealed to prevent water and other elements from entering the DMS. The polycarbonate shall contain UV inhibitors that protect the LED display matrix from the effects of ultraviolet light exposure and prevent premature aging of the polycarbonate itself.

The use of a plastic lens system will not meet the requirements and will be cause for rejection. Polycarbonate sheets shall have the following characteristics:

- Tensile Strength, Ultimate: 10,000 PSI
- Tensile Strength, Yield: 9,300 PSI
- Tensile Strain at Break: 125%
- Tensile Modulus: 330,000 PSI
- Flexural Modulus: 330,000 PSI
- Impact Strength, Izod (1/8", notched): 17 ft-lbs/inch of notch
- Rockwell Hardness: M75, R118
- Heat Deflection Temperature Under Load: 264 PSI at 270F and 66 PSI at 288F
- Coefficient of Thermal Expansion: 3.9X10-5 in/in/F
- Specific Heat: 0.30 BTU/lb/F
- Initial Light Transmittance: 85% minimum
- Change in Light Transmittance, 3 years exposure in a Southern latitude: 3%
- Change in Yellowness Index, 3 years exposure in a Southern latitude: less than 5%

LED display modules shall mount to the inside of the DMS front face door panels. No tools shall be needed for removal and replacement of LED display modules.
DMS front face borders (top, bottom, left side, and right side), which surround the front face panels and LED display matrix, shall be painted black to maximize display contrast and legibility. The surrounding borders shall be a minimum of 2/3 of the character height on the display according to NEMA TS4’s standard font set (7) pixels high by (5) pixels wide font).

In the presence of wind, the DMS front face shall not distort in a manner that adversely affects LED message legibility.

3. **Exterior Finish**

DMS front face panels and front face border pieces shall be coated with semi-gloss black polyvinylidene fluoride (PDVF) applied in accordance to American Architectural Manufacturers Association (AAMA 2605) which has an expected outdoor service life of 10 to 15 years.

All other DMS housing surfaces, including the DMS mounting brackets, shall be natural mill-finish aluminum.

4. **LED Display Modules**

The DMS shall contain LED display modules that include an LED pixel array, and LED driver circuitry. These modules shall be mounted adjacently in a two-dimensional array to form a continuous LED pixel matrix. Each LED display module shall be constructed as follows:

- Each LED display module may consist of one or two circuit boards. If two boards are used, they shall be mounted physically to each other using durable non-corrosive hardware. They shall be electrically connected via one or more header-type connectors. The header connectors shall be keyed such that the boards cannot be connected incorrectly.
- All LED modules shall be manufactured and designed to IPC standards.
- Each LED display module shall be mounted to the rear of the display’s front face panels using durable non-corrosive hardware. No tools shall be required for module removal and replacement. The modules shall be mounted such that the LEDs emit light through the face panel’s pixel holes and such that the face panel does not block any part of the viewing cone of any of the LEDs in any pixels. The use of light enhancing lenses to achieve defined viewing cone shall be cause for rejection.
- LED display module power and signal connections shall be a quick-disconnect locking connector type. Removal of a display module from the DMS shall not require a soldering operation.
- All exposed metal on both sides of each printed circuit board, except connector contacts, shall be protected from water and humidity exposure by a thorough application of conformal coating. Bench level repair of individual components, including discrete LED replacement and conformal coating repair, shall be possible.
- Individual addressing of each LED display module shall be configured via the communication wiring harness and connector. No on-board addressing jumpers or switches shall be allowed.
- Removal or failure of any LED module shall not affect the operation of any other LED module or sign component. Removal of one or more LED modules shall not
affect the structural integrity of any part of the sign. It shall not be possible to mount an LED display module upside-down or in an otherwise incorrect position within the DMS display matrix.

- All LED display modules, as well as the LED pixel boards and driver circuit boards, shall be identical and interchangeable throughout the DMS.

5. **LED Pixels:**

Each LED module shall contain a printed circuit board to which LED pixels are soldered. The LED pixel matrix shall conform to the following specifications:

- Each LED module shall contain a minimum of 135 LED pixels configured in a two-dimensional array. The pixel array shall be a minimum of nine (9) pixels high by fifteen (15) pixels wide.

- The distance from the center of one pixel to the center of all adjacent pixels, both horizontally and vertically, shall be 0.81-inches (20 mm).

- All pixels shall contain an equal quantity of discrete LEDs and LED strings. If a pixel contains four (4) or more discrete LEDs, then each pixel shall contain a minimum of two (2) independent and parallel strings of LEDs.

- The failure of an LED string or pixel shall not cause the failure of any other LED string or pixel in the DMS.

- Each pixel shall contain the quantity of discrete LEDs needed to output white colored light at a minimum luminous intensity of 12,400 candelas per square meter when measured using a photometric meter through the DMS front face panel assembly. Failure to conform to the requirements will be cause for rejection.

- Each pixel shall also be capable of displaying amber colored light with a minimum luminous intensity of 7,440 candelas per square meter when measured using a photometric meter through the DMS front face panel assembly. Failure to conform to the requirements will be cause for rejection.

- The circular base of the discrete LEDs shall be soldered so that they are flush and parallel to the surface of the printed circuit board. The longitudinal axis of the LEDs shall be perpendicular to the circuit board.

6. **Discrete LEDs:**

All LED's provided for the manufacture of DMS shall conform to the following requirements:

- All LEDs shall have a nominal viewing cone of 30 degrees with a half-power angle of 15 degrees measured from the longitudinal axis of the LED. Viewing cone tolerances shall be as specified in the LED manufacturer’s product specifications and shall not exceed +/- 5 degrees. Using optical enhancing lenses with 15 degree LED’s will not conform to 30 degree half-power viewing cone specifications and will be cause for rejection.

- Red LEDs shall utilize AllInGaP semiconductor technology and shall emit red light that has a peak wavelength of 615-635nm.
Green LEDs shall utilize InGaN semiconductor technology and shall emit green light that has a peak wavelength of 520-535nm.

Blue LEDs shall utilize InGaN semiconductor technology and shall emit blue light that has a peak wavelength of 464-470nm.

The LED packages shall be fabricated from UV light resistant epoxy.

The LED manufacturer shall perform intensity sorting of the bins. LEDs shall be obtained from no more than two (2) consecutive luminous intensity “bins” as defined by the LED manufacturer.

The LED manufacturer shall perform color sorting of the bins. LEDs shall be obtained from no more than two (2) consecutive color “bins” as defined by the LED manufacturer.

The various LED color and intensity bins shall be distributed evenly throughout the sign and shall be consistent from pixel to pixel. Random distribution of the LED bins shall not be accepted.

The LED manufacturer shall assure color uniformity and consistency on the LED display face within the 30 degree cone of vision. Inconsistent color shifts or intensity will be cause for rejection.

LED package style shall be through-hole flush-mount. Through-hole LEDs with standoffs or surface-mount LEDs will not be accepted.

All LEDs used in all DMS provided for this contract shall be from the same manufacturer and of the same part number, except for the variations in the part number due to the intensity and color.

The LEDs shall be rated by the LED manufacturer to have a minimum lifetime of 100,000 hours of continuous operation while maintaining a minimum of 70% of the original brightness.

7. **Pixel Drive Circuitry**

One (1) electronic driver circuitry shall be provided for each LED pixel module and shall individually control all pixels on that module. The driver circuit boards shall conform to the following specifications:

- Each LED driver board shall be microprocessor-controlled and shall communicate with the sign controller on a wire or fiber optic communication network using an addressable network protocol. The microprocessor shall process commands from the sign controller to display data, perform diagnostic tests, and report pixel and diagnostic status.

- Constant current LED driver ICs shall be used to prevent LED forward current from exceeding the LED manufacturer’s recommended forward current whenever a forward voltage is applied. To maximize LED service life, LED drive currents will not be allowed that exceed the manufacturer’s recommendations for the 100,000-hour lifetime requirement.
The LED pixels shall be directly driven using pulse width modulation (PWM) of the drive current to control the display intensity. This LED driver circuitry shall vary the current pulse width to achieve the proper display intensity levels for all ambient light conditions. The drive current pulse shall be modulated at a frequency high enough to provide flicker-free operation and a minimum of 200 brightness levels.

Each LED driver circuit shall be powered by 24 VDC from external regulated DC power supplies.

The voltage of each power input shall be measured to the nearest tenth of a volt and reported to the sign controller upon request. Each driver circuit shall also contain a status LED for the power supplies that indicates if the power source is present or not.

The LED driver circuitry shall be able to detect that individual LED strings or pixels are stuck off and shall report the pixel status to the sign controller upon request.

The LED driver board shall contain a seven segment numeric LED display that indicates the functional status of the LED pixel display module. At a minimum, it shall indicate error states of the LED pixels and communication network.

8. Power Supplies:

Power supplies shall operate from 120 VAC power. The LED displays shall be operated at low internal DC voltage not exceeding 24 VDC. Power supplies shall be solid state electronic regulated output comprised of Ferro-resonant components, or an approved equivalent. Power supplies shall provide N+1 redundancy, or approved equivalent method. Power supplies shall be rated so that if one supply fails, the other(s) can operate the entire LED section under nominal load conditions. A single failure of one power supply shall not cause a failure of the other(s). Power supplies shall meet NEMA TS-4 temperature requirements operating from -31°F to +165°F (-35°C to +74°C). Power supplies shall have over-voltage protection devices that supplement the DMS assembly over voltage, surge and transient voltage protection devices.

Power supplies shall be short circuit protected by turning the DC power off and shall reset automatically after 5 seconds of AC power off. Power supplies shall also be protected by a minimum overload allowance of 125% and have an efficiency rating of at least 80%. Power supplies shall be UL listed and RoHS compliant. Power supplies shall be installed with the terminals/connectors unobstructed by hardware or mounting brackets. The operator shall be able to read the terminal designations and measure voltages without removing the power supply or obstructions.

Power supplies shall have a visible means of determining power status of individual supplies via the DMS controller and the supplies themselves. Indicators shall identify whether the supplies are functioning properly and outputting power at the correct/calibrated levels. The DMS controller shall indicate that a power supply has failed and supply shall have an identifier that indicates the specific power supply that has failed.

The regulated DC power supplies shall conform to the following specifications, and shall be compatible with the DC voltage requirements set forth by the DMS equipment manufacturer:

- Nominal maximum output power rating of 1000 watts
- Operating input voltage range shall be a minimum of 90 to 264 VAC
- Operating temperature range shall be a minimum of –30°F to +165°F (-34°C to +74°C)
• Maximum output power rating shall be maintained over a minimum temperature range of \(-30\)°F to \(+140\)°F (\(-34\)°C to \(+60\)°C)
• Power supply efficiency shall be a minimum of 80%
• Power factor rating shall be a minimum of 0.95
• Power supply input circuit shall be fused
• Automatic output shut down and restart if the power supply overheats or one of the following output faults occurs: over-voltage, short circuit, or over-current
• Power supplies shall be UL listed
• Printed circuit boards shall be protected by an acrylic conformal coating

9. **Convenience Outlets**

The DMS housing shall contain a utility outlet circuit consisting of a minimum of one (1) 15-A NEMA 15-R, 120 VAC duplex outlet, with ground-fault circuit interrupters. This outlet shall be located near the panel board.

10. **Electrical Panel:**

The sign housing shall include an Electrical Panel with circuit breakers inside the sign case for 120/240 AC power distribution that is required for equipment in the sign case.

The in-sign case Electrical Panel shall be rated for a minimum 100 amperes and 20 single pole circuit breakers and a two pole 120/240 main breaker. Circuit breakers and wiring shall be rated and in accordance with the NEC and the anticipated loads that will be experienced by equipment and interior lighting and power receptacles located within the sign case. Circuit breakers of the appropriate size shall be provided with each panel and wiring shall be rated and in accordance with the NEC and the anticipated loads that will be experienced by equipment, interior lighting, and power receptacles within the DMS housing and the branch circuit feeding the sign case. The power wiring shall be sized to accept a short circuit current up to the maximum rating of the connected circuit breaker tripping current. At this maximum current level no damage or reduction in current capacity shall be sustained by the conductors.

11. **Environmental Control**

The DMS shall include sensors that monitor and report ambient (external) light level and temperature, as well as the internal temperature and humidity.

a. **Ambient Light Measurement**

Sensors that measure the outdoor ambient light level and the outdoor ambient temperature at the DMS site shall be mounted in-line with the DMS housing walls. This ambient light and temperature measurement system shall consist of three (3) electronic light sensors.

Two of the light sensors shall be placed such that they measure the ambient light levels striking the front and rear of the DMS. The third light sensor shall be mounted to the floor of the DMS housing and shall face the ground. The DMS sign controller shall continuously monitor the light sensors and adjust the LED display matrix intensity to a level that creates a legible message on the DMS face.
b. Ambient Temperature Measurement

A minimum of one (1) ambient temperature sensor shall be mounted to the rear wall or bottom of the DMS housing. The sensor shall be placed such that it is never in direct contact with sunlight. The external temperature sensor reading shall be continuously monitored by the DMS sign controller and shall be reported to the DMS control software upon request.

c. Internal Temperature Measurement

The DMS shall contain a minimum of one (1) temperature sensor. The sensor(s) shall measure the temperature of the air in the cabinet over a minimum range of -40°F to +176°F (-40°C to +80°C). The internal temperature sensor output shall be continuously monitored by the DMS sign controller and shall be reported to the DMS control software upon request.

The DMS shall contain one (1) sensor that measures the relative humidity of the air inside the DMS cabinet. The sensor shall monitor the humidity from 0 to 100%. The humidity sensor output shall be continuously monitored by the DMS sign controller and shall be reported to the DMS control software upon request.

d. Interior DMS Environmental Control

The DMS shall contain systems for cabinet ventilation and safe over-temperature shutdown.

12. Housing Ventilation System

The DMS shall contain an electronically controlled ventilation system and a failsafe thermostat designed to keep the internal DMS air temperature lower than +140°F (+60°C), when the outdoor ambient temperature is +115°F (+46°C) or less.

The ventilation system shall consist of two or more air intake ports. Intake ports shall be located near the bottom of the DMS rear wall. Each intake port shall be covered with a filter that removes airborne particles measuring 500 microns in diameter and larger. One or more ball bearing-type fans shall be mounted at each intake port. These fans shall positively pressure the DMS cabinet.

Fans and air filters shall be removable and replaceable from inside the DMS housing.

Each ventilation fan shall contain a sensor to monitor its rotational speed, measured in revolutions per minute. The fan speed shall be reported via a CAN (controller area network) communication network to the sign controller upon request.

The ventilation system shall move air across the rear of the LED modules in a manner such that heat is dissipated from the LED’s. The airflow shall move from the bottom of the cabinet towards the top to work with natural convection to move heat away from the modules.

Each exhaust port shall be located near the top of the rear DMS wall. One exhaust port shall be provided for each air intake port. All exhaust port openings shall be screened to prevent the entrance of insects and small animals.

An aluminum hood attached to the rear wall of the DMS shall cover each air intake and exhaust port. All intakes and exhaust hoods shall be thoroughly sealed to prevent water from entering the DMS.

a. Over Temperature Safety Shutdown

The DMS shall automatically shut down the LED modules to prevent damaging the LEDs if the measured internal cabinet air temperature exceeds a maximum threshold temperature. The threshold
temperature shall be configurable and shall have a default factory setting of 140°F (+60°C). The factory default setting shall be overridden if the selected message priority is set above 200 or is selected as an emergency message.

13. **DMS Communications Cable:**

In situations where the sign controller is located in a ground-mounted or pole-mounted traffic cabinet, the communication signals from the external sign controller to the DMS shall use fiber optic cable with the following specifications:

- 62.5/125 μm diameter
- ST-style connectors
- Rated for indoor/outdoor use
- UL-rated
- PVC outer jacket
- Tight buffer inner jacket
- Operating temperature range: −40°F to +185°F (−40°C to +85°C)

A minimum of six (6) fibers shall be provided with one (1) for controller to sign commands, one (1) for sign to controller responses, and four (4) spares.

For systems with controllers mounted inside the DMS cabinet, the controller to sign interface shall use shielded Category 5 copper cable.

14. **Electrical Transient Protection:**

All electrical connections internal to the DMS sign case where an electrical conductor of any type is terminated shall be provided with one or more transient noise suppression devices. The devices shall be of the multiple strike type and shall not require resetting/replacement when exposed to 100 times the electrical current capacity of the electrical conductor/terminator which it is fitted to as a protection device. A bonding conductor connected to earth ground shall be the voltage drain point for each of the transient protection devices. The device and grounding shall suppress the transient to a level of no more than the normal operating voltage / current of the connected circuit. No transient protection device shall be bonded to any Direct Current connection point or the Electrical Service neutral. The metal case of each sign shall be electrically bonded to the support structure at all mounting bolt locations using non corrosive connections soldered to the electrical grounding conductors. The bonding shall consist of an electrical bond wire or properly prepared electrical contact plate. The structure, in turn, shall be electrically bonded to earth ground through a grounding electrode array which provides a minimum of 5 ohms to true ground conductivity. The Contractor’s DMS vendor shall provide a DMS compatible with the grounding requirements.

Other items that are required to form and install complete and fully functional DMS assemblies that are not described in this document and that may be Vendor specific, shall be identified and supplied with the DMS assemblies. These items shall be included in the products provided for the contract and shall be considered incidental to the work.

15. **Displays:**

Displays shall be full matrix. Signs shall be designed to provide proper spacing between the lines of text for the characters and lines of text as indicated herein. Sign displays shall have sufficient
borders on all four sides for display clarity and background contrast. Characters and/or shapes shall be formed on a matrix comprised of rows and columns forming a continuous line.

Pixel columns and rows shall be perpendicular. Individual characters shall be formed by pixels within a character matrix defined by the character font. All upper case characters shall be displayed over the entire height of each character matrix. Character to character spacing shall be determined by the font selected by the user. Lower case letters that extend below the bottom of the line base shall be proportional in location and style per line. Both fixed and proportional spaced fonts shall be supported.

Fonts and other display formats supported shall be in accordance with the Profile Requirements List in Supplemental Specifications. Legibility distance shall be defined as the legibility of displays from a specified distance and shall include daylight hours with direct sunlight on the face and behind the DMS.

Each sign shall be able to display a message composed of any combination of the following characters and shapes:

- All upper case letters A through Z
- All lower case letters a through z
- All decimal digits 0 through 9
- A blank or space
- Punctuation marks shown in the brackets [., !?–’”/()]
- Special characters shown in brackets [#$%&*+<>]
- 32 or more special graphics shapes editable by the user.

The sign displays shall support text and graphic displays in accordance with the requirements of the NTCIP communication protocol specified and the Protocol Requirements List within Supplemental Specifications. All fonts shall be editable through the vendor’s maintenance laptop and from the DMS configuration software.

The time required to clear any display and post any new display shall not exceed 500 milliseconds.
The DMS shall conform to the following display characteristics requirements unless otherwise approved by the Engineer:

### TABLE 1: DISPLAY CHARACTERISTICS

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full Matrix</td>
</tr>
<tr>
<td></td>
<td>Full Color</td>
</tr>
<tr>
<td>Pixel Pitch (max.)</td>
<td>20 mm</td>
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<tr>
<td>Characters per Line (min.)</td>
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<tr>
<td>Character Height</td>
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<td>Vertical Spacing (pixels – min.)</td>
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<td>Rows (pixels – min.)</td>
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<td>Columns (pixels – min.)</td>
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<td>Viewing Angle</td>
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<tr>
<td>Border Horizontal Dimension – approx.</td>
<td>8 in</td>
</tr>
<tr>
<td>Border Vertical Dimension – approx.</td>
<td>8 in</td>
</tr>
<tr>
<td>Legibility Distance</td>
<td>700 ft</td>
</tr>
</tbody>
</table>

#### 16. Serviceable Parts:

LED driver boards shall be quickly replaceable and hot swappable within the sign housings for all signs. Plug-in locking connectors shall be provided on each Pixel driver board for all connections. Connectors shall be held in place with positive retaining latches. Spring clips, screws or any connector requiring tools to engage/disengage shall not be used. Driver boards shall be easily removable for service/replacement with simple hand tools. Driver boards and all electronic circuit boards installed in the sign housing shall be thoroughly coated with an acrylic or urethane conformal coating for moisture-resistance.

#### 15.4 DMS Controller Materials

##### A. General:

Each DMS shall be controlled and monitored by its own sign controller. The sign controller shall be a stand-alone microprocessor-based system, which does not require continuous communication with DMS control software in order to perform most DMS control functions.

The sign controller shall meet the following operational requirements:

- Communicate using embedded NTCIP protocol
- Contain memory for storing changeable and permanent messages, schedules, and other necessary files for controller operation
- Include a front panel user interface graphical LCD and keypad for direct operation and diagnostics as described herein
- Contain a minimum of three (3) NTCIP-compliant RS232 communication ports
- Contain a minimum of one (1) NTCIP-compliant RS422 communication port with RJ45 Connector.
- Contain a minimum of one (1) NTCIP-compliant Ethernet port with RJ45 connector
- Have the ability to play volatile messages
- Contain DMS-specific control firmware (embedded software) that shall monitor all external and internal sensors and communication inputs and control the display modules as directed by external control software and the front panel interface

NTCIP shall be natively supported in the DMS controller. External protocol converter or translator devices shall not be allowed.

Communications interface shall be configured per the City’s IP addressing requirements. The Contractor shall coordinate with the Engineer and the City’s existing System Integrator to obtain site-specific parameters.

B. Mechanical and Electrical

The sign controller shall meet the following electrical and mechanical requirements:
- Mount in a standard EIA 19-inch (480 mm) equipment rack with a maximum 4U space requirement
- Weigh no more than 10 pounds, including its enclosure
- Consume no more than 30 watts of power
- Powered by an internal regulated DC power supply capable of operating on 120VAC or 240VAC at both 50Hz and 60Hz
- All printed circuit boards shall be sealed with an acrylic conformal coating

C. Front Panel User Interface

The sign controller shall have a local front panel interface which is menu driven, a 16-button keypad, and a minimum LCD graphical display of 64x240. The controller shall be able to provide detail of the current display, perform diagnostic testing of system components, pixels, drivers, power systems, and sensors, DMS sign message manipulation including activation, creation, preview, and deletion, blank out the DMS, scheduling, and sign controller configurations including communication parameters, clocks, and security features.

The sign controller shall also provide interface for the following:
- Power on and off switch with LED indicator
- Local/Remote switch with LED indicator to activate local control and override system control
- Reset button for quick restart of the sign controller
- LED diagnostic indicator

D. Memory:

Controllers shall have both non-volatile electronically changeable memory. This memory shall be formed by flash or battery-backed static RAM integrated circuits that retain the data in memory for a minimum of 30 days following a power loss. This changeable memory shall be used to store messages and schedules. The controller memory shall be capable of storing a minimum of 500 changeable messages in non-volatile RAM.
E. Communications and Ports:

The DMS sign controller shall contain a minimum of three (3) NTCIP-compatible RS232 communication ports and one (1) Ethernet Port. All remote communication ports shall be NTCIP-compatible.

The DMS sign controller shall be able to receive instructions from and provide information to a computer containing DMS control software using the following communication modes:

- Remotely via direct or dial-up communications with a remotely located computer. The system communications backbone, as well as all field modems or signal converters, shall provide the DMS sign controller with an RS232 signal.

- Locally via direct connection with a laptop computer that is connected directly to the sign controller using an RS232 null modem connection.

The DMS sign controller shall contain a minimum of three (3) NTCIP-compatible RS232 communication ports. These ports shall support multiple communication interfaces, including, but not limited to, direct null-modem (for local laptop control), dial-up and leased-line modems, radio systems, cellular modems, and fiber optic modems. The RS232 ports shall all have standard DB9M connectors.

The baud rate, connection type, and NTCIP communication protocol shall be configurable. Each port must support all typical serial baud rates ranging from 1200 to 115,200 baud. All three ports shall be capable of supporting either of the following sub network profiles: NTCIP 2101 (PMPP) or NTCIP 2103 (PPP). They shall also be capable of supporting either NTCIP 2201 (Null) or NTCIP 2202 (Internet) transport profiles. Only one each of the transport and sub network profiles shall be active at any time on each port.

The DMS sign controller shall contain a minimum of one (1) 10/100Base-T Ethernet communication port. This port shall be available for optional use for communicating from the central control system to the DMS sign controller when an Ethernet network is available. The Ethernet port shall have a standard RJ45 connector.

Communications on the Ethernet port shall be NTCIP-compatible using the NTCIP 2202 Internet transport profile and the NTCIP 2104 Ethernet sub network profile. This shall permit the controller to be operated on any typical Ethernet network using the TCP/IP and UDP/IP protocols.

NTCIP 2101 (PMPP) networks shall be configured with an address in the range 1 to 255 with a default address of 1. NTCIP 2104 (Ethernet) networks shall use a static IP address. Both the IP address and subnet shall be configurable. NTCIP 2103 (PPP) networks shall not require network addressing.

The RS422 and Ethernet communication ports in the DMS sign controller shall be protected with surge protection between each signal line and ground. This surge protection shall be integrated internally within the controller.

A series/parallel two-stage suppression device shall protect the modem communication port from over-voltage and over-current conditions. This surge protection shall be integrated internally within the controller.
F. **Internal Clock:**

The Controller shall contain a computer-readable time-of-year clock with a lithium battery or other equivalent backup. Back up shall keep the clock operating properly for at least 3 years without external power. The clock shall automatically adjust for daylight saving time and leap year through upgradeable software. The clock shall be set by the sign controller's microprocessor and shall be accurate to within 1 minute per month.

G. **Controller Software:**

The DMS controller software shall support NTCIP V02.35. Local controllers shall be configurable by the user to define the number of LED display elements (pixels) to fail either in an off or on state before the controller blanks the sign.

1. **Display Presentation:**

The sign controller shall control the driver modules to create the desired display on the sign. At a minimum, the signs shall be able to display the characters as described in the respective NTCIP supported protocols. Space allocated to each character shall be proportional to the character's true width and a non-proportional spacing as commanded by the supported character fonts.

2. **Display Selection:**

The controller shall implement the display per the logic defined in the referenced NTCIP documentation.

3. **Photo-Electric Sensors**

Install three photoelectric sensors with ½ inch minimum diameter photosensitive lens inside the DMS enclosure. Use sensors that will operate normally despite continual exposure to direct sunlight. Place the sensors so they are accessible and field adjustable. Point one sensor north or bottom of the sign. Place the other two, one on the back wall and one on the front wall of the sign enclosure. Alternate designs maybe accepted, provided the sensor assemblies are accessible and serviceable from inside the sign enclosure.

Provide controls so that the Engineer can field adjust the following:

- The light level emitted by the pixels elements in each Light Level Mode.
- The ambient light level at which each Light Level Mode is activated.

4. **Diagnostics and System Failure:**

The DMS Sign controller shall be capable of automatically informing a maintenance operation (via the local LCD panel) and the central control system (via NTCIP communication) of the occurrence of important events and subsystems failures.

All major component and subsystem errors shall be indicated on the controller’s LCD front panel.

The controller shall be capable of sending event notifications to the central control system via SNMP “traps” as allowed by NTCIP. When one of these events occurs, the sign controller shall create a data packet for transmission to the central controller that shall contain details about the event. The transmission of traps shall be governed by the NTCIP standards. The controller shall be configurable to enable or disable the transmission of traps for each event or error type. This configuration will include the automatic initiation of these traps, including establishing telephone
modem connections if appropriate, when the NTCIP network permits transmission initiation by the sign controller.

The DMS Controller shall report the following Events and Errors:

- Message Display Status
- LED Pixel Testing
- Power Supply Operation
- Door States
- Fan Operation
- Environmental Conditions
- Temperature Shutdown
- Controller Restart
- Power Loss
- Power System Failure

5. **DMS Software Rights**

The Contractor shall provide a non-assignable software use license in support of the DMS provided on an exclusive perpetual basis. Any software licenses associated with the DMS shall be transferred to the City of Concord as the owner and shall be documented in writing by from the manufacturer prior to final acceptance.

15.5 **AUXILIARY CONTROL PANEL**

The DMS shall include an auxiliary control panel that will provide a secondary user interface panel for DMS control, configuration, and maintenance. The auxiliary control panel shall meet the same electrical, mechanical, and environmental specifications as the DMS controller. The auxiliary DMS controller shall be located inside the DMS housing, interface to the DMS equipment cabinet mounted DMS controller using Category 5 copper cable and shall be powered independently from a 120 VAC outlet.

The auxiliary control panel shall have graphical LCD panel and keypad identical to those found on the DMS controller. It shall also contain a local/remote switch, a reset switch, status LEDs, and one NTCIP compatible RS232 communication port that meet the same specifications as the DMS controller.

15.6 **GROUND MOUNTED DMS EQUIPMENT CABINET**

The ground-mounted control equipment cabinet shall be a Caltrans 334-type cabinet. It shall be designed to mount on a concrete pad near the DMS. The cabinet shall enclose the sign controller, panel board, 120 VAC electrical outlets, and remote communication devices, such as a layer 2 network switch.

A. **General**

The ground-mounted controller cabinet shall be 66” (1,676 mm) +/- 1” (25.4 mm) high by 24” (610 mm) +/- 0.5” (12.7 mm) wide by 30” (762 mm) +/- 0.5” (12.7 mm) deep. The front-to-back cabinet dimensions shall not exceed 36” (914 mm) at its widest point, including the door handles, louvers and roof overhang.

The controller cabinet weight shall not exceed 200 pounds (45.5 kg) when the cabinet is empty.
B. Cabinet Housing

The controller cabinet shall be constructed to have a neat, professional appearance. The cabinet shall protect all internal components from rain, ice, dust and corrosion in accordance with NEMA enclosure Type 3R standards, as described in NEMA Standards Publication 250, Enclosures for Electrical Equipment (1000 Volts Maximum).

Internal component hardware (nuts, bolts, screws, standoffs, rivets, fasteners, etc.) shall be fabricated from hot dipped galvanized steel, stainless steel, aluminum, nylon or other durable corrosion-resistant materials suitable for roadway signage applications.

The DMS controller cabinet shall be constructed using 0.125-inch thick aluminum alloy 5052-H32. The exterior of the controller cabinet shall be natural mill-finish aluminum.

C. Serviceability

The controller cabinet shall provide safe and convenient access to all modular assemblies, components, wiring and other materials located within the cabinet. All internal components shall be removable and replaceable by a single technician.

Two (2) vertically hinged doors shall be mounted on the cabinet for interior access. One door shall be located on the front face and one door shall be located on the rear face of the cabinet. Each of the door openings shall not be less than 54” (1,372 mm) high by 21” (533 mm) wide.

Each opening shall be sealed with a 0.5” x 2” closed cell foam gasket.

Each door shall be attached to the cabinet by a full-length stainless steel hinge and mounting hardware. Both doors shall open outward. In the closed position, each door shall latch to a double-flanged door opening with a three-point draw-roller mechanism. The door handle shall be stainless steel. Each door shall have a doorstop to hold the door in the open position. The doors shall each be equipped with a Corbin #2 lock.

An LED lamp shall be located at the top of the controller cabinet to illuminate the cabinet interior. A switch mounted near the front and rear doors shall automatically turn on the light when the door is opened.

D. Equipment Rack

The cabinet shall contain a full-height standard EIA 19-inch rack. The rack shall be secured within the cabinet by mounts at the top and bottom.

The rack shall contain a minimum of one (1) pullout drawer. The drawer shall be suitable for storing manuals and small tools, such as screwdrivers. The drawer shall be able to latch in the out position to function as a laptop/utility shelf.

E. Electrical Systems

The cabinet shall contain a power panel board and circuit breakers that meet the following minimum requirements:

- Service entrance-rated
- Minimum of 12 circuit breaker mounting positions
- Short circuit ratings of 22,000 amps and 10,000 amps for the main and branch circuits, respectively
The panel board shall be mounted in the equipment rack.

The cabinet shall contain a utility outlet circuit consisting of a minimum of two (2) 15-A NEMA 15-R, 120 VAC duplex outlets, with a minimum of one (1) ground-fault circuit interrupters. The outlets shall be mounted inside the cabinet and located near the panel board.

The cabinet shall include one (1) earth ground lug that is electrically bonded to the cabinet. The lug shall be installed near the power entrance. The installation contractor shall provide the balance of materials and services needed to properly connect to earth ground. All earth grounding shall conform to the National Electrical Code.

F. Environmental Systems

One (1) thermostatically controlled 100 cfm exhaust fan shall be mounted near the top of the control cabinet.

Filtered air intake ports shall be located on the bottom third of each access door. The fan and air filters shall be removable and replaceable from inside the cabinet.

G. Cabinet Labelling

The DMS equipment cabinet shall be labelled by the manufacturer prior to shipping. This label shall be permanently attached to the inside of the front door. The cabinet shall also be provided with a permanently attached serial number label.

15.7 DMS Control Software

This section describes the minimum specifications for the DMS sign control software. The contractor shall provide all software, software media, licenses, and documentation necessary to install and operate a dynamic message sign (DMS) control system that fully complies with the functional requirements herein, including incidental items that may have been inadvertently omitted.

The City of Concord will provide the server hardware based on the server requirements set for by the software manufacturer. A Specification document shall be provided by the Contractor 30 days after the Notice to Proceed.

A. General

DMS control software shall:

- Operate on desktop and laptop computers with the following minimum hardware requirements: 1.5GHz processor, 1 GB RAM, and 2GB of free hard drive space.
- Support 64 bit processors and operating systems
- Provide a user-friendly multi-color graphical user interface
- Be written using Microsoft-certified software development tools (compilers, etc.)
- Be able to support at least 250 dynamic message signs
- Utilize a client-server architecture with the server handling sign communications and the clients connecting to the server via local and wide area networks
• Support DMS communications via hardwired fiber-optic network, cellular IP modem, wireless radio, Ethernet, or other as specified herein
• Support DMS control, monitoring, and diagnostic functions as specified herein
• Control DMS both remotely from a central location, and locally at the DMS site using a laptop computer
• Be accompanied by an easy-to-use software installation utility
• Contain an on-line help system that includes documentation for each feature or present in the software. It shall also be context sensitive such that pressing the help button or [F1] key on any screen will launch the help page for that particular function.
• Be fully compliant with the communications protocol requirements of the NTCIP as specified in the NTCIP Section of the Specification

B. Software Security

DMS control software shall support the creation of user IDs and passwords for up to 100 system users. Only a “System Administrator” shall assign user creation.

The DMS control software shall support different level of rights and authorizations to control DMS, to create and modify messages within software, configuration of control software, and ability to modify DMS settings or running content on DMS.

DMS control software shall require the use of passwords and the ability to modify requirements for user passwords to ensure user passwords are secure. These include requiring setting minimum password lengths and include support for minimum alpha-numeric combinations.

Before a system operator can use the DMS control software, the software shall request a “user name” and user “password.” If the correct user name and password are not provided, access to the software shall be declined.

C. Client-Server Architecture

The software shall be of a modular design including a server and multiple client modules. The server shall handle all DMS communication and shall store all configuration data, messages, schedules, communications settings, DMS status, and other data. The client software modules shall send requests to and receive responses from the server over any TCP/IP-based network, including LANs and WANs. Client applications shall include the following functionality:

• Login application to provide user access to system with username and password
• Central software to manage display communications, monitoring system status, and various DMS diagnostics.
• Message creation application for creating DMS messages
• Message scheduler client for creating time and date schedules for activating messages
• Administration client for DMS system configuration and administration

D. DMS Control

The DMS control software shall provide a user interface that presents the system’s DMS in both list and graphical (map) formats. The software will allow the DMS to be organized into groups as defined by the end user to allow for separating displays by region, roadway, and or any user
specified category as needed by the administrator. The DMS list and map interfaces will include only the signs for the group currently selected.

1. **List, Map, and Display Monitor Interfaces**

The DMS list shall clearly display the following information about each DMS:

- DMS ID number, as the numerical ID of the display
- DMS name, in a descriptive text format
- Message name or description of the message being displayed on the DMS
- Date and time of last communication between the control software and the DMS sign controller
- Error and warning status, including pixel errors, power failures, communication error, etc.
- Graphical representation (WYSIWYG) of current message displayed

The graphical map interface shall include the following:

- Configurable bitmaps that may be used to show all or parts of the system geographically
- Message name or description of message being displayed on DMS
- Icons for each sign located anywhere on the map
- Icon color changes to indicate the status of the DMS (i.e., yellow for warnings or red for errors)
- Date and time of last communication between the control software and the DMS sign controller
- Sign name is visible if mouse is placed over a DMS icon
- Graphical representation (WYSIWYG) of current message displayed when hovering over the sign icon.

The display monitor interface shall display the following information:

- DMS name, in a descriptive text format
- Message name or description of message being displayed on DMS
- Date and time of last communication between the control software and the DMS sign controller
- Graphical representation of messages running on DMS
- Ability to select the DMS visible by sign name, running messages

2. **Direct Control Operations**

The user interface shall provide a means for users to directly perform the following tasks for each sign:

- Send and activate stored messages from the libraries
- Blank the display
- Activate an ad-hoc quick message that is created immediately, not loaded from a library
- Send and activate schedules
- Retrieve messages from the sign
• Perform diagnostics of DMS subsystems, such as power supplies, sensors, climate control devices, etc.
• Perform pixel testing and report coordinates of any failed pixels with failure detection

3. **Polling**

The software shall have a feature to poll all or a set of DMS at predefined intervals or at a specific time-of-day. During this poll, the software shall retrieve the most recent status information from the sign and present it to the user as appropriate in the list and map interfaces.

4. **Scenarios**

The administrator shall have the ability to create scenarios that act like macros or scripts to automate a series of often repeated tasks. These scenarios shall have the ability to perform the following actions:

• Send and activate stored messages from the libraries
• Blank the display
• Send and activate schedules
• Perform diagnostics of DMS subsystems, such as power supplies, sensors, climate control devices, etc.
• Perform tests of pixels

The scenarios shall be saved to libraries where system operators may activate them through the graphical user interface. The scenarios shall also be scheduled to automatically run at predetermined times and dates.

5. **System Monitoring**

The software shall be capable of monitoring and displaying to the operator the contents of any communication in progress with DMS. The status of all outgoing and incoming data packets will be visible.

6. **Multi-Vendor Sign Control**

The software shall be capable of controlling any NTCIP-compatible DMS regardless of the manufacturer. Functionality supported shall be limited to NTCIP standard MIB objects only. Other manufacturer support may require proof of NTCIP compliance of controller to verify compatibility. The software shall be configurable to enable or disable support for any standard optional NTCIP objects.

E. **Message Creation and Editing**

A DMS system operator shall be able to use the DMS control software to create, edit, name, and store message files.

The message editor GUI shall present a scaled image of the DMS display matrix, including a complete and accurate representation of the display matrix type (character, line or full matrix) and the number of display pixels. The DMS editor image shall actively show message content in a WYSIWYG format, while a new message is being created or an existing message is being edited.

The message editor shall provide the operator with the following capabilities:
1. **Text Editing Capabilities:**
   - Be able to type in message text as if typing in any word processor
   - Text entry shall be directly in message editing area, external input windows to enter text then displayed on a graphic representation is not a true WYSIWYG editor
   - Text entry includes but is not limited to text input, modification, removal, or insertion
   - Ability to select font per character
   - Ability to set flashing text and variable flashing rates per character
   - Character map functionality to insert special characters such as arrows
   - Support for many different fonts ranging in size and boldness for improved legibility of message (line and full matrix only)
   - Adjustable interline spacing in number of pixels for improved legibility of message (full matrix only)
   - Horizontal message justification on the DMS display matrix including left, center, and right
   - Vertical message justification on the DMS display matrix including top, middle, and bottom (full matrix only)
   - Ability to make text scrollable per line, including direction and scroll rate
   - Ability to change inter-character spacing between individual characters (line and full matrix only)
   - Ability to change text foreground and background color per character based on color depth capabilities of display
   - Support for inserting NTCIP standard real time fields

2. **Graphics Editing Capabilities (full matrix only)**
   - Be able to insert text and locate anywhere on matrix display
   - Be able to insert graphic images files into message editing area
   - Be able to move the graphic text and images around within message editing area
   - Support for inserting true type font text
   - Support for enabling anti-aliasing of font text
   - Be able to resize images when inserted
   - Be able to layer images and text and change the z-order (top to bottom)
   - Be able to move shapes to the front or back within the z-order
   - Be able to insert shapes include lines, rectangles, ellipse, triangles, spheres, and diamonds
   - Be able to support drawing tools include shape fill, line color, fill color, and brush width
   - Support at least color depth of 32k for full RGB color displays
   - Time with AM/PM or am/pm (NTCIP 1203 v2)

3. **Message Properties**
   - The number of pages that the message is to contain (shall be a maximum of six)
   - Ability to turn on and off beacon per message
   - Page on and off times for each page
   - Ability to adjust message priority status per message stored in library
   - Include a spell checker to verify against misspelled words
4. **Editor Capabilities**

- Ability to adjust message priority status per message stored in library
- Include a list of prohibited words and prevent from being used in message text
- Include a library of common MUTCD symbols for easy insertion of graphic images
- Support clipboard operations of cut, copy, and paste
- Support undo/redo actions
- Ability to rearrange page order for multiple page messages
  - Ability to duplicate pages
  - Be able to preview message as would run on display
  - Be able to zoom in/out editing area
  - Messages shall be able to be sent to any NTCIP DMS using standard NTCIP 1203 MULTI tags
  - Include a most recent list of last messages edited for quick access.
  - Support default options when creating new messages including page time on and off, line and page justification, and default font

5. **Message Library Capabilities**

- Top level folders shall be organize by DMS type and size
- Be able to create folders to store messages
- Be able to rename files and folders
- Be able to delete files and folders
- Be able to create multiple levels of folders
- Be able to save the message for future use
- Be able to edit a saved message for future changes
- Be able to open an existing message and save as a new message

6. **Available Fonts**

- Should include the following fonts (height x width, line width, fixed width)
  - 7 x 4, 1, variable
  - 7 x 6, 1, variable
  - 7 x 6, 2, variable
  - 7 x 8, 3, variable
  - 8 x 4, 1, variable
  - 8 x 6, 2, variable
  - 8 x 8, 3, variable
  - 9 x 5, 1, variable
  - 9 x 6, 2, variable
  - 9 x 8, 3, variable
  - 11 x 7, 2, variable
  - 11 x 9, 3, variable
  - 14 x 8, 2, variable
  - 14 x 10, 3, variable
  - 16 x 8, 2, variable
  - 16 x 10, 3, variable
  - 7 x 5, 1, fixed, as defined by NEMA 4 standards
F. Schedule Creation and Editing

DMS control software shall support the creation of message schedules, which instruct the DMS sign controller to run specific messages at pre-determined times and dates.

Software shall contain an editor, which allows messages to be scheduled via:

- Month of the year (January, February, etc.)
- Day of the week (Monday, Tuesday, etc)
- Day of the month (1, 2, …, 31)
- Time of the day

The schedule editor shall provide a convenient means for the operator to:

- Create a new schedule
- Rename an existing schedule
- Delete a schedule
- Save all new changes

The schedule editor shall contain a calendar view to see the scheduled day plans. The view shall be able to view by week, month, or year.

When adding a message to a schedule, the software shall provide a visual representation of the messages. The verification ensures the user is adding the correct message to the displays schedule.

It shall be possible to store schedule files in both the DMS control computer memory and the DMS sign controller memory.

G. Display Fonts

The software shall support a minimum of twelve (12) fonts for each model of DMS. These fonts shall be configurable by the system administrator. The fonts used shall be selectable from a library containing a minimum of 24 fonts provided by the software vendor. Each sign model shall be capable of using a different set of fonts. The software shall automatically adjust the available fonts in the message editor based on the DMS model configuration.

The software shall include a font editor to allow the operator to create custom fonts. The font editor shall allow the DMS system operator to create new fonts or modify existing fonts. The operator shall have the capabilities to graphically edit each character within a font in a pixel-by-pixel manner.

Any of the fonts provided by the software vendor or created/modified by the administrator shall be downloadable to the DMS.

H. Event Logging

The software shall include an event logging system that logs all significant system events. Each logged event shall include the following fields at a minimum:

- Event ID number
- Operator that initiated the event
• Time and date that the event occurred
• Description of the event (i.e., “Diagnostic Test Performed”)
• Source of the event (i.e., DMS sign name)
• Additional data relevant to the event (i.e., “Failed pixel: (4, 73)”) 

The events logged shall include, but not be limited to, the following:
• User login/logout
• Communication failures
• Configuration changes
• Message and schedule activation or display blanking
• Diagnostics test results
• Warning events sent from the sign
• Other system errors

The system operators will have the ability to view, sort by category, and print the log file at any time.

1. System Configuration

The DMS control software shall allow system administrators, and other users with correct security access right, to configure many system parameters and functions. The basic sets of configurable settings include the following:
• Sign models and individual signs
• Communication networks
• NTCIP profiles to enable/disable MIB objects
• System error/warning alarms
• User security rights
• System maps and sign icon placement
• Default system option settings
• Default message parameters
• Message priority settings
• Prohibited word list

1. Sign Configuration

• Each sign in the DMS control software shall be configured with the following parameters:
  • Sign viewing area height and width (for full-matrix signs)
  • Number of lines and each line’s height and width (for line-matrix signs)
  • Number of lines and characters size for character matrix signs
  • Color capabilities (amber, tricolor, full-color)
  • Site name
  • DMS ID number
  • Network address
  • Communication parameters
  • Time zone and daylight savings time settings
2. **Communication Settings**

Communication network configuration shall include the ability to configure and modify sign communication networks with the following parameters:

- Network type (direct serial, dial-up, Ethernet)
- Communication port (i.e., COM4)
- Baud rate (ranging from 1200 to 115,200)
- Hardware handshaking
- NTCIP subnetwork and transport protocols
- Communication retries and timeouts
- IP address and port

3. **User Administration**

- The access rights shall be capable of four (4) levels of security
  - Limited- access to only view information
  - Standard- simple control of running messages and content
  - Power-modify display settings and configuration
  - Administrator- full rights to all software commands including adding, removing, modifying user access rights.

4. **System Maps**

It shall be possible to configure each sign group to appear on a map within the software. The administrator shall be able to use the software to select the map, identified as a bitmap file, which can then be imported into the software. Each sign shall have an icon that may be placed anywhere on the map.

5. **Message Editor Defaults**

The message editor shall automatically utilize the following default settings during the creation of new message files:

- Pixel spacing between adjacent lines of text
- Pixel spacing between adjacent text characters
- Display duration of a given message page
- Beacon activation status (for DMS that contain flashing beacons)
- Effect to be applied to text (i.e., static, scrolling, etc.)
- Message priority classification
- Horizontal text justification supporting left, center, or right
- Vertical text justification supporting top, middle, and bottom
- Default font
- Spell check on message save
- Force text to uppercase
- Disable scrolling

6. **Message Priorities**

User-definable defaults shall allow messages to be assigned a priority classification of:

- Emergency
A numeric priority range shall be assigned to each of these five priority classifications. The priority shall allow two different message files to be assigned the same classification, but within that classification, one message can be identified as having higher priority.

J. Software Use and Reproduction Rights

Software shall support a licensing key to prevent unauthorized or unlicensed copies of the software to be installed on unauthorized servers or computers. The license shall apply to the server machine, and authorize client use from the server machine. The DMS manufacturer shall provide a DMS control software license directly to the City of Concord. A copy of the DMS control software shall be provided to the City of Concord on CD-ROM or through an approved electronic transfer, 14 days of prior to construction of the DMS support structures.

15.8 Construction Methods

A. Description

This article establishes practices and procedures and gives minimum standards and requirements for the installation of DMS systems, auxiliary equipment and the construction of related structures.

Provide electrical equipment described in this specification that conforms to the standards of NEMA, UL, or Electronic Industries Association (EIA), wherever applicable. Provide connections between controllers and electric utilities that conform to NEC standards. Express wire sizes according to the American Wire Gauge (AWG).

Provide stainless steel screws, nuts, and locking washers in all external locations. Do not use self-tapping screws unless specifically approved by the Engineer. Use parts made of corrosion-resistant materials, such as plastic, stainless steel, brass, or aluminum. Use construction materials that resist fungus growth and moisture deterioration. Separate dissimilar metals by an inert dielectric material.

A. Layout

The Engineer will establish the actual location of each Dynamic Message Sign assemblies. It is the Contractor’s responsibility to ensure proper elevation, offset, and orientation of all DMS assemblies. The location of service poles as well as conduit lengths shown in the Plans, are approximate based on available project data. Make actual field measurements to place conduit and equipment at the required location.

B. Construction Submittal

When the work is complete, submit "as built" plans, inventory sheets, and any other data required by the Engineer to show the details of actual construction and installation and any modifications made during installation.

The "as built" plans will show: the DMS, controller, and service pole locations; DMS enclosure and controller cabinet wiring layouts; and wire and conduit routing. Show all underground conduits and cables dimensioned from fixed objects.
Include detailed drawings that identify the routing of all conductors in the system by cable type, color code, and function. Clearly label all equipment in the DMS system, controller cabinet, and DMS enclosure.

C. Conduit

Install the conduit system in accordance with section 1715 of Standard Specification and NEC requirements for an approved watertight raceway.

Make bends in the conduit so as not to damage it or change its internal diameter. Install watertight and continuous conduit with as few couplings as standard lengths permit.

Clean conduit before, during, and after installation. Install conduit in such a manner that temperature changes will not cause elongation or contraction that might damage the system.

Attach the conduit system to and install along the structural components of the DMS structure assemblies with beam clamps or stainless steel strapping. Install strapping according to the strapping manufacturer's recommendations. Do not use welding or drilling to fasten conduit to structural components. Space the fasteners at no more than 4 feet for conduit 1.5 inches and larger or 6 feet for conduit smaller than 1.25 inches. Place fasteners no more than 3 feet from the center of bends, fittings, boxes, switches, and devices.

Flexible conduit will only be allowed when the conduits transition from the horizontal structure segment to the horizontal truss segment and from the horizontal truss segment to the rear entrance of the DMS when installing the DMS communications and feeder cables. The maximum length of flexible conduit allowed at each transition will be 5 feet.

Locate underground conduit as shown in the Plans in a manner consistent with these Project Special Provisions.

Do not exceed the appropriate fill ratio on all cable installed in conduit as specified in the NEC.

D. Wiring Methods

Do not pull permanent wire through a conduit system until the system is complete and has been cleaned.

Color-code all conductors per the NEC. Use approved marking tape, paint, sleeves or continuous colored conductors for No.8 AWG and larger. Do not mark a white conductor in a cable assembly any other color.

Bury underground circuits at the depth shown in the Plans and surround it with at least 3 inches of sand or earth back-fill free of rocks and debris. Compact backfill in 6 inch layers. Do not splice underground circuits unless specifically noted in the Plans.

Conductor sizing shall be in accordance with the

E. Equipment and Cabinet Mounting

Mount equipment securely at the locations shown in the Plans, in conformance with the dimensions shown. Install fasteners as recommended by the manufacturer and space them evenly. Use all mounting holes and attachment points for attaching DMS enclosures and controller cabinets to foundations.

Drill holes for expansion anchors of the size recommended by the manufacturer of the anchors and thoroughly clean them of all debris.
Provide one key-operated, pin tumbler, dead bolt padlock, with brass or bronze shackle and case, conforming to Military Specification MIL-P-17802E (Grade I, Class 2, Size 2, Style A) for each electrical panel and switch on the project. Key all padlocks alike, and provide 10 keys to the Engineer.

Provide cabinets with all mounting plates, anchor bolts, and any other necessary mounting hardware in accordance with these Project Special Provisions and the Plans.

Seal all unused conduit installed in cabinets at both ends to prevent water and dirt from entering the conduit and cabinet with approved sealing material.

Install a ground bushing attached inside the cabinet on all metal conduits entering the cabinet. Connect these ground bushings to the cabinet ground bus.

**F. Work Site Clean-Up**

Clean the site of all debris, excess excavation, waste packing material, wire, etc. Clean and clear the work site at the end of each workday. Do not throw waste material in storm drains or sewers.

**G. DMS Installation**

Securely mount the sign on the sign support structure in accordance with the requirements of the manufacturer, the design of the structure; DMS sign case, and attachment hardware. All signs shall be mounted with a minimum clearance of 18 feet between the crown of the roadway surface and any portions of the signs or associated structure.

Lift and install the DMS housing and display in place on the overhead structure only with prior approval of, and in the presence of the Engineer. Do not lift and install the DMS housing and display until all equipment, materials, and labor are available so that the DMS can be operated with messages from the local DMS controller within 72 hours of installation on the overhead structure.

When lane closures are required for DMS installation, attach and secure all mechanical hardware for initial attachment prior to the reopening of lanes to traffic. Complete the attachment of hardware prior releasing the lift cables. Install and connect the DMS sign wiring and communications cables to the field device cabinet only after attaching and securing the sign to the sign structure.

Furnish and install DMS communications cables between the DMS housing and DMS equipment cabinet. Install all equipment necessary to operate the dynamic message signs. Furnish and install any conduit required on the device structure for installation of any power conductors and communications cabling to the DMS assembly. All wiring between assemblies within the sign case and the ITS controller cabinet shall be installed in conduit. Feed all cable connections from the DMS assembly leaving a minimum of 25 feet of slack in the cable for normal movement and maintenance of the assembly. At vertical transitions, support the cable by integral hooks or other methods that assure that the stress placed on the wiring or fiber optic cable is minimized and in no case, violates the cable or wire manufacturer’s maximum static, pulling, or dynamic tension, or bend radius. Install the wiring in continuous, unspliced lengths between the sign housing and the field device cabinet. Coil sufficient slack neatly in the base of the field device cabinet to ensure that the connections to the housing and the power source will be possible without the need to add or splice any cables.

Route all other wiring within the sign case and DMS controller cabinet in properly supported cable trays.
Furnish and install all necessary power and communications cabling and terminations in the DMS controller cabinet for a fully functional system including operability at the cabinet, at the DMS, between the cabinet and the DMS, and between the cabinet and any upstream and downstream cabinets. This shall include any fiber jumpers, Cat5e jumpers, etc. that may be required for complete functionality of this DMS project.

Perform all connector crimping using a ratchet installation tool with a compatible crimp jaw sized for the connector used. Strip wire in accordance with the connector manufacturer’s recommendations. Make all connections to terminal boards or screw-type equipment terminals with insulated fork-tongue compression connectors using stranded cable. Make all wiring to bulkhead connectors on equipment housings with MS bayonet-type or other connectors. Solder connector joints for use with extra-low voltage (less than 30 Volts) systems, with the joint metals preheated to the flow temperature of the solder or crimped using ratchet-type positive crimp tools and a double crimp (conductor and jacket) connector.

Make all harnesses neat and firm, and route them to minimize cross talk and electrical interference. Separately bundle or shield wiring containing AC from all DC logic control circuits. Route wiring to prevent conductors from being in contact with metal edges. Arrange wiring so that any removable assembly may be removed without disturbing conductors not associated with that assembly.

After installation and cable termination, perform an initial test to confirm that the DMS has been installed in accordance with the manufacturer’s recommendations. This initial test is not a replacement of or substitute for any acceptance test. Perform the DMS assembly manufacturer’s initial power-on test in accordance with the manufacturer’s recommendation. Ensure that the DMS assembly receives all telemetry settings by exercising the DMS from the DMS controller in the cabinet or other recommended procedure(s) to confirm that the initial functionality is operational. The Engineer will program message displays on the DMS at the point in time that the power and communication circuits are fully operational. Visually confirm that the DMS display is properly aligned to provide maximum legibility. Make sight alignment adjustments to the DMS housing and display to ensure the greatest viewing angle is achieved as directed by the Engineer.

15.9 TESTING AND TRAINING

Testing shall be completed to demonstrate that all DMS functions and features are operational and shall be documented at the conclusion of each test procedure for each DMS provided under this contract.

The Contractor shall provide environmental testing certifications for compliance with NEMA TS-4.

The Engineer will be present at the testing and will confirm the results of any testing that is to be reported to the City for acceptance purposes. The Engineer will certify successful testing of individual DMS as the tests are successfully completed.

Testing requirements for DMS equipment accepted as pre-approved are not waived but the Contractor may request a waiver of some or all of the testing of pre-approved products at the approval of the Engineer.
A. Testing Requirements

Testing of all equipment and software/firmware furnished under this Contract shall be the responsibility of the Contractor and shall be conducted by the Contractor’s DMS Vendor. The City reserves the right to perform any inspections or other testing and to participate in all testing the Engineer deems necessary to assure that the equipment conforms to the specified requirements. The Contractor shall successfully complete all tests.

The Contractor shall make arrangements for the witnessing of tests as requested by the Engineer. Full documentation of test results including problems experienced shall be prepared by the Contractor and submitted to the Engineer. Any equipment that fails the tests shall be replaced or repaired and re-tested at the Contractor's expense. No additional time or other consideration will be added to the Contract in the event of failure and/or retesting.

The Engineer's approval of any testing document or witnessing of tests shall not relieve the Contractor of his responsibility to provide a fully functional operating system for acceptance that meets the requirements of the Contract.

B. Test Documentation

The Contractor shall submit appropriate documentation related to each phase of testing to the Engineer for approval. Testing shall not commence without test plan and procedure documentation approval. Unless otherwise noted, all test plan and procedure documents shall be submitted to the Engineer at least thirty (30) days prior to starting the applicable testing. Should any revisions be required by the Engineer, the Contractor shall re-submit the document for further review prior to starting the test. City review periods will not exceed fifteen days.

The Contractor shall provide Test Procedures and Test Reports for the following tests:

- Factory Proof of Performance / Environmental Tests
- Factory Acceptance Test
- Pre-installation Tests
- System Compatibility Test
- Field Acceptance/TOC Integration Test
- System Acceptance Test

C. Test Procedures

Test procedures and test data forms shall be submitted by the Contractor for review and approval by the Engineer and shall include the following:

- A description of any special equipment, setup; manpower, or conditions required for the test.
- A step-by-step outline of the test sequence to be followed, showing a test of every function of the equipment.
- A description of the expected operation, output, pass/fail criteria; test results, and criteria for re-test.
- A summary cross reference of test procedures to these specifications.
- An estimate of the test duration and proposed test schedule.
- A data form to be used to record all data and quantitative results obtained by the test.
- A failure analysis and corrective action plan as described herein, for failed equipment.
D. Test Reports

The Contractor shall submit Test Reports for all testing levels. The Test Reports shall verify that the approved test procedures were conducted. All Test Reports shall be presented and organized in logical groups of equipment and must be signed by the Contractor.

The Contractor shall compare the results of each test with the Contract requirements and with the approved test procedures. Failure to conform to the requirements shall be counted as a complete failure, and the equipment shall be rejected. Rejected equipment may be offered for retest provided all non-compliant items have been corrected and a retest is performed by the Contractor. Any corrections deemed necessary by the Engineer shall be made by the Contractor at no additional cost to the City. Any piece of equipment failing testing twice shall be replaced with new equipment at the Contractor’s expense.

Failure analysis and corrective action reports shall categorize the cause of failure as material defect, quality/workmanship defect, design defect, or system defect. Failure analysis and corrective action plans shall include the following items:

- Failure report form and numbering system
- Applicability: Vendors, Suppliers, Vendor-Component Subsystem and System Levels
- Sign off authority at the different levels of activity
- Incorporation into the test report
- Correlation with configuration management
- Precise corrective action
- Confirmation of corrective action
- Close out of the failure report, with accompanying charts, graphs, evidence, photographs, etc. (The failure analysis/corrective action report shall provide complete traceability and audit trail of each occurrence.)

E. NEMA TS-4 Environmental Testing

Shall include at a minimum the following:

- Physical Examination of the DMS assemblies and components for temperature specifications and voltage or other ratings
- Shake table testing for vibration / physical shock damage resistance (two hours at resonant frequency), 10 g shock on each axis
- Input voltage and line frequency variations/ fluctuations:
  - 95 VAC to 135 VAC at ambient, low and high temperatures /humidity
  - Electrical noise and transient / spike voltage levels at ambient, low and high temperatures / humidity
  - Line voltage interruption of .1 to .45 seconds, .46 to .50 seconds and .51 to 1.0 seconds at 95 VAC, 120 VAC and 135 VAC
  - Line Frequency and Voltage variation of 95 VAC at 57 to 63 Hz, 120 VAC at 57 to 63 Hz and 135 VAC at 57 to 63 Hz.
  - Cold Start after a 2 hour low temp soak at 0 degrees F with 95 VAC @ 60 Hz line power applied.
Display intensity / current test at 165 Degrees F temperature soak of two hours and at highest non condensing humidity attainable.

The DMS components under test shall be assembled into a small functional sign with a minimum of one pixel module that shall be powered and controlled by the same power supplies and control equipment that will be used in the DMS in which it will installed for production units. The component assemblies shall be used for all of the environmental tests from this test sign assembly. If a failure occurs as a result of a component within a specific assembly (module), the module may be repaired one time before a design review will be required to address a repeated failure mode for the module or assembly. If an entire module (power supply, Controller, Driver, interface board, pixel module, etc.) fails and the entire module is replaced the entire series of environmental tests shall be repeated. All failures shall be evaluated and a determination shall be made by the Contractor’s DMS vendor as to the cause and satisfactory correction method to address the failure mode so that the test sign will satisfactorily pass all of the environmental tests. This assembly may be used for the LED Pixel Module Testing.

A summary report describing the process, test results (including failures and remedial actions performed) and associated documentation of the successful completion of the tests shall be provided as one original (with all the backup documentation, completed test procedure forms, digital photographs, temperature, humidity, voltage, etc. recording charts and any other data that was collected) and 4 fully legible copies shall be provided to the Engineer after successful completion of the Environmental tests and other elements of the Factory Proof of Performance/Environmental Tests for review and approval.

F. LED Pixel Testing

A complete pixel module (including driver card) shall be tested and certified by an independent testing laboratory for the following:

- Luminous intensity per pixel and per square meter (measured through polycarbonate sheeting). This shall be done per pixel type as referenced in the specifications herein.
  - Measured on center, 15 degrees off center left-right-up-down
  - Calculated per square meter and measured per square meter
  - Measured per square meter at -30 degrees F and at 185 degrees F
- Operating voltage – pixel intensity curves
- Drive current - pixel intensity curves
- Voltage Drop per string at 100% applied operating power
- Vibration and shock tested for 2 hrs at NEMA TS-4 levels
- Documentation of circuit board characteristics including:
  - Track width/depth (current carrying capacity)
  - Board Thickness / % of curvature
  - Coating resistance to moisture – insulation resistance

The pixel module shall be powered and controlled by the same power supplies and control equipment that will be used in the DMS in which it will installed for production units. The pixel module may be incorporated into a small one pixel module test sign that includes all of the components of a production sign but configured as a single display module for LED Pixel test purposes. This assembly may be provided in satisfaction of a portion of the support material required herein.
Independent certification verifying conformance of the LED Pixel Module to the specifications shall be provided to the Engineer prior to the Factory Acceptance Test stage along with any supplemental data collected during the testing of the module.

G. Factory Acceptance Test:

A Factory Acceptance Test shall be performed on each sign prior to shipment. This test shall verify all final inspections for quality control prior to leaving the manufacturing facility. The test results shall be delivered with each sign. The Contractor shall demonstrate and document that the Dynamic Message Sign (DMS), DMS controller, communication between and from-to the sign and controller and a simulated Central System and software/firmware function and operate in accordance with the Contract. Satisfactory demonstration tests shall be performed by the Contractor and confirmed by the Engineer prior to shipment of the DMS.

The Engineer reserves the right to witness all demonstrations, participate in all tests and to perform additional tests as it deems necessary to confirm proper operation of the DMS prior to shipment. The Contractor shall notify the Engineer at least ninety days in advance of the first sign being shipped. The Contractor shall be prepared to adjust the scheduled start of testing by 7 days if the Engineer deems it necessary to allow for travel. Travel expenses of the Engineer and his representative will be the responsibility of the City.

Should a retest be deemed necessary by the Engineer, travel expenses of the Engineer and one additional City representative shall be the responsibility of the Contractor. This shall include all costs associated with having two City representatives on site including but not limited to airfare, automobile rental, lodging and per diem expenses. These costs, excluding airfare shall not exceed $500.00 per representative per day. These costs will be deducted from the semi-final estimate.

The Contractors’ schedule shall anticipate the required testing. Delays resulting from testing activities, test failures, retests or schedules controlled by the Contractor shall not be grounds for extensions of intermediate or final completion times or for additional compensation. At the conclusion of each test the Contractor shall provide one original and one copy of all test and demonstration documentation to the Engineer.

The Engineer may elect not to attend/witness Factory Acceptance Tests. Exercising this option does not relieve the Contractor of any liability or other obligation or requirement of the Contract. No equipment shall be shipped by a manufacturer without successful completion of testing, receipt of documented test results and authorization to ship by the Engineer.

The Contractor shall deliver the support equipment, final DMS documentation, training and warranty certification documentation 30 days prior to the Pre-installation Test.

H. Pre-Installation Tests:

The Contractor shall perform a Pre-Installation Test of each DMS delivered to demonstrate that each DMS is fully operational after delivery and that no functionality or degradation in performance of the delivered DMS has occurred during shipping and that the DMS is fully functional and ready for field installation. The Pre-Installation Tests will be conducted on each DMS delivered utilizing vendor-supplied software and hardware. The testing shall demonstrate all required functionality of the Dynamic Message Signs as specified within these specifications. The manufacturer’s representative shall be present for pre-installation testing at each site for technical assistance and troubleshooting support, unless otherwise approved by the Engineer.
I. Field Acceptance Testing:

Perform local field operational tests at each DMS field site according to the following:

- Verify that physical construction has been completed in accordance with Plans and Specifications.
- Verify the quality and tightness of ground and surge protector connections.
- Verify proper voltages for all power supplies and related power circuits.
- Verify all connections, including correct installation of communication and power cables.
- Verify that the communication signal from the DMS is present and of consistent quality at all connection points between the DMS, the controller and any conversion/communication devices therein.
- Exercise the firmware and software and execute a minimum of 3 other unique programming commands to ensure that the communication link between the controller and the DMS is functioning properly.

The Contractor’s DMS vendor shall be on site during the installation/integration activity for the first post installation test of a specific model of DMS supplied by the vendor to address any NTCIP compatibility/TOC integration issues and shall be available in the field as needed up through the final acceptance of the project.

J. System Acceptance Test:

Upon successful completion of the Field Acceptance Testing and any corrective actions that the Contractor is directed to perform and the warranty and other documentation are approved by the Engineer, the DMS shall undergo a 30-day System Acceptance Test (burn-in) to verify proper operations of the DMS and control of associated devices from the City of Concord Traffic Management Center.

K. Training:

Upon completion of the work and at a time approved by the Engineer, the Contractor shall provide training by a qualified instructor to City personnel in the proper operation and maintenance of the equipment. The Contractor shall provide a resume and credentials for the training instructor to the City for approval. The Contractor shall provide an outline for training submitted to the City for comment and approval. City personnel shall receive training comparable to the equipment manufacturer's factory training for each new type of DMS equipment including: DMS, DMS Controller, Auxiliary controller, local controller software, and DMS configuration software. The minimum training shall be one 4 hour session for instruction of device operation, one 4 hour session for instruction on device maintenance, and one 6 hour session of DMS configuration software.

Training will be held in the City of Concord at the Brown Operations Center located at 850 Warren C Coleman Blvd., Concord, NC 28025. The Contractor shall coordinate with the City of Concord – Traffic Engineer at 705-920-5377 to confirm and schedule the training times and locations.
15.10 AS-BUILTS AND WARRANTY

A. System Documentation

The Contractor shall supply all working and as-built documentation necessary for proper identification, scheduling, installation, operation and maintenance of the Dynamic Message Signs provided under this contract.

The Contractor shall provide two (2) copies of descriptive manuals or brochures for each type of equipment proposed and used for this project. No equipment shall be accepted for delivery or any payment made without written approval of the corresponding submittal by the Engineer. These documents shall contain sufficient technical data for the Engineer to evaluate the system proposed by the Contractor as meeting the Contract requirements.

The quality, function, and capability of each deliverable item shall be described. Manuals, brochures and certifications shall be originals or professional grade legible copies equal to originals. Documentation, catalog cuts and shop drawings submitted for review of DMS and cabinets shall be submitted to the Engineer as one complete package.

Three copies of shop drawings shall also be required for each type of fabricated item. These drawings shall contain all information required for complete fabrication in accordance with the Specifications, such as: materials, welds, finish, mounting details, weight, overall dimensions and position of doors and control cabinet foundation detail. DMS shop drawings shall be on sheets 11 inches in height and 17 inches long.

Submittals shall clearly document meeting the DMS requirements herein and shall be provided in the same order for review as the specifications are written.

The Contractor shall submit an installation summary for each DMS prior to the conducting of any Pre-Installation Testing. This summary shall include the following information:

- Equipment complement
- A complete wiring diagram for each cabinet, covering every cable entering the cabinet.
- DMS software control manuals including:
  - Three (3) copies of all instructions and installation manuals. All relevant manuals available from the manufacturer shall be provided. The manuals shall contain sufficient information to operate and maintain the equipment including schematic, wiring, and interconnection diagrams; complete instructions for proper installation including equipment outlines, mounting, weight, power, and cooling requirements; a complete parts list and a list of recommended spares.
  - Provide and attach to the inside of each dynamic message field controller cabinet a printed set of wiring diagrams. Drawings shall be attached to the door with stainless steel fasteners and protected from weather with a waterproof enclosure. An electronic version of all wiring diagrams shall be provided to the Engineer. The electronic format will be confirmed with the Engineer prior to delivery.

The documentation shall be in English.

B. Warranty/Guaranty Provision

Ensure that Dynamic Message Signs, DMS communication cables and all associated components defined herein furnished, assembled, and installed have a manufacturer’s warranty covering defects in assembly, fabrication, and materials for a minimum of two years from the date of final
acceptance, except as specified otherwise herein. If the manufacturer’s warranties for the components are for a longer period, those longer period warranties will apply.

The manufacturer’s warranties on Dynamic Message Signs, DMS communication cables, and associated components shall be fully transferable from the Contractor to the City. Ensure that these warranties require the manufacturer to furnish replacements for any part or equipment found to be defective during the warranty period at no cost to the City within 10 calendar days of notification by the City.

Warranty periods shall begin on the date of final acceptance by the City.

15.11 DMS SUPPORT EQUIPMENT

The Contractor shall provide the following spare support equipment for each type of DMS installed in the Contract per each Support Material Package quantified:

- 2 LED display modules
- 2 LED driver cards
- 1 Power supply (including surge suppressors)
- 1 Complete fan assemblies (for DMS sign case) including timers
- 1 Heater
- 1 Temperature Sensor
- 1 Photocell
- 1 Low voltage power panel circuit board

These items shall be identical to those that are provided within each type of DMS assembly provided by the Contractor under this Contract. Each item shall be individually boxed with a label attached to the box that includes a description of the item, date of manufacturer, part number and manufacturer/vendor of the item. A description of the item’s function and installation or replacement (remove and install) procedures shall be included with each item on 8.5”X11” sheets of paper. If multiple sheets are required the sheets shall be stapled together in sequential order. The top sheet shall have the item name and vendor’s name at the top of the sheet. The sheets shall be placed in the box with the item.
15.12 Measurement and Payment

*Dynamic Message Sign Assembly* will be measured in units of each and will be paid for at the contract unit price per each. This price shall include furnishing, installing, testing, personnel training, providing operational software package(s) and firmware(s), supplies, shop drawings, documentation; and all labor, tools, materials and equipment and incidentals necessary to complete the work. Fifty percent of the unit price bid for this item will be paid upon delivery of the DMS unit and all equipment for each individual location to the Contractor’s staging area.

*DMS Support Equipment* will be measured in units of each and will be paid for at the contract unit price per each. This price shall include furnishing a set of support materials for each type of DMS.

Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic Message Sign (DMS) Assembly</td>
<td>Each</td>
</tr>
<tr>
<td>DMS Support Materials Package</td>
<td>Each</td>
</tr>
</tbody>
</table>
16. NTCIP REQUIREMENTS

This section defines the detailed NTCIP requirements for the DMSs covered by these Project Special Provisions and Plans.

16.1 REFERENCES

This specification references several standards through their NTCIP designated names. The following list provides the full reference to the current version of each of these standards.

Implement the most recent version of the standard including any and all Approved or Recommended Amendments to these standards for each NTCIP Component covered by these project specifications.

Table 1: NTCIP Standards

<table>
<thead>
<tr>
<th>Abbreviated Number</th>
<th>Full Number</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTCIP 1101</td>
<td>NTCIP 1101:1997</td>
<td>Simple Transportation Management Framework</td>
</tr>
<tr>
<td>NTCIP 1201</td>
<td>NTCIP 1201:1997</td>
<td>Global Object Definitions</td>
</tr>
<tr>
<td>NTCIP 1203</td>
<td>NTCIP 1203:1997</td>
<td>Object Definitions for Dynamic Message Signs</td>
</tr>
<tr>
<td>NTCIP 2001</td>
<td>NTCIP 2001:1997</td>
<td>Class B Profile</td>
</tr>
<tr>
<td>NTCIP 2101</td>
<td>NTCIP 2101</td>
<td>SP-PMPP/232 Subnet Profile for PMPP over RS-232</td>
</tr>
<tr>
<td>NTCIP 2102</td>
<td>NTCIP 2102</td>
<td>SP-PMPP/FSK Subnet Profile for PMPP over FSK Modem</td>
</tr>
<tr>
<td>NTCIP 2103</td>
<td>NTCIP 2103</td>
<td>SP-PPP/232 Subnetwork Profile for PPP over RS232 (Dial Up)</td>
</tr>
<tr>
<td>NTCIP 2104</td>
<td>NTCIP 2104</td>
<td>SP-Ethernet Subnet Profile for Ethernet</td>
</tr>
<tr>
<td>NTCIP 2201</td>
<td>NTCIP 2201</td>
<td>TP-Null Transport Profile</td>
</tr>
</tbody>
</table>
a. **General Requirements**

A. **Subnet Level**

Ensure each serial port on each NTCIP Component supports NTCIP 2103 over a dial-up connection with a contractor provided external modem with data rates of 28.8 kbps, 19.2 kbps, 14.4 kbps, 9600 bps, 4800 bps, 2400 bps, 1200 bps, 600 bps, and 300 bps. Enable the NTCIP Component to make outgoing and receive incoming calls as necessary and support the following modem command sets:

- Hayes AT - Command Set
- MNP5
- MNP10
- V.42bis

Ensure each serial port on each NTCIP Component supports NTCIP 2103 over a null-modem connection with data rates of 19.2 kbps, 14.4 kbps, 9600 bps, 4800 bps, 2400 bps, 1200 bps, 600 bps, and 300 bps.

Ensure each serial port on each NTCIP Component supports NTCIP 2101 with data rates of 9600 bps, 4800 bps, 2400 bps, 1200 bps, 600 bps, and 300 bps.

Ensure NTCIP components support NTCIP 2102 and NTCIP 2104.

NTCIP Components may support additional Subnet Profiles at the manufacturer's option. At any one time, make certain only one Subnet Profile is active on a given serial port of the NTCIP Component. Ensure the NTCIP Component can be configured to allow the field technician to activate the desired Subnet Profile and provide a visual indication of the currently selected Subnet Profile.

B. **Transport Level**

Ensure each NTCIP Component complies with NTCIP 2201 and 2202.

NTCIP Components may support additional Transport Profiles at the manufacturer's option. Ensure Response datagrams use the same Transport Profile used in the request. Ensure each NTCIP Component supports the receipt of datagrams conforming to any of the identified Transport Profiles at any time.
C. Application Level

Ensure each NTCIP Component complies with NTCIP 1101 and 2301 and meets the requirements for Conformance Level 1 (NOTE - See Amendment to standard).

Ensure each NTCIP Component supports SNMP traps. An NTCIP Component may support additional Application Profiles at the manufacturer's option. Ensure Responses use the same Application Profile used by the request. Ensure each NTCIP Component supports the receipt of Application data packets at any time allowed by the subject standards.

D. Information Level

Guarantee each NTCIP Component provides Full, Standardized Object Range Support of all objects required by these Special Provisions unless otherwise indicated below. Make certain the maximum Response Time for any object or group of objects is 200 milliseconds.

Design the DMS to support all mandatory objects of all mandatory Conformance Groups as defined in NTCIP 1201 and NTCIP 1203. Table 2 indicates the modified object requirements for these mandatory objects.

Table 2: Modified Object Ranges for Mandatory Objects

<table>
<thead>
<tr>
<th>Object</th>
<th>Reference</th>
<th>Project Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>ModuleTableEntry</td>
<td>NTCIP 1201 Clause 2.2.3</td>
<td>Contains at least one row with moduleType equal to 3 (software). The moduleMake</td>
</tr>
<tr>
<td></td>
<td></td>
<td>specifies the name of the manufacturer, the moduleModel specifies the manufacturer's</td>
</tr>
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<td></td>
<td></td>
<td>name of the component and the modelVersion indicates the model version number of the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>component.</td>
</tr>
<tr>
<td>MaxGroupAddresses</td>
<td>NTCIP 1201 Clause 2.7.1</td>
<td>At least 1</td>
</tr>
<tr>
<td>CommunityNamesMax</td>
<td>NTCIP 1201 Clause 2.8.2</td>
<td>At least 3</td>
</tr>
<tr>
<td>DmsNumPermanentMsg</td>
<td>NTCIP 1203 Clause 2.6.1.1.1.1</td>
<td>At least 1*</td>
</tr>
<tr>
<td>DmsMaxChangeableMsg</td>
<td>NTCIP 1203 Clause 2.6.1.1.3</td>
<td>At least 21</td>
</tr>
<tr>
<td>DmsFreeChangeableMemory</td>
<td>NTCIP 1203 Clause 2.6.1.1.4</td>
<td>At least 20 when no messages are stored.</td>
</tr>
<tr>
<td>DmsMessageMultiString</td>
<td>NTCIP 1203 Clause 2.6.1.1.8.3</td>
<td>The DMS supports any valid MULTI string containing any subset of those MULTI tags</td>
</tr>
<tr>
<td></td>
<td></td>
<td>listed in Table 4</td>
</tr>
</tbody>
</table>
Ensure the sign blanks if a command to display a message contains an invalid Message CRC value for the desired message.

**Table 3: Content of Permanent Messages**

<table>
<thead>
<tr>
<th>Perm. Msg. Num.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Permanent Message #1 blanks the display (i.e., consist of and empty MULTI string). It has a run-time priority of one (1).</td>
</tr>
</tbody>
</table>

**Table 4: Required MULTI Tags**

<table>
<thead>
<tr>
<th>Code</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>f1</td>
<td>field 1 - time (12hr)</td>
</tr>
<tr>
<td>f2</td>
<td>field 2 - time (24hr)</td>
</tr>
<tr>
<td>f8</td>
<td>field 8 – day of month</td>
</tr>
<tr>
<td>f9</td>
<td>field 9 – month</td>
</tr>
<tr>
<td>f10</td>
<td>field 10 - 2 digit year</td>
</tr>
<tr>
<td>f11</td>
<td>field 11 - 4 digit year</td>
</tr>
<tr>
<td>fl (and /fl)</td>
<td>flashing text on a line by line basis with flash rates controllable in 0.5 second increments.</td>
</tr>
<tr>
<td>fo</td>
<td>Font</td>
</tr>
<tr>
<td>jl2</td>
<td>Justification – line – left</td>
</tr>
<tr>
<td>jl3</td>
<td>Justification – line – center</td>
</tr>
<tr>
<td>jl4</td>
<td>Justification – line – right</td>
</tr>
</tbody>
</table>
The NTCIP Component implements all mandatory and optional objects of the following optional conformance groups with FSORS.

E. Test Heading

a. Time Management

As defined in NTCIP 1201

b. Timebase Event Schedule

As defined in NTCIP 1201. The following list indicates the modified object requirements for this conformance group.

Table 5: Modified Object Ranges for the Timebase Event Schedule Conformance Group

<table>
<thead>
<tr>
<th>Object</th>
<th>Reference</th>
<th>Project Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>MaxTimeBaseScheduleEntries</td>
<td>NTCIP 1201 Clause 2.4.3.1</td>
<td>At least 28</td>
</tr>
<tr>
<td>maxDayPlans</td>
<td>NTCIP 1201 Clause 2.4.4.1</td>
<td>At least 14</td>
</tr>
<tr>
<td>maxDayPlanEvents</td>
<td>NTCIP 1201 Clause 2.4.4.2</td>
<td>At least 10</td>
</tr>
</tbody>
</table>

c. Report

As defined in NTCIP 1201. The following list indicates the modified object requirements for this conformance group.

Table 6: Modified Object Ranges for the Report Conformance Group

<table>
<thead>
<tr>
<th>Object</th>
<th>Reference</th>
<th>Project Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The NTCIP Component supports the following Event Configuration Modes: onChange, greaterThanValue, smallerThanValue.

MaxEventLogSize NTCIP 1201 Clause 2.5.3 At least 200
MaxEventClasses NTCIP 1201 Clause 2.5.5 At least 16

d. PMPP
e. Font Configuration
As defined in NTCIP 1203. The following list indicates the modified object requirements for this conformance group.

**Table 7: Modified Object Ranges for the Font Configuration Conformance Group**

<table>
<thead>
<tr>
<th>Object</th>
<th>Reference</th>
<th>Project Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>NumFonts</td>
<td>NTCIP 1203 Clause 2.4.1.1.1.1</td>
<td>At least 4*</td>
</tr>
<tr>
<td>MaxFontCharacters</td>
<td>NTCIP 1203 Clause 2.4.1.1.1.3</td>
<td>At least 127**</td>
</tr>
</tbody>
</table>

*Upon delivery, the first font is a standard 18” font. The second font is a double-stroke 18” font. The third font is a 28” font. The fourth font is empty.

**Upon delivery, the first three font sets are configured in accordance with the ASCII character set for the following characters:

- “A” thru “Z”- All upper case letters.
- “0” thru “9”- All decimal digits.
- Space (i.e., ASCII code 0x20).
- Punctuation marks shown in brackets [ . , ! ? ' " / ( ) ]
- Special characters shown in brackets [ # & * +<> ]

f. DMS Configuration
As defined in NTCIP 1203.
g. MULTI Configuration
As defined in NTCIP 1203. The following list indicates the modified object requirements for this conformance group.
Table 8: Modified Object Ranges for the MULTI Configuration Conformance Group

<table>
<thead>
<tr>
<th>Object</th>
<th>Reference</th>
<th>Project Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>DefaultBackgroundColor</td>
<td>NTCIP 1203 Clause 2.5.1.1.1.1</td>
<td>The DMS supports the following background colors: black</td>
</tr>
<tr>
<td>DefaultForegroundColor</td>
<td>NTCIP 1203 Clause 2.5.1.1.1.2</td>
<td>The DMS supports the following foreground colors: amber</td>
</tr>
<tr>
<td>DefaultJustificationLine</td>
<td>NTCIP 1203 Clause 2.5.1.1.1.6</td>
<td>The DMS supports the following forms of line justification: left center right full</td>
</tr>
<tr>
<td>defaultJustificationPage</td>
<td>NTCIP 1203 Clause 2.5.1.1.1.7</td>
<td>The DMS supports the following forms of page justification: top middle bottom</td>
</tr>
<tr>
<td>defaultPageOnTime</td>
<td>NTCIP 1203 Clause 2.5.1.1.1.8</td>
<td>The DMS supports the full range of these objects with step sizes no larger than 0.5 seconds</td>
</tr>
<tr>
<td>defaultPageOffTime</td>
<td>NTCIP 1203 Clause 2.5.1.1.1.9</td>
<td>The DMS supports the full range of these objects with step sizes no larger than 0.5 seconds</td>
</tr>
<tr>
<td>defaultCharacterSet</td>
<td>NTCIP 1203 Clause 2.5.1.1.1.10</td>
<td>The DMS supports the following character sets: eightBit</td>
</tr>
</tbody>
</table>

h. Default Message Control as defined in NTCIP 1203
i. Pixel Service Control as defined in NTCIP 1203
j. MULTI Error Control as defined in NTCIP 1203
k. Illumination/Brightness Control

As defined in NTCIP 1203. The following list indicates the modified object requirements for this conformance group.
Table 9: Modified Object Ranges for the Illumination/Brightness Control Conformance Group

<table>
<thead>
<tr>
<th>Object</th>
<th>Reference</th>
<th>Project Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>dmsIllumControl</td>
<td>NTCIP 1203 Clause 2.8.1.1.1.1</td>
<td>The DMS supports the following illumination control modes: photocell, timer, manual</td>
</tr>
<tr>
<td>dmsIllumNumBrightLevels</td>
<td>NTCIP 1203 Clause 2.8.1.1.4</td>
<td>At least 16</td>
</tr>
</tbody>
</table>

1. **Auxiliary I/O**

2. **Scheduling**

As defined in NTCIP 1203. The following list indicates the modified object requirements for this conformance group.

Table 10: Modified Object Ranges for the Scheduling Conformance Group

<table>
<thead>
<tr>
<th>Object</th>
<th>Reference</th>
<th>Project Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>NumActionTableEntries</td>
<td>NTCIP 1203 Clause 2.9.1.1.1.1</td>
<td>At least 21</td>
</tr>
</tbody>
</table>

n. **Sign Status** as defined in NTCIP 1203

o. **Status Error** as defined in NTCIP 1203

p. **Pixel Error Status** as defined in NTCIP 1203

q. **Fan Error Status** as defined in NTCIP 1203

r. **Power Status** as defined in NTCIP 1203

s. **Temperature Status** as defined in NTCIP 1203

Install necessary hardware for the support of items q, r, and s above.
### Table 11: Some Optional Object Requirements

<table>
<thead>
<tr>
<th>Object</th>
<th>Reference</th>
<th>Project Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>DefaultFlashOn</td>
<td>NTCIP 1203 Clause 2.5.1.1.1.3</td>
<td>The DMS supports the full range of these objects with step sizes no larger than 0.5 seconds</td>
</tr>
<tr>
<td>DefaultFlashOff</td>
<td>NTCIP 1203 Clause 2.5.1.1.1.4</td>
<td>The DMS supports the full range of these objects with step sizes no larger than 0.5 seconds</td>
</tr>
<tr>
<td>DmsMultiOtherErrorDescription</td>
<td>NTCIP 1203 Clause 2.7.1.1.1.20</td>
<td>If the vendor implements any vendor-specific MULTI tags, the DMS shall provide meaningful error messages within this object whenever one of these tags generates an error.</td>
</tr>
</tbody>
</table>

#### 16.2 Documentation

Supply software with full documentation, including a CD-ROM containing ASCII versions of the following MIB files in Abstract Syntax Notation 1 (ASN.1) format:

- The relevant version of each official standard MIB Module referenced by the device functionality.
- If the device does not support the full range of any given object within a Standard MIB Module, a manufacturer specific version of the official Standard MIB Module with the supported range indicated in ASN.1 format in the SYNTAX and/or DESCRIPTION fields of the associated OBJECT-TYPE macro. Name this file identical to the standard MIB Module, except that it will have the extension ".man".
- A MIB Module in ASN.1 format containing any and all manufacturer-specific objects supported by the device with accurate and meaningful DESCRIPTION fields and supported ranges indicated in the SYNTAX field of the OBJECT-TYPE macros.
- A MIB containing any other objects supported by the device.

Allow the use of any and all of this documentation by any party authorized by the City for systems integration purposes at any time initially or in the future, regardless of what parties are involved in the systems integration effort.

#### 16.3 NTCIP Acceptance Testing

Test the NTCIP requirements outlined above by a third party testing firm. Submit to the Engineer for approval a portfolio of the selected firm. Include the name, address, and a history of the selected firm in performing NTCIP testing along with references. Also provide a contact person’s name and
phone number. Submit detailed NTCIP testing plans and procedures, including a list of hardware and software, to the Engineer for review and approval 10 days in advance of a scheduled testing date. Develop test documents based on the NTCIP requirements of these Project Special Provisions. The acceptance test will use the NTCIP Exerciser, and/or other authorized testing tools and will follow the guidelines established in the ENTERPRISE Test Procedures. Conduct the test in North Carolina on the installed system in the presence of the Engineer. Document and certify the results of the test by the firm conducting the test and submit the Engineer for review and approval. In case of failures, remedy the problem and have the firm retest in North Carolina. Continue process until all failures are resolved. The City reserves the right to enhance these tests as deemed appropriate to ensure device compliance.

16.4 **MEASUREMENT AND PAYMENT**

There will be no direct payment for the work covered by this section.

Payment for this work will be covered in the applicable sections of these Project Special Provisions at the contract unit price for “DMS Assembly” and will be full compensation for all work listed above.
17. ETHERNET EDGE SWITCH

Furnish and install an Ethernet edge switch as specified below that is fully compatible, interoperable, and completely interchangeable and functional within the existing City of Concord traffic signal system communications network.

17.1 DESCRIPTION

A. Ethernet Edge Switch:

Furnish and install a hardened, field Ethernet edge switch (hereafter “edge switch”) for DMS controllers as specified below. Ensure that the edge switch provides wire-speed, gigabit Ethernet connectivity at transmission rates of up to 1000 Mbps from each remote signal cabinet location to the routing switches.

B. Network Compatibility:

Ensure that the edge switch is fully compatible with the City’s existing Ethernet network and traffic signal management software.

The edge switch will be delivered to the City of Concord for configuration and testing two weeks prior to being installed in the field. Contact the City of Concord – Traffic Engineer at 704-920-5377 to coordinate delivery.

17.2 MATERIALS

A. General:

Ensure that the edge switch is fully compatible and interoperable with the trunk Ethernet network interface and that the edge switch supports half and full duplex Ethernet communications.

Furnish an edge switch that provide 99.999% error-free operation, and that complies with the Electronic Industries Alliance (EIA) Ethernet data communication requirements using single-mode fiber-optic transmission medium and copper transmission medium. Ensure that the edge switch has a minimum mean time between failures (MTBF) of 10 years, or 87,600 hours, as calculated using the Bellcore/Telcordia SR-332 standard for reliability prediction.

B. Standards:

Ensure that the edge switch complies with all applicable IEEE networking standards for Ethernet communications, including but not limited to:

- IEEE 802.1D standard for media access control (MAC) bridges used with the Spanning Tree Protocol (STP);
- IEEE 802.1Q standard for port-based virtual local area networks (VLANs);
- IEEE 802.1P standard for Quality of Service (QoS);
- IEEE 802.1w standard for MAC bridges used with the Rapid Spanning Tree Protocol (RSTP);
- IEEE 802.1s standard for MAC bridges used with the Multiple Spanning Tree Protocol;
- IEEE 802.1x standard for port based network access control, including RADIUS;
- IEEE 802.3 standard for local area network (LAN) and metropolitan area network (MAN) access and physical layer specifications;
- IEEE 802.3u supplement standard regarding 100 Base-TX/100 Base-FX;
IEEE 802.3ab standard for 1000 Base-X Ethernet;
IEEE 802.3ab supplement for 1000 Base-X Ethernet (Auto-negotiation);
IEEE 802.3x standard regarding flow control with full duplex operation; and
IFC 2236 regarding IGMP v2 compliance.

C. Functional:

Ensure that the edge switch 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:

- An STP healing/convergence rate that meets or exceeds specifications published in the IEEE 802.1D standard.
- An RSTP healing/convergence rate that meets or exceeds specifications published in the IEEE 802.1w standard.
- An Ethernet edge switch that is a port-based VLAN and supports VLAN tagging that meets or exceeds specifications as published in the IEEE 802.1Q standard, and has a minimum 4-kilobit VLAN address table (254 simultaneous).
- A forwarding/filtering rate that is a minimum of 14,880 packets per second for 10 Mbps, 148,800 packets per second for 100 Mbps, and 1,488,000 packets per second for 1000 Mbps.
- A minimum 4-kilobit MAC address table.
- Support of Traffic Class Expediting and Dynamic Multicast Filtering.
- Support of remote and local setup and management via telnet or secure Web-based GUI and command line interfaces.
- Support of the Simple Network Management Protocol version 3 (SNMPv3). Verify that the Ethernet edge switch can be accessed using the resident EIA-232 management port, a telecommunication network, or the Trivial File Transfer Protocol (TFTP).
- Port security through controlling access by the users. Ensure that the Ethernet edge switch has the capability to generate an alarm and shut down ports when an unauthorized user accesses the network.
- Support of remote monitoring (RMON-I) of the Ethernet agent.
- Support of the TFTP and SNTP. Ensure that the Ethernet edge switch supports port mirroring for troubleshooting purposes when combined with a network analyzer.

D. Physical Features:

**Ports:** Provide 10/100 Mbps auto-negotiating ports (RJ-45) copper Fast Ethernet ports for all edge switches. 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.

**Optical Ports:** Ensure that all fiber-optic link ports operate at the 1310 nanometer wavelength in single mode. Provide Type LC connectors for the optical ports, as specified in the Plans or by the Engineer.

Provide an edge switch having a minimum of two optical 1000 Base FX ports capable of transmitting data at 1000 Mbps. Ensure that each optical port consists of a pair of fibers; one fiber
will transmit (TX) data and one fiber will receive (RX) data. Ensure that the optical ports have an optical power budget of at least 15 dB, and are capable of transmission distances of up to 10km.

_Copper Ports:_ Provide an edge switch that includes a minimum of eight copper ports. Provide Type RJ-45 copper ports and that auto-negotiate speed (i.e., 10/100 Base) and duplex (i.e., full or half). Ensure that all 10/100 Base TX 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.

_Port Security:_ Ensure that the edge switch supports/complies with the following (remotely) minimum requirements:

- Ability to configure static MAC addresses access;
- Ability to disable automatic address learning per ports; know hereafter as Secure Port. Secure Ports only forward; and
- Trap and alarm upon any unauthorized MAC address and shutdown for programmable duration. Port shutdown requires administrator to manually reset the port before communications are allowed.

**E. Management Capabilities:**

Ensure that the edge switch 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:

- An STP healing/convergence rate that meets or exceeds specifications published in the IEEE 802.1 D standards;
- An RSTP healing/convergence rate that meets or exceeds specifications published in the IEEE 802.1w standard;
- An Ethernet edge switch that is a port-based VLAN and supports VLAN tagging that meets or exceeds specifications as published in the IEEE 802.1Q standard, and has a minimum 4-kilobit VLAN address table (254 simultaneous);
- A forwarding/filtering rate that is a minimum of 14,880 packets per second for 10 Mbps, 148,800 packets per second for 100 Mbps, and 1,488,000 packets per second for 1000 Mbps;
- A minimum 4-kilobit MAC address table;
- Support of Traffic Class Expediting and Dynamic Multicast Filtering;
- Support of, at a minimum, snooping of Version 2 of the Internet Group Management Protocol (IGMP);
- Support of remote and local setup and management via telnet or secure Web-based GUI and command line interfaces; and
- Support of the Simple Network Management Protocol (SNMP). Verify that the Ethernet edge switch can be accessed using the resident EIA-232 management port, a telecommunication network, or the Trivial File Transfer Protocol (TFTP).

**Network Capabilities:** Provide an edge switch that supports/complies with the following minimum requirements:

- Provide full implementation of IGMPv2 snooping (RFC 2236);
- Provide full implementation of SNMPv1, SNMPv2c, and/or SNMPv3;
- Provide support for the following RMON–I groups, at a minimum:
- Part 2: History - Part 9: Event

- Capable of mirroring any port to any other port within the switch;
- Meet the IEEE 802.1Q (VLAN) standard per port for up to four VLANs;
- Meet the IEEE 802.3ad (Port Trunking) standard for a minimum of two groups of four ports;
- Password manageable;
- Telnet/CLI;
- HTTP (Embedded Web Server) with Secure Sockets Layer (SSL); and
- Full implementation of RFC 783 (TFTP) to allow remote firmware upgrades.

**Network Security:** Provide an edge switch that supports/complies with the following (remotely) minimum network security requirements:

- Multi-level user passwords;
- RADIUS centralized password management (IEEE 802.1X);
- SNMPv3 encrypted authentication and access security;
- Port security through controlling access by the users: ensure that the Ethernet edge switch has the capability to generate an alarm and shut down ports when an unauthorized user accesses the network;
- Support of remote monitoring (RMON) of the Ethernet agent; and
- Support of the TFTP and SNTP. Ensure that the Ethernet edge switch supports port mirroring for troubleshooting purposes when combined with a network analyzer.

**F. Electrical Specifications:**

Ensure that the edge switch supplied with a 120 VAC internal power supply. Ensure that the edge switch has a minimum operating input of 100 VAC and a maximum operating input of 240 VAC. Ensure that if the device requires operating voltages other than 120 VAC, supply the required voltage converter. Ensure that the maximum power consumption does not exceed 50 watts. Ensure that the edge switch has diagnostic light emitting diodes (LEDs), including link, TX, RX, speed (for Category 5E ports only), and power LEDs.

**G. Environmental Specifications:**

Ensure that the edge switch performs all of the required functions during and after being subjected to an ambient operating temperature range of -30 degrees to 165 degrees Fahrenheit as defined in the environmental requirements section of the NEMA TS 2 standard, with a noncondensing humidity of 0 to 95%.

Provide certification that the device has successfully completed environmental testing as defined in the environmental requirements section of the NEMA TS 2 standard. Provide certification that the device meets the vibration and shock resistance requirements of Sections 2.1.9 and 2.1.10, respectively, of the NEMA TS 2 standard. Ensure that the edge switch is protected from rain, dust, corrosive elements, and typical conditions found in a roadside environment.

The edge switch shall meet or exceed the following environmental standards:

- IEEE 1613 (electric utility substations)
- IEC 6185003 (electric utility substations)
- IEEE 61800-3 (variable speed drive systems)
• IEC 61000-6-2 (generic industrial)

H. Ethernet Patch Cable

Furnish a factory pre-terminated/pre-connectorized Ethernet patch cable with each edge switch. Furnish Ethernet patch cables meeting the following physical requirements:

• Five (5)-foot length
• Category 5e or better
• Factory-installed RJ-45 connectors on both ends
• Molded anti-snag hoods over connectors
• Gold plated connectors

Furnish Fast Ethernet patch cords meeting the following minimum performance requirements:

• TIA/EIA-568-B-5, Additional Transmission Performance Specifications for 4-pair 100 Ω Enhanced Category 5 Cabling
  • Frequency Range: 1-100 MHz
  • Near-End Crosstalk (NEXT): 30.1 dB
  • Power-sum NEXT: 27.1 dB
  • Attenuation to Crosstalk Ratio (ACR): 6.1 dB
  • Power-sum ACR: 3.1 dB
  • Return Loss: 10dB
  • Propagation Delay: 548 nsec

I. Fiber Optic Jumpers

Furnish two (2) factory pre-terminated/pre-connectorized LC/ST Singlemode Duplex fiber optic jumper cables with each edge switch. Furnish Fiber Optic Jumpers meeting the following physical requirements:

• Singlemode 9/125
• Duplex
• End 1: Factory installed LC Male Fiber Plug
• End 2: Factory installed ST Make Fiber Plug
• Three (3) meter length

Furnish Fast Ethernet patch cords meeting the following minimum performance requirements:

• Insertion loss < 0.3db
• Return loss > 50db
• Fiber Extension: -0.05mm < H < +0.05mm
• Apex Offset: < 50 um
• Intersection Loss will be increased after 500 mating
• Operating Temperature: -20 ºC to +70 ºC
• Storage Temperature: -40 ºC to +80 ºC

J. Rack Mount Shelf

Furnish one factory production 2 post rack shelf for mounting the edge network switch meeting the following physical requirements:
17.3 CONSTRUCTION METHODS

A. General:

Ensure that the edge switch is UL listed.

Verify that network/field/data patch cords meet all ANSI/EIA/TIA requirements for Category 5E four-pair unshielded twisted pair cabling with stranded conductors and RJ45 connectors.

Contact the City of Concord, Traffic Engineer at 704-920-5377 a minimum of 5 days prior to installation to arrange for the city to program the Ethernet Edge Switches.

B. Edge Switch:

Mount the 1U rack shelf in the back door of each DMS equipment cabinet. Mount the edge switch inside each field cabinet by securely fastening the edge switch to the rack shelf using manufacturer-recommended or Engineer-approved attachment methods, attachment hardware and fasteners. Refer any questions concerning edge switch mounting to the City of Concord.

Ensure that the edge switch is mounted securely in the cabinet and is fully accessible by field technicians without blocking access to other equipment. Verify that fiber-optic jumpers consist of a length of cable that is connectorized on both ends, primarily used for interconnecting termination or patching facilities and/or equipment.

Do not connect the Ethernet cable between the Ethernet edge switch and the DMS controller. Contact the City of Concord - Traffic Engineer at 704-920-5377 with a minimum of 5 days advance notice to arrange for Signal Technicians to make the final connections.

17.4 MEASUREMENT AND PAYMENT

Ethernet edge switch will be measured and paid as the actual number of Ethernet edge switches furnished, installed, and accepted.

No separate measurement will be made for Ethernet patch cable, power cord, fiber optic jumpers, rack shelf, mounting hardware, nuts, bolts, brackets, or edge switch programming as these will be considered incidental to furnishing and installing the edge switch.

Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet Edge Switch</td>
<td>Each</td>
</tr>
</tbody>
</table>
18. **REMOVAL OF LANE DESIGNATION SIGNS AND POLES**

18.1 **DESCRIPTION**

This Project includes the removal of existing lane designations signs and the installation of a new Dynamic Message Sign Assembly. At locations shown on the Plans, remove and dispose of the existing lane designation signs, poles, anchors, down guys, and span wire.

18.2 **CONSTRUCTION METHODS**

Remove existing lane designation signs at locations shown in the Plans. Remove the existing signs, poles, anchors, down guys, and span wire.

For unpaved areas, backfill excavations of removed material, tamp the backfilled material, and rake smooth the top 1 ½ inches. Finish unpaved areas flush with surrounding natural ground and to match the original contour of the ground. Seed with the same type of grass as surrounding area and mulch the newly seeded area. If unpaved area was not grassed, replace the original ground cover in-kind as directed by the Engineer.

Complete repairs to and restoration of all ground (paved and unpaved) disturbed for construction within five consecutive calendar days following initials removal. If the Contractor fails to repair and restore the ground in accordance with these Project Special provisions within the time frame specified, the City reserves the right to make the necessary repairs, and all expenses incurred by the City in making the repairs and restoring the ground will be deducted from payment.

18.3 **MEASUREMENT AND PAYMENT**

*Remove Existing ()* will be measured and paid as the actual number removed and accepted.

No measurement or payment will be made for restoration of the surrounding unpaved ground surfaces in accordance with these Project Special Provisions as such work will be considered incidental to removing cabinet foundations.

Payment will be made under:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove Existing Lane Designation Signs and Poles</td>
<td>Each</td>
</tr>
</tbody>
</table>
STANDARD SPECIAL PROVISION

AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS

(5-20-08) Z-2

General Statute 143C-6-11. (h) Highway Appropriation is hereby incorporated verbatim in this contract as follows:

(h) Amounts Encumbered. – Transportation project appropriations may be encumbered in the amount of allotments made to the Department of Transportation by the Director for the estimated payments for transportation project contract work to be performed in the appropriation fiscal year. The allotments shall be multiyear allotments and shall be based on estimated revenues and shall be subject to the maximum contract authority contained in General Statute 143C-6-11(c). Payment for transportation project work performed pursuant to contract in any fiscal year other than the current fiscal year is subject to appropriations by the General Assembly. Transportation project contracts shall contain a schedule of estimated completion progress, and any acceleration of this progress shall be subject to the approval of the Department of Transportation provided funds are available. The State reserves the right to terminate or suspend any transportation project contract, and any transportation project contract shall be so terminated or suspended if funds will not be available for payment of the work to be performed during that fiscal year pursuant to the contract. In the event of termination of any contract, the contractor shall be given a written notice of termination at least 60 days before completion of scheduled work for which funds are available. In the event of termination, the contractor shall be paid for the work already performed in accordance with the contract specifications.

Payment will be made on any contract terminated pursuant to the special provision in accordance with Subarticle 108-13(E) of the 2018 Standard Specifications.

STANDARD SPECIAL PROVISION

NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY

(5-17-11) Z-3

Seed shall be sampled and tested by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory. When said samples are collected, the vendor shall supply an independent laboratory report for each lot to be tested. Results from seed so sampled shall be final. Seed not meeting the specifications shall be rejected by the Department of Transportation and shall not be delivered to North Carolina Department of Transportation warehouses. 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:

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

Seed of Pensacola Bahia grass 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.

<table>
<thead>
<tr>
<th>Tall Fescue (all approved varieties)</th>
<th>Bermudagrass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kobe Lespedeza</td>
<td>Browntop Millet</td>
</tr>
<tr>
<td>Korean Lespedeza</td>
<td>German Millet – Strain R</td>
</tr>
<tr>
<td>Weeping Lovegrass</td>
<td>Clover – Red/White/Crimson</td>
</tr>
<tr>
<td>Carpetgrass</td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Rye (grain; all varieties)</th>
<th>Japanese Millet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kentucky Bluegrass (all approved varieties)</td>
<td>Reed Canary Grass</td>
</tr>
<tr>
<td>Hard Fescue (all approved varieties)</td>
<td>Zoisia</td>
</tr>
<tr>
<td>Shrub (bicolor) Lespedeza</td>
<td></td>
</tr>
</tbody>
</table>

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 Japanese Millet
Crownvetch Reed Canary Grass
Pensacola Bahiagrass Zoisia
Creeping Red Fescue

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
Revise the 2018 Standard Specifications as follows:

**Division 7**

Page 7-27, line 4, Article 725-1 MEASUREMENT AND PAYMENT, replace article number “725-1” with “724-4”.

Page 7-28, line 10, Article 725-1 MEASUREMENT AND PAYMENT, replace article number “725-1” with “725-3”.

**Division 10**

Page 10-162, line 1, Article 1080-50 PAINT FOR VERTICAL MARKERS, replace article number “1080-50” with “1080-10”.

Page 10-162, line 5, Article 1080-61 EPOXY RESIN FOR REINFORCING STEEL, replace article number “1080-61” with “1080-11”.

Page 10-162, line 22, Article 1080-72 ABRASIVE MATERIALS FOR BLAST CLEANING STEEL, replace article number “1080-72” with “1080-12”.

Page 10-163, line 25, Article 1080-83 FIELD PERFORMANCE AND SERVICES, replace article number “1080-83” with “1080-13”.

I-45
STANDARD SPECIAL PROVISION

PLANT AND PEST QUARANTINES

(Imported Fire Ant, Gypsy Moth, Witchweed, Emerald Ash Borer, and Other Noxious Weeds)

(3-18-03) (Rev. 12-20-16) Z-04a

Within Quarantined Area

This project may be within a county regulated for plant and/or pests. If the project or any part of the Contractor's operations is located within a quarantined area, thoroughly clean all equipment prior to moving out of the quarantined area. Comply with federal/state regulations by obtaining a certificate or limited permit for any regulated article moving from the quarantined area.

Originating in a Quarantined County

Obtain a certificate or limited permit issued by the N.C. Department of Agriculture/United States Department of Agriculture. Have the certificate or limited permit accompany the article when it arrives at the project site.

Contact

Contact the N.C. Department of Agriculture/United States Department of Agriculture at 1-800-206-9333, 919-707-3730, or http://www.ncagr.gov/plantindustry/ to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

Regulated Articles Include

1. Soil, sand, gravel, compost, peat, humus, muck, and decomposed manure, separately or with other articles. This includes movement of articles listed above that may be associated with cut/waste, ditch pulling, and shoulder cutting.
2. Plants with roots including grass sod.
3. Plant crowns and roots.
4. Bulbs, corms, rhizomes, and tubers of ornamental plants.
5. Hay, straw, fodder, and plant litter of any kind.
6. Clearing and grubbing debris.
7. Used agricultural cultivating and harvesting equipment.
8. Used earth-moving equipment.
9. Any other products, articles, or means of conveyance, of any character, if determined by an inspector to present a hazard of spreading imported fire ant, gypsy moth, witchweed, emerald ash borer, or other noxious weeds.
STANDARD SPECIAL PROVISION

TITLE VI AND NONDISCRIMINATION:

(6-28-77)(Rev 6/19/2018)  Z-6

Revise the 2018 *Standard Specifications* as follows:

Replace Article 103-4(B) with the following:

The North Carolina Department of Transportation is committed to carrying out the U.S. Department of Transportation’s policy of ensuring nondiscrimination in the award and administration of contracts.

The provisions of this section related to United States Department of Transportation (US DOT) Order 1050.2A, Title 49 Code of Federal Regulations (CFR) part 21, 23 United States Code (U.S.C.) 140 and 23 CFR part 200 (or 49 CFR 303, 49 U.S.C. 5332 or 49 U.S.C. 47123) are applicable to all North Carolina Department of Transportation (NCDOT) contracts and to all related subcontracts, material supply, engineering, architectural and other service contracts, regardless of dollar amount. Any Federal provision that is specifically required not specifically set forth is hereby incorporated by reference.

(1) Title VI Assurances (USDOT Order 1050.2A, Appendix A)

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

(a) Compliance with Regulations

The contractor (hereinafter includes consultants) shall comply with the Acts and the Regulations relative to Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation, Federal Highway Administration (FHWA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

(b) Nondiscrimination

The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

(c) Solicitations for Subcontractors, Including Procurements of Materials and Equipment

In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Nondiscrimination on the grounds of race, color, or national origin.
(d) Information and Reports

The contractor shall provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the FHWA to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor shall so certify to the Recipient or the FHWA, as appropriate, and shall set forth what efforts it has made to obtain the information.

(e) Sanctions for Noncompliance:

In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it and/or the FHWA may determine to be appropriate, including, but not limited to:

(i) Withholding payments to the contractor under the contract until the contractor complies; and/or

(ii) Cancelling, terminating, or suspending a contract, in whole or in part.

(f) Incorporation of Provisions

The contractor shall include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor shall take action with respect to any subcontract or procurement as the Recipient or the FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

(2) Title VI Nondiscrimination Program (23 CFR 200.5(p))

The North Carolina Department of Transportation (NCDOT) has assured the USDOT that, as a condition to receiving federal financial assistance, NCDOT will comply with Title VI of the Civil Rights Act of 1964 and all requirements imposed by Title 49 CFR part 21 and related nondiscrimination authorities to ensure that no person shall, on the ground of race, color, national origin, limited English proficiency, sex, age, or disability (including religion/creed or income-level, where applicable), be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any programs, activities, or services conducted or funded by NCDOT. Contractors and other organizations under contract or agreement with NCDOT must also comply with Title VI and related authorities, therefore:

(a) During the performance of this contract or agreement, contractors (e.g., subcontractors, consultants, vendors, prime contractors) are responsible for complying with NCDOT’s Title VI Program. Contractors are not required to prepare or submit Title VI Programs. To comply with this section, the prime contractor shall:
1. Post NCDOT’s Notice of Nondiscrimination and the Contractor’s own Equal Employment Opportunity (EEO) Policy in conspicuous locations accessible to all employees, applicants and subcontractors on the jobsite.

2. Physically incorporate the required Title VI clauses into all subcontracts on federally-assisted and state-funded NCDOT projects, and ensure inclusion by subcontractors into all lower-tier subcontracts.

3. Required Solicitation Language. The Contractor shall include the following notification in all solicitations for bids and requests for work or material, regardless of funding source:

“The North Carolina Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 US.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award. In accordance with other related nondiscrimination authorities, bidders and contractors will also not be discriminated against on the grounds of sex, age, disability, low-income level, creed/religion, or limited English proficiency in consideration for an award.”

4. Physically incorporate the FHWA-1273, in its entirety, into all subcontracts and subsequent lower tier subcontracts on Federal-aid highway construction contracts only.

5. Provide language assistance services (i.e., written translation and oral interpretation), free of charge, to LEP employees and applicants. Contact NCDOT OCR for further assistance, if needed.

6. For assistance with these Title VI requirements, contact the NCDOT Title VI Nondiscrimination Program at 1-800-522-0453.

(b) Subrecipients (e.g. cities, counties, LGAs, planning organizations) may be required to prepare and submit a Title VI Plan to NCDOT, including Title VI Assurances and/or agreements. Subrecipients must also ensure compliance by their contractors and subrecipients with Title VI. (23 CFR 200.9(b)(7))

(c) If reviewed or investigated by NCDOT, the contractor or subrecipient agrees to take affirmative action to correct any deficiencies found within a reasonable time period, not to exceed 90 calendar days, unless additional time is granted by NCDOT. (23 CFR 200.9(b)(15))

(d) The Contractor is responsible for notifying subcontractors of NCDOT’s External Discrimination Complaints Process.

1. Applicability

Title VI and related laws protect participants and beneficiaries (e.g., members of the public and contractors) from discrimination by NCDOT employees, subrecipients and contractors, regardless of funding source.
2. Eligibility
Any person—or class of persons—who believes he/she has been subjected to discrimination based on race, color, national origin, Limited English Proficiency (LEP), sex, age, or disability (and religion in the context of employment, aviation, or transit) may file a written complaint. The law also prohibits intimidation or retaliation of any sort.

3. Time Limits and Filing Options
Complaints may be filed by the affected individual(s) or a representative and must be filed no later than 180 calendar days after the following:
(i) The date of the alleged act of discrimination; or
(ii) The date when the person(s) became aware of the alleged discrimination; or
(iii) Where there has been a continuing course of conduct, the date on which that conduct was discontinued or the latest instance of the conduct.

Title VI and related discrimination complaints may be submitted to the following entities:
- North Carolina Department of Transportation, Office of Civil Rights, Title VI Program, 1511 Mail Service Center, Raleigh, NC 27699-1511; toll free 1-800-522-0453
- Federal Highway Administration, North Carolina Division Office, 310 New Bern Avenue, Suite 410, Raleigh, NC 27601, 919-747-7010
- US Department of Transportation, Departmental Office of Civil Rights, External Civil Rights Programs Division, 1200 New Jersey Avenue, SE, Washington, DC 20590; 202-366-4070

4. Format for Complaints
Complaints must be in writing and signed by the complainant(s) or a representative, and include the complainant’s name, address, and telephone number. Complaints received by fax or e-mail will be acknowledged and processed. Allegations received by telephone will be reduced to writing and provided to the complainant for confirmation or revision before processing. Complaints will be accepted in other languages, including Braille.

5. Discrimination Complaint Form
Contact NCDOT Civil Rights to receive a full copy of the Discrimination Complaint Form and procedures.

6. Complaint Basis
Allegations must be based on issues involving race, color, national origin (LEP), sex, age, disability, or religion (in the context of employment, aviation or transit). “Basis” refers to the complainant’s membership in a protected group category.
<table>
<thead>
<tr>
<th>Protected Categories</th>
<th>Definition</th>
<th>Examples</th>
<th>Applicable Nondiscrimination Authorities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race and Ethnicity</td>
<td>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</td>
<td>Black/African American, Hispanic/Latino, Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, White</td>
<td>Title VI of the Civil Rights Act of 1964; 49 CFR Part 21; 23 CFR 200; 49 U.S.C. 5332(b); 49 U.S.C. 47123. (Executive Order 13166)</td>
</tr>
<tr>
<td>Color</td>
<td>Color of skin, including shade of skin within a racial group</td>
<td>Black, White, brown, yellow, etc.</td>
<td></td>
</tr>
<tr>
<td>National Origin (Limited English Proficiency)</td>
<td>Place of birth. Citizenship is not a factor. (Discrimination based on language or a person’s accent is also covered)</td>
<td>Mexican, Cuban, Japanese, Vietnamese, Chinese</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>Gender. The sex of an individual. Note: Sex under this program does not include sexual orientation.</td>
<td>Women and Men</td>
<td>1973 Federal-Aid Highway Act; 49 U.S.C. 5332(b); 49 U.S.C. 47123.</td>
</tr>
<tr>
<td>Disability</td>
<td>Physical or mental impairment, permanent or temporary, or perceived.</td>
<td>Blind, alcoholic, para-amputee, epileptic, diabetic, arthritic</td>
<td>Section 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act of 1990</td>
</tr>
<tr>
<td>Religion (in the context of employment) (Religion/ Creed in all aspects of any aviation or transit-related construction)</td>
<td>An individual belonging to a religious group; or the perception, based on distinguishable characteristics that a person is a member of a religious group. In practice, actions taken as a result of the moral and ethical beliefs as to what is right and wrong, which are sincerely held with the strength of traditional religious views. Note: Does not have to be associated with a recognized religious group or church; if an individual sincerely holds to the belief, it is a protected religious practice.</td>
<td>Muslim, Christian, Sikh, Hindu, etc.</td>
<td>Title VII of the Civil Rights Act of 1964; 23 CFR 230; FHWA-1273 Required Contract Provisions. (49 U.S.C. 5332(b); 49 U.S.C. 47123)</td>
</tr>
</tbody>
</table>

(3) Pertinent Nondiscrimination Authorities

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest agrees to comply with the following non-discrimination statutes and authorities, including, but not limited to:

• 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);


• 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);

(g) The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

(h) Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;

(i) The Federal Aviation Administration's Nondiscrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);

(j) Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures Nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;

(k) Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of Limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);

(l) Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

(m)Title VII of the Civil Rights Act of 1964 (42 U.S.C. § 2000e et seq., Pub. L. 88-352), (prohibits employment discrimination on the basis of race, color, religion, sex, or national origin).

(4) Additional Title VI Assurances
**The following Title VI Assurances (Appendices B, C and D) shall apply, as applicable**

(a) Clauses for Deeds Transferring United States Property (1050.2A, Appendix B)

The following clauses will be included in deeds effecting or recording the transfer of real property, structures, or improvements thereon, or granting interest therein from the United States pursuant to the provisions of Assurance 4.

NOW, THEREFORE, the U.S. Department of Transportation as authorized by law and upon the condition that the North Carolina Department of Transportation (NCDOT) will accept title to the lands and maintain the project constructed thereon in accordance with the North Carolina General Assembly, the Regulations for the Administration of the Federal-Aid Highway Program, and the policies and procedures prescribed by the Federal Highway Administration of the U.S. Department of Transportation in accordance and in compliance with all requirements imposed by Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation pertaining to and effectuating the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252; 42 U.S.C. § 2000d to 2000d-4), does hereby remise, release, quitclaim and convey unto the NCDOT all the right, title and interest of the U.S. Department of Transportation in and to said lands described in Exhibit A attached hereto and made a part hereof.

(HABENDUM CLAUSE)

TO HAVE AND TO HOLD said lands and interests therein unto the North Carolina Department of Transportation (NCDOT) and its successors forever, subject, however, to the covenants, conditions, restrictions and reservations herein contained as follows, which will remain in effect for the period during which the real property or structures are used for a purpose for which Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits and will be binding on the NCDOT, its successors and assigns.
The NCDOT, in consideration of the conveyance of said lands and interests in lands, does hereby covenant and agree as a covenant running with the land for itself, its successors and assigns, that (1) no person will on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination with regard to any facility located wholly or in part on, over, or under such lands hereby conveyed [,] [and]* (2) that the NCDOT will use the lands and interests in lands and interests in lands so conveyed, in compliance with all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Effectuation of Title VI of the Civil Rights Act of 1964, and as said Regulations and Acts may be amended [, and (3) that in the event of breach of any of the above-mentioned nondiscrimination conditions, the Department will have a right to enter or re-enter said lands and facilities on said land, and that above described land and facilities will thereon revert to and vest in and become the absolute property of the U.S. Department of Transportation and its assigns as such interest existed prior to this instruction].*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary in order to make clear the purpose of Title VI.)

(b) Clauses for Transfer of Real Property Acquired or Improved Under the Activity, Facility, or Program (1050.2A, Appendix C)

The following clauses will be included in deeds, licenses, leases, permits, or similar instruments entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(a):

1. The (grantee, lessee, permittee, etc. as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree [in the case of deeds and leases add "as a covenant running with the land"] that:

   (i.) In the event facilities are constructed, maintained, or otherwise operated on the property described in this (deed, license, lease, permit, etc.) for a purpose for which a U.S. Department of Transportation activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permittee, etc.) will maintain and operate such facilities and services in compliance with all requirements imposed by the Acts and Regulations (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.

2. With respect to licenses, leases, permits, etc., in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to terminate the (lease, license, permit, etc.) and to enter, re-enter, and repossess said lands and facilities thereon, and hold the same as if the (lease, license, permit, etc.) had never been made or issued. *
3. With respect to a deed, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to enter or re-enter the lands and facilities thereon, and the above described lands and facilities will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

(c) Clauses for Construction/Use/Access to Real Property Acquired Under the Activity, Facility or Program (1050.2A, Appendix D)

The following clauses will be included in deeds, licenses, permits, or similar instruments/agreements entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(b):

1. The (grantee, licensee, permittee, etc., as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add, "as a covenant running with the land") that (1) no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities, (2) that in the construction of any improvements on, over, or under such land, and the furnishing of services thereon, no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination, (3) that the (grantee, licensee, lessee, permittee, etc.) will use the premises in compliance with all other requirements imposed by or pursuant to the Acts and Regulations, as amended, set forth in this Assurance.

2. With respect to (licenses, leases, permits, etc.), in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to terminate the (license, permit, etc., as appropriate) and to enter or re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, permit, etc., as appropriate) had never been made or issued. *

3. With respect to deeds, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)
STANDARD SPECIAL PROVISION

MINORITY AND FEMALE EMPLOYMENT REQUIREMENTS

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**

<table>
<thead>
<tr>
<th>Economic Areas</th>
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<tbody>
<tr>
<td><strong>Area 023</strong> 29.7%</td>
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<tr>
<td>Bertie County</td>
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<td>Wilson County</td>
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<td>Duplin County</td>
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<td>Onslow County</td>
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<tr>
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<td>Yancey County</td>
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SMSA Areas

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<th>County</th>
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<td>Currituck County</td>
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<td>3120</td>
<td>16.4%</td>
<td>Davidson County</td>
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<td>9200</td>
<td>20.7%</td>
<td>Orange County</td>
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<td>6640</td>
<td>22.8%</td>
<td>Forsyth County</td>
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<td>22.8%</td>
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<td>3120</td>
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<td>9200</td>
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<td>Stokes County</td>
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<td>24.2%</td>
<td>Cumberland County</td>
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<tr>
<td>1520</td>
<td>18.3%</td>
<td>Union County</td>
</tr>
</tbody>
</table>

Goals for Female Participation in Each Trade

(Statewide) 6.9%
Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract subcontracts of $10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

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.

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 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).

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 supervision and to all work performed on the contract by piecework, station work, or by subcontract.

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.

Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of the term Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation.

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.

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 qualified 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
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 social security number).
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 contain the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(i) 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 5.

(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.

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 journeymen hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits 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.
2. The contractor shall perform work 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. Speciality 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 5.12(a)).

3. The contractor shall comply with the requirements of 29 CFR 5.12(a)(1). 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).

4. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

5. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to insert 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.

6. 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.

7. 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.

8. 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.

   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. If the contractor is debarred as a contractor and a subcontractor as provided in 29 CFR 5.12(a)(1).


10. 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.

V. 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 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 subject, 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 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 quality or quantity 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.

* * * *

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) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for any covered transaction 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 any covered transaction by any Federal department or agency;
      (3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with 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;
      (4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
   b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:
   (Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost $25,000 or more - 2 CFR Parts 180 and 1200)
   a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.
   b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other
remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contractor). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epis.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 the transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion–Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 (49 CFR 20).

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

   a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, grant, or cooperative agreement.

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

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

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.
STANDARD SPECIAL PROVISION

ON-THE-JOB TRAINING

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:
The Department has established common training classifications and their respective training requirements that may be used by the contractors. However, the classifications established are not all-inclusive. Where the training is oriented toward construction applications, training will be allowed in lower-level management positions such as office engineers and estimators. Contractors shall submit new classifications for specific job functions that their employees are performing. The Department will review and recommend for acceptance to FHWA the new classifications proposed by contractors, if applicable. New classifications shall meet the following requirements:

Proposed training classifications are reasonable and realistic based on the job skill classification needs, and

The number of training hours specified in the training classification is consistent with common practices and provides enough time for the trainee to obtain journeyman level status.

The Contractor may allow trainees to be trained by a subcontractor provided that the Contractor retains primary responsibility for meeting the training and this provision is made applicable to the subcontract. However, only the Contractor will receive credit towards the annual goal for the trainee.

Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. The number of trainees shall be distributed among the work classifications on the basis of the contractor’s needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman level status or in which they have been employed as a journeyman.

**Records and Reports**

The Contractor shall maintain enrollment, monthly and completion reports documenting company compliance under these contract documents. These documents and any other information as requested shall be submitted to the OJT Program Manager.

Upon completion and graduation of the program, the Contractor shall provide each trainee with a certification Certificate showing the type and length of training satisfactorily completed.
Trainee Interviews

All trainees enrolled in the program will receive an initial and Trainee/Post graduate interview conducted by the OJT program staff.

Trainee Wages

Contractors shall compensate trainees on a graduating pay scale based upon a percentage of the prevailing minimum journeyman wages (Davis-Bacon Act). Minimum pay shall be as follows:

- 60 percent of the journeyman wage for the first half of the training period
- 75 percent of the journeyman wage for the third quarter of the training period
- 90 percent of the journeyman wage for the last quarter of the training period

In no instance shall a trainee be paid less than the local minimum wage. The Contractor shall adhere to the minimum hourly wage rate that will satisfy both the NC Department of Labor (NCDOL) and the Department.

Achieving or Failing to Meet Training Goals

The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and who receives training for at least 50 percent of the specific program requirement. Trainees will be allowed to be transferred between projects if required by the Contractor’s scheduled workload to meet training goals.

If a contractor fails to attain their training assignments for the calendar year, they may be taken off the NCDOT’s Bidders List.

Measurement and Payment

No compensation will be made for providing required training in accordance with these contract documents.
STANDARD SPECIAL PROVISION

GENERAL DECISION NC180101 01/05/2018 NC101

Date: January 5, 2018
General Decision Number: NC180101 01/05/2018 NC101
Superseded General Decision Numbers: NC20170101
State: North Carolina
Construction Type: HIGHWAY

COUNTIES:

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HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.35 for calendar year 2018 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.35 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract for calendar year 2018. The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2) – (60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number 0
Publication Date 01/05/2018

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Welders – Receive rate prescribed for craft performing operation to which welding is incidental.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they
work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers
Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

**WAGE DETERMINATION APPEALS PROCESS**

1.) Has there been an initial decision in the matter? This can be:
   - an existing published wage determination
   - a survey underlying a wage determination
   - a Wage and Hour Division letter setting forth a position on a wage determination matter
   - a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

   Branch of Construction Wage Determinations  
   Wage and Hour Division  
   U. S. Department of Labor  
   200 Constitution Avenue, N.W.  
   Washington, D.C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

   Wage and Hour Administrator  
   U.S. Department of Labor  
   200 Constitution Avenue, N.W.  
   Washington, D.C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:
Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, D.C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION
**LISTING OF DBE SUBCONTRACTORS**

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* 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.
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<th>Firm Name and Address</th>
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** 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.
EXECUTION OF BID

NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION

CORPORATION

The prequalified bidder being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating N.C.G.S. §133-24 within the last three years, and that the prequalified bidder intends to do the work with his own bona fide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the Contractor is attesting his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. §133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF PREQUALIFIED BIDDER

Full name of Corporation

Address as Prequalified

Attest

Secretary/Assistant Secretary
(Select appropriate title)

By

President/Vice President/Assistant Vice President
(Select appropriate title)

Print or type Signer’s name

Print or type Signer’s name

CORPORATE SEAL
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

PARTNERSHIP

The prequalified bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating N.C.G.S. § 133-24 within the last three years, and that the prequalified bidder intends to do the work with its own bona fide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the Contractor is attesting his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF PREQUALIFIED BIDDER

Full Name of Partnership

Address as Prequalified

Signature of Witness

Signature of Partner

Print or Type Signer’s Name

Print or Type Signer’s Name
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

LIMITED LIABILITY COMPANY

The prequalified bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating N.C.G.S. § 133-24 within the last three years, and that the prequalified bidder intends to do the work with its own bona fide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the Contractor is attesting his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF PREQUALIFIED BIDDER

__________________________________
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
NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION

JOINT VENTURE (2) or (3)

The prequalified bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating N.C.G.S. § 133-24 within the last three years, and that the prequalified bidder intends to do the work with its own bona fide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the Contractor is attesting his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable. N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF PREQUALIFIED BIDDER

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.

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<thead>
<tr>
<th>Line</th>
<th>Description</th>
<th>Details</th>
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<tr>
<td>1</td>
<td>Name of Joint Venture</td>
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<td>Name of Contractor</td>
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<td>Name of Contractor</td>
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<td>Name of Contractor</td>
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<td>If Corporation, affix Corporate Seal</td>
<td>AND</td>
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</table>

Address as Prequalified
Contract No. U-5522
County Cabarrus

______________________________________  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
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

INDIVIDUAL DOING BUSINESS UNDER A FIRM NAME

The prequalified bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating N.C.G.S. § 133-24 within the last three years, and that the prequalified bidder intends to do the work with its own bona fide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the Contractor is attesting his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF PREQUALIFIED BIDDER

Name of Prequalified Bidder

Trading and Doing Business As

Signatory of Witness

Signature of Prequalified Bidder, Individual

Print or Type Signer’s Name

Print or Type Signer’s Name
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

INDIVIDUAL DOING BUSINESS IN HIS OWN NAME

The prequalified bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating N.C.G.S. § 133-24 within the last three years, and that the prequalified bidder intends to do the work with its own bona fide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the Contractor is attesting his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF PREQUALIFIED BIDDER

Name of Prequalified Bidder

__________________________________________
Print or Type Name

__________________________________________
Address as Prequalified

__________________________________________
Signature of Prequalified Bidder, Individually

__________________________________________
Print or type Signer’s Name

__________________________________________
Signature of Witness

__________________________________________
Print or type Signer’s name
DEBARTMENT CERTIFICATION OF PREQUALIFIED BIDDER

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation that is file with the Department, or has become erroneous because of changed circumstances.

2. The terms covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded, as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.

3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.

4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal-Aid Provision titled Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR 1273) provided by the Department, without subsequent modification, in all lower tier covered transactions.

5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.

6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.
DEBARMENT CERTIFICATION

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and

d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion 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
City of Concord

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 City of Concord 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 City of Concord 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 City of Concord 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 City of Concord 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

<table>
<thead>
<tr>
<th>Address as prequalified</th>
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<tr>
<td>Signature of Witness or Attest</td>
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<tr>
<td>Print or type Signer's name</td>
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</table>

*If Corporation, affix Corporate Seal*

and

(3) ______________________________

Name of Contractor

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<th>Address as prequalified</th>
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<tr>
<td>Signature of Witness or Attest</td>
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<td>Print or type Signer's name</td>
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</tbody>
</table>

*If Corporation, affix Corporate Seal*

and

(4) ______________________________

Name of Contractor *(for 3 Joint Venture only)*

<table>
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<tr>
<th>Address as prequalified</th>
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<tr>
<td>Signature of Witness or Attest</td>
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<td>Print or type Signer's name</td>
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</tbody>
</table>

*If Corporation, affix Corporate Seal*
City of Concord

CONTRACT PAYMENT BOND

Date of Payment Bond Execution

Name of Principal Contractor

Name of Surety:

Name of Contracting Body:

Amount of Bond:

Contract ID No.:

County Name:

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL CONTRACTOR (hereafter, PRINCIPAL) and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the Contracting Body, numbered as shown above and hereto attached:

NOW THEREFORE, if the principal shall promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.
CONTRACT PAYMENT BOND

Affix Seal of Surety Company

____________________________________
Print or type Surety Company Name

By

____________________________________
Print, stamp or type name of Attorney-in-Fact

____________________________________
Signature of Attorney-in-Fact

____________________________________
Signature of Witness

____________________________________
Print or type Signer’s name

____________________________________
Address of Attorney-in-Fact
CONTRACT PAYMENT 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
CONTRACT PAYMENT BOND

LIMITED LIABILITY COMPANY

SIGNATURE OF CONTRACTOR (Principal)

Name of Contractor

________________________________________

Full name of Firm

________________________________________

Address as prequalified

By:

________________________________________

Signature of Member, Manager, Authorized Agent

Select appropriate title

________________________________________

Print or type Signer’s name
CONTRACT PAYMENT 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
CONTRACT PAYMENT 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
CONTRACT PAYMENT 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
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. On 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 NCDOT Standard 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
   Signature of Witness or Attest
   By
   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
   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
   Print or type Signer's name

If Corporation, affix Corporate Seal
CONTRACT PAYMENT BOND

Attach certified copy of Power of Attorney to this sheet
KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL CONTRACTOR (hereafter, PRINCIPAL) and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the Contracting Body, numbered as shown above and hereto attached:

NOW THEREFORE, if the principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.
CONTRACT PERFORMANCE BOND

Affix Seal of Surety Company

Print or type Surety Company Name

By

Print, stamp or type name of Attorney-in-Fact

Signature of Attorney-in-Fact

Signature of Witness

Print or type Signer’s name

Address of Attorney-in-Fact

I-104
CONTRACT PERFORMANCE 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
CONTRACT PERFORMANCE BOND

LIMITED LIABILITY COMPANY

SIGNATURE OF CONTRACTOR (Principal)

Name of Contractor

______________________________________________

Full name of Firm

______________________________________________

Address as prequalified

By:

______________________________________________

Signature of Member, Manager, Authorized Agent

Select appropriate title

______________________________________________

Print or type Signer’s name
CONTRACT PERFORMANCE 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
CONTRACT PERFORMANCE 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
CONTRACT PERFORMANCE 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
## CONTRACT PERFORMANCE 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. On 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 NCDOT Standard 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.

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<td>Name of Contractor</td>
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*If Corporation, affix Corporate Seal*

and

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<td>Print or type Signer's name Print or type Signer's name</td>
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*If Corporation, affix Corporate Seal*

and

<table>
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<tr>
<th>Line</th>
<th>Description</th>
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<tr>
<td>(4)</td>
<td>Name of Contractor <em>(for 3 Joint Venture only)</em></td>
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<td></td>
<td>Address as prequalified</td>
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<tr>
<td></td>
<td>Signature of Witness or Attest By Signature of Contractor</td>
</tr>
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<td>Print or type Signer's name Print or type Signer's name</td>
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</table>

*If Corporation, affix Corporate Seal*
CONTRACT PERFORMANCE BOND

Attach certified copy of Power of Attorney to this sheet
BID FORM

City of Concord Intelligent Transportation System Communications Project
City Project # 2015-054

THIS BID IS SUBMITTED TO:

W. Brian Hiatt, City Manager
c/o Sue Hyde, PE, Director of Engineering
City of Concord
P.O. Box 308
Concord, North Carolina 28026-0308

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with Owner in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents within the specified time and for the amount indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.

2. Bidder accepts all of the terms and conditions of the Invitation to Bid and the Instructions to Bidders, including without limitation those dealing with the disposition of bid security. This Bid will remain subject to acceptance for 90 days after the day of bid opening.

3. In submitting this Bid, Bidder represents that:

   a. Bidder has examined copies of all the Bidding Documents and of the following Addenda (receipt of all which is hereby acknowledged):

      No. ____________________  Dated__________________
      No. ____________________  Dated__________________
      No. ____________________  Dated__________________
      No. ____________________  Dated__________________
      No. ____________________  Dated__________________

   b. Bidder has visited the site and become familiar with and satisfied itself as to the general, local, and site conditions that may affect cost, progress, performance, and furnishing of the Work.

   c. Bidder is familiar with and has satisfied itself as to all Federal, state, and local Laws and Regulations that may affect cost, progress, performance, and furnishing of the Work.
d. Bidder has carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site (except underground facilities) which have been identified in the Supplementary Conditions and Special Conditions as provided in Section 102-7 of the General Requirements. Bidder accepts the determination set forth in the Supplementary Conditions and Special Conditions of the extent of the "technical data" contained in such reports and drawings upon which Bidder is entitled to rely as provided in Section 102-7 of the General Requirements. Bidder acknowledges that such reports and drawings are not Contract Documents and may not be complete for Bidder's purposes. Bidder acknowledges that Owner and Engineer do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Bidding Documents with respect to underground facilities at or contiguous to the site. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all such additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and underground facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance, or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder and safety precautions and programs incident thereto. Bidder does not consider that any additional examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance and furnishing of the Work in accordance with the time, price, and other terms and conditions of the Contract Documents.

e. Bidder is aware of the general nature of Work to be performed by Owner and others at the site that relates to Work for which this Bid is submitted as indicated in the Contract Documents.

f. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

g. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Contract Documents and the written resolution thereof by Engineer is acceptable to Bidder, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Bid is submitted.

h. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm, or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm, or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.
### UNIT PRICE SCHEDULE

**City Project # 2013-054**  
**TIP #: U-5522**

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<tr>
<th>Sect.</th>
<th>No.</th>
<th>Item Description</th>
<th>Quantity</th>
<th>Unit</th>
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<tr>
<td>1</td>
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<td>CY</td>
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<td>Remove Existing Lane Control Signs and Poles</td>
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<td>EA</td>
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**TOTAL BID** $
4. Communications concerning this Bid shall be sent to Bidder at the following address:

- NAME: ________________________________
- ADDRESS: ________________________________
- P.O. BOX: ________________________________
- CITY: __________________ STATE: __________
- ZIP CODE: ________________________________

5. The terms used in this Bid, which are defined in the General Conditions included as part of the Contract Documents, have the meanings assigned to them in the General Conditions.

SIGNATURE OF BIDDER

Contractor's License Number __________________________

License Expiration Date __________________________

IN WITNESS WHEREOF, the City of Concord and the Contractor have caused this contract to be executed under seal by their respective duly authorized agents or officers.

CITY OF CONCORD: __________________________

(Typed or Printed Legal Name of Contractor)

By: __________________________

City Manager

By: __________________________

Signature of President/Vice President/Manager/Partner

ATTEST BY: __________________________

Printed Name: __________________________

Title: __________________________

City Clerk

SEAL

ATTEST: __________________________

BY: __________________________

Signature of Vice President, Secretary, or other officer

APPROVED AS TO FORM:

Printed Name: __________________________

Title: __________________________

Attorney for the City of Concord

SEAL

APPROVAL BY CITY FINANCE OFFICER

This instrument has been pre-audited in the manner required by the Local Government Budget and Fiscal Control Act.

________________________________________

Signature

I-115