STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION	10

CONTRACT PROPOSAL

WBS ELEMENT:	**43313.3.1**	**COUNTY:**	**Mecklenburg**
LOCATION:	**I-277/ West Brookshire Freeway**		
TYPE OF WORK:	**Advanced Queue Detection Warning System, Pavement Markings and Signing**		
BID OPENING:	**Wednesday, August 15, 2012 @ 2:00 PM**		
TIP NUMBER:	**SS-4910AR**		

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

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

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

RETURN BIDS TO: **Mr. Sean Epperson, PE**
NC Department of Transportation
716 West Main Street
Albemarle, NC 28001

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 sheet furnished by NCDOT with the proposal shall be used and shall not be altered in any manner. **DO NOT SEPARATE THE BID SHEET FROM THE PROPOSAL!**
2. All entries on the bid sheet, including signatures, shall be written in ink.
3. The Bidder shall submit a unit price for every item on the bid form. The unit prices for the various contract items shall be written in figures.
4. An amount bid shall be entered on the bid sheet for every item. The amount bid for each item shall be determined by multiplying each unit bid by the quantity for that item, and shall be written in figures in the "Amount Bid" column of the sheet.
5. The total amount bid shall be written in figures in the proper place on the bid sheet. The total amount shall be determined by adding the amounts bid for each item.
6. Changes in any entry shall be made by marking through the entry in ink and making the correct entry adjacent thereto in ink. A representative of the Bidder shall initial the change in ink.
7. The bid shall be properly executed. All bids shall show the following information:
   a. Name of individual, firm, corporation, partnership, or joint venture submitting bid.
   b. Name of individual or representative submitting bid and position or title.
   c. Name, signature, and position or title of witness.
   d. Federal Identification Number
   e. Contractor's License Number
8. Bids submitted by corporations shall bear the seal of the corporation.
9. The bid shall not contain any unauthorized additions, deletions, or conditional bids.
10. The bidder shall not add any provision reserving the right to accept or reject an award, or to enter into a contract pursuant to an award.
11. A bid bond or deposit is not required when submitting a bid for this project.
12. **THE PROPOSAL WITH THE BID SHEET STILL ATTACHED SHALL BE PLACED IN A SEALED ENVELOPE AND SHALL HAVE BEEN DELIVERED TO AND RECEIVED IN THE DIVISION ENGINEER'S OFFICE AT 716 WEST MAIN STREET, ALBEMARLE, NC 28001 NO LATER THAN AUGUST 15, 2012 @ 2:00 PM.**
13. The sealed bid must display the following statement on the front of the sealed envelope: **QUOTATION FOR ADVANCED QUEUE DETECTION WARNING SYSTEM, PAVEMENT MARKINGS AND SIGNING WBS# 43313.3.1**
14. If delivered by mail, the sealed envelope shall be placed in another sealed envelope and the outer envelope shall be addressed as follows:

Mr. Sean Epperson, PE
NC Department of Transportation
716 West Main Street
Albemarle, NC 28001

The award of the contract, if it is awarded, will be made to the lowest responsible Bidder in accordance with Section 102 (excluding 102-2 and 102-10) of the 2012 Standard Specifications for Roads and Structures. The lowest responsible Bidder will be notified that his bid has been accepted and that he has been awarded the contract. NCDOT reserves the right to reject all bids.

PURCHASE ORDER CONTRACT

Standard Provisions

GENERAL

This contract is for furnishing, installing, testing, and integrating an Advanced Queue Detection Warning System in Mecklenburg County, along I-277/West Brookshire Freeway from Tryon Street to I-77 North along with the removal of existing pavement markings, the installation of new pavement markings and the installation of Type A, B and D signs. The system will consist of using Microwave Vehicle Detection Technology (MVD) to detect traffic data (presence, speed, volume, and occupancy).

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

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

AUTHORITY OF THE ENGINEER

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

The Engineer, in accordance with Section 105-1 of the Standard Specifications, will decide all questions which may arise as to the quality and acceptability of work performed and as to the rate of progress of the work; all questions which may arise as to the interpretation of the contract; and all questions as to the acceptable fulfillment of the contract on the part of the Contractor. His decision shall be final and he shall have executive authority to enforce and make effective such decisions and orders if the Contractor fails to carry out promptly.

CONTRACT PAYMENT AND PERFORMANCE BOND

The successful bidder will be required to execute both a payment bond and a performance bond for a contract of $300,000 or more. The successful bidder, within 14 calendar days after the notice of award is received by bidder, shall provide the Department with a contract payment bond and a contract performance bond each in an amount equal to 100 percent of the amount of the contract. All bonds shall be in conformance with G. S. 44A-33. The corporate surety furnishing the bonds shall be authorized to do business in the State. The successful bidder's failure to file acceptable bonds within 14 calendar days after the notice of award is received by him shall be just cause for rescinding the award of the contract.

SUBLETTING OF CONTRACT

The Contractor shall not sublet, sell, transfer, assign or otherwise dispose of this contract or any portion thereof; or his/her right, title, or interest therein; without written consent of the Engineer. Subletting of this contract or any portion of the contract shall conform to the requirements of Article of 108-6 of the Standard Specifications.

CONFORMITY WITH CONTRACT

The presence of the Engineer or an Inspector at the work site shall in no way lessen the Contractor's responsibility for conformity with the provisions of this contract. Should the Engineer or Inspector fail to point out work not in conformance with the plans and specifications, whether from lack of discovery or for any other reason, it shall in no way prevent later rejection or correction to the unsatisfactory work when discovered. The Contractor shall have no claim for losses suffered due to any necessary removals or repairs resulting from unsatisfactory work.

The Engineer or Inspector shall have the authority to suspend the work wholly or in part for such periods as he/she may deem necessary for any of the following reasons:

1. Conditions considered unfavorable for the suitable prosecution of the work,
2. The Contractor's failure to correct conditions unsafe for working staff or the general public.
3. The Contractor has not carried out orders given him/her by the Engineer, or
4. The Contractor's failure to perform any provisions of the contract.

No extension of the completion date will be allowed for the above suspensions.

DEFAULT OF CONTRACT

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

PROSECUTION AND PROGRESS

The Contractor shall pursue the work diligently with workmen in sufficient numbers, abilities, and supervision, and with equipment, materials, and methods of construction as may be required to complete the work described in the contract by the completion date and in accordance with Section 108 of the Standard Specifications.

Work shall only be performed when weather and visibility conditions allow safe operations. The Contractor's vehicles and equipment shall not be parked within the State Highway System right of way overnight or at other times when work has been suspended unless approved by the Engineer, and in no case within 30 feet of the edge of pavement. The Engineer may designate specific locations for parking equipment.

NOTIFICATION OF OPERATIONS

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

TRAFFIC CONTROL AND WORK ZONE SAFETY

The Contractor shall maintain traffic during construction and provide, install, and maintain all traffic control devices in accordance with these project guidelines, the Project Special Provisions, North Carolina Department of Transportation Standard Specifications for Roads and Structures 2012, NCDOT Roadway Standard Drawings, and the current edition of the Manual of Uniform Traffic Control Devices (MUTCD).

The Contractor shall utilize complete and proper traffic controls and traffic control devices during all operations. All traffic control and traffic control devices required for any operation shall be functional and in place prior to the commencement of that operation. The Contractor shall conduct his/her operations so as to offer the least possible obstruction and inconvenience to the public and shall have under construction no greater length or amount of work that he/she can prosecute properly with due regards

to the rights of the public. Signs for temporary operations shall be removed during periods of inactivity. The Contractor is required to leave the project in a manner that will be safe to the traveling public and which will not impede motorists.

Public traffic shall be permitted to pass through the work-site with as little inconvenience and delay as possible. The Contractor shall maintain existing traffic patterns at all times except in the immediate work zone. Unless otherwise specified or directed by the Engineer, only one lane of traffic may be closed at any time. Lane closures shall not be permitted during periods of inclement weather or at other times when, in the opinion of the Engineer, the lane closure would be a hazard to traffic. Convenient access to driveways, houses, and buildings along the line of work shall be maintained. The Contractor shall use standard lane closures in accordance with NCDOT Highway Design Branch Roadway Standard Drawing Number 1101.02.

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

Failure to comply with any of the requirements for safety and traffic control of this contract shall result in suspension of work as provided in sub-article 108-7(2) of the Standard Specifications.

The intent is for TMP-2 and TMP-2A to be used when a lane closure is needed between the Graham St ramp and the I-77 ramp. This may include, but not be limited to, the removal and installation of pavement markings, the installation of signs or sign supports and the installation of the ITS devices needed for the queue detection system. The line items for Lane Closure and Shoulder Closure shall be used for all other closures.

SUPERVISION BY CONTRACTOR

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

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

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

MATERIALS AND TESTING

The Engineer reserves the right to perform all sampling and testing in accordance with Section 106 of the Standard Specifications and the Department's "Materials and Test Manual."

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

WORK AREA

The Contractor shall clean the site of excess excavation, waste packing material, wire, and all other debris resulting from the work done. At the end of each workday the site shall be clear and clean. The Contractor will haul away any waste material and shall not dispose of any waste material in streams, storm sewers or on highway right-of-way. All areas that involve trenching or any disruption of top soil shall be graded and prepared for seeding.

The Contractor shall exercise every reasonable precaution throughout the life of the project to prevent erosion and siltation. Silt fence and erosion control measures shall be installed in locations directed by the Engineer or his representative. The Contractor shall be responsible for any/all damage to private and/or public property resulting from this work. The Department of Transportation assumes no liability regarding injury and/or property damage resulting from work performed by the Contractor.

CLAIMS FOR ADDITIONAL COMPENSATION OR EXTENSION OF TIME

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

COMPENSATION

The quantity of unit or lump sum prices and payment will be full compensation for all work, including, but not limited to securing and installing material, transporting and storage of material, supervision, transportation, repair parts, equipment, machinery, tools, and traffic control during construction. The quantities contained herein are estimated only and the quantity to be paid for shall be the actual quantities, which were used on the project. In no case will the total amount paid to the Contractor exceed the total contract quote by more than ten percent (10%) without prior written request from the Division Engineer to Fiscal Section.

ORDERING OF MATERIALS

For the purposes of this contract is shall be assumed that it will take up to 45 days for all materials to be ordered and delivered. This shall include, but not be limited to, all equipment for the queue detection system, pavement marking materials, signs and sign supports. No additional days will be granted for any materials taking less than 45 days to be ordered and delivered.

PRECONSTRUCTION CONFERENCE

A PRECONSTRUCTION CONFERENCE shall be held at the Division 10 office between the Department and the Contractor that has been awarded the contract. This meeting shall be scheduled within 2 weeks of the letter of notification of awarded contract. This conference must be held prior to the beginning of any work under the contract. The time of the conference shall be decided by all parties involved and notification shall be sent to all affected parties.

PURCHASE ORDER CONTRACT

Project Special Provisions

Contents

CONTRACT TIME AND LIQUIDATED DAMAGES:

(7-1-95) (Rev. 12-18-07) 108 SP1 G10 A

The date of availability for this contract is **September 5th, 2012**.

The completion date for this contract is **December 4th, 2012**

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 **Five Hundred Dollars ($500.00)** per calendar day.

INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES:

(2-20-07) 108 SP1 G14 A

The Contractor shall complete the required work of installing, maintaining, and removing the traffic control devices for lane closures and restoring traffic to the existing traffic pattern. The Contractor shall not close or narrow a lane of traffic on **I-277/ West Brookshire Freeway** during the following time restrictions:

DAY AND TIME RESTRICTIONS

Shoulder Closure
Monday-Friday
6:00AM to 9:00AM
4:00PM to 7:00PM

One (1)Lane Closure
Monday –Friday
6:00AM to 9:00PM
10:00AM Saturday to 9:00PM Sunday

Two (2) Lane Closure
Monday-Friday
6:00AM to 11:00PM
10:00AM Saturday to11:00PM Sunday

In addition, the Contractor shall not close or narrow a lane of traffic on **I-277** detain and/or alter the traffic flow on or during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy, including the following schedules:

HOLIDAY AND HOLIDAY WEEKEND LANE CLOSURE RESTRICTIONS

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

2. For **New Year's Day**, between the hours of **6:00 AM** December 31st and **11:00 PM** January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until **11:00 PM** the following Tuesday.

3. For **Easter**, between the hours of **6:00 AM** Thursday and **11:00 PM** Monday.

4. For **Memorial Day**, between the hours of **6:00 AM** Friday and **11:00 PM** Tuesday.

5. For **Independence Day**, between the hours of **6:00 AM** the day before Independence Day and **11:00 PM** the day after Independence Day.

   If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of **6:00 AM** the Thursday before Independence Day and **11:00 PM** the Tuesday after Independence Day.

6. For **Labor Day**, between the hours of **6:00 AM** Friday and **11:00 PM** Tuesday.

7. For **Thanksgiving Day**, between the hours of **6:00 AM** Tuesday and **11:00 PM** Monday.

8. For **Christmas**, between the hours of **6:00 AM** the Friday before the week of Christmas Day and **11:00 PM** the following Tuesday after the week of Christmas Day.

9. For **NASCAR and NHRA**, at **Charlotte Motor Speedway** between the hours of **6:00 AM** the **Wednesday** before the event **and 11:00 PM the Monday after the event.**

   And

   For **any Event**, occurring at **Bank of America Stadium or Time Warner Arena** between three **(**3**) hours** before the start and three (3) hours after the end of the **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** (**$1000.00**) per hour.

INTERMEDIATE CONTRACT TIME NUMBER 2 AND LIQUIDATED DAMAGES:

The Contractor shall complete the required work of removing the existing pavement marking, installing all new pavement markings and installing the Type D and E signs by **October 30th, 2012.**

The liquidated damages for **ICT #2** are **Five Hundred Dollars ($500.00)** per calendar day.

TRAFFIC CONTROL
(SINGLE LANE AND SHOULDER CLOSURE)

This line item is to be used when a single lane of travel needs to be closed to perform associated work. This line item includes all necessary signs, equipment, labor and material required per North Carolina Department of Transportation Standard Specifications for Roads and Structures 2012, NCDOT Roadway Standard Drawings, and the current edition of the Manual of Uniform Traffic Control Devices (MUTCD) and must be approved by the Engineer prior to being installed. This line item will be paid for on a per each basis. The intent is for this line item to be used when a lane closure is needed and will not require the need for the traffic control set up as shown in TMP-2 and 2A.

Payment will be made under:

Pay Item	Pay Unit
Lane Closure	Ea.
Shoulder Closure	Ea.

1.2 **DESCRIPTION**

A. Project Overview:

This project consists of the following major tasks:

Furnish, install, test, and integrate an Advanced Queue Detection Warning System in Mecklenburg County, along I-277/West Brookshire Freeway from Tryon Street to I-77 North. The system will consist of using Microwave Vehicle Detection Technology (MVD) to detect traffic data (presence, speed, volume, and occupancy).

The traffic data detected by the MVD units will be sent to an on-site Event Processor, located at one of the downstream static signs, which will in turn analyze the traffic data and relay a contact closure output to activate the flashing beacons (LED) on one or both of the downstream static signs.

Provide power to the two MVD Detection Stations and Static Sign 2 location utilizing Solar Photovoltaic Systems.

Provide Communication between the MVD Detection Stations and the Event Processor Controller by 900MHz Serial Radios. Provide communication between the Event Processor Controller and the Static Signs/Flashing Beacons using hardwired Contact Closure Outputs or by 900MHz Contact Closure Radio.

Determine the exact location of all devices and obtain Engineer's approval prior to starting any work at these locations.

B. General:

Conform to these Project Special Provisions, Project Plans, and the *2012 North Carolina 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, these Project Special Provisions shall govern.

C. Submittal Requirements:

Before beginning installation of any component, submit manufacturer's specifications, catalog cut sheets, system block diagrams, and / or wiring diagrams (as applicable) for each proposed piece of equipment. The Engineer will return submittals with comments to the Contractor within forty (40) days. Once materials have been approved, the Contractor may begin installation. Provide three (3) copies of each submittal for review. Sixty (60) days prior to system testing provide Engineer with an installation test plan outlining test procedures and test reports.

Submit the following items for information purposes only:

- Manufacturer's warranty information on all devices furnished with each device subsystem.
- Furnish all manuals (user's guides, owners' manuals, etc.) furnished by the manufacturer for all devices used in each device subsystem.
- All software to be furnished on the project with associated user's/setup manuals.

D. Warranties:

Ensure all equipment and workmanship supplied is fully warranted. Unless otherwise required herein, provide manufacturer's warranties on all Contractor-furnished equipment for material and workmanship that are customarily issued by the equipment manufacturer and that are at least one (1) year in length from the completion of the 30-day Observation Period. Include unconditional coverage for all parts and labor necessary or incidental to the repair of defective equipment or workmanship and malfunctions that arise during the warranty period. Ensure that all Contractor-furnished equipment, including hardware, firmware, software, middle-ware, internal components, and subroutines which perform any date or time data recognition function, calculation, or sequencing will support a four-digit year format for a period of at least 50 years.

Upon successful completion of the 30-day Observation Period, and Final Acceptance of the project, transfer all manufacturers' warranties with proper validation by the manufacturer to the Department or its designated maintaining agency.

E. Firmware and Licensing and Upgrades:

Provide the Department with an unlimited license to duplicate all central programs and remote site programs to facilitate the addition of future sites throughout North Carolina. Provide three (3) copies of all software packages on CD-ROM.

Ensure software and firmware performance upgrades that occur during the warranty period are available to the Department at no additional cost.

F. Documentation:

Except for standard bound manuals, bind all 8.5 x 11 inch documentation, including 11 x 17 inch drawings folded to 8.5 x 11 inch, in logical groupings in loose-leaf binders. Use either the 3-ring or the plastic slide-ring type binders. Permanently label each such bound grouping of documentation.

For documentation that exceeds 8.5 x 11 inch, furnish good quality, highly legible, reproducible drawings; however, the use of 11 x 17 inch drawings folded and bound into manuals will be acceptable.

Provide three (3) Operators' Manuals containing detailed operating instructions for all contractor-furnished equipment. Ensure manuals contain instructions for possible modification of equipment within the capability of equipment. Ensure personnel who have a clear understanding of system operation, system components, maintenance, troubleshooting, and expansion write the manuals.

Provide three (3) Maintenance Procedure manuals containing detailed preventive and corrective maintenance procedures for each type or model of equipment. Provide detailed wiring diagrams that include interconnection of equipment with pin-out configurations, pin functions, and cable parts numbers.

Provide three (3) copies of the system connection diagrams showing system interconnection cables and associated terminations.

Provide detailed reproducible wiring diagrams that include interconnection of equipment with pin-out configurations, pin functions, and cable part numbers.

Provide wiring diagrams for each location in which new equipment is installed or wiring/cabling configurations are modified.

G. Real World Coordinates:

Provide real world coordinates for all junction boxes and field devices installed under this project. Provide the coordinates in feet units using the North Carolina State Plane coordinate system (1983 North American Datum also known as NAD '83). Furnish coordinates that do not deviate more than 1.7 feet (½ meter) in the horizontal plane and 3.3 feet (1 meter) in the vertical plane. Global positioning system (GPS) equipment able to obtain the coordinate data within these tolerances may be used. Submit cut sheets on the GPS unit proposed to collect the data for approval by the Engineer. For equipment cabinets, obtain and provide the location of the cabinet.

Provide both a digital copy and hard copy of all information regarding the location (including to but not limited to manufacturer, model number, and NCDOT inventory number) in the Microsoft spreadsheet provided by the Department, shown by example below.

NCDOT Inv #	Name	Location	Latitude	Longitude	Manufacturer	Model #	Comm Media	Destination
05-7009	Cam 1	I-540/I-40	35.8625	-78.8123	Pelco	Spectravision	60 SMFO	TRTMC
05-7010	Cam 2	NC 54/I-40	35.8523	-78.7631	Pelco	Spectravision	60 SMFO	TRTMC
05-7030	HAR 1 – Johnston Co.	I-40 at NC 42 (mp 312)	35.2456	-77.952			Dial-up	TRTMC
05-7001	DMS # 1	I-85 N/I-40 E, mp 159.1			Mark IV		Dial-Up	TRTMC
05-7003	DMS # 3	I-40 W, mp 307.7			Mark IV		Dial-Up	TRTMC
05-7004	DMS # 4	I-40 E, mp 286.0			Mark IV		60 SMFO	TRTMC

H. Qualified Products:

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

Furnish factory assembled cables without adapters, unless otherwise approved by the Engineer, for all cables required to interconnect any field or central equipment including but not limited to fiber optic transceivers.

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

Furnish detailed electrical schematics showing detailed pin connections for approved equipment used to construct this project for review and approval by the Engineer. Include electronic components with proprietary part numbers. Upon approval by the Engineer furnish a final copy of the applicable electrical schematic at each equipment cabinet installation.

The QPL is available on the Department's website. The QPL website is:
http://www.ncdot.org/doh/preconstruct/traffic/ITSS/SMS/qpl/

1. MOBILIZATION

1.1 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.

1.2 MEASUREMENT AND PAYMENT

"Mobilization" will be measured and paid for at the contract lump sum price for Mobilization.

Partial payments for "*Mobilization*" will be made with the first and second partial pay estimates paid on the contract, and will be made at the rate of 50% lump sum price on each of these partial pay estimates, provided the amount bid for "*Mobilization*" does not exceed 5% of the total amount for the bid contract. Where the amount bid for "*Mobilization*" exceeds 5% of the total amount bid for the contract, 2.5% of the total amount bid will be paid on each of the first two partial pay estimates. That portion exceeding 5% will be paid on the last partial pay estimate. All such payment must be made less than the retainage provided for in Article 109-4 of the Standard Specifications.

Payment will be made under:

Pay Item

Mobilization ..... Lump Sum

2. LOCATION SPECIFIC COMPONENTS AND ASSEMBLIES

2.1 DESCRIPTION

Each assembly installed under this project will include a specific set of components which will interface together to provide a complete and operational Advanced Queue Detection Warning System. The individual assemblies will include MVD Stations 1 and 2, Master Static Sign 1, and Static Sign 2.

2.2 MATERIALS

A. MVD Stations 1 & 2:

At MVD Stations 1 and 2 furnish, install and integrate the following system components as described elsewhere in these Project Special Provisions. The individual components listed below shall form a complete Solar Powered MVD Station assembly that will in turn be an integral component of the Advanced Queue Detection Warning System.

- Wood Pole
- Solar Power Assembly
- Type F3 Equipment Cabinet
- 900 MHz Radio
- MVD Unit
- Riser Assembly
- Junction Box
- Conduit

B. Master Static Sign 1:

At Master Static Sign 1 furnish, install and integrate the following system components as described elsewhere in these Project Special Provisions. The individual components listed below shall form a complete Master Static Signs assembly that will in turn be an integral component of the Advanced Queue Detection Warning System.

- Wood Pole
- 336 Pole Mounted Equipment Cabinet
- 900 MHz Radio
- 900 MHz Contract Closure Radio
- Event Processor
- Flasher Equipment 120 VAC
- Flashing Beacons
- Riser Assembly
- New Electrical Service
- Conduit

C. Static Sign 2:

At Static Sign 2 furnish, install and integrate the following system components as described elsewhere in these Project Special Provisions. The individual components listed below shall form a complete Solar Powered Static Flashing Beacon Sign assembly that will in turn be an integral component of the Advanced Queue Detection Warning System.

- Wood Pole
- Solar Power Assembly
- Type F3 Equipment Cabinet
- 900 MHz Contact Closure Radio
- Flasher Equipment 12 VDC
- Flashing Beacons
- Riser Assembly
- Conduit

2.3 **CONSTRUCTION METHODS**

Construct each assembly with and the location specific components to meet the requirements of these Project Special Provisions and the plans. Each assembly will be an integral part of the Advanced Queue Detection Warning System along I-277/West Brookshire Freeway in Charlotte, North Carolina.

2.4 **MEASUREMENT AND PAYMENT**

No separate measurement will be made for work covered under this section.

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

3. WOOD POLE

3.1 **DESCRIPTION**

Furnish and install wood poles at locations shown in the plans and in accordance with these Project Special Provisions.

3.2 **MATERIALS**

Furnish 40-foot Class 3 wood poles. Comply with the Standard Specifications:

Pages 10-170 & 171, Section 1082, "Structural Timber and Lumber." Refer to Sub Articles 1082-3(F) and 1082-4(G).

3.3 **CONSTRUCTION METHODS**

Install wood poles as shown in the Plans. Comply with the Standard Specifications:

Pages 17-17 & 18, Section 1720, "Wood Poles."

3.4 **MEASUREMENT AND PAYMENT**

"Wood Pole (40')" will be measured and paid as the actual number of Class 3 wood poles furnished, installed and accepted. No measurement will be made for installing grounding system, as it will be incidental to furnishing and installing wood poles.

Payment will be made under:

Pay Item

Wood Pole (40')..... Each

4. RISER ASSEMBLIES

4.1 **DESCRIPTION**

Furnish and install riser assemblies as shown in the Plans. Comply with Standard Specifications:

Pages 17-19 & 20, Section 1722, "Riser Assemblies."

4.2 **MATERIALS**

Comply with Standard Specifications:

Page 17-19, Article 1722-2.

4.3 **CONSTRUCTION METHODS**

Comply with Standard Specifications:

Pages 17-19 & 20, Article 1722-3.

4.4 **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 separate payment will be made for weatherheads, or pole attachment fittings as these will be considered incidental to furnishing and installing risers.

Payment will be made under:

Pay Item

$1\frac{1}{2}$" Riser with Weatherhead ..... Each

5. JUNCTION BOXES

5.1 **DESCRIPTION**

Furnish and install standard sized junction boxes at locations shown in the Plans and in accordance with these Project Special Provisions.

Comply with Standard Specifications:

Pages 17-16, Section 1716, “Junction Boxes.”

5.2 **MATERIALS**

Comply with the Standard Specifications:

Pages 10-211, Article 1098-5, “Junction Boxes.”

5.3 **CONSTRUCTION METHODS**

Install standard sized junction boxes as noted in the Plans. Comply with the Standard Specifications:

Page 17-16 & 17, Section 1716, “Junction Boxes.”

5.4 **MEASUREMENT AND PAYMENT**

*“Junction box (*standard size*)”* will be measured and paid in actual number of junction boxes furnished, installed, and accepted.

No separate measurement will be made for seeding, mulching, excavation of rock, conduit duct plugs, mechanical sealing devices, graded stone, paving materials, nuts and bolts or any other hardware or materials required for installation of junction boxes as these will be considered incidental to the items listed above.

Payment will be made under:

Pay Item

Junction Box (standard size) ..... Each

6. CONDUIT

6.1 **DESCRIPTION**

Furnish and install high-density polyethylene conduit (HDPE) or PVC conduit at locations shown in the Plans and in accordance with these Project Special Provisions.

6.2 **MATERIALS**

Comply with the Standard Specifications:

Page 10-199 thru 201, Article 1091-3, “Conduit”.

6.3 **CONSTRUCTION METHODS**

Install HDPE or PVC conduit as noted in the Plans. Comply with the Standard Specifications:

Page 17-11, Article 1715-3.

6.4 **MEASUREMENT AND PAYMENT**

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

No separate measurement will be made for seeding, mulching, excavation of rock, conduit duct plugs, conduit sealing material, mechanical sealing devices, back fill, graded stone, paving materials, miscellaneous fittings, nuts and bolts or any other hardware or materials required for installation of underground conduit as these will be considered incidental to the items listed above.

Payment will be made under:

Pay Item

Unpaved Trenching (1) ($1\frac{1}{4}$") .....Linear Foot

7. ELECTRICAL SERVICE

7.1 **DESCRIPTION**

Install new electrical service equipment including meter base/disconnect combination. Upon installation of the meter base/disconnect combination the Engineer will coordinate with the Power Company to acquire and 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.

It is the Contractor's responsibility to apply and pay for all fees associated with any electrical permits and inspections required by the local utilities. The Department will apply for electrical service in the Department's name and be responsible for any monthly fees associated with the electrical service. No contract time extensions will be granted for delays associated with installing new electrical service.

7.2 **MATERIAL**

Comply with the Standard Specifications:

Page 10-210. Refer to Sub Article 1098-5(H), "Electrical Service".

Furnish and install new Meter Base/Disconnect Combination Panels at the Master Static

Sign 1 Location shown in the Plans. Ensure Meter Base/Disconnect Combination Panels are listed as meeting UL Standard UL-67 and marked as being suitable for use as service equipment. Fabricate enclosure from galvanized steel and electrostatically apply dry powder paint finish, light gray in color, to yield a minimum thickness of 2.4 mils. Provide ground bus and neutral bus with a minimum of four terminals with minimum wire capacity range of number 14 through number 4 AWG.

Furnish a NEMA Type 3R, 100 Ampere rated meter base/disconnect combination panel with a minimum of 4 spaces for all electrical services. Furnish a 4-terminal, 600 volt, single phase, 3 wire meter base that complies with the following:

- Line, Load, and Neutral Terminals accept #6 to 2/0 AWG Copper/Aluminum wire
- Ringless Type without bypass
- Made of galvanized steel
- Meet the UL-414 standard
- Overhead and underground service entrance
    - For underground electrical service installations ensure the meter base/disconnect combination panel is designed such that the service entrance conductors and the load side of the panel are separated from each other via a continuous metal raceway.

For Equipment Cabinet at the Master Static Sign 1 Location furnish as the main disconnect a single pole 30-ampere circuit breaker with a minimum of 10,000 RMS symmetrical amperes short circuit current rating.

7.3 **CONSTRUCTION METHODS**

At Master Static Sign 1 location furnish and install New Electrical Service as called for in the Plans. Comply with section 1700 of the Standard Specifications. Ground the New Electrical Service in accordance with the NCDOT 2012 Standard Specifications and Roadway Standard Drawings.

Run all service entrance cable(s) separately in 1" or larger rigid metallic conduit into the meter base. Do not allow the service conductors to share conduits with any other conductors or communications circuits.

Route the feeder conductors from the meter base/disconnect combination panel to the equipment cabinet.

Permanently label all cables at all access points. Stamp or engrave label identifications on metal tags, or neatly and legibly lettered with permanent ink on nylon tags. Provide a unique label identifier for each cable and label each cable immediately upon installation. Use component name and labeling scheme approved by the Engineer.

In addition to the requirements of the NEC, test grounding electrode resistance at the connection point to the electrical service ground bus for a maximum of 20 ohms. Furnish and install additional ground rods to the grounding electrode system as necessary to meet the test requirements

After installation of the meter base, coordinate with the Engineer and the utility company to make connections and install the new meter base.

For the purposes of this contract is shall be assumed that it will take up to 3 days for a State Electrical Inspector to arrive on site and inspect a new service. No additional days will be granted for an electrical inspection that takes 3 days or less to occur from the day the NCDOT is notified that the service is ready for an inspection.

For the purposes of this contract it shall be assumed that it will take up to 7 days for a power company to install a new electrical service. No additional days will be granted for a new service that is installed in 7 days or less from the day the NCDOT is notified that everything is ready for a new service to be energized.

7.4 **MEASUREMENT AND PAYMENT**

New Electrical Service will be measured and paid as the actual number of complete and functional Electrical Service with meter base/disconnect combination panel service locations furnished, installed and accepted. This item will include all coordination with outside parties to complete installation of New Electrical Service, the appropriately sized/quantity service entrance conductors between the meter socket and corresponding breakers, mounting posts and mounting hardware, exposed vertical conduit runs to the cabinet, ground rods, ground wire and any remaining hardware and conduit to connect the electrical service to the equipment cabinet will be considered incidental to the meter base/disconnect combination panel. The 6" X 6" treated wood post will be considered incidental to the New Electrical Service.

The quantity of new electrical service installations measured as provided above will be paid for at the contract unit price for "New Electrical Service."

Payment will be made under:

Pay Item

New Electrical Service……..……..…...…...……Each

8. EQUIPMENT CABINETS

8.1 **DESCRIPTION**

Install a pole mounted Equipment Cabinet to house the equipment at each the four assemblies described elsewhere in these Project Special Provisions and identified in the Plans. This includes MVD Stations 1 and 2, Master Static Sign 1 and Static Sign 2.

8.2 **MATERIAL**

A. General:

Furnish NEMA Type 3R equipment cabinet at MVD Stations 1 and 2 and at Static Sign 2. Furnish a Type 336 equipment cabinet enclosure at Master Static Sign 1.

Provide all necessary hardware to mount the Equipment Cabinets securely to the wood pole at each location.

B. NEMA Type 3R Equipment Cabinet:

Provide a NEMA Type 3R equipment cabinet enclosure that is of a pole mount design, with compartments to house the battery(ies) and electronic components separately. Ensure that the equipment installed inside the cabinet does not occupy more than 60% of the total cabinet volume. Equipment associated with the MVD's and Static Message Sign 2 is addressed in Section 3 of these Specifications.

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

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

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

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

A police panel door is not required for these cabinets.

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

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

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

Furnish the cabinet with a 12VDC LED light source, mounted inside the cabinet along with an exhaust fan with an on/off switch and temperature selection control knob.

C. Type 336 Equipment Cabinet:

Provide a Type 336 equipment cabinet enclosure that is of a pole mount design. Furnish the Type 336 equipment cabinet to house the 900 MHz radio, 900 MHz Contact Closure radio, Event Processor and Flasher equipment. Furnish cabinets that consist of a cabinet housing, 19-inch EIA mounting cage, and power distribution assembly (PDA #3 as described in the CALTRANS TSCES).

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

Ensure the cabinet cage conforms to Section 6.3 of the CALTRANS TSCES.

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

Furnish terminal blocks for power for cabinet equipment as listed above to accommodate the number of devices in the cabinet.

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

Furnish the cabinet with a minimum of 2 shelves, mounting adapters, and other equipment as necessary to route cabling, and mount equipment in the cabinet.

8.3 **CONSTRUCTION METHODS**

A. General:

Do not obstruct the sight distance of vehicles when locating and installing the equipment cabinet. Mount equipment cabinet so that the height to the middle of the cabinet is 4 feet above grade. Secure the cabinet to the pole using ¾" stainless steel straps or a method approved by the Engineer.

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

B. NEMA Type 3R Equipment Cabinet:

At Static Sign Location 2 and at MVD Detection Stations 1 and 2 install a NEMA Type 3R cabinet.

Run field wiring from the solar power array(s) to the equipment cabinet through riser and make connections inside the equipment cabinets as required. Install a DC disconnect between the solar array and the solar charger controller and between the solar charger controller and the battery/(ies) and other attached equipment. Ensure the DC disconnect allows personnel working on the system to safely isolate critical items from each other while performing maintenance and trouble shooting. Ensure that all wiring including grounding of the solar photovoltaic system meets the requirements of Article 690 of the National Electric Code (NEC) and these project special provisions. To protect against high voltage power surges, furnish and install one grounding electrode.

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

Ensure the solar array(s) does not obstruct the view of traffic and that the array(s) are arranged for optimal sunlight exposure for charging of the battery(ies).

Install all Equipment in the NEMA Type 3R Equipment Cabinet in accordance with the manufacturers' instructions. Neatly label all field devices and their associated field wiring for future reference.

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

C. Type 336 Equipment Cabinet:

At master static sign location 1 install a Type 336 equipment cabinet. Terminate all wires using spade connectors under binding screws on terminal blocks. Label all terminal blocks and terminals for easy identification. Label all wires and harnesses for easy identification. Neatly secure all wiring and harness inside the cabinet in a method approved by the Engineer.

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

8.1 **MEASUREMENT AND PAYMENT**

Actual number of *Type 336 Cabinet(s)* furnished, installed, tested and accepted. No additional measurements will be made for cabinet power supply, wires, cables, two-state power line surge protection, RFI filter, fluorescent light, fan, thermostat, GFCI receptacle, breakers, disconnect switch, grounding electrode, shelf, power supply and harness, data interface cable/serial cables and/or other cables for equipment integration, terminal strips, duplex outlets, installation manuals, drawings, specifications and materials used to program any equipment and all other equipment hardware will be considered incidental to furnishing and installing a "*Type 336 Equipment Cabinet."*

Actual number *NEMA Type* 3R *Cabinet(s)* furnished, installed, tested and accepted. This item disconnect switch, DC breakers, power stripes and harness, shelf, grounding electrode, light, thermostat, battery compartment(s), additional interface cables for equipment integration, and all associated mounting hardware and brackets installation manuals, drawings, specifications and materials used to program any equipment and all other equipment hardware will be considered incidental to furnishing and the "NEMA Type 3R *Equipment Cabinet."*

Payment will be made under:

Pay Item

Type 336 Equipment Cabinet ……..……...…...…...…Each

NEMA Type 3R Equipment Cabinet……..……..……...…...…Each

9. 900 MHZ RADIO EQUIPMENT

9.1 **DESCRIPTION**

Furnish and install a 900 MHz Spread Spectrum Serial Radio at the MVD Stations and at Master Static Sign 1 to serve as the communication link between the MVD Stations and the master Static Sign with the Event Processor. Provide a 900 MHz spread spectrum contact closure radio system to serve as the communications link between the Event Processor at Master Static Sign 1 and downstream Static Sign 2.

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

9.2 **MATERIAL**

900 MHz Contact Closure Radio:

Furnish a spread spectrum contact closure radio with internal time delay capabilities designed specifically for ON/OFF applications including antennas, coaxial cable and mounting hardware, and configuration software. Design radio to work in "point-to-point", "point-to-multipoint", "multipoint-to-point", and "multipoint-to-multipoint" configurations. Provide a contact closure radio system with a bi-directional, full duplex communications channel between two "line-of-sight" antennas using license free, spread spectrum technology operating in the 902-928 MHz license free (ISM) band and has the following minimum requirements:

- Utilizing Frequency Hopping Technology (Direct Sequence Spread Spectrum Technology is not acceptable)
- Bi-Directional communications and the ability to confirm switch closure at the remote site capable of operating as a Master, Remote/Repeater, or remote,
  Programmable Radio Frequency (RF) output levels ranging from 1mW up to 1 Watt,
  Provide user-selectable radio frequency channels (Min. 50) and hopping pattern (Min. 50) that will allow the user to adjust operating characteristics to avoid interference within the intended 902-928 MHz frequency range.
- RS-232 interface capable of operating from 1200 bps to 115.2Kbps, with 8 or 9 bit, DB9-F connector for the RS-232 port.
- 16 bit Cyclic Redundancy Check (CRC) / error checking with auto re-transmit
- Provide Forward Error Correction (FEC) as standard 16 Bit encryption
- Receiver Sensitivity of –108 dBm @ 10^{-6} BER
- Programming Port: RJ12
- Antenna Port: Reverse Polarity - Threaded Normalized Connector-Female (RP TNC-F) antenna connector
- Pre-programmable timer outputs for up to two hours
- Relay Input: 0-24V DC (ground activated)
- Relay Inputs/Outputs: 16 digital open collector (Max 500ma load current per output)
- Power Requirements (Typical): 6 to 30V DC
  Typical current draw <100 mA (standby), <125mA at 100mW output setting (during Transmit)
- Operating temperature of –40 to +176 degrees F (-40 to +80 degrees C)
- Humidity: 95% Non-condensing

- Front panel LED indicators for:
- Power/RF link status
- Input Active per channel
- Output Active per channel
- Shelf Mount Design

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

900 MHz Serial Radio:

Furnish a spread spectrum serial radio modem including antennas, coaxial cable and mounting hardware, and configuration software. Design radio modems to work in "point-to-point", "point-to-multipoint", "multipoint-to-point", and "multipoint-to-multipoint" configurations. Provide a serial radio system with a bi-directional, full duplex communications channel between two "line-of-sight" antennas using license free, spread spectrum technology operating in the 902-928 MHz license free (ISM) band.

Ensure radio complies with Section 1098-18 (B) of the *Standard Specifications*.

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

Software:

Furnish units with a Window Based™ software program that uses a GUI (Graphical User Interface) to provide "remote programming, radio configuration, remote maintenance, diagnostics and spectrum analyzer" features. Provide configuration software that can be upgraded in the future at no additional charge.

Ensure the radio is configurable from a single location (i.e. master radio location) via supplied software (no extra cost). Furnish software supplied with drivers to allow easy set-up. Furnish complete instructions for system programming.

Radio Frequency Signal Jumper:

Furnish a Radio Frequency Signal Jumper constructed of an RG-58 Coaxial Cable with Reverse Polarity - Threaded Normalized Connector-Male (RP TNC-M) on one end for connection to a radio unit and a Standard N-Type Male Connector on the other end for connection to the antenna lightning arrestor. Provide the jumper in 6-foot (1.8 m) lengths.

Directional Yagi:

Furnish 8.5 dB gain Directional Antenna (Yagi Antenna) that complies with Section 1098-18 (D) of the Standard Specifications.

Antenna Mounting Hardware:

Furnish Antenna Mounting Hardware Kits that comply with Section 1098-18 (F) of the 2012 Standard Specifications.

Coaxial Cable:

Furnish Coaxial Cable – Power Divider (Splitter) when required that complies with Section 1098-18 (K) of the Standard Specifications.

Standard N-Type Male Connector:

Furnish Standard N-Type Connectors that comply with Section 1098-18 (H) of the Standard Specifications.

Coaxial Cable Shield Grounding and Weatherproofing Kit:

Furnish Coaxial Cable Shield Grounding and Weatherproofing Kits that comply with Section 1098-18 (I) of the Standard Specifications.

Lightning Arrestor:

Furnish Lightning Arrestors that comply with Section 1098-18 (J) of the Standard Specifications.

Coaxial cable – Power Divider (Splitter):

Furnish Coaxial Cable – Power Divider (Splitter) when required that complies with Section 1098-18 (K) of the Standard Specifications.

9.3 **CONSTRUCTION METHODS**

Install 900 MHz Serial radios at the MVD Stations 1 and 2 and at Master Static Sign 1. Integrate the radios at the MVD stations for communication between each MVD Unit and the Event Processor for continuous transmission of traffic data to the Event Processor.

Install 900 MHz Contact Closure radios at Master Static Sign 1 and at Static Sign 2 and integrate the radios for communication between the Event Processor and Static Sign 2 for activation of the flashing beacons.

Perform a radio path Site Survey test before installing any equipment. Ensure the test evaluates the Signal Strength (dBm), Fade Margin (dB), Signal-to-Noise Ratio, Data Integrity (poll test), and a complete frequency spectrum scan. Ensure the radio path site survey test is performed using the supplied brand of radio equipment to be deployed. A 98% success rate with a minimum of 1,000 uninterrupted polls will be considered acceptable when performing the "Data Integrity" field tests to determine optimal signal strength throughput acceptance. During the initial radio path signal strength test it may be determined that a repeater station may be necessary to complete the intended link. Provide the test results to the Engineer for review and approval. Submit copies of the test results and colored copies of the frequency spectrum scan along with an electronic copy of this information. The Engineer will approve final locations of antennas and any necessary repeater stations. Install a power divider (splitter) device at locations where it is determined that a dual antenna configuration is necessary (repeater locations) to accommodate communications in multiple directions.

Mount the antenna(s) to the 40' wood pole with the method recommended by the antenna manufacturer. Secure the antenna mounting hardware to the wood pole and route the coaxial cable such that no strain is placed on the coaxial connectors and the cable. Route and secure the conduits and raceways to the structure in a method approved by the Engineer. Install the antenna two feet above the solar array.

Install the coaxial cable shield grounding system by carefully removing the outer jacket of the coaxial cable without damaging the cable shield. Install the shield grounding system following the cable manufacturer recommendations. Install and make weatherproof the connection using the appropriate weatherproofing materials and following the manufacturer's recommendations. On metal poles, secure the #6 AWG grounding lead cable to the pole using an Engineer approved method.

Do not exceed the 1-inch (25-mm) bend radius of the coaxial cable as it traverses from the device to the antenna assembly. Connect the lightning arrestor to the coaxial cable in the equipment cabinet. Properly ground and secure the arrestor in the cabinet. Permanently label all cables entering the cabinet. Ensure that

the power supply for the radio unit is **NOT** connected to the GFCI receptacle circuit located in the cabinet. Place a copy of all manufacturer equipment specifications and instruction and maintenance manuals in the equipment cabinet.

Perform diagnostic test to ensure that all communications channels are functional between the Event Processor and Static Sign 1, Static Sign 2 and the Vehicle Detection Stations.

9.4 **MEASUREMENT AND PAYEMNT**

Actual number of *900MHz Contact Closure Radio(s)* furnished, installed, tested, and accepted. This item includes the appropriate sized antenna(s), coaxial cable, power splitters, coaxial cable shield grounding system with weatherproofing, lightning arrestor, labeling and mounting hardware, conduit, connectors and raceways and any integration. The quantity of 900 MHz Contact Closure Radios, measured as provided above, will be paid for at the contract unit price each for "*900MHz Contact Closure Radio.*"

Actual number of *900MHz Serial Radio(s)* furnished, installed, tested, and accepted. This item includes the appropriate sized antenna(s), coaxial cable, power splitters, coaxial cable shield grounding system with weatherproofing, lightning arrestor, labeling and mounting hardware, conduit, connectors and raceways and any integration. The quantity of 900 MHz Serial Radios, measured as provided above, will be paid for at the contract unit price each for "*900MHz Serial Radio.*"

All power supplies, power cords, adapters, antenna mounting hardware, connectors, serial cables, installation materials, configuration software, and diagnostic testing necessary to complete work for radio system at Master Static Sign 1 location, including the radio path site survey test and warranties, will be incidental. Final payment will be made when work is accepted by the Engineer.

Payment will be made under:

Pay Item

900 MHz Contact Closure Radio……..…...…...….Each

900 MHz Serial Radio……..……..…...…...…Each

10. SOLAR POWER ASSEMBLY

10.1 **DESCRIPTION**

Furnish, install, and integrate a Solar Power Assembly at MVD Detection Stations 1 and 2 and at Static Sign 2 location.

10.2 **MATERIAL**

Furnish a Solar Power Assembly consisting of the following:

- Solar Array
- Solar Charge Controller
- Battery(ies)
- DC Disconnect Switch

Ensure that DC disconnects are supplied between the Solar Array and the Solar Charge Controller, and between the Solar Charge Controller and the Battery(ies), and between the Battery(ies) and any other equipment.

10.3 SOLAR POWER SYSTEM DESIGN REQUIREMENTS

General:

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

Fully powering all the equipment supplied in the Equipment Cabinet 24 hours a day with 50% of that time being in a standby (sleep) mode; and 50% of the time being in operational mode.

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

Solar Array:

Furnish solar modules made in North America and have a minimum 20 year factory warranty. The solar array should have a minimum peak output of 85 Watts. Solar modules must be UL listed, FM Class I, Div II, Group C&D approved. For the solar array, power wiring should be 10-2, stranded copper, double insulated, sunlight resistant, 600V 90C rated cable. Ensure the solar array mount is manufactured from an aluminum alloy or stainless steel and is capable of withstanding 140 mph winds.

Solar Charger Controller:

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

Batteries:

Provide a 12V gel electrolyte, non-spillable, maintenance free battery. The battery(ies) should be able to provide power to all the devices inside the Equipment Cabinet for 10 consecutive days without being charged by the Solar Array. Ensure that the furnished solar array and the solar charge controller will properly charge and recharge the gel cell battery(ies) without causing damage to the battery(ies). Furnish battery(ies) with a minimum operating temperature of -76° F to 140°F.

Warranty:

Provide a minimum two-year warranty with the Solar Power Assembly to ensure that the Battery/(ies), Equipment Cabinet, and the Solar Charge Controller are free of manufacturing defects in material and workmanship. The warranty period commences upon final acceptance of the project by the Engineer. During the warranty period, the manufacturer must provide replacement batteries within 45 days of receiving a battery that has failed at no cost to the Department.

Provide Solar Array(s) that have a minimum 10-year factory warranty stating that the unit will provide 80% power output and a minimum 5-year factory warranty stating that the unit will provide 90% power output. The warranty period commences upon final acceptance of the project by the Engineer.

10.4 CONSTRUCTION METHODS

The Engineer will approve final locations of all field located devices. Furnish and install new Solar Power Assemblies consisting of a Solar Array(s), Solar Charger Controller, Battery/(ies), and wiring.

At the MVD Stations and at Static Sign 2 location mount the Solar Power Assembly on the new 40' wood pole. On wood pole installations mount the solar array(s) a minimum of 25 feet above grade. Ensure the solar array does not obstruct the view of traffic or the static sign and that the array(s) are arranged for optimal sunlight exposure for charging of the battery/(ies).

Run field wiring from the solar power array(s) to the equipment cabinet through riser and make connections inside the equipment cabinets as required. Install separate DC disconnects between the solar array and the solar charger controller and between the solar charger controller and the battery(ies), and between the battery(ies) and any other equipment. Ensure the DC disconnect allows personnel working on the system to safely isolate critical items from each other while performing maintenance and trouble shooting. Ensure that all wiring including grounding of the solar photovoltaic system meets the requirements of Article 690 of the National Electric Code (NEC) and these project special provisions.

Perform "Data Integrity" testing of MVD unit to ensure Solar Powered Assembly is integrated with the MVD unit and with Wireless System such that data is true and accurate 100% of the time over the course of the designed testing period. Design and provide to the Engineer documentation for approval of the "Data Integrity" testing procedures forty (40) days prior to beginning of testing.

Ensure that the solar array(s) and its mounting hardware, and the radio antenna and its mounting hardware are capable of surviving sustaining winds of 140 MPH. Ensure the solar array(s) does not obstruct the view of traffic and that the array(s) are arranged for optimal sunlight exposure for charging of the battery(ies). Install batteries in the battery compartments in the Equipment Cabinet.

10.5 MEASUREMENT AND PAYMENT

"Solar Power Assembly" will be measured and paid as the actual number of *Solar Power Assemblies* furnished, installed and accepted.

No separate payment will be made for solar arrays, risers for the solar array(s), installing DC Disconnects, solar charge controller, battery/(ies), mounting systems, support mast, "Data Integrity" testing, and testing procedure documentation, wiring, grounding system and all associated hardware and calculations as these will be considered incidental to furnishing and installing the solar power assembly. No separate payment will be made for additional equipment cabinets required to house additional batteries, as this will be incidental to the solar power assembly.

Payment will be made under:

Pay Item

Solar Power Assembly ..... Each

11. MICROWAVE VEHICLE DETECTOR (MVD)

11.1 DESCRIPTION

Furnish MVD Unit at both Vehicle Detection Stations. Ensure the MVD unit functions as a wireless, out-of-pavement, and queue detection device that will detect traffic travelling on *one inside lane* of I-277/ West Brookshire Freeway. MVD Unit 1 and MVD Unit 2 will both continue to poll the *one inside lane* and send data collected over a user selectable "data collection period" to the Event Processor, a controller with programmed logic to identify the queues at the detection stations. The MVD units will transmit this data using 900MHz Serial Radios.

11.2 **MATERIALS**

Microwave Vehicle Detection (MVD):

Furnish new non-intrusive pole-mounted microwave/radar vehicle detector (MVD) with mounting hardware in accordance with the Plans and these Project Special Provisions. Ensure the MVD unit functions as a wireless, out-of-pavement, queue detection device which can provide presence, volume, lane occupancy, speed, and vehicle classification information for up to 12 separate lanes, when mounted up to 250 feet away from the farthest detection location of the roadway. Ensure MVD meets the requirements set forth in these plans and the Project Special Provisions. Ensure the MVD unit is fully programmable to support multiple applications using simple intuitive software on a Notebook PC.

Ensure the MVD unit functions as a true presence detector and can be mounted to poles located alongside the roadway, or on overhead structure supports. Ensure the unit provides presence detection of moving and/or stopped vehicles through emulation of single or dual induction loop configurations. Furnish units that can identify vehicle data on a per lane basis with regards to class and length of vehicle. Provide units that detect and classify six different vehicle classes. Ensure the units can either transmit data either through hardwired connections to the Event Processor or via a built-in wireless serial interface operating in the 900 MHZ frequency range.

Ensure the MVD unit is reliable in all weather conditions and enclosed in a water tight enclosure. Ensure the MVD unit supports various built-in communications options including RS 232/485 hardwire interface and/or 900 MHz spread spectrum radio.

Ensure the units are designed to prevent reversed assembly or improper installation of connectors, fasteners, etc., to guard against over, under and wrong polarity of applied voltage. Ensure equipment is designed to protect personnel from exposure to high voltage during equipment operation, adjustments, and maintenance.

Ensure the MVD unit meets the following minimum functional requirements:

1. **Radar Detection**
   - Radar detector for vehicle detection operates in 24GHz band
   - Area Coverage — Field of view defined by:
Elevation Beam Width: 50º,
Azimuth: Beam Width 12º,
Range: 0-250 feet
   - Measured Quantities — Volume, speed, occupancy, classification
   - Detection Zone (lanes) — Up to 12 traffic lanes
   - Range (Increment) — 1.3 feet (User Defined)
   - Zone Width — 7-20 feet
2. **Interfaces**
   - Single MS crimp multi-pin connector providing multiple options of power and communication signals.
   - Optional 16 built-in isolated contact pairs rated for 100mA at 350 volts AC for presence indication.
   - Isolated RS-232 / RS-485 port provide per vehicle measurement data, presence event data or statistical data.
   - NTCIP 1209 protocol option.
   - Serial Radio operating at 900MHz with antenna for data transmission to the Event Processor.
   - Standard 8 Mb built-in memory for data collection.

- Optional second port or TCP/IP-UDP interface.
- Traffic data accumulated over user defined time intervals in a 10 to 900 sec range, transmitted wirelessly to the Event Processor.

3. Mechanical

- Enclosed in NEMA 4X IP-65 polycarbonate water tight cabinet.
- Mounting bracket with locking mechanism to accommodate tilting in both axes,
- Ensure the mounting assembly is manufactured from either stainless steel, or aluminum, and can support a load of 20 pounds
- Weight, not including mounting hardware, not to exceed 10 lbs.

4. Power

- 3 Watts at 12 – 24 volt AC or DC with plug type transformers, 95 - 135 VAC @60H
- Power surge of 1kV surge (rise time = 1.2 sec, hold = 50µsec) applied in differential mode to all lines, power and output, as defined by IEC 1000-4-5 and EN 61000-4-5 standards

5. Environmental

- Temperature Range -40º to 167º Fahrenheit (95% Relative Humidity)
- Vibration = 0.5 to 30 Hz
- Shock of 10g at 11 msec. half sine wave
- Wind Loads of not less than 130 MPH

6. Error Tolerances

Ensure the MVD unit identifies vehicle presence within each detection zone with a 95% accuracy or greater, independent of the vehicle's direction of travel through the detection zone during normal traffic flow and when truck traffic is 10% or less. Ensure the following error levels are achievable.

Furnish the MVD unit equipped with the following features:

MVD Detection	Side fired Error
Presence	±5%
Volume	±5%
Lane Occupancy	±5%
Average Speed	±10%
Per Vehicle Speed	±10%
Length Classification	±10%
Time Event	1.3mS
Input Voltage	± 2 %

- Allow the user to define the contents of transmitted data
- Built-in non-volatile flash memory of no less than 8 Mb for storing collected time-stamped data and mechanism for remote data retrieval
- Provide fail-safe indication by contact closure
- Allow local or remote upgrade capability of its internal firmware

MVD Software:

Provide user friendly software to allow for programming of operational modes, detection zones and other calibration and set up parameters to be performed using a MS-Windows based software and a Notebook PC. Ensure the software allows for both manual and automatic lane configuration and verification of correct setup, and diagnostics. Provide software that is capable of saving verification data

and collected traffic data, as well as, saving and retrieving sensor setup from disk file. Provide units with internal memory to store up to 8MB of data including speed, volume, occupancy, headway, and vehicle classification.

Provide MVD software licenses for use by the Department and by any other agencies responsible for maintaining or operating the MVD system. Provide the Department with a license to duplicate and distribute the software as necessary for design, maintenance, and emergency repairs.

Composite Power/Serial Communications Cable:

Furnish a composite power and serial communications cable that provides power connections and serial communications (RS-232/485) wiring all manufactured into one cable. Furnish cables manufactured with multiple twisted pair/stranded copper conductors (AWG #20 or #22) that are shielded to prevent crosstalk. Ensure the shield is rated for 300 volts. Ensure the completed cable assembly is suitable for installation in both a wet location and is UV protected for exposure to sunlight. Ensure the cable complies with EIA requirements as detailed in the EIA-232/422/485 standards.

11.3 CONSTRUCTION METHODS

Vehicle Detection:

Install the MVD unit on the 40' wood poles at the height recommended by the manufacturer in order to minimize the masking of vehicles. Ensure that all detection zones are contained within the specified elevation angle suggested by the manufacturer.

Set up program parameters as required for a system that is functional and operational in accordance with these Project Special Provisions and the Plans.

Test and verify the mounting height and location of each MVD unit to ensure proper/accurate detection of the inside Westbound lane of I-277/West Brookshire Freeway prior to final installation. Ensure that MVD Unit is placed in at the optimal location on the pole to provide specified elevation angle. Ensure the MVD Unit is mounted below the solar array.

Perform "Data Integrity" testing of each MVD unit to ensure the MVD unit is integrated with the Solar Powered Assembly and with the Wireless System. Design and provide to the Engineer documentation for approval of the "Data Integrity" testing procedures forty (40) days prior to beginning of testing.

11.4 MEASURMENT AND PAYMENT

"Microwave Vehicle Detector Unit" will be measured and paid as the actual number of *Microwave Vehicle Detector Unit(s)* furnished, installed and accepted.

This item includes MVD attachment hardware, interface and connection cables, composite power and serial communications cable, connectors and raceways, noise filters, site testing, "Data Integrity" testing procedure documentation, and all other items, equipment, and labor required to furnish and completed assembly with complete detection accuracy. No separate payment will be made for software configuration required to set up the MVD unit and integrate with the system.

Payment will be made under:

Pay Item

Microwave Vehicle Detector Unit…….....Each

12. EVENT PROCESSOR

12.1 DESCRIPTION

General:

Furnish and install an Event Processor in accordance with the Plans and these Project Special Provisions. The Event Processor's logic programming will analyze the speed data detected by both MVD units. Once the preprogrammed user defined parameters have been met at the Vehicle Detection Station, the Event Processor will send out a contact closure output to activate static sign flashing beacons to notify motorist of the of traffic queue(s).

The Department will furnish internet service in the form of a wireless modem at the Event Processor for remote operation from the Division 10 facility and other sites.

Event Processor Integration for System Operation:

Upon integration of the Event Processor at Master Static Sign 1 the system shall operate as follows:

- MVD Units 1 and 2 shall both continue to poll *the one inside lane* of I-277/Westbound Brookshire Freeway and send data collected over a user selectable "data collection period" to the Event Processor to evaluate if conditions exist at the Vehicle Detection Stations to necessitate activating the flashing beacons at Static Sign 1 alone or both Static Signs 1 and 2.
- When MVD Unit 1 detects the average vehicle speed at MVD Station 1 is between 0 to 20 MPH the Event Processor will initiate a contact closure to activate Static Sign 1 in a bouncing ball pattern at the specified flash rate.
- When MVD Unit 2 detects the average vehicle speed at MVD Station 2 is between 0 to 20 MPH the Event Processor will initiate a contact closure to activate the flashing beacons for both Static Sign 1 and Static Sign 2 in a bouncing ball pattern at the specified flash rate.
- The static signs with their flashing beacons are set in place to notify downstream motorists that traffic is queuing at the detection stations. The static signs will both display the following message:

In addition to activating the appropriate flashing beacons, ensure that the software allows the user to select the amount of time allotted for the "data collection period". The time out function, the minimum amount of time to activate the flashing beacons, even after the condition has terminated, shall be user selectable as "X" number of "data collection periods". Also, ensure the software does not drop the contact closure at the end of a timeout function, if the condition is still present. Ensure the software has user programmable features that based on vehicle speed and lane occupancy will allow the appropriate priority message to be displayed.

12.2 MATERIAL

Event Processor:

Provide an Event Processor that is a shelf mount design and that comes complete with software that runs on a PC or Notebook Computer.

Provide a fully programmable Event Processor unit capable of processing data from up to 8 MVD stations. Ensure that the Event Processor is capable of monitoring up to 16 pre-defined Complex Boolean events using up to four (4) parameter-limit conditions. Ensure that based on these preprogrammed parameter-limit conditions the Event Processor will send a contact closure output to the appropriate Static Sign to activate the flashing beacons. Ensure the Event Processor's software allows for a programmable response delay.

Ensure the unit has two communication ports that will allow the Event Processor to interface with a Notebook Computer and the MVD units. Ensure the Event Processor has a minimum of 8 Mb of date storage capability.

Ensure the Event Processor can receive data from MVD units over a wireless link connected to the same serial port using a Y-Type serial cable.

Ensure the Event Processor supports a minimum of eight (8) Open Collector contact closure output pairs rated at 30 VDC, 5A, polarity sensitive. Ensure that the contact closure output remains in effect as long as the condition persists incorporating a preprogrammed delay if desired.

Ensure the Event Processor meets the minimum Environmental Conditions:

Temperature Range	-35° to 165°F
Power	12V DC or AC
Power Consumption	0.5 watts (Standalone)
Humidity	95% Relative Humidity
Vibration	2g up to 200Hz sinusoidal
Shock	5g 10 ms half sine wave

Ensure the Event Processor's Software provides for the programming of command parameters and event definitions. Ensure the system can record and upload event functions to a notebook computer or via a wireless modem to the Division Office located at 716 West Main Street, Albemarle, NC 28001. Ensure the software is password protected.

Provide the Event Processor with set up software that allows for various communications options with the MVD stations as well as dialup exchange with the Division 10 sites. The Engineer will approve the Division 10 sites that are applicable for dialup exchange. Ensure the set up software is user friendly and provides event definitions using simple tables along with remote or local event status, data and diagnostic display, etc. Ensure the Event Processor system has a fail-safe design for power failure by opening the contact closure output during a power failure.

12.3 CONSTRUCTION METHODS

General:

Install the Event Processor in the Equipment Cabinet at the Master Static Sign 1 Location in accordance with the manufacturer's installation instructions. Interface the outputs of the Event Processor as follows:

- Interface the Event Processor RS232 communications port with the Serial Radio for communication with the 900 MHz Serial radios at the Vehicle Detection Stations. Integrate the radios in order to make a fully operational radio system between each MVD Units and the Event Processor for continuous transmission of traffic data to the Event Processor for logic evaluation.

- Interface the Event Processor Contact Closure outputs with the 900MHz Contact Closure Radio for communication with Static Sign 2 flashing beacon relay. Integrate the Radio in order to make a fully operational radio system between the Event Processor and Static Sign 2 location for activation of the flashing beacons.
- Hardwire the Contact Closure Outputs with Static Sign1 flashing beacon relay unit at the Master location for activation of flashing beacons.
- Interface with wireless internet modem for dial up operation.

Set up the Event Processor software configurations for the Advanced Queue Detection Warning System outlined in these Project Special Provisions and the Plans. Program the Event Processor with the predefined events once approved by the Engineer. Set up software parameters for the Event Processor, the wireless internet modem, as well as the event notification parameters (conditions, phone number(s), etc.)

Upon installing all devices permanently mark all cables with cable number and information designating from/to units and associated connectors.

Perform diagnostic testing to ensure that all communications channels are functional between the Event Processor and Static Signs 1 and 2 and MVD Stations 1 and 2. Perform testing to ensure event accuracy and data integrity. Also perform system wide testing of the Event Processor Integration to ensure flashers are activated when parameters are met as identified in these Project Special Provision and the Plans. Submit documentation of testing procedures to the Engineer forty (40) days prior to the beginning of testing.

12.4 MEASUREMENT AND PAYMENT

Actual number of *Event Processor Unit(s)* furnished, installed, tested, and accepted. This item includes all wiring and cabling including that which is required for contact closure interface with any other equipment, conduit, raceways, hardware, software, and any integration necessary to install and program the Event Processor and interface the device with other equipment. The quantity of Event Processors, measured as provided above, will be paid for at the contract unit price each for *"Event Processor Unit."*

All connectors, cables, installation materials and configuration necessary to complete work for Event Processor integration at Master Static Sign 1 location, including event accuracy testing, data integrity testing, testing the system integration of Event Processor, and testing procedure documentation is incidental to the Event Processor Unit. Final payment will be made when work is accepted by the Engineer.

Payment will be made under:

Pay Item

Event Processor Unit……..... Each

13. FLASHING BEACONS

13.1 DESCRIPTION

General:

Fabricate flashing beacon housings and end caps from die-cast aluminum. Provide visor mounting screws, door latches, and hinge pins fabricated from stainless steel. Provide interior screws, fasteners, and metal parts fabricated from stainless steel or corrosion resistant material.

Fabricate tunnel and traditional visors from sheet aluminum.

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

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

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

A.1 DC Flashing Beacons (with Amber LED Modules):

Furnish two (2) DC Flashing Beacons mounted to Static Sign 2 as shown in the plans. The DC Flashing Beacon consists of a 12-inch, 1-section vehicular signal head, with amber LED modules and is solar powered with 12VDC. Upon evaluation of MVD data by the Event Processor and parameters being met to activate contact closure signal to sign location the flashing beacons begin operation in a bouncing ball pattern at a specified flash rate. Comply with the provisions of Section 1700 of the *Standard Specifications* and the MUTCD.

A.2 AC Flashing Beacons (with Amber LED Modules):

Furnish two (2) AC Flashing Beacons mounted to Master Static Sign 1as shown in the plans. The AC Flashing Beacons consists of a 12-inch, 1-section vehicular signal head, with amber LED modules and is powered with120VAC. Upon evaluation of MVD data by the Event Processor and parameters being met to activate contact closure signal to sign location the flashing beacons begin operation in a bouncing ball pattern at a specified flash rate. Comply with the provisions of Section 1700 of the *Standard Specifications* and the MUTCD.

13.2 **MATERIALS**

General:

Comply with the ITE standard "Vehicle Traffic Control Signal Heads." Provide housings with provisions for attaching visors. Provide 10-inch visors for 12-inch flashing beacons.

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

Provide LED vehicular traffic signal modules (hereafter referred to as modules) that consist of an assembly that uses LEDs as the light source in lieu of an incandescent lamp for use in traffic signal sections. Use LEDs that are aluminum indium gallium phosphorus (AlInGaP) technology for yellow indications. Install the ultra-bright type LEDs that are rated for 100,000 hours of continuous operation from

-40°F to +165°F. Design modules to have a minimum useful life of 60 months and to meet all parameters of this specification during this period of useful life.

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

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

On the back of the module, permanently mark the date of manufacture (month & year) or some other method of identifying date of manufacture.

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

LED Amber Circular Signal Modules:

Provide modules in the following configuration: 12-inch amber circular section.

LED modules provided for flashing beacons that are solar powered provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications*, that each module meets or exceeds the ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement" dated June 27, 2005 (hereafter referred to as VTCSH Circular Supplement) with the exception of paragraphs 5.2, 5.3, and 5.7 and other requirements stated in this specification.

For amber circular signal modules, provide modules tested under the procedures outlined in the VTCSH Circular Supplement to insure power required at 77° F is 22 Watts or less for the 12-inch amber circular module. Note: Use a wattmeter having an accuracy of ±1% to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

Signal Cable:

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

- For 16-4 cable: white, yellow, red, and green

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

13.3 CONSTRUCTION METHODS

Mount the flashing beacons to the prefabricated static signs at locations shown on the plans and integrate with the equipment cabinet. Adjust each flashing beacon vertically and horizontally so that light output will be of maximum effectiveness for traffic. Do not tilt flashing beacons forward.

Make electrical connections inside each flashing beacons. Do not splice connections at any point between the flashing beacon and the equipment cabinet.

13.4 MEASUREMENT AND PAYMENT

"12-inch, 1-section amber flashing beacon" will be measured and paid as the actual number of *12-inch, 1- section amber flashing beacon* furnished, installed and accepted.

No separate payment will be made for mounting assembly, signal cable, wiring, wire entrance fittings, painting, integration in the cabinet and all associated hardware, as these will be considered incidental to furnishing and installing the 12-inch 1-section amber flashing beacon.

Payment will be made under:

Pay Item

12-inch, 1-Section Amber Flashing Beacon……Each

14. FLASHER EQUIPMENT

14.1 DESCRIPTION

Furnish, install, and integrate Solid State DC Flasher Equipment consisting of a solid state 12V DC Flasher unit and a 12V DC relay unit for the solar powered Static Sign 2 location.

Furnish, install, and integrate Solid State AC Flasher Equipment 120 VAC Flasher Unit and a 24VDC relay unit at the Master Static Sign 1 location which will be powered by a new Electrical Service.

14.2 MATERIAL

DC Flasher:

At Static Sign 2 location furnish a 12V DC, 2-Circuit, Solid State Flasher. Provide a compact flasher unit with an (8-pin octal base designed for use with the solar power assembly. Ensure that flasher output has two (2) outputs each rated at 6 amps to operate the LED flashing beacons. Provide a flasher that is designed such that circuit #1 will be ON when circuit #2 is OFF, and vice versa. The maximum OFF period when both circuit #1 and circuit #2 are OFF, or the maximum period when both circuit #1 and circuit #2 are ON, shall not exceed 17 milliseconds during the transition from OFF to ON and ON to OFF.

Provide a Flasher that operates at a temperature range between 0 through 70 degrees Celsius (0 through 158 degrees Fahrenheit). Provide flasher with a nominal control current of 0 Amps for normal operation and .005A for active operation. Provide a Flasher with a minimum flash rate of once per second (0.5 seconds on and 0.5 seconds off).

Provide a flasher unit that has a front panel with two indicators to indicate the state of the output circuits of the flasher. Ensure each output circuit is protected from over-current and short-circuit faults and that output circuits are protected from transient over-voltage by a clamp circuit.

12 VDC Relay

Provide a general purpose relay with 2 Form "C" (DPDT) silver-cadmium contacts rated for 10A @ 28VDC. Provide a 12VDC coil rated at 120 ohms DC resistance (+/- 10%) and 100 mA nominal coil current at 25 degrees Celsius. Coil must operate at 9 volts or greater; operate time to be 15 milliseconds (typical) and release time 10 milliseconds (typical) at nominal coil voltage. Provide relay equipped with industry standard 8 pin octal base. Provide a relay with a life expectancy of 10 million operations (min.) mechanical; 100,000 operations (min.) at rated loads. Provide a relay that is enclosed in transparent polycarbonate.

AC Flasher:

At Master Static Sign 1 location furnish a solid state 120VAC flasher. Furnish an AC flasher with the following Requirements:

ELECTRICAL

- Each output switch shall be capable of switching any current from 0.03 to

10 A of tungsten lamp load at 120 VAC and 60 Hz, or 10 A at a power factor of 0.85, at 70 degrees C.

- The output switches shall have a one cycle surge rating of 175 A RMS, of 247.5 A peak and a 1 second surge rating of 40 A RMS. Each output switch shall be capable of withstanding a peak inverse voltage of 500 volts.
- Each output switch shall turn on within ± 5 degrees of the zero voltage crossing of the AC sinusoidal line, and shall turn off within ± 5 degrees of the zero current crossing of the alternating current sinusoidal line. Upon application of power, the zero voltage turn-on must be within ± 10 degrees of the zero voltage crossing only during the first half cycle of the incoming line.
- Each switch shall have an OFF state dv/dt rating of 200 V per microsecond or greater.
- The output switches shall have a mean time between failure of 300 million operations or greater when switching a tungsten filament load of 1000W per switch.
- A surge arrester shall be provided between AC+ and Flasher Outputs. The surge arrestor shall be capable of reducing the effects of a transient voltage applied to the field signal circuits, and shall have the following ratings:
  - Recurrent peak voltage: 212 V
  - Energy rating, maximum: 50 joules
  - Power dissipation, average: 0.85 W
  - Peak current for pulses less than 6 microseconds: 2,000 A
  - Standby current: less than 1 mA
- Each circuit shall be designed to operate in an open circuit (without load) condition for a minimum of 10 years.

MECHANICAL

- Indicators shall be mounted on the Flasher Unit to indicate when the output from each solid state switch is on or off, with or without a load.
- All indicator lights shall be water clear, Ultra Bright LEDs.
  - Flasher unit control circuitry and switches shall be readily accessible by the use of a screwdriver or common wrench with access by use of one type of screw head.
- Includes gripping device attached to flasher unit.
- Includes an enclosure to protect electrical parts from dust and corrosion.
- Edges shall be provided on the Flasher Unit to mate with edge guides.
- All electrical connections into and out of the flasher unit shall be through a multi-terminal connector plug. The connector contact tails shall be solder hook or eye styles only. Connectors soldered directly to the printed circuit board and quick connector connection styles are not allowed. The connector shall be rigidly fixed to the rear of the unit.
- Wires soldered to the printed circuit board shall be stranded type.
- Solid state switches may utilize encapsulated components.
- Components on printed circuit board must be securely mounted to withstand damage by shock or vibration.

- Machine screws shall be used to mount components to the heat sink.

Provide Model 204 flashers that conform to CALTRANS' "*Transportation Electrical Equipment Specifications*" dated March 12, 2009 with Erratum 1.

24 VDC Relay Unit:

Provide a general purpose relay with 2 Form "C" (DPDT) silver-cadmium contacts rated for 10A @ 120VAC. Provide a 24VDC coil rated at 472 ohms DC resistance (+/- 10%) and 51 mA nominal coil current at 25 degrees Celsius. Coil must operate at 20.4 volts or greater; operate time to be 15 milliseconds (typical) and release time 10 milliseconds (typical) at nominal coil voltage. Provide relay equipped with industry standard 8 pin octal base. Provide a relay with a life expectancy of 10 million operations (min.) mechanical; 100,000 operations (min.) at rated loads. Provide a relay that is enclosed in transparent polycarbonate.

14.3 CONSTRUCTION METHOD

General:

Integrate flasher equipment and test flasher diagnostics to ensure the flashing beacons are operating at the specified flash rate, and are operating as an integral part of the Advanced Queue Detection warning system to meet the requirements of these Project Special Provisions and the Plans.

DC Flasher Equipment:

Integrate the outputs of the 12V DC, 2-Circuit, Solid State Flasher with the 12V DC flashing beacon relay unit In the Equipment Cabinet. Integrate the DC flasher inputs with the Contact Closure radio in the Equipment Cabinet. Ensure that once the radio sends a signal to activate the contact closure through the flasher circuitry that the flashing beacons at Static Sign 2 location will become active. Ensure also that the flashing beacons remain active until the conditions of the activation contact closure is eliminated and times out.

Provide and leave all data interface cables, installation manuals, and specifications and materials used to program any equipment in the Equipment Cabinet. Neatly secure all wiring and harness inside the cabinet in a method approved by the Engineer.

Comply with the provisions of Sections 1700 of the *Standard Specifications.*

Comply with manufacturer instructions to operate the flashing beacons in a bouncing ball operation. Use wire gauged as per manufacturer's recommendation to connect Flasher Equipment with solar power assembly.

AC Flasher Equipment at Master Static Sign 1 location:

Install AC Flasher Equipment in the Equipment Cabinet furnished and installed at Master Static Sign 1 location. Integrate the outputs of the 120VAC Solid State Flasher with the flashing beacon relay unit for activation of the amber LED flashing beacons mounted to the static sign 1. Ensure that once the contact closure input is initiated and then activated through the flasher circuitry that the flashing beacons at Master Static Sign 1 location will become active. Ensure also that the flashing beacons remain active until the conditions of the activation contact closure is eliminated and times out.

Label all wires and harnesses for easy identification. Install the AC flasher in the Equipment Cabinet with the attached handle attached to eliminate the need to insert hands or fingers and thus eliminate any exposure to live voltage during flasher installation.

14.4 **MEASUREMENT AND PAYMENT**

Actual number of *"DC Flasher Equipment"* furnished, installed, integrated, tested and accepted will be measured and paid for as *DC Flasher Equipment.*

No additional measurements will be made for wiring, harnesses, cables, securing or wiring and harnesses, terminal blocks, warning sticker, labeling, relay units, flashers, drawings, installation manuals, specifications and materials used to program equipment, diagnostic testing, grounding system, or system integration of Flasher Equipment as these items will be considered incidental to furnishing "*DC Flasher Equipment."*

Actual number of *"AC Flasher Equipment"* furnished, installed, integrated, tested and accepted will be measured and paid for as *AC Flasher Equipment*.

No additional measurements will be made for wiring, harnesses, cables, securing or wiring and harnesses, terminal blocks, warning sticker, labeling, flashers, drawing, installation manuals, specifications and materials used to program equipment, grounding system, diagnostic testing, or system integration of Flasher Equipment as these items will be considered incidental to furnishing "*AC Flasher and Equipment."*

Payment will be made under:

Pay Item:

DC Flasher Equipment ……..……..……Each

AC Flasher Equipment.……..……..……Each

15. TESTING AND OBSERVATION PERIOD

15.1 **DESCRIPTION**

Perform testing on the Flashing Beacons and Vehicle Detection Stations to ensure the completed systems function in accordance with the Plans and Project Special Provisions. Perform testing to also ensure that the each Solar Power Assembly is of adequate design to meet the requirements listed in Section 11, "SOLAR POWER ASSEMBLY", of these Project Special Provisions. Ensure, that once the battery(ies) are fully charged, they will provide power for continuous operation for a minimum of ten (10) consecutive days without recharging the battery/(ies) or additional power being provided from the solar array or solar charge controller. Provide documentation as referenced in Section 11 of these Project Special Provisions.

Perform testing of each MVD unit to ensure that they are installed and functioning in accordance with these Project Special Provisions and the Plans. Perform testing to test the wireless systems to ensure communications requirements are met between the MVD Stations and the downstream flashing beacon sign locations. Perform testing to ensure that the LED flashing beacons flash in accordance with the requirements set forth in the *Standard Specifications*, the MUTCD, and these Project Special Provisions.

Testing requirements set forth in this section do not supersede any other testing requirements described in any other section of these Project Special Provisions.

Submit to the Engineer for review a test plan for the system testing. The Engineer will either approve or indicate changes that are required for approval within forty (40) calendar days of receipt of the test plan. Submit a revised test plan to the Engineer for review within forty (40) calendar days following receipt of the review of the initial plan. The review and re-submittal process described above will continue until the Engineer approves a final test plan. Multiple submittals of the test plan, if required, will be supplied at no additional cost. Testing will commence at a time mutually agreed by the Contractor and the Engineer.

The Testing will be executed on the basis of the approved test plan only. The Engineer or his representative will witness all tests. If any component has been modified due to system testing performance failure, a report must be prepared by the Contractor and delivered to the Engineer prior re-testing.

The Contractor is fully responsible for documenting the results of each test and for furnishing the documented testing results to the Engineer.

Upon completion of all project work, the successful completion of the equipment tests and the receipt of all testing documentation, system support equipment, and correction of all known deficiencies, including minor construction items, a 30-day Observation Period will commence. The Observation Period consists of a 30-day period of normal operations of the new field equipment without any failure. The 30-day Observation Period will be warranted by the payment and performance bond. The purpose of this period is to ensure that all components of the system function in accordance with the Plans and these Project Special Provisions over an extended length of time.

Respond to system, equipment failures, component failures, or any reported failures that occur during the 30-day Observation Period within twenty-four (24) hours. Correct said failures within forty-eight (48) hours. Failures that affect any of the major system equipment for more than forty-eight (48) hours will suspend the timing of the 30-day Observation Period beginning at the time when the failure occurred. After the cause of such failures that necessitate a change of any system equipment or failures in any of the major system equipment exceeding a total of three (3) occurrences will terminate the 30-day Observation period and cause the 30-day Observation Period to be started over from day zero when the revised system equipment has been installed and/or the failures corrected.

15.2 METHOD OF MEASUREMENT

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, and will be full compensation for all work listed above.

16. TRAINING

16.1 DESCRIPTION

Provide training courses covering the operation and maintenance of the assemblies and systems included under this project. This includes the MVD Unit, the Event Processor, the Wireless Contact Closure Radio System, the Solar Power Assembly, as well as in depth classroom and hands-on training highlighting trouble shooting and repair techniques for equipment and systems on this project.

Provide department approved training courses covering the operation and maintenance of the equipment being supplied as part of the system. Training courses shall be required for both the control center elements and field elements of the system. Provide training material to present formal classroom as well as “hands-on” user training in the operation, maintenance, and troubleshooting of the equipment being supplied as part of the system. Each category shall consist of demonstration and hands-on activities. Particular attention shall be given to precautions that must be observed in operating the equipment.

Provide department approved qualified instructors or personnel approved by the Engineer to conduct the training courses. Training Department personnel must be able to properly operate, maintain, and troubleshoot each piece of equipment and software within the system.

All training courses shall be conducted at a Contractor provided location within the time mutually agreed upon by the Engineer and the Contractor. Provide training materials for up to 15 attendees. Training course shall not exceed 8 hours on any given day.

16.2 MATERIALS

General:

Provide training to properly install, operate, maintain, diagnose and repair all equipment and software associated with this project. Thirty (30) days prior to commencement of the training course, submit detailed course curricula, draft manuals, and handouts, and resumes of the instructors for review and approval. The Engineer may request modification of the material and request courses desired by the Department.

For all training programs, a staff of engineers, technicians, and maintenance personnel familiar with the system will be the training participants.

For each session, provide training materials (manuals, notebooks, handouts, etc.) as specified in the Documentation Section of these Project Special Provisions.

Conduct all training courses at a location provided by the Contractor and approved by the Engineer. Training shall be conducted in the Division 10 area. Complete all training prior to the beginning of the System Acceptance Testing. Provide training material, manuals, and other handouts to serve not only as subject guidance, but also as quick reference for use by the students. Deliver course material in reproducible form immediately following the course.

Subject Area:

Provide the training sessions at the required durations as listed in the Table below. A more detailed description of the required content of each training session is provided in the following sections.

Subject	Minimum Duration
Advanced Queue Detection Warning System Including: MVD Unit Event Processor Wireless Contact Closure Radio System Solar Power Assembly Trouble Shooting and Repair	2 Days for all Training

16.3 REQUIRED CONTENT AND FORMAT

Equipment Training:

Provide training for the above listed components and ensure the individual sessions address the following:

- Theory of operation
- Installation
- Operation
- Preventative maintenance of equipment
- Trouble shooting and equipment diagnostics
- Integration of equipment with field hardware, central hardware, and software components.

16.4 **MEASUREMENT AND PAYMENT**

Training will be paid for on a Lump Sum basis.

Payment will be full compensation for fees associated with labor, lecturers, travel and lodging, hosting facilities, manuals, handouts and reproducible materials, demonstration and training aids, other incidentals, etc.

Payment will be made under:

Pay Item	**Pay Unit**
Training	Lump Sum

OUTSOURCING OUTSIDE THE USA:

(9-21-04) (Rev. 5-16-06) SP1 G150

All work on consultant contracts, services contracts, and construction contracts shall be performed in the United States of America. No work shall be outsourced outside of the United States of America.

Outsourcing for the purpose of this provision is defined as the practice of subcontracting labor, work, services, staffing, or personnel to entities located outside of the United States.

The North Carolina Secretary of Transportation shall approve exceptions to this provision in writing.

GIFTS FROM VENDORS AND CONTRACTORS:

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

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

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

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

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

EMPLOYMENT:

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

Revise the *2012 Standard Specifications* as follows:

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

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

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

MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE (DIVISIONS):

(10-16-07)(Rev. 1-17-12) 102-15(J) SP1 G67

Description

The purpose of this Special Provision is to carry out the North Carolina Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts financed in whole or in part with State funds.

Definitions

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

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

Contract Goals Requirement - The approved MBE and WBE participation at time of award, but not greater than the advertised contract goals for each.

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

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

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

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

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 MBE/WBE certification. The MBE/WBE program follows the same regulations as the federal Disadvantaged Business Enterprise (DBE) program in accordance with 49 CFR Part 26.

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

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

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

Forms and Websites Referenced in this Provision

Payment Tracking System - On-line system in which the Contractor enters the payments made to MBE and WBE 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 MBE/WBE firms working on the project. This form is for paper bid projects only. http://www.ncdot.org/doh/forms/files/DBE-IS.xls

RF-1 *MBE/WBE Replacement Request Form* - Form for replacing a committed MBE or WBE. https://apps.dot.state.nc.us/_includes/download/external.html?pdf=http%3A//www.ncdot.gov/doh/forms/files/RF-1.pdf

SAF *Subcontract Approval Form* - Form required for approval to sublet the contract. http://www.ncdot.org/doh/operations/dp_chief_eng/constructionunit/saf.xls

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.
https://apps.dot.state.nc.us/_includes/download/external.html?pdf=http%3A//www.ncdot.gov/doh/forms/files/JC-1.pdf

Letter of Intent - Form signed by the Contractor and the MBE/WBE subcontractor, manufacturer or regular dealer that affirms that a portion of said contract is going to be performed by the signed MBE/WBE for the amount listed at the time of bid.
http://www.ncdot.org/doh/preconstruct/ps/contracts/letterofintent.pdf

Listing of MBE and WBE Subcontractors Form - Form for entering MBE/WBE subcontractors on a project that will meet this MBE and WBE goals. This form is for paper bids only.

http://www.ncdot.gov/doh/preconstruct/ps/word/MISC3.doc

Subcontractor Quote Comparison Sheet - Spreadsheet for showing all subcontractor quotes in the work areas where MBEs and WBEs quoted on the project. This sheet is submitted with good faith effort packages.
http://www.ncdot.gov/business/ocs/goodfaith/excel/Ex_Subcontractor_Quote_Comparison.xls

MBE and WBE Goal

The following goals for participation by Minority Business Enterprises and Women Business Enterprises are established for this contract:

(A) Minority Business Enterprises **[0]** %

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

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

(B) Women Business Enterprises **[0]** %

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

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

Directory of Transportation Firms (Directory)

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

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

Listing of MBE/WBE Subcontractors

At the time of bid, bidders shall submit <u>all</u> MBE and WBE participation that they anticipate to use during the life of the contract. Only those identified to meet the MBE goal and the WBE goal will be considered committed, even though the listing shall include both committed MBE/WBE subcontractors and additional MBE/WBE subcontractors. Any additional MBE/WBE subcontractor participation submitted at the time of bid will be used toward overall race-neutral goals. Only those firms with current MBE and

WBE certification at the time of bid opening will be acceptable for listing in the bidder's submittal of MBE and WBE participation. The Contractor shall indicate the following required information:

Blank forms will not be deemed to represent zero participation. Bids submitted that do not have MBE and WBE participation indicated on the appropriate form will not be read publicly during the opening of bids. The Department will not consider these bids for award and the proposal will be rejected.

(A) *If either the MBE or WBE goal is more than zero,*

(1) Bidders, at the time the bid proposal is submitted, shall submit a listing of MBE/WBE participation, including the names and addresses on *Listing of MBE and WBE 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 MBE and WBE participation for the contract.

(2) If bidders have no MBE or WBE participation, they shall indicate this on the *Listing of MBE and WBE Subcontractors* by entering the word "None" or the number "0." This form shall be completed in its entirety.

(3) The bidder shall be responsible for ensuring that the MBE/WBE 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 MBE's or WBE's participation will not count towards achieving the corresponding goal.

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

MBE or WBE Prime Contractor

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

For example, on a proposed contract, the WBE goal is 10%, and the MBE goal is 8%. A WBE bidder puts in a bid where they will perform 40% of the contract work and have a WBE subcontractor which will perform another 5% of the work. Together the two WBE firms submit on the *Listing of MBE and WBE Subcontractors* a value of 45% of the contract which fulfills the WBE goal. The 8% MBE goal shall be obtained through MBE participation with MBE certified subcontractors or documented through a good faith effort. It should be noted that you cannot combine the two goals to meet an overall value. The two goals shall remain separate.

MBE/WBE prime contractors shall also follow Sections A or B listed under *Listing of MBE/WBE Subcontractors* just as a non-MBE/WBE bidder would.

Written Documentation – Letter of Intent

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

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

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

Submission of Good Faith Effort

If the bidder fails to meet or exceed either the MBE or the WBE goal, the apparent lowest responsive bidder shall submit to the Department documentation of adequate good faith efforts made to reach that specific goal(s).

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

Note: Where the information submitted includes repetitious solicitation letters, it will be acceptable to submit a representative letter along with a distribution list of the firms that were solicited. Documentation of MBE/WBE 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 MBE/WBE 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 MBE/WBE participation. Adequate good faith efforts also mean that the bidder actively and aggressively sought MBE/WBE participation. Mere *pro forma* efforts are not considered good faith efforts.

The Department will consider the quality, quantity, and intensity of the different kinds of efforts a bidder has made. Listed below are examples of the types of actions a bidder will take in making a good faith effort to meet the goals 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 and/or written notices through the use of the NCDOT Directory of Transportation Firms) the interest of all certified MBEs/WBEs 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 MBEs/WBEs to respond to the solicitation. Solicitation shall provide the opportunity to MBEs/WBEs within the Division and surrounding Divisions where the project is located. The bidder must determine with certainty if the MBEs/WBEs are interested by taking appropriate steps to follow up initial solicitations.

(B) Selecting portions of the work to be performed by MBEs/WBEs in order to increase the likelihood that the MBE and WBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate MBE/WBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.

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

(D) (1) Negotiating in good faith with interested MBEs/WBEs. It is the bidder's responsibility to make a portion of the work available to MBE/WBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available MBE/WBE subcontractors and suppliers, so as to facilitate MBE/WBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of MBEs/WBEs 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 MBEs/WBEs to perform the work.

(2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including MBE/WBE 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 MBEs/WBEs is not in itself sufficient reason for a bidder's failure to meet the contract MBE or WBE goals, 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 MBEs/WBEs if the price difference is excessive or unreasonable.

(E) Not rejecting MBEs/WBEs 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 MBEs/WBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or bidder.

(G) Making efforts to assist interested MBEs/WBEs 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 MBEs/WBEs. Contact within 7 days from the bid opening NCDOT's Business Development Manager in the Business Opportunity and Work Force Development Unit to give notification of the bidder's inability to get MBE or WBE quotes.

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

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

(1) Whether the bidder's documentation reflects a clear and realistic plan for achieving the MBE and WBE goals.

(2) The bidders' past performance in meeting the MBE and WBE goals.

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

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

Non-Good Faith Appeal

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

Counting MBE/WBE Participation Toward Meeting MBE/WBE Goals

(A) Participation

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

(B) Joint Checks

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

(C) Subcontracts (Non-Trucking)

A MBE/WBE may enter into subcontracts. Work that a MBE subcontracts to another MBE firm may be counted toward the MBE contract goal requirement. The same holds for work that a WBE subcontracts to another WBE firm. Work that a MBE subcontracts to a non-MBE firm does not count toward the MBE contract goal requirement. Again, the same holds true for the work that a WBE subcontracts to a non-WBE firm. If a MBE or WBE 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 MBE or WBE is not performing a commercially useful function. The MBE/WBE may present evidence to rebut this presumption to the Department. The Department's decision on the rebuttal of this presumption may be subject to review by the Office of Inspector General, NCDOT.

(D) Joint Venture

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

(E) Suppliers

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

(F) Manufacturers and Regular Dealers

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

(1) The fees or commissions charged by a MBE/WBE 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 MBE/WBE, 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) MBE/WBE Utilization

The Contractor may count toward its contract goal requirement only expenditures to MBEs and WBEs that perform a commercially useful function in the work of a contract. A MBE/WBE 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 MBE/WBE 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 MBE/WBE is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing and the MBE/WBE credit claimed for its performance of the work, and any other relevant factors.

(B) MBE/WBE Utilization in Trucking

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

(1) The MBE/WBE 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 the MBE or WBE goal.

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

(3) The MBE/WBE 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 MBE may subcontract the work to another MBE firm, including an owner-operator who is certified as a MBE. The same holds true that a WBE may subcontract the work to another WBE firm, including an owner-operator who is certified as a WBE. When this occurs, the MBE or WBE who subcontracts work receives credit for the total value of the transportation services the subcontracted MBE or WBE provides on the contract. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the goal requirement. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified transportation service providers and there is no interest or availability, and they can get assistance from other certified providers, the Engineer will not hold the prime liable for meeting the goal.

(5) The MBE/WBE may also subcontract the work to a non-MBE/WBE firm, including from an owner-operator. The MBE/WBE who subcontracts the work to a non-MBE/WBE is entitled to credit for the total value of transportation services provided by the non-MBE/WBE subcontractor not to exceed the value of transportation services provided by MBE/WBE-owned trucks on the contract. Additional participation by non-MBE/WBE 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 MBE/WBE and the Contractor will not count towards the MBE/WBE contract requirement.

(6) A MBE/WBE may lease truck(s) from an established equipment leasing business open to the general public. The lease must indicate that the MBE/WBE 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 MBE/WBE, so long as the lease gives the MBE/WBE absolute priority for use of the leased truck. This type of lease may count toward the MBE/WBE's credit as long as the driver is under the MBE/WBE's payroll.

(7) Subcontracted/leased trucks shall display clearly on the dashboard the name of the MBE/WBE 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.

MBE/WBE Replacement

When a Contractor has relied on a commitment to a MBE or WBE firm (or an approved substitute MBE or WBE firm) to meet all or part of a contract goal requirement, the contractor shall not terminate the MBE/WBE 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 MBE/WBE subcontractor, a non-MBE/WBE subcontractor, or with the Contractor's own forces or those of an affiliate. A MBE/WBE may only be terminated after receiving the Engineer's written approval based upon a finding of good cause for the termination.

All requests for replacement of a committed MBE/WBE firm shall be submitted to the Engineer for approval on Form RF-1 *(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 MBE/WBE:

(A) Performance Related Replacement

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

If a replacement MBE/WBE is not found that can perform at least the same amount of work as the terminated MBE/WBE, 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 MBEs/WBEs that their interest is solicited in contracting the work defaulted by the previous MBE/WBE or in subcontracting other items of work in the contract.

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

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

(3) A list of reasons why MBE/WBE quotes were not accepted.

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

(B) Decertification Replacement

(1) When a committed MBE/WBE is decertified by the Department after the SAF (*Subcontract Approval Form*) has been received by the Department, the Department will not require the Contractor to solicit replacement MBE/WBE 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 MBE/WBE is decertified prior to the Department receiving the SAF (*Subcontract Approval Form*) for the named MBE/WBE firm, the Contractor shall take all necessary and reasonable steps to replace the MBE/WBE subcontractor with another similarly certified MBE/WBE subcontractor to perform at least the same amount of work to meet the MBE/WBE goal requirement. If a MBE/WBE firm is not found to do the same amount of work, a good faith effort must be submitted to NCDOT (see A herein for required documentation).

Changes in the Work

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

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

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

When the Contractor requests changes in the work that result in the reduction or elimination of work that the Contractor committed to be performed by a MBE/WBE, the Contractor shall seek additional participation by MBEs/WBEs equal to the reduced MBE/WBE 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 MBE/WBE subcontractor. The Department reserves the right to require copies of actual subcontract agreements involving MBE/WBE 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 MBE/WBE for materials, supplies or services, not otherwise documented by the SAF as specified above, the Contractor shall furnish the Engineer a copy of the agreement. The documentation shall also indicate the percentage (60% or 100%) of expenditures claimed for MBE/WBE credit.

Reporting Minority and Women Business Enterprise Participation

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

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

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

While each contractor (prime, subcontractor, 2nd tier subcontractor) is responsible for accurate accounting of payments to MBEs/WBEs, 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 further work on future projects until the required information is submitted.

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

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

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

Failure to Meet Contract Requirements

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

STANDARD SPECIAL PROVISION
AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS

(5-20-08) Z-2

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

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

Payment will be made on any contract terminated pursuant to the special provision in accordance with Subarticle 108-13(E) of the *2012 Standard Specifications*.

STANDARD SPECIAL PROVISION

ERRATA

(1-17-12) (Rev. 5-15-12) Z-4

Revise the *2012 Standard Specifications* as follows:

Division 2

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

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

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

Division 4

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

Division 6

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

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

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

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

Division 10

Page 10-74, Table 1056-1 Geotextile Requirements, replace "50%" for the UV Stability (Retained Strength) of Type 5 geotextiles with "70%".

Division 12

Page 12-8, Table 1205-4 and 1205-5, replace "THERMOPLASTIC" in the title of these tables with "POLYUREA".

Division 15

Page 15-6, Subarticle 1510-3(B), after line 21, replace the allowable leakage formula with the following:

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

Page 15-6, Subarticle 1510-3(B), line 32, delete "may be performed concurrently or" and replace with "shall be performed".

Page 15-17, Subarticle 1540-3(E), line 27, delete "Type 1".

Division 17

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

Revise the *2012 Roadway Standard Drawings* as follows:

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

STANDARD SPECIAL PROVISION

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

(3-18-03) Z-04a

Within Quarantined Area

This project may be within a county regulated for plant and/or pests. If the project or any part of the Contractor's operations is located within a quarantined area, thoroughly clean all equipment prior to moving out of the quarantined area. Comply with federal/state regulations by obtaining a certificate or limited permit for any regulated article moving from the quarantined area.

Originating in a Quarantined County

Obtain a certificate or limited permit issued by the N.C. Department of Agriculture/United States Department of Agriculture. Have the certificate or limited permit accompany the article when it arrives at the project site.

Contact

Contact the N.C. Department of Agriculture/United States Department of Agriculture at 1-800-206-9333, 919-733-6932, or *http://www.ncagr.com/plantind/* to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

Regulated Articles Include

1. Soil, sand, gravel, compost, peat, humus, muck, and decomposed manure, separately or with other articles. This includes movement of articles listed above that may be associated with cut/waste, ditch pulling, and shoulder cutting.
2. Plants with roots including grass sod.
3. Plant crowns and roots.
4. Bulbs, corms, rhizomes, and tubers of ornamental plants.
5. Hay, straw, fodder, and plant litter of any kind.
6. Clearing and grubbing debris.
7. Used agricultural cultivating and harvesting equipment.
8. Used earth-moving equipment.
9. Any other products, articles, or means of conveyance, of any character, if determined by an inspector to present a hazard of spreading imported fire ant, gypsy moth, witchweed or other noxious weeds.

STANDARD SPECIAL PROVISION

MINIMUM WAGES

(7-21-09) Z-5

FEDERAL: The Fair Labor Standards Act provides that with certain exceptions every employer shall pay wages at the rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

STATE: The North Carolina Minimum Wage Act provides that every employer shall pay to each of his employees, wages at a rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

The minimum wage paid to all skilled labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

The minimum wage paid to all intermediate labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

The minimum wage paid to all unskilled labor on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS ($7.25) per hour.

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

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

STANDARD SPECIAL PROVISION

ON-THE-JOB TRAINING

(10-16-07) (Rev. 7-21-09) Z-10

Description

The North Carolina Department of Transportation will administer a custom version of the Federal On-the-Job Training (OJT) Program, commonly referred to as the Alternate OJT Program. All contractors (existing and newcomers) will be automatically placed in the Alternate Program. Standard OJT requirements typically associated with individual projects will no longer be applied at the project level. Instead, these requirements will be applicable on an annual basis for each contractor administered by the OJT Program Manager.

On the Job Training shall meet the requirements of 23 CFR 230.107 (b), 23 USC – Section 140, this provision and the On-the-Job Training Program Manual.

The Alternate OJT Program will allow a contractor to train employees on Federal, State and privately funded projects located in North Carolina. However, priority shall be given to training employees on NCDOT Federal-Aid funded projects.

Minorities and Women

Developing, training and upgrading of minorities and women toward journeyman level status is a primary objective of this special training provision. Accordingly, the Contractor shall make every effort to enroll minority and women as trainees to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

Assigning Training Goals

The Department, through the OJT Program Manager, will assign training goals for a calendar year based on the contractors' past three years' activity and the contractors' anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from 1 to 15 per contractor per calendar year. The Contractor shall sign an agreement to fulfill their annual goal for the year. A sample agreement is available at www.ncdot.org/business/ocs/ojt/.

Training Classifications

The Contractor shall provide on-the-job training aimed at developing full journeyman level workers in the construction craft/operator positions. Preference shall be given to providing training in the following skilled work classifications:

Equipment Operators	Office Engineers
Truck Drivers	Estimators
Carpenters	Iron / Reinforcing Steel Workers

Concrete Finishers	Mechanics
Pipe Layers	Welders

The Department has established common training classifications and their respective training requirements that may be used by the contractors. However, the classifications established are not all-inclusive. Where the training is oriented toward construction applications, training will be allowed in lower-level management positions such as office engineers and estimators. Contractors shall submit new classifications for specific job functions that their employees are performing. The Department will review and recommend for acceptance to FHWA the new classifications proposed by contractors, if applicable. New classifications shall meet the following requirements:

Proposed training classifications are reasonable and realistic based on the job skill classification needs, and

The number of training hours specified in the training classification is consistent with common practices and provides enough time for the trainee to obtain journeyman level status.

The Contractor may allow trainees to be trained by a subcontractor provided that the Contractor retains primary responsibility for meeting the training and this provision is made applicable to the subcontract. However, only the Contractor will receive credit towards the annual goal for the trainee.

Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman level status or in which they have been employed as a journeyman.

Records and Reports

The Contractor shall maintain enrollment, monthly and completion reports documenting company compliance under these contract documents. These documents and any other information as requested shall be submitted to the OJT Program Manager.

Upon completion and graduation of the program, the Contractor shall provide each trainee with a certification Certificate showing the type and length of training satisfactorily completed.

Trainee Interviews

All trainees enrolled in the program will receive an initial and Trainee/Post graduate interview conducted by the OJT program staff.

Trainee Wages

Contractors shall compensate trainees on a graduating pay scale based upon a percentage of the prevailing minimum journeyman wages (Davis-Bacon Act). Minimum pay shall be as follows:

60 percent	of the journeyman wage for the first half of the training period
75 percent	of the journeyman wage for the third quarter of the training period
90 percent	of the journeyman wage for the last quarter of the training period

In no instance shall a trainee be paid less than the local minimum wage. The Contractor shall adhere to the minimum hourly wage rate that will satisfy both the NC Department of Labor (NCDOL) and the Department.

Achieving or Failing to Meet Training Goals

The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and who receives training for at least 50 percent of the specific program requirement. Trainees will be allowed to be transferred between projects if required by the Contractor's scheduled workload to meet training goals.

If a contractor fails to attain their training assignments for the calendar year, they may be taken off the NCDOT's Bidders List.

Measurement and Payment

No compensation will be made for providing required training in accordance with these contract documents.

SUBSTITUTE FORM W-9

VENDOR REGISTRATION FORM
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Pursuant to Internal Revenue Service (IRS) Regulations, vendors must furnish their Taxpayer Identification Number (TIN) to the State. If this number is not provided, you may be subject to a 20% withholding on each payment. To avoid this 20% withholding and to insure that accurate tax information is reported to the Internal Revenue Service and the State, please use this form to provide the requested information exactly as it appears on file with the IRS.

INDIVIDUAL AND SOLE PROPRIETOR: ENTER NAME AS SHOWN ON SOCIAL SECURITY CARD
CORPORATION OR PARTNERSHIP : ENTER YOUR LEGAL BUSINESS NAME

NAME: _____

MAILING ADDRESS: STREET/PO BOX: _____

CITY, STATE, ZIP: _____

DBA / TRADE NAME (IF APPLICABLE): _____

BUSINESS DESIGNATION:

☐ INDIVIDUAL (use Social Security No.) ☐ SOLE PROPRIETER (use SS No. or Fed ID No.)
☐ CORPORATION (use Federal ID No.) ☐ PARTNERSHIP (use Federal ID No.)
☐ ESTATE/TRUST (use Federal ID no.) ☐ STATE OR LOCAL GOVT. (use Federal ID no.)
☐ OTHER / SPECIFY _____

SOCIAL SECURITY NO. ___ ___ ___ - ___ ___ - ___ ___ ___ ___ (Social Security #)
OR
FED.EMPLOYER IDENTIFICATION NO. ___ ___ - ___ ___ ___ ___ ___ ___ ___ (Employer Identification #)

COMPLETE THIS SECTION IF PAYMENTS ARE MADE TO AN ADDRESS OTHER THAN THE ONE LISTED ABOVE:

REMIT TO ADDRESS: STREET / PO BOX: _____

CITY, STATE, ZIP: _____

Participation in this section is voluntary. You are not required to complete this section to become a registered vendor. The information below will in no way affect the vendor registration process and its sole purpose is to collect statistical data on those vendors doing business with NCDOT. If you choose to participate, circle the answer that best fits your firm's group definition.

What is your firm's ethnicity? **(☐Prefer Not To Answer, ☐African American, ☐Native American, ☐Caucasian American, ☐Asian American, ☐Hispanic American, ☐Asian-Indian American, ☐Other:** _____)

What is your firm's gender? (☐Prefer Not to Answer, ☐Male, ☐Female**)** **Disabled-Owned Business?** (☐Prefer Not to Answer, ☐Yes,☐ No)

IRS Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the IRS that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. person (including a U.S. resident alien).

The IRS does not require your consent to any provision of this document other than the certifications required to avoid backup withholding. For complete certification instructions please see IRS FORM W-9 at http://www.irs.gov/pub/irs-pdf/fw9.pdf .

_____ _____
NAME (Print or Type) TITLE (Print or Type)

_____ _____ _____
SIGNATURE DATE PHONE NUMBER

To avoid payment delays, completed forms should be returned promptly to your local DOT office.

LISTING OF MBE & WBE SUBCONTRACTORS

Sheet _____ of _____

FIRM NAME AND ADDRESS	MBE or WBE	ITEM NO.	ITEM DESCRIPTION	* AGREED UPON UNIT PRICE	** DOLLAR VOLUME OF ITEM

* The Dollar Volume shown in this column shall be the Actual Price Agreed Upon by the Prime Contractor and the MBE and/or WBE subcontractor, and these prices will be used to determine the percentage of the MBE and/or WBE participation in the contract.

** Must have entry even if figure to be entered is zero.

** Dollar Volume of MBE Subcontractor	$ _____
MBE Percentage of Total Contract Bid Price	_____ %
** Dollar Volume of WBE Subcontractor	$ _____
WBE Percentage of Total Contract Bid Price	_____ %

This form must be completed in order for the Bid to be considered responsive and be publicly read. Bidders with no MBE and/or WBE participation must so indicate this on the form by entering the word or number *zero*.

Contract No. _____ Rev. 4-19-11
County _____

EXECUTION OF BID

NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

CORPORATION

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

_____

Full name of Corporation

_____

Address as Prequalified

Attest _____ By_____

Secretary/Assistant Secretary
Select appropriate title

President/Vice President/Assistant Vice President
Select appropriate title

_____ _____

Print or type Signer's name

Print or type Signer's name

CORPORATE SEAL

AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the
_____ day of _____ 20__.

_____
Signature of Notary Public

of _____County
State of _____
My Commission Expires:_____

NOTARY SEAL

Contract No. _____ Rev. 4-19-11
County _____

EXECUTION OF BID
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

PARTNERSHIP

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

_____
Full Name of Partnership

_____
Address as Prequalified

_____ By_____
Signature of Witness Signature of Partner

_____ _____
Print or type Signer's name Print or type Signer's name

AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the **NOTARY SEAL**
_____ day of _____ 20__.

_____
Signature of Notary Public
of _____County
State of _____
My Commission Expires: _____

Contract No. _____ Rev. 4-19-11
County _____

EXECUTION OF BID
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

LIMITED LIABILITY COMPANY

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

_____

Full Name of Firm

_____

Address as Prequalified

_____ _____

Signature of Witness

Signature of Member/Manager/Authorized Agent
Select appropriate title

_____ _____

Print or type Signer's name

Print or type Signer's Name

AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the
_____ day of _____ 20__.

NOTARY SEAL

_____
Signature of Notary Public
of _____County
State of _____
My Commission Expires:_____

Contract No. _____ Rev. 4-19-11
County _____

EXECUTION OF BID
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

JOINT VENTURE (2) or (3)

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

Instructions: **2 Joint Venturers** Fill in lines (1), (2) and (3) and execute. **3 Joint Venturers** Fill in lines (1), (2), (3) and (4) and execute. On Line (1), fill in the name of the Joint Venture Company. On Line (2), fill in the name of one of the joint venturers and execute below in the appropriate manner. On Line (3), print or type the name of the other joint venturer and execute below in the appropriate manner. On Line (4), fill in the name of the third joint venturer, if applicable and execute below in the appropriate manner.

(1)_____
Name of Joint Venture

(2)_____
Name of Contractor

_____
Address as Prequalified

_____ _____
Signature of Witness or Attest By Signature of Contractor

_____ _____
Print or type Signer's name Print or type Signer's name

If Corporation, affix Corporate Seal and

(3)_____
Name of Contractor

_____
Address as Prequalified

_____ _____
Signature of Witness or Attest By Signature of Contractor

_____ _____
Print or type Signer's name Print or type Signer's name

If Corporation, affix Corporate Seal and

(4)_____
Name of Contractor *(for 3 Joint Venture only)*

_____
Address as Prequalified

_____ _____
Signature of Witness or Attest By Signature of Contractor

_____ _____
Print or type Signer's name Print or type Signer's name

If Corporation, affix Corporate Seal

NOTARY SEAL
Affidavit must be notarized for Line (2)
Subscribed and sworn to before me this
_____day of_____ 20___

_____
Signature of Notary Public
of _____County
State of _____
My Commission Expires:_____

NOTARY SEAL
Affidavit must be notarized for Line (3)
Subscribed and sworn to before me this
_____day of _____ 20___

_____
Signature of Notary Public
of _____County
State of _____
My Commission Expires:_____

NOTARY SEAL
Affidavit must be notarized for Line (4)
Subscribed and sworn to before me this
____day of__ _____20___

_____
Signature of Notary Public
of _____County
State of _____
My Commission Expires:_____

EXECUTION OF BID
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

INDIVIDUAL DOING BUSINESS UNDER A FIRM NAME

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

Name of Contractor _____
Individual name

Trading and doing business as
_____
Full name of Firm

_____
Address as Prequalified

_____ _____
Signature of Witness Signature of Contractor, Individually

_____ _____
Print or type Signer's name Print or type Signer's name

AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the _____ day of _____ 20__.

NOTARY SEAL

_____
Signature of Notary Public
of _____County
State of _____
My Commission Expires:_____

EXECUTION OF BID
NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

INDIVIDUAL DOING BUSINESS IN HIS OWN NAME

The person executing the bid, on behalf of the Bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee of the bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Bidder intends to do the work with its own bonafide employees or subcontractors and is not bidding for the benefit of another contractor.

In addition, execution of this bid in the proper manner also constitutes the Bidder's certification of status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR

Name of Contractor _____
Print or type Individual name

_____
Address as Prequalified

_____
Signature of Contractor, Individually

_____
Print or type Signer's Name

_____
Signature of Witness

_____
Print or type Signer's name

AFFIDAVIT MUST BE NOTARIZED

Subscribed and sworn to before me this the
_____ day of _____ 20__. **NOTARY SEAL**

_____
Signature of Notary Public
of _____County
State of _____
My Commission Expires:_____

Contract No. _____ Rev. 4-19-11
County _____

DEBARMENT CERTIFICATION

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation filed with the Department, or has become erroneous because of changed circumstances.

2. The terms *covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal,* and *voluntarily excluded,* as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.

3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.

4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal-Aid Provision titled *Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR* 1273) provided by the Department, without .subsequent modification, in all lower tier covered transactions.

5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.

6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

Contract No. _____ Rev. 4-19-11
County _____

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

Work Order No. WBS# 43313.3.1; TIP# SS-4910AR

Description: Advanced Queue Detective Warning System, Pavement Markings and Signing

Mecklenburg

LINE NO.	MASTER ITEM NO.	SEC. NO.	ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL AMOUNT
1	0000100000-N	800	MOBILIZATION	Lump Sum	LS		
2	4025000000-E	901	CONTRACTOR FURNISHED, TYPE A*** SIGN	130	SF		
3	4025000000-E	901	CONTRACTOR FURNISHED, TYPE D*** SIGN	24	SF		
4	4025000000-E	901	CONTRACTOR FURNISHED, TYPE E*** SIGN	16	SF		
5	4048000000-E	902	REINFORCED CONCRETE SIGN FOUN-DATIONS	2	CY		
6	4066000000-E	903	SUPPORTS, SIMPLE STEEL BEAM	1584	LB		
7	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	45	LF		
8	4110000000-N	904	SIGN ERECTION , TYPE A***(GROUND MOUNTED)	2	EA		
9	4110000000-N	904	SIGN ERECTION , TYPE D***(GROUND MOUNTED)	1	EA		
10	4110000000-N	904	SIGN ERECTION , TYPE E***(GROUND MOUNTED)	1	EA		
11	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	128	SF		
12	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	265	SF		
13	4415000000-N	1115	FLASHING ARROW BOARD	2	EA		
14	4422000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN (SHORTTERM)	30	DAY		
15	4430000000-N	1130	DRUMS	100	EA		
16	4480000000-N	1165	TMA	2	EA		
17	4600000000-N	SP	GENERIC TRAFFIC CONTROL ITEM -LANE CLOSURE	4	EA		
18	4600000000-N	SP	GENERIC TRAFFIC CONTROL ITEM -SHOULDER CLOSURE	4	EA		
19	4726100000-E	1205	HEATED-IN-PLACE THERMOPLASTIC PAVEMENT MARKING CHARACTER (120 MILS)	8	EA		
20	4726110000-E	1205	HEATED-IN-PLACE THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	4	EA		
21	4847120000-E	1205	POLYUREA PAVEMENT MARKING LINES (12", **********)	1800	LF		
22	4855000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (6")	350	LF		
23	4865000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (12")	1800	LF		
24	4875000000-N	1205	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	12	EA		
25	7300000000-E	1715	UNPAVED TRENCHING (1) (1 1/4") *********	80	LF		
26	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	4	EA		
27	7384000000-E	1722	1 1/2" RISER WITH WEATHERHEAD	7	EA		
28	7484000000-N	SP	MICROWAVE VEHICLE DETECTOR	2	EA		
29	7575142200-N	SP	NEW ELECTRICAL SERVICE	1	EA		
30	7980000000-N	SP	GENERIC SIGNAL ITEM….12-INCH ,1 SECTION AMBER FLASHING BEACON	4	EA		
31	7980000000-N	SP	GENERIC SIGNAL ITEM….900 MHz CONTACT CLOSURE RADIO	2	EA		
32	7980000000-N	SP	GENERIC SIGNAL ITEM….900 MHz SERIAL RADIO	3	EA		
33	7980000000-N	SP	GENERIC SIGNAL ITEM….AC FLASHER EQUIPMENT	1	EA		
34	7980000000-N	SP	GENERIC SIGNAL ITEM…DC FLASHER EQUIPMENT	1	EA		
35	7980000000-N	SP	GENERIC SIGNAL ITEM….EVENT PROCESSOR UNIT	1	EA		
36	7980000000-N	SP	GENERIC SIGNAL ITEM….NEMA TYPE 3R EQUIPMENT CABINET	3	EA		

37	7980000000-N	SP	GENERIC SIGNAL ITEM….SOLAR POWER ASSEMBLY	3	EA		
38	7980000000-N	SP	GENERIC SIGNAL ITEM….TYPE 336 EQUIPMENT CABINET	1	EA		
39	7980000000-N	SP	GENERIC SIGNAL ITEM….WOOD POLE (40')	4	EA		
40	7985000000-N	SP	GENERIC SIGNAL ITEM….TRAINING	1	LS		

Total Bid for Project $ _____

CONTRACTOR _____

ADDRESS _____

_____

Federal ID No. _____

Contr. License No. _____

Telephone No. _____

Vendor No. _____

CORPORATE SEAL

Authorized Agent _____ Title _____

Signature _____ Date _____

Witness _____ Title _____

Signature _____ Date _____