*** PROJECT SPECIAL PROVISIONS ***

CONTRACT TIME AND LIQUIDATED DAMAGES

(7-12-7) DB1 G04A

The date of availability for this contract is October 28, 2019, except that the Design-Build Team shall only begin ground disturbing activities as allowed by this Request for Proposals (RFP). The Design-Build Team shall consider this factor in determining the proposed completion date for this project.

The completion date for this contract is defined as the date proposed in the Technical Proposal by the proposer who is awarded the project. The completion date thus proposed shall not be later than May 15, 2024.

When observation periods are required by the special provisions, they are not a part of the work to be completed by the completion date and / or intermediate contract times. Should an observation period extend beyond the Final Completion Date proposed by the Design-Build Team in the Technical Proposal, the performance and payment bonds shall remain in full force and effect until the observation period has been completed and the work accepted by the Department.

The liquidated damages for this contract are **Fifteen Thousand Dollars ($ 15,000.00)** per calendar day. As an exception to this amount, where the contract has been determined to be substantially complete as defined by the *Substantial Completion* Project Special Provision found elsewhere in this RFP, the liquidated damages will be reduced to **Five Thousand Dollars ($5,000.00)** per calendar day.

Where the Design-Build Team who is awarded the contract has proposed a completion date for the contract as required above, but also has proposed an earlier date for substantial completion, then both of these proposed dates will become contract requirements.

Liquidated damages of **Fifteen Thousand Dollars ($ 15,000.00)** per calendar day will be applicable to the early date for substantial completion proposed by the bidder. Liquidated damages of **Five Thousand Five Hundred Dollars ($5,000.00)** per calendar day will be applicable to the Final Completion Date proposed by the bidder where the Design-Build Team has proposed an earlier date for substantial completion.

OTHER LIQUIDATED DAMAGES AND INCENTIVES

(3-22-7) (Rev. 2-14-8) DB1 G11

Reference the Transportation Management Scope of Work found elsewhere in this RFP for more information on the following time restrictions and liquidated damages:

Liquidated Damages for Intermediate Contract Time #1 for lane narrowing, lane closure, holiday and special event time restrictions for US 70 and all ramps and loops are $2,500.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #2 for lane narrowing, lane closure, holiday and special event time restrictions for US 70 and all ramps and loops are $2,500.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #3 for lane narrowing, lane closure, holiday and special event time restrictions for Williams Road are $1,250.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #4 for road closure time restrictions for US 70 and all ramps and loops are $5,000.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #5 for road closure time restrictions for All Other Roads are $2,500.00 per 15-minute period or any portion thereof.

Liquidated Damages for Erosion Control efforts apply to this project

Reference the Erosion and Sedimentation Control Scope of Work found elsewhere in this RFP for additional information under the Erosion Control Damages Section.

Reference the ITS Scope of Work found elsewhere in this RFP for more information on the following time restrictions and liquidated damages:

Liquidated Damages for Intermediate Contract Time #6 for Failure to Maintain Traveler Information for Westbound Traffic After the Existing DMS is Removed are $10,000.00 per day or any portion thereof.

PAYOUT SCHEDULE

(11-16-09) DB1 G13

No later than 12:00 o'clock noon on the sixth day after the opening of the Price Proposal, the responsive proposer with the lowest adjusted price shall submit a proposed Anticipated Monthly Payout Schedule to the office of the State Contract Officer. The information shall be submitted in a sealed package with the outer wrapping clearly marked "Anticipated Monthly Payout Schedule" along with the Design-Build Team name and the contract number. The Anticipated Monthly Payout Schedule will be used by the Department to establish the monthly funding levels for this project. The Anticipated Monthly Payout Schedule shall parallel, and agree with, the project schedule the Design-Build Team submits as a part of their Technical Proposal. The schedule shall include a monthly percentage breakdown (in terms of the total contract amount percentages) of the work anticipated to be completed. The schedule shall begin with the Date of Availability and end with the Actual Completion Date proposed by the Design-Build Team. If the Payout Schedule is not submitted as stated herein, the Technical and Price Proposals will be considered irregular by the Department, and the bid may be rejected.

Submit updates of the Anticipated Monthly Payout Schedule on March 15, June 15, September 15, and December 15 of each calendar year until project acceptance. Submit all updates to the Resident Engineer with a copy to the Division Construction Engineer at 105 Pactolous Highway NC 33, Greenville, NC 27835.

MOBILIZATION

(8-28-17) DB1 G15B

Revise the 2018 *Standard Specifications for Roads and Structures* as follows:

Page 8-1, Subarticle 800-2, MEASUREMENT AND PAYMENT

Delete this subarticle in its entirety and replace with the following:

800-2 MEASUREMENT AND PAYMENT

Five percent of the "Total Amount of Bid for Entire Project" shall be considered the lump sum amount for Mobilization. Partial payments for Mobilization will be made beginning with the first partial pay estimate paid on the contract. Payment will be made at the rate of 50 percent of the lump sum amount calculated for Mobilization. The remaining 50 percent will be paid with the partial pay estimate following approval of all permits required in the Environmental Permits Scope of Work for this project.

SUBSTANTIAL COMPLETION

(3-22-07) DB1 G1

When the special provisions provide for a reduction in the rate of liquidated damages for the contract time or an intermediate contract time after the work is substantially complete, the work will be considered substantially complete when the following requirements are satisfied:

1. Through traffic has been placed along the project or along the work required by an intermediate contract time and the work is complete to the extent specified below, and all lanes and shoulders are open such that traffic can move unimpeded at the posted speed. Intersecting roads and service roads are complete to the extent that they provide the safe and convenient use of the facility by the public.

2. The final layers of pavement for all lanes and shoulders along the project or along the work required by an intermediate contract time are complete.

3. Excluding signs on intersecting roadways, all signs are complete and accepted.

4. All guardrails, drainage devices, ditches, excavation and embankment are complete.

5. Remaining work along the project consists of permanent pavement markings, permanent pavement markers or incidental construction that is away from the paved portion of the roadway.

Upon apparent substantial completion of the entire project or the work required by an intermediate contract time, the Engineer will make an inspection of the work. If the inspection discloses the entire project or the work required by an intermediate contract time is substantially complete; the Engineer will notify the Design-Build Team in writing that the work is substantially complete. If the inspection discloses the entire project or the work required by an intermediate contract time is not substantially complete, the Engineer will notify the Design-Build Team in writing of the work that is not substantially complete. The entire project or the work required by an intermediate contract time will not be considered substantially complete until all of the recommendations made at the time of the inspection have been satisfactorily completed.

SUBMITTAL OF QUANTITIES, FUEL BASE INDEX PRICE AND OPT-OUT OPTION

1/23/14 DB1 G43

(A) Submittal of Quantities

Submit quantities on the Fuel Usage Factor Chart and Estimate of Quantities sheet, located in the back of this RFP, following the Itemized Proposal Sheet.

The Design-Build Team shall prepare an Estimate of Quantities that they anticipate incorporating into the completed project and upon which the Price Proposal was based. The quantity breakdown shall include all items of work that appear in the Fuel Usage Factor

Chart and Estimate of Quantities sheet. Only those items of work which are specifically noted in the Fuel Usage Factor Chart and Estimate of Quantities sheet will be subject to fuel price adjustments.

Submittal The submittal shall be signed and dated by an officer of the Design-Build Team. The information shall be copied and submitted in a separate sealed package with the outer wrapping clearly marked "Fuel Price Adjustment" and shall be delivered at the same time and location as the Technical and Price Proposal. The original shall be submitted in the Price Proposal.

Trade Secret Information submitted on the Fuel Usage Factor Chart and Estimate of Quantities sheet will be considered "Trade Secret" in accordance with the requirements of G.S. 66-152(3) until such time as the Price Proposal is opened.

(B) Base Index Price

The Design-Build Team's Estimate of Quantities will be used on the various partial payment estimates to determine fuel price adjustments. The Design-Build Team shall submit a payment request for quantities of work completed based on the work completed for that estimate period. The quantities requested for partial payment shall be reflective of the work actually accomplished for the specified period. The Design-Build Team shall certify that the quantities are reasonable for the specified period. The base index price for DIESEL #2 FUEL is $ 2.18 per gallon.

(C) Opt Out of Fuel Price Adjustment

If the Design-Build Team elects not to pursue reimbursement for Fuel Price Adjustments, a quantity of zero shall be entered for all quantities in the Fuel Usage Factor Chart and Estimate of Quantities sheet and the declination box shall be checked. Failure to complete this form will mean that the Design-Build Team is declining the Fuel Price Adjustments for this project.

(D) Change Option

The proposer will not be permitted to change the option after the Price Proposal and the copy of the Fuel Usage Factor Chart and Estimate of Quantities sheet are submitted.

(E) Failure to Submit

Failure to submit the completed Fuel Usage Factor Chart and Estimate of Quantities sheet separately and in the Price Proposal will result in the Technical and Price Proposal being considered irregular by the Department and the Technical and Price Proposal may be rejected.

INDIVIDUAL MEETINGS WITH PROPOSERS

(9-1-11) DB1 G048

The Department will provide at least two Question and Answer Sessions to meet with each proposer individually to specifically address questions regarding the draft Requests for Proposals.

After issuance of the First Industry Draft RFP, the Department will attempt to arrange a meeting between each individual proposer and the affected utility owners.

After issuance of the First Industry Draft RFP, the Department will attempt to arrange a meeting between each individual proposer and the North Carolina Railroad Company and Norfolk Southern Railroad Company.

The Department will afford each proposer one additional meeting with the Department (maximum two-hour time limit per each meeting) to discuss project specifics and address the proposer's concerns and questions. These meetings may occur at any time after the first Question and Answer Session with the proposers and before two weeks prior to the Technical and Price Proposals submittal date. The proposer shall request these meetings in writing to the State Contract Officer, providing the Department a minimum of one week advance notice of the requested date. The proposer shall also state in the request those disciplines within the Department that are requested to be in attendance. The Department makes no assurance that the request may be honored on that specific date or that all disciplines requested can be in attendance.

Additional individual meetings may be permitted in accordance with the Alternative Technical Concepts and Confidential Questions Project Special Provision found elsewhere in this RFP.

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

(1/24/13) DB1 G52

The Proposer's attention is directed to the various sheets in the Request for Proposals which are to be signed by the Proposer. A list of these sheets is shown below. The signature sheets are located behind the Itemized Proposal Sheet in this Request for Proposal. The NCDOT bid bond form is available on-line at:

https://connect.ncdot.gov/letting/Pages/Design-Build-Resources.aspx

or by contacting the Records and Documents office at 919-707-6900.

1. Applicable Signature Sheets: 1, 2, 3, 4, 5, or 6 (Bid)

2. Bid Bond dated the day of Technical and Price Proposal submission

The Proposer shall certify to the best of his knowledge all subcontractors, material suppliers and vendors utilized herein current status concerning suspension, debarment, voluntary exclusion, or determination of ineligibility by any federal agency, in accordance with the "Debarment Certification" located behind the *Execution of Bid Non-Collusion Affidavit, Debarment Certification and Gift Ban Certification* signature sheets in this RFP. Execution of the bid signature sheets in conjunction with any applicable statements concerning exceptions, when such statements have been made on the "Debarment Certification", constitutes the Proposer's certification of "status" under penalty of perjury under the laws of the United States.

SUBMISSION OF DESIGN-BUILD PROPOSAL

(9-1-11) (Rev. 8-30-17) DB1 G55B

The Proposer's attention is directed that each Proposer's Design-Build Proposal shall comply with the following requirements in order for that Design-Build Proposal to be responsive and considered for award.

1. The Proposer shall be prequalified with the Department prior to submitting a Design-Build Proposal.

2. The Proposer shall deliver the Design-Build Proposal to the place indicated, and prior to the time indicated in this Request for Proposals.

3. The Design-Build Proposal documents shall be signed by an authorized employee of the Proposer.

4. The Design-Build Proposal shall be accompanied by Bid surety in the form of a Bid Bond or Bid Deposit, dated the day of Technical and Price Proposal submission.

5. If Minority and Women's Business Enterprise (MBE / WBE) goals are established for this contract, the Proposer shall complete the form Listing of MBE / WBE Subcontractors contained elsewhere in this RFP in accordance with the Minority Business Enterprise and Women Business Enterprise Project Special Provision found elsewhere in this RFP.

6. The Design-Build Proposal shall address all the requirements as specified in this Request for Proposals.

In addition to the above requirements, failure to comply with any of the requirements of Article 102-8 of the Standard Special Provisions, Division One (found elsewhere in this RFP), Article 102-9 of the 2018 Standard Specifications for Roads and Structures, or Article 102-10 of the 2018 Standard Specifications for Roads and Structures and as amended in the Standard Special Provisions, Division One (found elsewhere in this RFP) may result in a Design-Build Proposal being rejected.

ALTERNATIVE TECHNICAL CONCEPTS AND CONFIDENTIAL QUESTIONS

(6-18-11) (Rev. 7-20-17) DB1 G56A

To accommodate innovation that may or may not be specifically allowed by the RFP, or other documents incorporated into the contract by reference, the Design-Build Team has the option of submitting Confidential Questions and Alternative Technical Concepts.

Definitions

A Confidential Question is defined as a private query to the Department containing information whose disclosure could alert others to certain details of doing business in a particular manner.

An Alternative Technical Concept is a private query to the Department that requests a variance to the requirements of the RFP, or other documents incorporated into the contract by reference, that is equal or better in quality or effect, as determined by the Department in its sole discretion, and that have been used elsewhere under comparable circumstances.

Confidential Questions

The Design-Build Team will be permitted to ask Confidential Questions of the Department, and neither the question nor the answer will be shared with other Design-Build Teams. The Department, in its sole discretion, will determine if a question is considered confidential.

Confidential Questions arising prior to issuance of the Final RFP will be allowed during the industry review of the draft RFP with the individual Design-Build Teams. The Department will answer the Confidential Question verbally at the industry review meeting, if possible, and / or through revisions in subsequent industry drafts of the RFP and in the Final RFP, which will clarify the scope by either allowing or disallowing the request. To the greatest extent possible, the revision will be made in such a manner as to not disclose the Confidential Question.

After the issuance of the Final RFP, Confidential Questions may be asked by requesting a meeting with the State Contract Officer. The request shall be in writing and provide sufficient detail to evaluate the magnitude of the request. Questions shall be of such magnitude as to warrant a special meeting. Minor questions will not be acknowledged or answered. After evaluation, the State Contract Officer will respond to the question in writing to the Design-Build Team and / or through subtle changes in the Final RFP as reflected in an addendum, which will clarify the scope by either allowing or disallowing the request. To the greatest extent possible, the revision will be made in such a manner as to not disclose the Confidential Question.

If the Design-Build Team includes work based on the Confidential Questions and answers, the work shall be discussed in the Technical Proposal.

Alternative Technical Concepts

The Design-Build Team will be allowed to submit a maximum of ten (10) Alternative Technical Concepts. Excluding (1) Formal ATCs that are submitted in response to the Department's favorable review of a Preliminary ATC and (2) ATCs that are deemed to take advantage of an error or omission in the RFP, all ATCs submitted by the Design-Build Team shall count towards the maximum number of allowable ATCs, regardless of the Department's response. (e.g. an ATC submitted by the Design-Build Team that the Department deems does not qualify as an ATC shall count towards the maximum number of allowable ATCs). Should the Design-Build Team submit a single ATC with multiple concepts, the Department may (a) return the unevaluated ATC to the proposer requiring resubmittals that contain an individual concept or (b) consider the ATC submittal multiple ATCs that count towards the maximum number of allowable ATCs.

Initial ATC submittals shall be submitted in accordance with the following deadlines:

1. The Design-Build Team will be allowed to submit the maximum number of allowable ATCs prior to the Final RFP distribution.

2. The Design-Build Team will be allowed to submit a maximum of two (2) ATCs after the Final RFP distribution, plus an additional two (2) ATCs that are specific to the Geotechnical Scope of Work, provided (a) the ATC submittal does not exceed the aforementioned maximum number of allowable ATCs and (b) the ATC is received by the Department no later than six (6) weeks prior to the deadline for submitting the Technical and Price Proposals.

The Design-Build Team may include an ATC in the Technical and Price Proposal only if the ATC was received by the Department in accordance with the requirements noted above and it was approved by the Department (including conditionally approved ATCs, if all conditions are met).

The submittal deadlines above only apply to initial ATC submittals. Resubmittal of an ATC that (a) has been revised in response to the Department's requests for further information concerning a prior submittal, (b) is a Formal ATC for a Preliminary ATC that received a favorable response from the Department, or (c) requests approval of additional required variances to the RFP requirements that were omitted in the original ATC submittal shall be received by the Department no later than two weeks prior to the deadline for submitting Technical and Price Proposals.

The Design-Build Team shall be solely responsible for reviewing all versions of the RFP, including all Addenda, and determining variances required by a Formal ATC. The Design-Build Team is cautioned that the Department's approval in no way implies that the Design-Build Team has requested approval of all the required variances to the RFP requirements. Additionally, should the Department revise the RFP after a Formal ATC has been approved, the Design-Build Team shall be solely responsible for reviewing the RFP and determining if the ATC deviates from the revised requirements. If necessary, the Design-Build Team must submit a request for approval of all additional required variance(s) no later than two weeks prior to the deadline for submitting Technical and Price Proposals.

An ATC shall in no way take advantage of an error or omission in the RFP, or other documents incorporated into the contract by reference. If, at the sole discretion of the Department, an ATC is deemed to take advantage of an error or omission in the RFP, or other documents incorporated into the contract by reference, the RFP will be revised without regard to confidentiality. If at any time, the Department receives a documented question on the project similar to a concept submitted in the form of a Preliminary ATC or Formal ATC, the Department reserves the right to revise the RFP without further regard for confidentiality.

By approving an ATC, the Department acknowledges that the ATC may be included in the design and RFC Plans; however, approval of any ATC in no way relieves the Design-Build Team of its obligation to satisfy (a) other contract requirements not specifically identified in the ATC submittal; (b) any obligation that may arise under applicable laws and regulations; and (c) any obligation mandated by the regulatory agencies as a permit condition.

ATC Submittals

Each ATC submittal shall include three individually bound hard copies and an electronic .pdf file of the entire submittal and shall be submitted to the State Contract Officer at the address provided elsewhere in this RFP. Excluding the ATC distribution letter and supporting information that is provided as an attachment, the ATC shall not include any reference to the submitter's identity.

Formal ATCs

Each Formal ATC submittal shall include the following information:

1. **Description** – A detailed description and schematic drawings of the configuration of the ATC or other appropriate descriptive information (including, if appropriate, product details [i.e., specifications, construction tolerances, special provisions] and a traffic operational analysis, if appropriate);

2. **Usage** – Where and how the ATC would be used on the project;

3. **Deviations** – References to all RFP requirements, or other documents incorporated into the contract by reference, that are inconsistent with the proposed ATC, an explanation of the nature of the deviations from said requirements, and a request for approval of such variance(s);

4. **Analysis** – An analysis justifying use of the ATC and why the variance to the RFP requirements, or other documents incorporated into the contract by reference, should be allowed;

5. **Impacts** – Discussion of potential impacts on vehicular traffic, environmental impacts identified, community impact, safety and life-cycle project impacts, and infrastructure costs (including impacts on the cost of repair and maintenance);

6. **History** – A detailed description of other projects where the ATC has been used, the success of such usage, and names and telephone numbers of project owners that can confirm such statements;

7. **Risks** – A description of added risks to the Department and other entities associated with implementing the ATC; and

8. **Costs** – An estimate of the ATC implementation costs to the Department, the Design-Build Team, and other entities (right of way, utilities, mitigation, long term maintenance, etc.).

The Formal ATC, if approved, shall be included in the Price Proposal if the Design-Build Team elects to include it in their Technical Proposal.

Review of ATCs

A panel will be selected to review each ATC, which may or may not include members of the Technical Review Committee. The Design-Build Team shall make no direct contact with any member of the review panel, except as may be permitted by the State Contract Officer. Unapproved contact with any member of the review panel will result in a disqualification of that ATC.

The Department may request additional information regarding a proposed ATC at any time. To the greatest extent possible, the Department will return responses to, or request additional information from, the Design-Build Team within 15 business days of the original submittal of a Formal ATC. If additional information is requested, the Department will provide a response within five business days of receipt of all requested information.

The Department may conduct confidential one-on-one meeting(s) to discuss the Design-Build Team's ATC. Under no circumstances will the Department be responsible or liable to the Design-Build Team or any other party as a result of disclosing any ATC materials, whether the disclosure is deemed required by law, by a court order, or occurs through inadvertence, mistake or negligence on the part of the Department or their respective officers, employees, contractors, or consultants.

In the event that the Department receives ATCs from more than one Design-Build Team that are deemed by the Department, in its sole discretion, to be similar in nature, the Department reserves the right to modify the RFP without further regard for confidentiality.

The Department Response to Formal ATCs

The Department will review each Formal ATC and will respond to the Design-Build Team with one of the following determinations:

1. The ATC is approved.

2. The ATC is not approved.

3. The ATC is not approved in its present form, but may be approved upon satisfaction, in the Department's sole discretion, of certain identified conditions that shall be met or certain clarifications or modifications that shall be made (conditionally approved).

4. The submittal does not qualify as an ATC but may be included in the Design-Build Proposal without an ATC (i.e., the concept complies with the baseline requirements of the RFP).

5. The submittal does not qualify as an ATC and may not be included in the Design-Build Proposal.

6. The ATC is deemed to take advantage of an error or omission in the RFP, or other documents incorporated into the contract by reference, in which case the ATC will not be considered, and the RFP will be revised to correct the error or omission.

7. A documented question has been received outside of the ATC process on the same topic and the RFP will be revised to address that question.

8. More than one ATC has been received on the same topic and the Department has elected to exercise its right to revise the RFP. This response could also follow and supersede one of the other previously supplied responses above.

9. The ATC contains multiple concepts and has not been considered. Should the Design-Build Team wish to pursue one or more of the concepts presented in the ATC, a submittal for each individual concept will be required.

Formal ATC Inclusion in Technical Proposal

The Design-Build Team may incorporate one or more approved Formal ATCs as part of its Technical and Price Proposals. If the Department responded to a Formal ATC by stating that it would be approved if certain conditions were met, those conditions shall be stipulated and met in the Technical Proposal.

In addition to outlining each implemented Formal ATC, and providing assurances to meet all attached conditions, the Design-Build Team shall also include a copy of the Formal ATC approval letter from the State Contract Officer in each of the twelve Technical Proposals submitted. This letter will be included in the distribution of the Technical Proposals to the Technical Review Committee.

Approval of a Formal ATC in no way implies that the Formal ATC will receive a favorable review from the Technical Review Committee. The Technical Proposals will be evaluated in regards to the evaluation criteria found in this RFP, regardless of whether or not Formal ATCs are included.

The Price Proposal shall reflect all incorporated Formal ATCs. Except for incorporating approved Formal ATCs, the Technical Proposal may not otherwise contain exceptions to, or deviations from, the requirements of the RFP, or other documents incorporated into the contract by reference.

Preliminary ATCs

At the Design-Build Team's option, a Preliminary ATC submittal may be made that presents a concept and a brief narrative of the benefits of said concept. The purpose of allowing such a Preliminary ATC is to limit the Design-Build Team's expense in the pursuit of a Formal ATC that may be quickly denied by the Department.

To the greatest extent possible, the Department will review Preliminary ATCs within ten business days of submittal and provide written comments that include one of the responses noted below. The Department's response to a Preliminary ATC submittal will be either (a) that the Preliminary ATC is denied; (b) that the Preliminary ATC would be considered as a Formal ATC if the Team so elects to pursue a Formal ATC submission; (c) that an ATC is not required; (d) a documented question has been received outside of the ATC process on the same topic and the RFP will be revised to address that question; (e) more than one ATC has been received on the same topic and the Department has elected to exercise its right to revise the RFP; (f) that the ATC takes advantage of an error or omission in the RFP or other documents incorporated into the contract by reference, in which case the ATC will not be considered and the RFP will be revised to correct the error or omission; or (g) the ATC contains multiple concepts and has not been considered, in which case an ATC for each individual concept will be required. The Department in no way warrants that a favorable response to a Preliminary ATC submittal will translate into a favorable response to a Formal ATC submittal. Likewise, a favorable response to a Preliminary ATC submittal is not sufficient to include the ATC in a Technical Proposal.

SCHEDULE OF ESTIMATED COMPLETION PROGRESS

(9-1-11) (Rev. 8/31/17) DB1 G58

The Design-Build Team's attention is directed to the *Availability of Funds - Termination of Contracts* Standard Special Provision found elsewhere in this RFP. The Department of Transportation's schedule of estimated completion progress for this project, as required by that Standard Special Provision, is as follows:

Fiscal Year	Progress (% of Dollar Value)
2020 (07/01/19 – 06/30/20)	8 % of Total Amount Bid
2021 (07/01/20 – 06/30/21)	25 % of Total Amount Bid
2022 (07/01/21 – 06/30/22)	32 % of Total Amount Bid
2023 (07/01/22 – 06/30/23)	24 % of Total Amount Bid
2024 (07/01/23- 08/20/24)	11 % of Total Amount Bid

The Design-Build Team shall also furnish its own progress schedule in accordance with Article 108-2 of the 2018 Standard Specifications for Roads and Structures. Any acceleration of the progress as shown by the Design-Build Team's progress schedule over the progress as shown above shall be subject to the approval of the Engineer.

MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE

(10-16-7) (Rev. 3-2-18) 102-15(J) DB1 G66

Description

The purpose of this project 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 the Combined MBE / WBE Goal. No submittal of a Letter of Intent is required, unless the additional participation is used for banking purposes.

Combined MBE / WBE Goal – A portion of the total contract, expressed as a percentage that is to be performed by committed MBE / WBE subcontractors.

Committed MBE / WBE Subcontractor – Any MBE / WBE submitted at the time of bid that is being used to meet the Combined MBE / 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 Goal Requirement – The approved participation at time of award, but not greater than the contract Combined MBE / WBE Goal.

Goal Confirmation Letter – Written documentation from the Department to the Proposer confirming the Design-Build Team's approved, committed 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 Design-Build Team.

MBE Participation (Anticipated) – A portion of the total contract, expressed as a percentage, that is anticipated 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 Participation (Anticipated) – A portion of the total contract, expressed as a percentage, that is anticipated 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 Design-Build Team 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.

https://connect.ncdot.gov/business/Turnpike/Documents/Form%20DBE-IS%20Subcontractor%20Payment%20Information.pdf

RF-1 MBE / WBE Replacement Request Form – Form for replacing a committed MBE or WBE.

https://connect.ncdot.gov/projects/construction/Construction%20Forms/DBE%20MBE%20WBE%20Replacement%20Form%20and%20Instructions.pdf

SAF Subcontract Approval Form – Form required for approval to sublet the contract.

https://connect.ncdot.gov/projects/construction/Construction%20Forms/SAF%20Form%20-%20Subcontract%20Approval%20Form%20Revised%2004-19.zip

JC-1 Joint Check Notification Form – Form and procedures for joint check notification. The form acts as a written joint check agreement among the parties providing full and prompt disclosure of the expected use of joint checks.

https://connect.ncdot.gov/projects/construction/Construction%20Forms/Joint%20Check%20Notification%20Form%20and%20Procedures.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.

https://connect.ncdot.gov/letting/LetCentral/Letter%20of%20Intent%20to%20Perform%20as%20a%20Subcontractor.pdf

Listing of MBE and WBE Subcontractors Form – Form for entering MBE / WBE subcontractors on a project that will meet the Combined MBE / WBE Goal contained elsewhere in the RFP. This form is for paper bids only.

https://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/09%20MBE-WBE%20Subcontractors%20(State).docx

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.

https://connect.ncdot.gov/business/SmallBusiness/Pages/UCP%20Certification%20Process%20for%20DBE%20firms.aspx

Combined MBE / WBE Goal

The Combined MBE / WBE Goal for this project is **9.0%.**

The Combined MBE / WBE Goal was established utilizing the following anticipated participation for Minority Business Enterprises and Women Business Enterprises:

(A) Minority Business Enterprises **3.0 %**

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

(2) *If the anticipated MBE participation is zero*, the Design-Build Team 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 **6.0 %**

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

(2) *If the anticipated WBE participation is zero*, the Design-Build Team 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.

The Proposer is required to submit only participation to meet the Combined MBE / WBE Goal. The Combined MBE / WBE Goal may be met by submitting all MBE participation, all WBE participation, or a combination of MBE and WBE participation.

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 Combined MBE / WBE Goal. The Directory can be found at the following link:

https://www.ebs.nc.gov/VendorDirectory/default.html

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

Listing of MBE / WBE Subcontractors

At the time of bid, Proposers shall submit all MBE and WBE participation that they anticipate to use during the life of the contract. Only those identified to meet the Combined MBE / 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 above the goal for which letters of intent are received will follow the banking guidelines found elsewhere in this provision. All other additional MBE / WBE subcontractor participation submitted at the time of bid will be used toward the Department's overall race-neutral goals. Only those firms with current MBE and WBE certification at the time of Price Proposal opening will be acceptable for listing in the Proposer's submittal of MBE and WBE participation. The Design-Build Team shall indicate the following required information:

(A) *If the Combined MBE / WBE Goal is more than zero*,

(1) Proposers, at the time the Price 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 Price Proposal to be considered responsive. Proposers shall indicate the total dollar value of the MBE and WBE participation for the contract.

(2) If Proposers 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. **Blank forms will not be deemed to represent zero participation**. Price Proposals submitted that do not have MBE and WBE participation indicated on the appropriate form will not be read publicly during the opening of Price Proposals. The Department will not consider these Price Proposals for award and the proposal will be rejected.

(3) The Proposer 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 opening of the Price Proposals, that MBE's or WBE's participation will not count towards achieving the Combined MBE / WBE Goal.

(B) *If the Combined MBE / WBE Goal is zero*, entries on the Lis*ting of MBE and WBE Subcontractors* are not required for the zero goal, however any MBE or WBE participation

that is achieved during the project shall be reported in accordance with requirements contained elsewhere in the special provision.

MBE or WBE Prime Contractor

When a certified MBE or WBE firm proposes on a contract that contains a Combined MBE / WBE Goal, the firm is responsible for meeting the Combined MBE / WBE Goal or making good faith efforts to meet the Goal, just like any other proposer. In most cases, a MBE or WBE proposer on a contract will meet the Combined MBE / WBE Goal 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 proposer and any other similarly certified subcontractors will count toward the Goal. The MBE or WBE proposer shall list itself along with any MBE or WBE subcontractors, if any, in order to receive credit toward the Combined MBE / WBE Goal.

MBE / WBE prime contractors shall also follow Sections A and B listed under *Listing of MBE and WBE Subcontractor* just as a non-MBE / WBE proposer would.

Written Documentation – Letter of Intent

The Proposer shall submit written documentation for each MBE / WBE that will be used to meet the contract Combined MBE / WBE Goal, indicating the Proposer'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 State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. on the sixth calendar day following opening of, Price Proposals unless the sixth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

If the Proposer fails to submit the Letter of Intent from each committed MBE and WBE to be used toward the Combined MBE / WBE Goal, or if the form is incomplete (i.e. both signatures are not present), the MBE / WBE participation will not count toward meeting the Combined MBE / WBE Goal. If the lack of this participation drops the commitment below the Combined MBE / WBE Goal, the Design-Build Team shall submit evidence of good faith efforts for the Goal, completed in its entirety, to the State Contractor Utilization Engineer or DBE@ncdot.gov no later than 10:00 a.m. on the eighth calendar day following opening of Price Proposals, unless the eighth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

Banking MBE / WBE Credit

If the Price Proposal of the Proposer with the apparent adjusted low price exceeds $500,000.00 and if the committed MBE / WBE participation submitted by Letter of Intent exceeds the algebraic sum of the Combined MBE / WBE Goal by $1,000.00 or more, the excess will be placed on deposit by the Department for future use by the Proposer. Separate accounts will be maintained for MBE and WBE participation and these may be accumulated for a period not to exceed 23 months.

When the Proposer with the apparent adjusted low price fails to submit sufficient participation by MBE and WBE firms to meet the contract Combined MBE / WBE Goal, as part of the good faith effort, the Department will consider allowing the Proposer to withdraw funds to meet the Combined MBE / WBE Goal, as long as there are adequate funds available from the Proposer's MBE and WBE bank accounts.

Submission of Good Faith Effort

If the Proposer fails to meet or exceed the Combined MBE / WBE Goal, the Proposer with the apparent adjusted low price shall submit to the Department documentation of adequate good faith efforts made to reach the Combined MBE / WBE Goal.

A hard copy and an electronic copy of this information shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. on the sixth calendar day following opening of Price Proposals unless the sixth day falls on an official state holiday. In that situation, it would be due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day. If the Design-Build Team cannot send the information electronically, then one complete set and nine copies of this information shall be received under the same time constraints above.

Note: Where the information submitted includes repetitious solicitation letters, it will be acceptable to submit a representative letter along with a distribution list of the firms that were solicited. Documentation of 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 a Combined MBE / WBE Goal More Than Zero

Adequate good faith efforts mean that the Proposer took all necessary and reasonable steps to achieve the Combined MBE / WBE 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 Proposer 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 Proposer has made. Listed below are examples of the types of actions a Proposer 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, written notices, use of verifiable electronic means through the use of the NCDOT Directory of Transportation Firms) the interest of all certified MBEs / WBEs that are also prequalified subcontractors. The Proposer must solicit this interest within at least ten days prior to the opening of the Price Proposals 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 Proposer 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 Combined MBE / WBE Goal will be achieved.

(1) Where appropriate, break 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.

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

(C) Providing interested certified MBEs / WBEs, that are also prequalified subcontractors, 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 Proposer'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 Proposer 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 the contract Combined MBE / WBE Goal 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 proposer's failure to meet the contract Combined MBE / WBE Goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the Proposer of the responsibility to make good faith efforts. Proposing Design-Build Teams 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 Proposer'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 Price Proposals in the Proposer'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 Proposer.

(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 seven days from the opening of the Price Proposals the Business Opportunity and Work Force Development Unit at OWD@ncdot.gov to give notification of the Proposer's inability to get MBE or WBE quotes.

(I) Any other evidence that the Proposer submits which shows that the Proposer has made reasonable good faith efforts to meet the contract Combined MBE / WBE Goal.

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

1. Whether the Proposer's documentation reflects a clear and realistic plan for achieving the Combined MBE / WBE Goal.

2. The Proposers' past performance in meeting the contract goal.

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

If the Department does not award the contract to the Proposer with the apparent adjusted low price, the Department reserves the right to award the contract to the Proposer with the next apparent lowest adjusted price that can satisfy to the Department that the Combined MBE / WBE Goal can be met or that an adequate good faith effort has been made to meet the Combined MBE / WBE Goal.

Non-Good Faith Appeal

The State Contractual Services Engineer will notify the Design-Build Team verbally and in writing of non-good faith. A Design-Build Team may appeal a determination of non-good faith made by the Goal Compliance Committee. If a Design-Build Team wishes to appeal the determination made by the Committee, they shall provide written notification to the State Contractual Services Engineer or at DBE@ncdot.gov. The appeal shall be made within two business days of notification of the determination of non-good faith.

Counting MBE / WBE Participation Toward Meeting the Combined MBE / WBE Goal

(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 Design-Build Team.

(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 towards the anticipated MBE participation. The same holds true for work that a WBE subcontracts to another WBE firm. Work that a MBE / WBE subcontracts to a non-MBE / WBE firm does not count toward the contract goal requirement. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (e.g. MBEs to MBEs and WBEs to WBEs), in order to fulfill the MBE or WBE participation breakdown. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows good faith effort has been made to reach out to similarly certified firms and there is no interest or availability, and they can get assistance from other certified firms, the Engineer will not hold the prime contractor responsible for meeting the individual MBE or WBE breakdown. If a MBE or WBE contractor or subcontractor subcontracts a significantly greater portion of the contract work 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.

(D) Joint Venture

When a MBE or WBE performs as a participant in a joint venture, the Design-Build Team 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 Design-Build Team may count toward its MBE or WBE requirement 60.0 percent of its expenditures for materials and supplies required to complete the contract and obtained from a MBE or WBE regular dealer and 100.0 percent of such expenditures from a MBE or WBE manufacturer.

(F) Manufacturers and Regular Dealers

A Design-Build Team 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 Design-Build Team 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. If is determined that a MBE or WBE is not performing a Commercially Useful Function, the Design-Build Team may present evidence to rebut this presumption to the Department.

(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 Combined MBE / 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 participation breakdown. 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 contractor responsible for meeting the individual MBE or WBE participation breakdown.

(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 Design-Build Team 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 Design-Build Team 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 Design-Build Team shall not terminate the MBE / WBE for convenience. This includes, but is not limited to, instances in which the Design-Build Team seeks to perform the work of the terminated subcontractor with another MBE / WBE subcontractor, a non-MBE / WBE subcontractor, or with the Design-Build Team'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. The prime contractor, or any other affiliated company within the Design-Build Team, must give the MBE / WBE firm five calendar days to respond to the prime contractor's, or any other affiliated company within the Design-Build Team, notice of termination and advise the prime contractor, or any other affiliated company within the Design-Build Team, and the Department of the reasons, if any, why the firm objects to the proposed termination of its subcontract and why the Department should not approve the action.

All requests for replacement of a committed MBE / WBE firm shall be submitted to the Engineer for approval on Form RF-1 (*Replacement Request*). If the Design-Build Team fails to follow this procedure, the prime contractor, or other affiliated companies within the Design-Build Team, may be disqualified from further bidding for a period of up to six months.

The Design-Build Team shall comply with the following for replacement of a committed MBE / WBE:

(A) Performance Related Replacement

When a committed MBE / WBE is terminated for good cause as stated above, an additional MBE / WBE that was submitted at the time of bid may be used to fulfill the MBE / WBE commitment to meet the Combined MBE / 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 Design-Build Team 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 Design-Build Team.

(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 Design-Build Team 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 Design-Build Team 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 Combined 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 Design-Build Team 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 Design-Build Team'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 Design-Build Team 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 Design-Build Team shall seek participation by MBEs / WBEs unless otherwise approved by the Engineer.

When the Design-Build Team requests changes in the work that result in the reduction or elimination of work that the Design-Build Team committed to be performed by a MBE / WBE, the Design-Build Team 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 Design-Build Team 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 Design-Build Team shall furnish the Engineer a copy of the agreement. The documentation shall also indicate the percentage (60.0% or 100.0%) of expenditures claimed for MBE / WBE credit.

Reporting Minority and Women Business Enterprise Participation

The Design-Build Team shall provide the Engineer with an accounting of payments made to all MBE / 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 prime contractor, or other affiliated companies within the Design-Build Team, 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 Design-Build Team to submit the required information in the time frame specified may result in the disqualification of that prime contractor and any affiliate companies within the Design-Build Team 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 prime contractor and any affiliate companies within the Design-Build Team from being approved for work on future DOT projects until the required information is submitted.

Design-Build Teams 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 Design-Build Team shall report the accounting of payments through the Department's Payment Tracking System.

Failure to Meet Contract Requirements

Failure to meet contract requirements in accordance with Subarticle 102-15(J) of the 2018 *Standard Specifications for Roads and Structures* may be cause to disqualify the prime contractor or any other affiliated company within the Design-Build Team from further bidding for a specified length of time.

SPECIAL NOTICE TO BIDDERS

(2-19-13) (Rev. 7-3-18) DB1 G71

Project U-5713 / R-5777A & B involves the reconstruction of at-grade crossings on existing Railroad right of way. The North Carolina Department of Transportation (NCDOT) will be administering the project and the work will be constructed in accordance with the 2018 NCDOT *Standard Specifications for Roads and Structures*; Norfolk Southern Railway (NSR) *Public Projects Manual*, August 2015; (or later edition if applicable); North Carolina Railroad Company (NCRR) FORM NCR 101, SPECIFICATIONS FOR WIRE, CONDUIT AND CABLE OCCUPATIONS OF NORTH CAROLINA RAILROAD COMPANY, Revised February 2017 (or later edition if applicable); and North Carolina Railroad Company FORM NCR 102, SPECIFICATIONS FOR PIPELINE OCCUPANCY OF NORTH CAROLINA RAILROAD COMPANY, Revised February 2017 (or later edition if applicable).

The construction of portions of the projects will be taking place in existing Railroad right of way owned by NCRR and adjacent to an existing main track that is operated and maintained by NSR. Safety in the right of way will be top priority and NSR's safety and security policies shall be followed for all employees working within the right of way. The safety and security policies and guidelines are further defined in the Project Special Provisions found elsewhere in this RFP.

All work adjacent to live tracks shall be coordinated with both NSR's Roadway Worker In Charge, as defined in the *Protection of Railroad Interest – NCRR and NSR* Project Special Provision found elsewhere in this RFP. As a result of safety requirements for passing trains, there will be intermittent delays requiring all labor and equipment within 25 feet of the operating tracks to stop work until authorized to proceed by the operating Railroad. This will result in intermittent delays to the Design-Build Team's operations. The Design-Build Team needs to account for this in preparing their bid. The Design-Build Team shall have no claims whatsoever against NCDOT, NCRR, or NSR for any additional cost incurred for delays caused by train operations or any changes to the information above.

PROTECTION OF RAILROAD INTEREST – NCRR AND NSR

(2-19-13) (Rev. 7-3-18) DB1 G73

KEY STAKEHOLDERS AND ROLES FOR THE JOB

The following defines the roles of key stakeholders and persons with authority on the project:

TERMS	DEFINITIONS
Owner, Company	North Carolina Railroad Company (NCRR). They own the right of way / easement, facilities, tracks, structures, etc., that Norfolk Southern Railway (NSR) and others operate on.
Owner's Engineer / Representative	NCRR's engineer or their authorized representative for the project.
Operating Railroad, Railroad, Railway, Railway Company	NSR operates and Railroad Company maintains the track facilities and signals.
Railroad Engineer	NSR Engineers or their authorized representatives.
RWIC / Flagman	Roadway Worker In Charge. This is NSR's onsite representative responsible for obtaining track time for work activities adjacent to the tracks and safety within the Railroad right of way / easement. The Roadway Worker In Charge may be in charge of multiple Railroad flagmen assigned to a project if more than one is required or may be the flagman for the project.
Standard Specifications, Specifications	NCDOT Standard Specifications for Road and Structures, January 2018.
NCDOT Rail, Rail Division	The North Carolina Department of Transportation, Rail Division. They are a branch of the Department of Transportation responsible for schedule review, reviewing change orders; assisting in answering requests for information (RFI), and working with the owners, operating rail and the Department, and the FRA for compliance and project closeout.
NSR Public Projects Manual	Norfolk Southern Railway Public Projects Manual, August 2015.
NCRR Specifications	This includes the following documents: North Carolina Railroad - NCR101 – Specifications for Wire, Conduit and Cable Occupations of North Carolina Railroad Company Property, NCR102 – Specifications for Pipeline Occupancy of North Carolina Railroad Company Property, NCR103 – Specific Requirements of North Carolina Railroad Company for Work on its right of way / easement.

AUTHORITY OF RAILROAD ENGINEER AND DEPARTMENT ENGINEER

The authorized representative of the Operating Railroad Company, hereinafter referred to as Railroad Engineer, shall have final authority in all matters affecting the safe maintenance of Railroad traffic of the Operating Railroad Company including the adequacy of the foundations and structures supporting the Railroad tracks.

The authorized representative of the North Carolina Department of Transportation, hereinafter referred to as the Engineer or Department Engineer, shall have authority over all other matters as prescribed herein including Project Specifications, Special Provisions and the plans developed by the Design-Build Team.

SAFETY GUIDELINES FOR PERSONNEL WORKING ON COMPANY CORRIDOR

The Design-Build Team personnel shall adhere to the following Norfolk Southern Railway safety guidelines:

(A) The Design-Build Team shall follow all applicable Railroad and governmental rules, with particular attention paid to Railroad operating rules, Railroad rules for the conduct of contractors, Railroad rules for the operation of moving vehicles, and Federal Railway Administration roadway worker rules.

(B) No one shall be allowed within 25 feet of the centerline of the nearest track without the specific authorization of the RWIC / flagman.

(C) The Design-Build Team shall wear the following while on or about the Railroad right of way / easement:

(1) Appropriate head protection

(2) Appropriate eye protection

(3) Appropriate hearing protection

(4) Appropriate respiratory protection

(5) Appropriate high visibility reflective safety vests are required for work inside active intermodal facilities, public rights of way, or other locations as required by the Railroad and the MUTCD

(6) Suitable protective clothing and footwear. Working in shorts shall be prohibited. Shirts shall cover shoulders, back and abdomen. Working in tennis or jogging shoes, sandals, boots with high heels, cowboy and other slip-on type boots shall be prohibited. Hard sole, lace up footwear, zippered boots or boots cinched up with straps which fit snugly about the ankle are adequate. Safety steel toe boots shall be required.

(7) All protective equipment shall be in good condition and properly fitted

(D) The Design-Build Team shall observe the safety provisions of applicable laws and building and construction codes shall be observed. Machinery and equipment and other hazards shall be guarded in accordance with the safety provisions of the most recent edition of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, to the extent that such provisions are consistent with applicable law or regulation.

(E) The Design-Build Team shall permit only qualified personnel to perform welding. Proper clothing, gloves and shields shall be worn for body and eye protection. All welding equipment shall be properly tested and in good working order. All welding equipment and cutting torches being used within 25 feet of the track shall be shut off and work stopped when a train is passing.

(F) Anyone working on the Railroad right of way / easement found to be under the influence of alcohol or other intoxicant, narcotic or hallucinogenic drug, or in possession of such intoxicant or drug, shall be immediately dismissed from the property by the Design-Build Team and not allowed to return.

(G) When anyone working on the Railroad right of way / easement is injured, the Design-Build Team shall arrange for emergency medical assistance, if needed, and the Design-Build Team shall notify Railroad Engineer and the Department's Engineer of such incident by the quickest method of communication available.

(H) The Design-Build Team shall not use defective or improvised tools and / or equipment to perform the work.

(I) At the direction of the Railroad Engineer and / or the Department's Engineer, the Design-Build Team shall work with local emergency response personnel to develop action plans to respond to emergency situations.

(J) The Design-Build Team shall maintain emergency site access for local emergency response personnel at all times.

(K) The Design-Build Team shall promptly notify the Railroad Engineer and the Department Engineer of all safety incidents and / or injuries involving any person(s) on the project site.

(L) The Design-Build Team shall hold daily safety briefings involving all personnel working on site per Railroad safety rules. Personnel arriving onsite after the safety briefing shall be briefed before proceeding with their work. The Design- Build Team and all personnel shall hold additional safety briefings during the day as conditions or work changes.

(M) All persons working near Railroad tracks while a train is passing shall lookout for dragging bands, chains and / or protruding or shifted cargo. If any of these are observed, they must notify the RWIC / flagman immediately.

(O) No one shall cross tracks without specific authorization from the flagman.

(P) Steel tape and / or chain shall not cross or touch rails without permission from the flagman.

GUIDELINES FOR EQUIPMENT WORKING ON COMPANY'S CORRIDOR

The following shall apply to all equipment being operated within the Railroad right of way / easement:

(A) The Design-Build Team's actions shall not interfere with normal train operations. The Design-Build Team shall provide a weekly schedule of activities that may affect train operations or require flagging protection.

(B) NSR will provide service outages only when absolutely required for construction activities as determined by the Railroad Engineer. No claim by the Design-Build Team against NSR and / or the Department will be allowed for delays caused by NSR's operations.

(C) When working on or near operating tracks to be kept in service, NSR may provide a schedule of allowable work periods. Allowable work periods may change due to the variances in train operations. If the Design-Build Team fails to comply with the schedules and performs its work in a manner that causes delay to NSR train operations, it shall be liable for any delays and shall reimburse NSR upon receipt of bills therefore. If at any time the Design-Build Team is required to work longer than a normal eight-hour day to prevent disruption to NSR's train operations, then the Design-Build Team shall do so at no expense to the Railroad and / or the Department.

(D) At locations where a flagman is deemed necessary by the Railroad Engineer for the safety of Railroad's property and operations, the Design-Build Team shall observe the directions given by the RWIC / flagman. The Design-Build Team shall assure that it's officers, agents, suppliers, subcontractors and employees observe the directives given by the RWIC / flagman. It shall be distinctly understood, however, that no direction or failure to give direction by the RWIC / flagman will relieve the Design-Build Team from any of its indemnification commitments.

(E) No one shall be within 25 feet of the centerline of the nearest track without the specific authorization of the RWIC / flagman.

(F) No one shall cross the tracks without specific authorization of the RWIC / flagman.

(G) All persons working near the track while a train is passing shall look for dragging bands, chains and protruding or shifted cargo. If any of these are observed, they must notify the RWIC / flagman immediately.

(H) No one shall pass between, over or under rail cars.

(I) Steel chain, metallic chain and / or measuring tape shall not cross or touch rails without permission from the RWIC / flagman.

(J) Construction materials shall not be placed on tracks without approval of the Railroad Engineer.

(K) When working on tracks, switches shall be lined away from the work area and switch points spiked down or clamped or rail ends mismatched to prevent cars or engines from entering the work area.

(L) Crane and / or boom equipment shall not be set up to work or be parked within boom distance plus 15' of centerline of track without specific permission from the Railroad official and flagman.

(M) Crane and / or boom equipment shall not foul track or lift a load over the track without flagman protection and track time.

(N) All employees shall stay with their machines when crane or boom equipment is pointed toward track.

(O) All cranes and boom equipment under load shall stop work while a train is passing (including pile driving).

(P) All swinging loads shall be secured to prevent movement while a train is passing. Loads shall not be suspended above a moving train.

(Q) Equipment shall not be within 25 feet of centerline of track without specific authorization of the flagman.

(R) Trucks, tractors and / or any equipment shall not touch ballast line without specific permission from the flagman.

(S) Equipment and / or load movement shall not be within 25 feet or above a standing train or railroad equipment without specific authorization from the flagman.

(T) All operating equipment within 25 feet of track shall halt operations when a train is passing. All other operating equipment may be halted by the flagman if the flagman views the operation to be dangerous to the passing train.

(U) All equipment, loads and cables shall be prohibited from touching the rails.

(V) While clearing and grubbing, no vegetation will be removed from Railroad embankment with heavy equipment without specific permission from the Railroad Engineer and flagman.

(W) The Design-Build Team shall be responsible for the ingress and egress of its plant, equipment, materials and labor to and from the construction site in accordance with the following:

(1) No movement that may endanger the safe normal Railroad operations shall be made without the approval of the RWIC / flagman as to route and time of use.

(2) No movement of the Design-Build Team’s equipment, materials and / or labor to and from the site shall be made without the approval of the RWIC / flagman.

(X) Railroad regulations concerning the movement of vehicles on Railroad property shall be followed by the Design-Build Team, including, without limitation, weight restrictions for roadways.

(Y) Use of access routes shall not cause the fouling of turnouts, flangeways, equipment, and drainage facilities with gravel, mud, waste materials, or timbers used for crossing tracks. Such routes shall be planned in such a way to minimize the risk of damage to Railroad facilities and shall be approved by the Railroad Engineer.

(Z) Equipment and / or materials shall not be parked or stored on Company's corridor unless specific authorization is granted from the Railroad Engineer.

(AA) All unattended equipment that is left parked on Company's corridor shall be effectively immobilized so that it cannot be moved by unauthorized persons.

(BB) All cranes and boom equipment shall be turned away from track after each work day or whenever unattended by an operator.

FAILURE TO COMPLY WITH SAFETY REQUIREMENTS

Failure to comply with any safety requirements within the Railroad right of way / easement may result in the removal of the individual or individuals responsible for violation of policies. Depending upon the severity of the violation as determined by the Railroad Engineer, RWIC / flagman or the Department's Engineer, the individual or individuals implicated must leave the Railroad right of way / easement within one hour of notification of the violation. Depending on the severity of the violation, the individual or individuals who were involved in the incident may be able to return to the job the following day. That determination will be made by the RWIC and the Department's representative on site. The individual or individuals will be notified if they are allowed to return the following day by the close of business the day of the occurrence. If they are not allowed to return the next day, the Design-Build Team may file an appeal to the Department's Engineer requesting the individual or individuals accused of the violation be allowed to return to the job. The Engineer will then notify the Railroad of the appeal and a meeting will be held to determine if the individual or individuals will or will not be allowed to return to the job. The individual or individuals alleged to have committed the violation will not be allowed on the project until after the Railroad Engineer and Department Engineer have reviewed the appeal and made a determination if the individual or individuals may return. If a person is allowed to return to the site after the appeal process and a second violation of policies occurs, that will be grounds for permanent removal of the individual from the worksite. This does not only apply to individuals, but may apply to entire crews as well depending on the circumstances and severity of the violation of policy. The Design-Build Team shall have no claims whatsoever against the Railroad or the Department for any delays or additional cost incurred as a result of safety violations and removal of the individual or individuals from the job.

FEDERAL RAILROAD ADMINISTRATION (FRA) SAFETY REQUIREMENTS

In addition to NSR safety guidelines above, the Design-Build Team shall adhere to the safety requirements of the Federal Railroad Administration and comply with Title 49, Volume 4, Chapter 2, Part 213 and 214 of the Code of Federal Regulations. This information can be found at the following website:

https://www.gpo.gov/fdsys/browse/collectionCfr.action?collectionCode=CFR&searchPath=Title+49%2FSubtitle+B%2FChapter+II%2FPart+213&oldPath=Title+49%2FSubtitle+B%2FChapter+II&isCollapsed=true&selectedYearFrom=2017&ycord=1739

The FRA may conduct inspections on this project and fines can be levied against both the individual cited and the Design-Build Team for violations of these policies. The Design-Build Team shall have no claims whatsoever against the Railroad or the Department for any delays or additional cost incurred as a result of violations and fines for noncompliance with the above FRA guidelines.

RAILROAD INSURANCE – SPECIAL PROVISIONS FOR PROTECTION OF RAILWAY INTEREST

State Project: U-5713 / R-5777A & B **County:** Craven

(A) In addition to any other forms of insurance or bonds required under the terms of the contract and specifications, the Design-Build Team shall provide coverage conforming to the requirements of the Federal-Aid Policy Guide outlined under 23 CFR 646A for all work to be performed on Company's corridor by carrying insurance of the following kinds and amounts:

(1) DESIGN-BUILD TEAM'S COMMERCIAL GENERAL LIABILITY INSURANCE:

The Design-Build Team shall furnish an original and one copy of the certificate of insurance and one certified copy of the policy to the Department as evidence that, with respect to the operations the Design-Build Team performs on Railroad right of way / easement, the Design-Build Team carries regular Commercial General Liability Insurance having a combined single limit of not less than $2,000,000 per occurrence for all loss, damage, cost and expense, including attorneys' fees, arising out of bodily injury liability and property damage liability during the policy period. Said policy shall include explosion, collapse, and underground hazard (XCU) coverage, shall be endorsed to name Company and Railroad specified in Item A.2.c. below as an additional insured, and shall include a severability of interests provision.

(2) RAILROAD PROTECTIVE LIABILITY INSURANCE

The Design-Build Team shall obtain individual NCRR and NSR Railroad Protective Liability Insurance for Bodily Injury Liability, Property Damage Liability and Physical Damage to Property to Railroad Owner and Railroad Operator. It is anticipated that the Railroad Protective Liability Insurance shall have a combined single limit of not less than $2,000,000 each occurrence and $6,000,000 in the aggregate applying separately to each annual period. However, the Design-Build Team shall verify and obtain the appropriate insurance and coverage with NSR and NCRR. The Design-Build Team shall furnish to the Department an original and one duplicate of the Railroad Protective Liability Insurance Policy. Said Policy shall provide coverage for all loss, damage or expense

arising from bodily injury and property damage liability, and physical damage to property attributed to acts or omissions at the job site.

The standards for the Railroad Protective Liability Insurance shall be as noted below:

(a) The insurer shall be rated A- or better by A.M. Best Company, Inc.

(b) The policy shall be written using one of the following combinations of Insurance Services Office ("ISO") Railroad Protective Liability Insurance Form Numbers:

(1) CG 00 35 01 96 and CG 28 31 10 93; or

(2) CG 00 35 07 98 and CG 28 31 07 98; or

(3) CG 00 35 10 01; or

(4) CG 00 35 12 04; or

(5) CG 00 35 12 07; or

(6) CG 00 35 04 13.

(c) The named insured on each policy as required to be issued to each Company and to Railroad shall read: (NOTE: The below insured is to be treated separately as an insured on each railroad protective policy for a total of (2) two separate policies being issued.)

North Carolina Railroad Company
2809 Highwoods Blvd, Suite 100
Raleigh, NC 27604-1000
Attention: Property Department;

and

Norfolk Southern Railway
Three Commercial Place
Norfolk, Virginia 23510-2191
Attention: Risk Management

(d) The description of operations shall appear on the Declarations, shall match the project description in the Railroad Agreement(s), and shall include the appropriate Department project and contract identification numbers.

The Description and Designation shall read:

All Work within Railroad Right of Way for NCDOT project U-5713/R-5777A & B which provides for improvements to US 70 located in James City, Craven County, NC.

(e) The job location shall appear on the Declarations and shall include the city, state and appropriate highway name / number.

(f) The name and address of the prime contractor shall appear on the Declarations.

(g) The name and address of the Department shall be identified on the Declarations as the "Involved Governmental Authority or Other Contracting Party."

(h) Other endorsements / forms that will be accepted include the following:

(1) Broad Form Nuclear Exclusion – Form IL 00 21

(2) 30-day Advance Notice of Non-renewal or cancellation

(3) 60-day written notice be given the Department prior to cancellation or change

(4) Quick Reference or Index Form CL/IL 240

(i) Endorsements / forms that are NOT acceptable include the following:

(1) Any Pollution Exclusion Endorsement except CG 28 31

(2) Any Punitive or Exemplary Damages Exclusion

(3) Known injury or Damage Exclusion form CG 00 59

(4) Any Common Policy Conditions form

(5) Any other endorsement / form not specifically authorized in item No. 2.h above.

(B) If any part of the work is sublet, similar insurance, and evidence thereof as specified in A.1 above, shall be provided by or on behalf of the subcontractor to cover its operations on the Railroad right of way / easement. As an alternative, the Design-Build Team may provide insurance for the subcontractor by means of separate and individual policies.

(C) Prior to entry on Company's corridor, the original and one duplicate copy of the Railroad Protective Liability Insurance Policy shall be submitted by the Design-Build Team to the Department at the address below for its review and transmittal to the Company and Railroad. In addition, certificates of insurance evidencing the Design-Build Team's and any subcontractors' Commercial General Liability Insurance shall be issued to the Department, Company and Railroad at the addresses below, and one certified copy of the

Design-Build Team and any Subcontractor's policy is to be forwarded to the Department for its review and transmittal to the Company and Railroad. All policies and certificates of insurance shall state that the insurance coverage will not be suspended, voided, canceled, or reduced in coverage or limits without (30) days advance written notice to the Department, Company and Railroad. The Railroad will not permit any work on Company's corridor until the Company and Railroad has reviewed and approved the evidence of insurance required herein.

DEPARTMENT
NCDOT Rail Division
Engineering & Safety Branch
c/o State Railroad Agent
1556 Mail Service Center
Raleigh, NC 27699-1556

RAILROAD
Risk Management
Norfolk Southern Railway Company
Three Commercial Place
Norfolk, Virginia 23510-2191

COMPANY
North Carolina Railroad Company
2809 Highwoods Blvd.
Suite 100
Raleigh, NC 27604

(D) The insurance required herein shall not limit the obligations of Department or its Design-Build Team under the Railroad Agreement(s) terms.

(E) The insurance amounts specified are minimum amounts and the Design-Build Team may carry insurance in larger amounts if the Design-Build Team so desires. As to "aggregate limits", if the insurer establishes loss reserves equal to or in excess of the aggregate limit specified in any of the required insurance policies, the Design-Build Team shall immediately notify the Department and shall cease all operations until the aggregate limit is reinstated. If the insurer establishes loss reserves equal to or in excess of one-half of the aggregate limit, the Design-Build Team shall arrange to restore the aggregate limit to at least the minimum amount stated in these requirements. Any insurance policies and certificates taken out and furnished due to these requirements shall be approved by the Department, Company and Railroad as to form and amount prior to beginning work on Company's corridor.

(F) All insurance herein before specified shall be carried until the final inspection and acceptance of the project by the Department, Company and Railroad, or acceptance of that portion of the project within Company's corridor. At this point, no work or any other activities by the Design-Build Team shall take place in Company's corridor without written permission from the Department, Company and Railroad.

FAILURE TO COMPLY

In the event the Design-Build Team violates or fails to comply with any of the requirements of this Request for Proposals:

(1) The Railroad Engineer may require that the Design-Build Team vacate Company's corridor.

(2) The Engineer may withhold monies due the Design-Build Team on monthly statements.

Any such orders shall remain in effect until the Design-Build Team has remedied the situation to the satisfaction of the Railroad Engineer and the Engineer.

PAYMENT FOR COST OF COMPLIANCE

No separate payment shall be made for any extra costs incurred on account of compliance with the Request for Proposal requirements. All such costs shall be included in the lump sum bid for the entire project.

RAILROAD SITE DATA

The following information is provided as a convenience to the Design-Build Team. Since this information is subject to change without notice, the Design-Build Team shall contact the Railroad to verify the accuracy. Additionally, since this information is shown as a convenience to the Design-Build Team and is subject to change, the Design-Build Team shall have no claims whatsoever against either the Railroad or the Department for any delays or additional costs incurred based on changes in this information.

Number of tracks	One (1) track
Number of trains per day	Two (2) trains per day
Type of trains per day	Freight trains
Maximum train speed	35 mph

NOTICE OF STARTING WORK

The Design-Build Team shall not commence any work on Company's corridor until the Design-Build Team has complied with the following conditions:

(A) Give the Company and Railroad written notice, with copy to the Engineer who has been designated to be in charge of the work, at least ten days in advance of the date the Design-Build Team proposes to begin work on Company's corridor / Railroad right of way / easement. Notice to be given to:

Mr. Scott Overbey	Mr. Jim Kessler, PE
Norfolk Southern Railway	North Carolina Railroad Company
1200 Peachtree Street NE	2809 Highwoods Blvd
Building Box 142	Suite 100
Atlanta, Georgia 30309	Raleigh, NC 27604

(B) Obtained written authorization from both Norfolk Southern Railway and North Carolina Railroad Company to begin work on Railroad right of way / easement, such authorization to include an outline of specific conditions with which the Design-Build Team must comply.

(C) Obtained written approval from the Railroad of Railroad Protective Insurance Liability coverage as required by the Railroad Insurance – Special Provisions for Protection of Railway Interest section above. The Railroad shall not accept notation of Railroad protective insurance on a certificate of liability insurance form or Binders, as the Railroad must have the full original countersigned policy. The policy will be reviewed for compliance prior to written approval. Due to the number of projects system-wide, it typically takes a minimum of 30-45 days for Railroad to review.

(D) Furnish a schedule for all work within the Railroad right of way / easement, as required. Obtain written authorization from the Railroad to begin work on Railroad right of way / easement, such authorization to include an outline of specific conditions with which the Design-Build Team must comply.

(E) Obtain Railroad's Flagging Services, as required.

(F) The Design-Build Team must execute and deliver to NCRR and NSR a standard construction right of entry agreement approved by NCRR and NSR together.

The Railroad's written authorization to proceed with the work shall include the names, addresses and telephone numbers of the Railroad's representatives who are to be notified as hereinafter required. Where more than one representative is designated, the area of responsibility of each representative shall be specified.

INTERFERENCE WITH RAILROAD OPERATIONS

The Design-Build Team shall so arrange and conduct work such that there will be no interference with the Railroad operations, including train, signal, telephone and telegraphic services, or damage to the property of the Company or Railroad or to poles, wires, and other facilities of tenants on the Railroad right of way / easement. Whenever work is liable to affect the operations or safety of trains, the method of doing such work shall first be submitted to the Railroad Engineer for approval, but such approval shall not relieve the Design-Build Team from liability. Any work to be performed by the Design-Build Team which requires flagging service or inspection service (watchman) shall be deferred by the Design-Build Team until the flagging protection or inspection service required by the Railroad is available at the job site.

Whenever work within Company's corridor is of such a nature that impediment to Railroad operations, such as use of runaround tracks or necessity for reduced speed is unavoidable, the Design-Build Team shall schedule and conduct operations so that such impediment shall be reduced to the absolute minimum.

Should conditions arising from, or in connection with the work, require that immediate and unusual provisions be made to protect operations and property of the Company and Railroad, the Design-Build Team shall make such provisions. If in the judgment of the Railroad Engineer, or in his absence, the Railroad's Division Engineer, such provision is insufficient, either may require or provide such provisions as deemed necessary. In any event, such unusual provisions shall be at the Design-Build Team's expense and without cost to the Department, Company or Railroad.

TRACK CLEARANCES

(A) Before undertaking any work within Railroad right of way / easement, or before placing any obstruction over any track, the Design-Build Team shall:

(1) Notify the RWIC / Track Supervisor at least 72 hours in advance of the work.

(2) Receive assurance from the Railroad Engineer that arrangements have been made for flagging service as may be necessary.

(3) Receive permission from the RWIC / Track Supervisor to proceed with the work.

(4) Ascertain that the Engineer has received copies of notice to the Railroad and of the Railroad's response thereto.

(B) The minimum track clearances to be maintained by the Design-Build Team during construction are as follows:

(1) Horizontal clearance measured from centerline of track to falsework:
13'-0" on tangent track
14'-0" on curved track

(2) Vertical clearance from top of rail to falsework: 22'-0"

CONSTRUCTION PROCEDURES

(A) General

Construction work and operations by the Design-Build Team on Company's property shall be:

(1) Subject to the inspection and approval of the NSR and NCDOT.

(2) In accordance with all of the Railroad's written specific conditions.

(3) In accordance with the Railroad's general rules, regulations and requirements including those relating to safety, fall protection and personal protective equipment.

(4) In accordance with this Request for Proposals.

(B) Excavation

The subgrade of an operated track shall be maintained with edge of berm at least 7'-0" from centerline of track and not more than 45" below top of rail. The Design-Build Team will not be required to make an existing section meet this specification if substandard, in which case existing section will be maintained.

(C) Excavation for Structures

The Design-Build Team shall take special precaution and care in connection with excavating and shoring pits, and in driving piles or sheeting, for footings adjacent to tracks to provide adequate lateral support for the tracks and the loads which they carry, without disturbance of track alignment and surface, and to avoid obstructing track clearances with working equipment, tools or other material. All plans and calculations for shoring shall be prepared and signed by a North Carolina Registered Professional Engineer. The Professional Engineer shall be responsible for the accuracy for all controlling dimensions as well as the selection of soil design values which will accurately reflect the actual field conditions. The procedure for doing such work, including need of and plans for shoring, shall first be reviewed by the Department Engineer then reviewed and approved by the Railroad Engineer, but such approval shall not relieve the Design-Build Team from liability.

Additionally, a walkway with handrail protection may be required as noted in the section for Trainman's walkways herein.

(D) Demolition, Erection, Hoisting

(1) Railroad tracks and other Company corridor or railroad property must be protected from damage during all operations.

(2) The Design-Build Team shall submit a plan showing the location of cranes, horizontally and vertically, operating radii, with delivery or disposal locations shown. The location of all tracks and other railroad facilities as well as all obstructions such as wire lines, poles, adjacent structures, etc. must also be shown.

(3) Crane rating sheets showing cranes to be adequate for 150 percent of the actual weight of the pick. A complete set of crane charts, including crane, counterweight, and boom nomenclature is to be submitted.

(4) Plans and computations showing the weight of the pick must be submitted. Calculations shall be made from plans of the existing and / or proposed structure showing complete and sufficient details with supporting data for the demolition or erection of the structure. If plans do not exist, lifting weights must be calculated from field measurements. The field measurements shall be made under the supervision of the North Carolina Registered Professional Engineer submitting the procedure and calculations.

(5) A data sheet must be submitted listing the types, size and arrangements of all rigging and connection equipment.

(6) A complete procedure shall be submitted, including the order of lifts, time required for each lift, and any repositioning or re-hitching of the crane or cranes.

(7) All erection or demolition plans, procedures, data sheets, etc. submitted shall be prepared, signed and sealed by a North Carolina Registered Professional Engineer.

(8) The Railroad's Engineer must be present at the site during the entire demolition and erection procedure period.

(9) All procedures, plans and calculations shall first be approved by the Department Engineer and the Railroad Engineer, but such approval shall not relieve the Design-Build Team from liability.

(E) Blasting

The Design-Build Team shall obtain advance approval of the Railroad Engineer and the Department Engineer for use of explosives on or adjacent to Company corridor. The request for permission to use explosives shall include a detailed blasting plan. If permission for use of explosives is granted, the Design-Build Team shall comply with the following:

(1) Blasting shall be done with light charges under the direct supervision of a responsible officer or employee of the Design-Build Team and a licensed blaster.

(2) Electric detonating fuses shall not be used because of the possibility of premature explosions resulting from operation of two-way radios.

(3) No blasting shall be done without the presence of an authorized representative of the Railroad. A minimum 72-hours advance notice to the person designated in the Railroad's notice of authorization to proceed shall be required to arrange for the presence of an authorized Railroad representative and such flagging as the Railroad may require.

(4) Have at the job site adequate equipment, labor and materials and allow sufficient time to clean up debris resulting from the blasting without delay to trains, as well as correcting at the Design-Build Team’s expense any track misalignment or other damage to Company corridor resulting from the blasting as directed by the Railway's authorized representative. If the Design-Build Team’s actions result in delay of trains, the Design-Build Team shall bear the entire cost thereof.

The Railroad representative / Engineer will:

(1) Determine the approximate location of trains and advise the Design-Build Team the approximate amount of time available for the blasting operation and clean-up.

(2) Have the authority to order discontinuance of blasting if, in the Railroad representative / Engineer’s opinion, blasting is too hazardous or is not in accordance with this Request for Proposal.

(F) Maintenance of Railroad Facilities

The Design-Build Team shall maintain all ditches and drainage structures free of silt or other obstructions that may result from construction operations and provide and maintain any erosion control measures, as required. The Design-Build Team shall promptly repair

eroded areas within Company's corridor and repair any other damage to the property of the Company or its tenants.

All such maintenance and repair of damages due to the Design-Build Team's operations shall be done at the Design-Build Team's expense.

(G) Storage of Materials and Equipment

Materials and equipment shall not be stored where they will interfere with Railroad operations, nor on the corridor of the Company without first having obtained permission from the Railroad Engineer. Such permission shall be with the understanding that neither the Company nor Railroad will be liable for damage to such material and equipment from any cause and that the Railroad Engineer may move or require the Design-Build Team to move, at the Design-Build Team's expense, such material and equipment.

All grading or construction machinery that is left idle or parked near the track unattended by a watchman shall be effectively immobilized so that it cannot be moved by unauthorized persons. The Design-Build Team shall protect, defend, indemnify and save Company and Railroad, and any associated, controlled or affiliated corporation, harmless from and against all losses, costs, expenses, claim or liability for loss or damage to property or the loss of life or personal injury, arising out of or incident to the Design-Build Team's failure to immobilize grading or construction machinery.

(H) Cleanup

During construction of the project, the Design-Build Team shall furnish garbage disposal containers and dispose of all trash appropriately. The Design-Build Team shall clean the construction site periodically as requested by the Department Engineer or the Railroad Engineer of all waste, rubbish and unused construction material. The removal of waste and debris shall be the responsibility of the Design-Build Team. Unused construction materials shall be stockpiled in an orderly fashion at a location that will not interfere with train operations and the construction progress. If the Design-Build Team does not clean the construction site after receiving notification, other forces may be used to clean the site of waste and rubbish. If other forces are used, the cleanup cost shall be deducted from monies due to the Design-Build Team.

Upon completion of the work, the Design-Build Team shall remove from within the limits of the Railroad right of way / easement, all machinery, equipment, surplus materials, falsework, rubbish or temporary buildings of the Design-Build Team, and leave said Railroad right of way / easement in a neat condition satisfactory to the Chief Engineer of the Railroad or his authorized representative and satisfactory to the Company's authorized representative. Cleanup shall also include removal, replacement or cleaning of soiled or contaminated ballast in the construction area.

DAMAGES

The Design-Build Team shall assume all liability for any, and all, damages to the Design-Build Team's work, employees, servants, equipment and / or materials caused by Railroad traffic.

Any cost incurred by the Company of Railroad for repairing damages to its corridor or to property of its tenants, caused by or resulting from the operations of the Design-Build Team, shall be paid directly to the Company or Railroad by the Design-Build Team.

DESIGN-BUILD TEAM FURNISHED TWO WAY RADIOS

The Design-Build Team shall furnish a minimum of three push to talk, two way radios that operate on a frequency unique to the project and separate from NSR frequencies. The operational frequency shall not be the same as the frequency on adjacent jobs unless directed by the Railroad Engineer. The radios shall be used for communication between the RWIC / flagman or the Railroad's designated contact and the Design-Build Team's Superintendent or designated contact on the job for safety. The Design-Build Team shall maintain at least three working radios at all time during the project. Project conditions and the Design-Build Team's work may require the need for more than three radios on the project. It shall be the Design-Build Team's responsibility to furnish the number of radios required by NSR and NCDOT to maintain safety on the project. Failure on the part of the Design-Build Team to have working radios on site can result in suspension of the work until the radio requirements are met. There shall be no direct payment for the cost of furnishing the radios. The cost shall be included in the lump sum bid for the entire project.

The Design-Build Team shall provide radios capable of transmitting and receiving clearly, from any location within the project limits. Relaying messages from one radio operation to another shall not be an acceptable method. Any upgrades or additional equipment necessary to provide clear transmissions between two single radios, including signal repeaters shall be considered incidental to the radio requirements and shall not be subject to additional compensation.

The Design-Build Team shall submit information about the radios prior to use for approval by the Railroad.

The Design-Build Team shall have no claims whatsoever against the Railroad or the Department for any delays or additional cost incurred as a result of failure to have the required number of working radios on site each day or as a result of insufficient radio communication.

FLAGGING SERVICES

All work to be performed by the Design-Build Team within the Railroad right of way / easement shall require a flagman be present. Any work to be performed by the Design-Build Team requiring flagging service shall be deferred by the Design-Build Team until the flagging protection required by the Railroad is available at the job site. It will take approximately 30 days from the date the Railroad receives notification of award from the NCDOT to provide flagging protection for this project.

(A) When Required

Under the terms of the agreement between the Department and the Railroad, the Railroad has sole authority to determine the need for flagging required to protect its operations. In general, the requirements of such services shall be whenever the Design-Build Team's personnel or equipment are, or are likely to be, working on the Railroad right of

way / easement, or across, over, adjacent to, or under a track, or when such work has disturbed or is likely to disturb a Railroad structure or the Railroad roadbed or surface and alignment of any track to such extent that the movement of trains must be controlled by flagging.

Normally, the Railroad will assign one flagman to a project; but in some cases, more than one may be necessary, such as yard limits where three (3) flagmen may be required. The Railroad Engineer will determine how many flagmen are required for the job. However, if the Design-Build Team works within distances that violates instructions given by the Railroad's authorized representative or performs work that has not been scheduled with the Railroad's authorized representative, a flagman or flagmen may be required full time until the project has been completed. Any additional flagging costs resulting from the Design-Build Team violating the RWIC / flagman instructions shall be the Design-Build Team's responsibility and shall be paid for in accordance with Section C – Payment noted below.

(B) Scheduling and Notification

(1) The Design-Build Team's work requiring railroad flagging services shall be scheduled in advance and updated weekly to insure flagman coverage for the work to be performed. Flagging services will be provided by the Railroad for work required by the contract to complete the project. The Design-Build Team's work schedule shall be during normal daylight hours for safety concerns. Nighttime operations shall not be permitted without prior written approval from the Railroad Engineer and the Department Engineer and shall be only be considered on a case by case basis.

(2) Not later than the time that approval is initially requested to begin work on Company corridor, the Design-Build Team shall furnish to the Company, Railroad and the Department a schedule for all work required to complete the portion of the project within Company corridor and arrange for a job site meeting between the Design-Build Team, the Department, and the Railroad's authorized representative. Flagman or flagmen may not be provided until the job site meeting has been conducted and the Design-Build Team's work scheduled.

(3) The Design-Build Team, through the Engineer, shall be required to give the Railroad representative a minimum of ten working days advance written notice of intent to begin work within Company corridor in accordance with this Project Special Provision. Once begun, when such work is then suspended at any time, or for any reason, the Design-Build Team, through the Engineer, shall be required to give the Railroad representative at least three working days of advance notice before resuming work on Railroad right of way / easement. Such notices shall include sufficient details of the proposed work to enable the Railroad representative to determine if flagging will be required. If such notice is in writing, the Design-Build Team shall furnish the Engineer a copy; if notice is given verbally, it shall be confirmed in writing with copy to the Engineer.

(4) If flagging is required, no work shall be undertaken until the flagman or flagmen are present at the job site. It may take up to 30 days to obtain flagging initially from the Railroad. When flagging begins, the flagman is usually assigned by the Railroad to work at the project site on a continual basis until no longer needed and cannot be called for on a spot basis. If flagging becomes unnecessary and is suspended, it may take up to 30 days to obtain flagging again from the Railroad. Due to Railroad labor agreements, the Design-Build Team shall provide five working days' notice before flagging service may be discontinued and responsibility for payment stopped.

(5) If, after the flagman is assigned to the project site, an emergency arises that requires the flagman's presence elsewhere, then the Design-Build Team shall delay work on Railroad right of way / easement until such time as the flagman is again available. Any additional costs resulting from such delay shall be borne by the Design-Build Team and not the Company, Department or Railroad.

(C) Payment

The Department will be responsible for paying the Railroad directly for any, and all, flagging costs required to accomplish the construction. The Design-Build Team shall reimburse the Department for any, and all, flagging costs required to accomplish the construction. The estimated flagging costs noted below are 1) provided for informational purposes only, 2) are subject to change without notice, and 3) shall not be binding:

(1) The estimated cost of flagging service is the current rate per day based on a ten-hour work day. This cost includes the base pay for each flagman, overhead, and a per diem charge for travel expenses, meals and lodging. The charge by the Railroad shall be the actual cost based on the rate of pay for the Railroad's employees who are available for flagging service at the time the service is required.

(2) Work by a flagman in excess of eight hours per day or 40 hours per week, but not more than 12 hours a day shall result in overtime pay at 1½ times the appropriate rate. Work by a flagman in excess of 12 hours per day shall result in overtime pay at two times the appropriate rate. If work is performed on a holiday, the flagging rate shall be 2½ times the appropriate rate.

(3) Railroad work involved in preparing and handling bills shall be charged to the Department. Charges to the Department by the Railroad shall be in accordance with applicable provisions of the Federal-Aid Policy Guide, Title 23 Subchapter B, Part 140I and Subchapter G, Part 646B issued by the Federal Highway Administration on December 9, 1991, including all current amendments. The Design-Build Team shall reimburse the Department for all Railroad work involved in preparing and handling bills.

(D) Verification

The Railroad flagman assigned to the project will be responsible for notifying the Department Engineer upon arrival at the job site on the first day (or as soon thereafter as possible) that flagging services begin and on the last day that flagging services are performed for each separate period that services are provided. The Department Engineer will document such notification and general flagging times for verification purposes in the project records. When requested, the Department Engineer will also sign the flagman's diary showing daily time spent and activity at the project site. Also, if requested, the flagman will cooperate with the Department by submitting daily timesheets or signing the Department Engineer's diary showing daily time spent at the project site.

Railroad's flagman will electronically enter flagging time via Railroad's electronic billing system. Any complaints concerning flagman or flagmen must be resolved in a timely manner. If need for flagman or flagmen is questioned, please contact Railroad's System Engineer of Public Improvements at (404) 529-1641. All verbal complaints must be confirmed in writing by the Design-Build Team within five working days with copy to the Department Engineer. Address all written correspondence to:

Office of Chief Engineer-Bridges & Structures
Attention: System Engineer of Public Improvements
Norfolk Southern Railway
1200 Peachtree St. NE
Internal Box 142
Atlanta, GA 30309

HAULING ACROSS RAILROAD

Where the plans developed by the Design-Build Team show or imply that materials of any nature must be hauled across the Railroad, unless the aforementioned plans clearly show that the Design-Build Team has included arrangements for such haul in its agreement with the Railroad, the Design-Build Team shall make all necessary arrangements with the Railroad regarding means of transporting such materials across the Railroad. The Design-Build Team shall bear all costs incidental to such crossings whether services are performed by the Design-Build Team's own forces or by Railroad personnel.

If the Design-Build Team desires to haul across the Railroad for convenience, the Design-Build Team shall make all the necessary arrangements with the Railroad and the Company for a temporary crossing and shall bear all cost associated with construction and removal of the temporary crossing. The crossing shall only be used at times approved by the Engineer. The project shall not be considered complete until all temporary crossings have been removed by the Design-Build Team, unless directed by the Railroad or Company to leave the crossing(s) installed. A private grade crossing agreement shall be required for each crossing installed. The Design-Build Team shall have no claims whatsoever against the Railroad or the Department for denying any temporary crossing for the convenience of the Design-Build Team.

No crossing may be established for use of the Design-Build Team for transporting materials or equipment across the tracks of the Company unless specific authority for its installation, maintenance, necessary watching and flagging thereof and removal, all at the expense of the Design-Build Team, is first obtained from the Railroad Engineer. The approval process for a temporary private crossing agreement normally takes 90 days.

WORK FOR THE BENEFIT OF THE DESIGN-BUILD TEAM

All temporary or permanent changes in wire lines or other facilities which are considered necessary to the project shall be shown on the plans developed by the Design-Build Team; shall be included in the force account agreement between the Department, Company and the Railroad or shall be covered by appropriate revisions to same which will be initiated and approved by the Department, Company and / or the Railroad.

Once approved, should the Design-Build Team desire to make changes to the above, then the Design-Build Team shall make separate arrangements with the Railroad for same to be accomplished at the Design-Build Team's expense. The Design-Build Team shall notify the Department of agreements between the Railroad the and the Design-Build Team for any work for the benefit of the Design-Build Team.

COOPERATION AND DELAYS

It shall be the Design-Build Team's responsibility to arrange a schedule with the Railroad for accomplishing stage construction of work to be done by Railroad crews. In arranging the schedule, the Design-Build Team shall ascertain, from the Railroad, the lead time required for assembling crews and materials and shall make due allowance therefore. The Design-Build Team shall cooperate with others in the construction of the project to the end that all work may be accomplished to the best advantage.

The Design-Build Team shall insure that all work required to be completed by the Design-Build Team forces prior to Railroad’s crews schedule move in date is completed. Delays by the Design-Build Team in meeting the schedule can result in delays in rescheduling Railroad crews and result in delays to the project. The Design-Build Team shall have no claims whatsoever against the Railroad or the Department for delays as a result of rescheduling Railroad crews due the Design-Build Team failing to meet the Design-Build Team’s schedule.

No charge or claim of the Design-Build Team against the Department, Company or the Railroad shall be allowed for hindrance or delay on account of railway traffic; any work done by the Railroad or other delays incident to or necessary for safe maintenance of railway traffic or for any delays due to compliance with this Request for Proposals.

The Design-Build Team's attention is called to the fact that neither the Department, Company nor Railroad assumes any responsibility for any work performed by others in connection with the construction of the project, and the Design-Build Team shall have no claim whatsoever against the Department, Company or Railroad for any inconvenience, delay, or additional cost incurred by the design-Build Team on account of such operations by others.

TRAINMAN'S WALKWAYS

In areas along any existing tracks, on the side opposite of the track from where the work will be done; existing trainman walkways shall be maintained at a distance not less than ten feet from the centerline of the existing track. If the trainman's walkway does not exist, it will not be built or maintained unless shown on the plans developed by the Design-Build Team. In areas of new construction along turnouts / switches, signals and derails, trainman walkways shall be constructed and maintained not less than ten feet from the centerline of the track. The trainman's walkway shall extend from the point of switch through the derail. The trainman's walkway shall be an unobstructed continuous space suitable for the trainman to walk along the side of trains. Any temporary impediments to walkways and track drainage encroachments or obstructions allowed during work hours while the Railway's protective service is provided shall be removed before the close of each work day. If there is any excavation near the walkway, a handrail, with ten-foot minimum clearance from centerline of track, shall be installed.

CONTRACTOR'S LICENSE REQUIREMENTS

(7-1-95) DB1 G88

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

SUBSURFACE INFORMATION

(3-22-07) DB1 G112D

Available subsurface information will be provided on this project. The Design-Build Team shall be responsible for additional investigations and for verifying the accuracy of the subsurface information supplied by the Department.

COOPERATION BETWEEN CONTRACTORS

(9-1-11) DB1 G133

The Design-Build Team's attention is directed to Article 105-7 of the 2018 *Standard Specifications for Roads and Structures*.

The Design-Build Team on this project shall cooperate with the Contractor or Design-Build Team working within or adjacent to the limits of this project, to the extent that the work can be carried out to the best advantage of all concerned including the R-5777C and R-1015 projects.

BID DOCUMENTATION

(7-31-12) (Rev. 8-3-15) DB1 G142

General

The successful Design-Build Team shall submit the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation used to prepare the Price Proposal for this contract to the Department within ten days after receipt of notice of award of contract. Such documentation shall be placed in escrow with a banking institution or other bonded document storage facility selected by the Department.

The Department will not execute the contract until the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation has been received by the Department.

Terms

Bid Documentation – Bid Documentation shall mean all written information, working papers, computer printouts, electronic media, charts, and all other data compilations which contain or reflect information, data, and calculations used by the Proposer in the preparation of the Price Proposal. The term *bid documentation* includes, but is not limited to, Design-Build Team equipment rates, Design-Build Team overhead rates, labor rates, efficiency or productivity factors, arithmetical calculations, and quotations from subcontractors and material suppliers to the extent that such rates and quotations were used by the Proposer in formulating and determining the Price Proposal. The term *bid documentation* also includes any manuals, which are standard to the industry used by the Proposer in determining the Price Proposal. Such manuals may be included in the bid documentation by reference. Such reference shall include the name and date of the publication and the publisher. *Bid Documentation* does not include bid documents provided by the Department for use by the Proposer in bidding on this project. The Bid Documentation can be in the form of electronic submittal (i.e. thumb drive) or paper. If the Bidder elects to submit the Bid Documentation in electronic format, the Department requires a backup submittal (i.e. a second thumb drive) in case one is corrupted.

Design-Build Team's Representative – Officer of the Prime Contractor's company; if not an officer, the Contractor shall supply a letter signed and notarized by an officer of the Prime Contractor's company, granting permission for the representative to sign the escrow agreement on behalf of the Prime Contractor.

Escrow Agent – Officer of the select banking institution or other bonded document storage facility authorized to receive and release bid documentation.

Escrow Agreement Information

A draft copy of the Escrow Agreement will be mailed to the Proposer after the notice of award for informational purposes. The Proposer and Department will sign the actual Escrow Agreement at the time the bid documentation is delivered to the Escrow Agent.

Failure to Provide Bid Documentation

The Proposer's failure to provide the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation within ten days after the notice of award is received by him may be just cause for rescinding the award of the contract and may result in the removal of the Proposer from the Department's list of qualified bidders for a period of up to 180 days. Award may then be made to the Proposer with the next lowest adjusted price or the work may be readvertised and constructed under the contract or otherwise, as the Department may decide.

Submittal of Bid Documentation

(A) Appointment – Email specs@ncdot.gov or call (919) 707-6900 to schedule an appointment.

(B) Delivery – A representative of the Bidder shall deliver the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation to the Department, in a container suitable for sealing, within ten days after the notice of award is received.

(C) Packaging – The container shall be no larger than 15.5 inches in length by 12 inches wide by 11 inches high and shall be water resistant. The container shall be clearly marked on the face and the back of the container with the following information: Bid Documentation, Bidder's Name, Bidder's Address, Date of Escrow Submittal, Contract Number, TIP Number if applicable, and County.

Affidavit

Bid documentation will be considered a certified copy if the proposer includes an affidavit stating that the enclosed documentation is an EXACT copy of the original documentation used by the Proposer to determine the bid for this project. The affidavit shall also list each bid document with sufficient specificity so a comparison may be made between the list and the bid documentation to ensure that all of the bid documentation listed in the affidavit has been enclosed for escrow. The affidavit shall attest that the affiant has personally examined the bid documentation, that the affidavit lists all of the documents used by the proposer to determine the bid for this project, and that all bid documentation has been included. The affidavit shall be signed by a chief officer of the company, have the person's name and title typed below the signature, and the signature shall be notarized at the bottom of the affidavit.

Verification

Upon delivery of the bid documentation, the Department's Contract Officer and the Design-Build Team's representative will verify the accuracy and completeness of the bid documentation compared to the affidavit. Should a discrepancy exist, the Design-Build Team's representative shall immediately furnish the Department's Contract Officer with any other needed bid documentation. The Department's Contract Officer upon determining that the bid documentation is complete will, in the presence of the Design-Build Team's representative, immediately place the complete bid documentation and affidavit in the container and seal it. Both parties will deliver the sealed

container to the Escrow Agent for placement in a safety deposit box, vault, or other secure accommodation.

Confidentiality of Bid Documentation

The bid documentation and affidavit in escrow are, and will remain, the property of the Proposer. The Department has no interest in, or right to, the bid documentation and affidavit other than to verify the contents and legibility of the bid documentation unless the Design-Build Team gives written notice of intent to file a claim, files a written claim, files a written and verified claim, or initiates litigation against the Department. In the event of such written notice of intent to file a claim, filing of a written claim, filing a written and verified claim, or initiation of litigation against the Department, or receipt of a letter from the Design-Build Team authorizing release, the bid documentation and affidavit may become the property of the Department for use in considering any claim or in litigation as the Department may deem appropriate.

Any portion or portions of the bid documentation designated by the Proposer as a trade secret at the time the bid documentation is delivered to the Department's Contract Officer shall be protected from disclosure as provided by *G.S. 132-1.2*.

Duration and Use

The bid documentation and affidavit shall remain in escrow until 60 calendar days from the time the Prime Contractor receives the final estimate; or until such time as the Design-Build Team:

(A) Gives written notice of intent to file a claim,
(B) Files a written claim,
(C) Files a written and verified claim,
(D) Initiates litigation against the Department related to the contract; or
(E) Authorizes in writing its release.

Upon the giving of written notice of intent to file a claim, filing a written claim, filing a written and verified claim, or the initiation of litigation by the Design-Build Team against the Department, or receipt of a letter from the Design-Build Team authorizing release, the Department may obtain the release and custody of the bid documentation.

The Proposer certifies and agrees that the sealed container placed in escrow contains all of the bid documentation used to determine the Price Proposal and that no other bid documentation shall be relevant or material in litigation over claims brought by the Design-Build Team arising out of this contract.

Release of Bid Documentation to the Contractor

If the bid documentation remains in escrow 60 calendar days after the time the Design-Build Team receives the final estimate and the Design-Build Team has not filed a written claim, filed a written and verified claim, or has not initiated litigation against the Department related to the contract, the Department will instruct the Escrow Agent to release the sealed container to the Prime Contractor.

The Prime Contractor will be notified by certified letter from the Escrow Agent that the bid documentation will be released to the Prime Contractor. The Prime Contractor or his representative shall retrieve the bid documentation from the Escrow Agent within 30 days of the receipt of the certified letter. If the Prime Contractor does not receive the documents within 30 days of the receipt of the certified letter, the Department will contact the Prime Contractor to determine final dispersion of the bid documentation.

Payment

The cost of the escrow will be borne by the Department. There will be no separate payment for all costs of compilation of the data, container, or verification of the bid documentation. Payment at the various contract unit or lump sum prices in the contract will be full compensation for all such costs.

TWELVE MONTH GUARANTEE

(7-15-03) DB1 G145

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

(B) Where items of equipment or material carry a manufacturer's guarantee for any period in excess of twelve months, then the manufacturer's guarantee shall apply for that particular piece of equipment or material. The Department's first remedy shall be through the manufacturer although the Design-Build Team shall be responsible for invoking the warranted repair work with the manufacturer. The Design-Build Team's responsibility shall be limited to the term of the manufacturer's guarantee. NCDOT would be afforded the same warranty as provided by the Manufacturer.

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

Appropriate provisions of the payment and / or performance bonds shall cover this guarantee for the project. In addition, failure on the part of the responsible entity(ies) of the Design-Build Team to perform guarantee work within the terms of this provision shall be just cause to remove the responsible entity(ies) from the Department's corresponding prequalified list. The Design-Build Team shall be removed for a minimum of six months and will be reinstated only after all work has been corrected and the Design-Build Team requests reinstatement in writing.

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

OUTSOURCING OUTSIDE THE USA

(9-21-04) (Rev. 5-16-06) DB1 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.

PERMANENT VEGETATION ESTABLISHMENT

(6-11-15) (Rev. 8-30-17) DB01 G160

Establish permanent vegetation stands of the Long-Term Stabilization mixtures identified in the Erosion and Sedimentation Control Scope of Work found elsewhere in this RFP. During the period between initial vegetation planting and final project acceptance, perform all work necessary to establish 80% coverage of permanent vegetation within the project limits, as well as, in borrow and waste pits. This work shall include erosion control device maintenance and installation, repair seeding and mulching, supplemental seeding and mulching, mowing, and fertilizer topdressing, as directed. All work shall be performed in accordance with the Erosion and Sedimentation Control Scope of Work found elsewhere in this RFP and the applicable sections of the 2018 *Standard Specifications for Roads and Structures*.

Once the Engineer has determined that 80% coverage of permanent vegetation has been established, the Design-Build Team will be notified to remove the remaining erosion control devices that are no longer needed. The Design-Build Team shall be responsible for, and shall correct, any areas disturbed by operations performed in permanent vegetation establishment and the removal of temporary erosion control measures, whether occurring prior to or after placing traffic on the project.

EROSION & SEDIMENT CONTROL / STORMWATER CERTIFICATION

(1-16-07) (Rev. 9-20-16) 105-16, 225-2, 16 DB1 G180

General

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

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

(A) *Certified Supervisor* – Provide a certified Erosion and Sediment Control / Stormwater (E&SC/SW) Supervisor to manage the Design-Build Team and subcontractor(s) operations, ensure compliance with Federal, State and Local ordinances and regulations, and manage the Quality Control Program.

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

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

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

Roles and Responsibilities

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

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

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

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

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

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

(e) Provide any needed erosion and sediment control / stormwater practices for the Design-Build Team's temporary work not shown on the plans developed by the Design-Build Team, such as, but not limited to work platforms, temporary construction, pumping operations, plant and storage yards, and cofferdams.

(f) Acquire applicable permits and comply with requirements for borrow pits, dewatering, and any temporary work conducted by the Design-Build Team in jurisdictional areas.

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

(h) Fully perform and install erosion and sediment control / stormwater work prior to any suspension of the work.

(i) Coordinate with Department, Federal, State and Local Regulatory agencies on resolution of erosion and sediment control / stormwater issues due to the Design-Build Team's operations.

(j) Ensure that proper cleanup occurs from vehicle tracking on paved surfaces and / or any location where sediment leaves the right of way.

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

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

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

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

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

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

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

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

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

(h) Provide training for employees concerning general erosion and sediment control / stormwater awareness, the Department's NPDES Stormwater Permit *NCS000250* requirements, and the applicable requirements of the *General Permit, NCG010000*.

(i) Report violations of the NPDES Permit to the Engineer immediately who will notify the NC Department of Environmental Quality Regional Office within 24 hours of becoming aware of the violation.

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

(a) Follow permit requirements related to the Design-Build Team and subcontractors' construction activities.

(b) Ensure that all operators and / or subcontractor(s) on site have the proper erosion and sediment control / stormwater certification.

(c) Notify the Engineer when the required certified erosion and sediment control / stormwater personnel are not available on the job site when needed.

(d) Conduct the inspections required by the NPDES Permit.

(e) Take corrective actions in the proper timeframe as required by the NPDES Permit for problem areas identified during the NPDES inspections.

(f) Incorporate erosion control into the work in a timely manner and stabilize disturbed areas with mulch / seed or vegetative cover on a section-by-section basis.

(g) Use flocculants approved by state regulatory authorities where appropriate and where required for turbidity and sedimentation reduction.

(h) Ensure proper installation and maintenance of temporary erosion and sediment control devices.

(i) Remove temporary erosion or sediment control devices when they are no longer necessary as agreed upon by the Engineer.

(j) The Design-Build Team's quality control and inspection procedures shall be subject to review by the Engineer. Maintain NPDES inspection records and make records available at all times for verification by the Engineer.

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

(1) Foreman in charge of grading activities

(2) Foreman in charge of bridge or culvert construction over jurisdictional areas

(3) Foreman in charge of utility activities

The Design-Build Team may request to use the same person as the Level II Supervisor and Level II Foreman. This person shall be onsite whenever construction activities as described above are taking place. This request shall be approved by the Engineer prior to work beginning.

The Design-Build Team may request to name a single Level II Foreman to oversee multiple construction activities on small bridge or culvert replacement projects. This request shall be approved by the Engineer prior to work beginning.

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

(1) Seeding and Mulching

(2) Temporary Seeding

(3) Temporary Mulching

(4) Sodding

(5) Silt fence or other perimeter erosion / sediment control device installations

(6) Erosion control blanket installation

(7) Hydraulic tackifier installation

(8) Turbidity curtain installation

(9) Rock ditch check / sediment dam installation

(10) Ditch liner / matting installation

(11) Inlet protection

(12) Riprap placement

(13) Stormwater BMP installations (such as but not limited to level spreaders, retention / detention devices)

(14) Pipe installations within jurisdictional areas

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

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

Preconstruction Meeting

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

Ethical Responsibility

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

Revocation or Suspension of Certification

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

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

(A) Failure to adequately perform the duties as defined within this certification provision

(B) Issuance of an ICA, NOV, or Cease and Desist Order

(C) Failure to fully perform environmental commitments as detailed within the permit conditions and specifications

(D) Demonstration of erroneous documentation or reporting techniques

(E) Cheating or copying another candidate's work on an examination

(F) Intentional falsification of records

(G) Directing a subordinate under direct or indirect supervision to perform any of the above actions

(H) Dismissal from a company for any of the above reasons

(I) Suspension or revocation of one's certification by another entity

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

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

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

Failure to appeal within ten calendar days shall result in the proposed adverse action becoming effective on the date specified on the certified notice. Failure to appeal within the time specified shall result in a waiver of all future appeal rights regarding the adverse action taken. The certificant will not be allowed to perform duties associated with the certification during the appeal process. The Chief Engineer will hear the appeal and make a decision within seven days of hearing the appeal. The decision of the Chief Engineer shall be final and will be made in writing to the certificant.

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

Measurement and Payment

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

PROCEDURE FOR MONITORING BORROW PIT DISCHARGE

(1-22-13) (Rev. 9-7-17) DB1 G181

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

If during any operating day, the downstream water quality exceeds the standard, the Design-Build Team shall do all of the following:

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

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

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

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

During the Environmental Assessment required by Article 230-4 of the 2018 *Standard Specifications for Roads and Structures*, the Design-Build Team shall define the point at which the discharge enters into the State's surface waters and the appropriate sampling locations. Sampling locations shall include points upstream and downstream from the point at which the discharge enters these waters. Upstream sampling location shall be located so that it is not influenced by backwater conditions and represents natural background conditions. Downstream sampling location shall be located at the point where complete mixing of the discharge and receiving water has occurred.

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

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

To plan, design, construct, and maintain BMPs to address water quality standards, the Design-Build Team shall use the NCDOT Turbidity Reduction Options for Borrow Pits Matrix, available at the website noted below:

https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/TurbidityReductionOptionSheet.pdf

Tier I Methods include stilling basins which are standard compensatory BMPs. Other Tier I methods are noncompensatory and shall be used when needed to meet the stream turbidity standards. Tier II Methods are also noncompensatory and are options that may be needed for protection of rare or unique resources or where special environmental conditions exist at the site which have led to additional requirements being placed in the DWR's 401 Certifications and approval letters, Isolated Wetland Permits, Riparian Buffer Authorization or a DOT Reclamation Plan's Environmental Assessment for the specific site. Should the Design-Build Team exhaust all Tier I Methods on a site exclusive of rare or unique resources or special environmental conditions, Tier II Methods may be required by regulators on a case by case basis per supplemental agreement.

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

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

CLEARING AND GRUBBING

(9-1-11) (Rev. 8-18-15) DB2 R013

With the exception of areas with Permanent Utility Easements, perform clearing on this project to the limits established by Method "III" shown on Roadway Standard Drawing No. 200.03. In areas with Permanent Utility Easements, clearing shall extend to the right of way limits.

BUILDING AND APPURTENANCE REMOVAL / DEMOLITION

(9-1-11) (Rev. 9-7-17) DB2 R12A

Unless otherwise as agreed upon by the Department, seal all wells and remove or demolish all buildings and appurtenances, in their entirety, that are located either partially or completely within the project's right of way limits or are located outside the project's right of way limits but within property purchased as an uneconomical remnant in accordance with Sections 205, 210 and 215 of the 2018 *Standard Specifications for Roads and Structures*.

The Department will perform all assessment, removal and disposal of asbestos. Once the Design-Build Team has acquired a parcel and all buildings and appurtenances have been vacated, the Design-Build Team shall immediately notify the Division Right of Way Agent in writing. Upon receipt of the written notification, the Department then requires 60 days to assess and remove any asbestos prior to the Design-Build Team demolishing any building or appurtenance.

DRAINAGE PIPE

(9-1-11) DB3 R36

Description

Where shown in the plans developed by the Design-Build Team, the Design-Build Team shall use Reinforced Concrete Pipe, Corrugated Aluminum Alloy Pipe, Aluminized Corrugated Steel Pipe, Corrugated Polyethylene Pipe (HDPE Pipe) or Polyvinyl-Chloride Pipe (PVC Pipe) in accordance with the following requirements:

(A) All pipe types shall be subject to the maximum and minimum fill height requirements as found on Roadway Standard Drawing No. 300.01 - Sheet 3 of 3. The appropriate Reinforced Concrete Pipe class and the appropriate gage thickness for Corrugated Aluminum Alloy Pipe and Aluminized Corrugated Steel Pipe shall be selected based on fill height.

(B) Site specific conditions may limit a particular material beyond what is identified in this Project Special Provision. These conditions include, but are not limited to, abrasion, environmental, soil resistivity and pH, high ground water and special loading conditions. The Design-Build Team shall determine if additional restrictions are necessary.

(C) Slope drains shall be Corrugated Aluminum Alloy Pipe, Corrugated Polyethylene Pipe (HDPE Pipe) or Polyvinyl-Chloride Pipe (PVC Pipe).

(D) Transverse median drains, storm drainage system pipes and open-ended cross drains shall be Reinforced Concrete Pipe unless the pipe slope is greater than 10%, in which case the pipe shall be Corrugated Aluminum Alloy Pipe.

PRICE ADJUSTMENTS FOR ASPHALT BINDER

(9-1-11) (Rev. 9-8-17) DB6 R25

Price adjustments for asphalt binder for plant mix will be made in accordance with Section 620 of the 2018 *Standard Specifications for Roads and Structures*.

When it is determined that the monthly selling price of asphalt binder on the first business day of the calendar month during which the last day of the partial payment period occurs varies either upward or downward from the Base Price Index, the partial payment for that period will be adjusted. The partial payment will be adjusted by adding the difference (+ or -) of the base price index subtracted from the monthly selling price multiplied by the total theoretical quantity of asphalt binder authorized for use in the plant mix placed during the partial payment period involved.

The CEI firm is responsible for maintaining records in accordance with the procedures outlined in the Construction Manual for "Weight Tickets As A Basis Of Payment." And summarizing and submitting these records monthly for review and approval by the Resident Engineer.

The base price index for asphalt binder for plant mix is $ 524.09 per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on May 1st, 2019.

AUTOMATED MACHINE GUIDANCE

(6-17-08)

General

This Special Provision contains requirements that shall be followed if the Design-Build Team elects to use Global Positioning System (GPS) machine control grading and shall be used in conjunction with Section 801 of the 2018 *Standard Specifications for Roads and Structures*. The use of this technology is referenced as Automated Machine Guidance (AMG).

All equipment using AMG shall be able to generate end results that adhere to the 2018 *Standard Specifications for Roads and Structures*. The Design-Build Team shall perform test sections for each type of work to be completed with AMG to demonstrate that the system has the capability to achieve acceptable results. If acceptable results cannot be achieved, the Design-Build Team shall conform to the requirements for conventional stakeout.

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

Submittals

If the Design-Build Team elects to use AMG, a Digital Terrain Model (DTM) of the design surface and all intermediate surfaces shall be developed in conjunction with plan development. The Engineer of Record shall certify that the model used for AMG is representative of the approved "Released for Construction" sealed plans. The certification and DTM files in TIN format shall be provided to the Engineer for review.

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

Inspection

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

The Design-Build Team shall provide the Engineer with a GPS rover unit for use during the duration of the contract. The rover shall be loaded with the same model that is used with the AMG and shall have the same capability as rover units used by the Design-Build Team. The rover will be kept in the possession of the Engineer and will be returned to the Design-Build Team upon completion of the contract. Any maintenance or repairs required for the rover shall be the responsibility of the Design-Build Team. Formal training of at least eight (8) hours on the use of the proposed AMG system shall be provided to the Engineer by the Design-Build Team and the equipment manufacturer. Training shall include, but not be limited to, hardware, software, and operation of the rover unit.

Subgrade and Base Controls

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

(A) Provide control points at intervals along the project not to exceed 1000 feet. The horizontal position of these points shall be determined by static GPS sessions or by traverse connection from the original base line control points. The elevation of these control points shall be established using differential leveling from project benchmarks, forming closed loops where practical. A copy of all new control point information shall be provided to the Engineer prior to construction activities.

(B) Provide fine grade hubs referencing the top of finish grade along the cross section at 500-foot intervals. These hubs shall be established using conventional survey methods for use by the Engineer to check the accuracy of fine grading and pavement construction and shall remain in place until completion of all pavement layers unless otherwise allowed by the Engineer.

(C) Provide conventional survey grade stakes at other critical points such as TSs, SCs, CSs, STs, PCs, PTs, and super elevation transition points as requested by the Engineer.

FIELD OFFICE

(6-1-07) (Rev. 6-22-15) DB 08-01

1. Description

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

2. Procedures

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

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

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

Number	Item
1	Double-pedestal desk (approximately 60 by 34 inches, at least 2,000 square inches)
1	Plan and drafting table (approximately 30 by 96 inches) with adjustable stool
1	Computer table having a minimum size of 48 by 30 by 29 inches
1	Plan rack for 24 by 36 inch drawings with 6 plan clamps
1	Printing calculator

2	2-drawer fire protection file, 15-inch drawer width, minimum UL rating of Class 350
6	Office chairs with a minimum of two having casters
2	Wastebaskets
1	Pencil sharpener
1	Copy machine (8 inch x 11 inch copies)
1	Telephone
1	Fax Machine
1	Answering machine
1	Internet Connection Service (modem for Wi-Fi)

3. Windows and Doors

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

4. Steps

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

5. Storage Facility for Nuclear Gage

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

6. Lighting, Heating, and Air Conditioning

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

7. Fire Extinguishers

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

8. Toilets

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

9. Utilities

Except for telephone service, make arrangement for necessary internet and utility connections, maintain internet and utilities, pay internet and utility service fees and bills, and make arrangements for final disconnection of internet and utilities. Furnish a telephone in each field office and permit the work necessary to install it. Installation and service fees for the telephone will be paid for by the Department.

10. Storage Facility for Test Equipment

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

11. Miscellaneous Items

The field office must also include the following:

(1) A certification that the office is free of asbestos and other hazardous materials.

(2) A broom, dust pan, mop and bucket, and general cleaning supplies.

(3) Provide and maintain an all-weather parking area for six vehicles, including graveled access to the paved surface.

DYNAMIC MESSAGE SIGN (DMS)

(2-7-17) DB 08-04

General Requirements

DMSs used on the State Highway System shall be preapproved on the current NCDOT ITS & Signals 2018 Qualified Products List (QPL) by the date of installation. DMSs not preapproved will not be allowed for use on the project. To ensure compatibility with the existing DMS Control Software deployed in the State, furnish NTCIP compliant DMSs that are fully compatible with Daktronics, Inc. Vanguard Version 4 software (also referred to hereinafter as the “Control Software”). The QPL is available on the Department’s website. The QPL website is:

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

DMS Requirements

Furnish and install DMSs compliant with UL standards 48, 50, and 879.

Add and configure the new DMSs in the system using the Control Software and computer system. Furnish, install, test, integrate and make fully operational the new DMSs at locations shown in the plans developed by the Design-Build Team.

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

- Full Matrix, 27 pixels high and 90 pixels wide LED DMS with 18" border
- DMS mounting hardware
- DMS controllers, Uninterruptible Power Supplies (UPS), cabinets and accessories with interconnect and power cabling and conduit
- Branch circuit conductors and related equipment
- All other equipment and incidentals required for furnishing, installing, and testing the DMS system and system components

Use only UL listed and approved electronic and electrical components in the DMS system.

Materials

A. Environmental Requirements

Construct the DMS and DMS controller-cabinet so the equipment within shall be protected against moisture, dust, corrosion, and vandalism.

Design the DMS system to comply with the requirements of Section 2.1 (Environmental and Operating Standards) of NEMA TS 4-2005.

B. Full Matrix LED Dynamic Message Sign (DMS)

Construct the DMS to display at least three lines of text that, when installed, are clearly visible and legible to a person with 20/20 corrected vision from a distance of 900 feet in advance of the DMS at an eye height of 3.5 feet along the axis.

When displaying three lines, each line must display at least 15 equally spaced and equally sized alphanumeric individual characters. Each character must be at least 18 inches in height and composed from a luminous dot matrix. The entire LED matrix shall be at the minimum 27 pixels high and 90 pixels wide.

1. DMS Enclosure

The DMS enclosure construction shall comply with the requirements of Section 3 (Sign Mechanical Construction) of NEMA TS 4-2005 as it applies to Walk-in enclosures. The following requirements complement TS 4-2005:

(a) Construct the DMS with a metal walk-in enclosure excluding the face. Provide an aluminum walking platform inside the enclosure that is at least 28 inches wide. Ensure the width of the walking platform is free of obstructions to a height of 7 feet. Construct the enclosure of welded aluminum type 6061-T6, 5052 H38, 5052-H34, or of an Engineer approved alternate at least 1/8-inch thick. Perform all welding of aluminum and aluminum alloys in accordance with the latest edition of AWS D1.2, Structural Welding Code - Aluminum. Continuously weld the seams using Gas Metal Arc Welding (GMAW).

(b) Provide all exterior and interior DMS enclosure surfaces with natural, mill-finish aluminum. Remove all grind marks and discoloration from the surfaces.

(c) Provide corrosion resistant nuts, bolts, washers, and other mounting and bonding parts and components used on the exterior of the DMS enclosure and ensure they are sealed against water intrusion.

(d) Provide one key lockable, hinged, gasket-sealed inspection door for service and maintenance along each side of the enclosure. Install one appropriately sized fire extinguisher within 12 inches of each maintenance door. Equip the DMS enclosure with internal fluorescent lighting controlled by timers installed close to each inspection door. Make certain no light emitted from the fluorescent tubes or any other light source inside the enclosure not comprising the display is leaked to the outside of the enclosure. Equip the door with a door-hold-open device. Install GFCI duplex utility receptacles every 6 feet along the width of the DMS in convenient locations for powered service tools.

(e) Do not place a manufacturer name, logo, or other information on the front face of the DMS or shield visible to the motorist.

(f) Provide power supply monitoring circuitry to detect power failure in the DMS and to automatically report this fault to the Control Software. This requirement shall be in addition to reporting power failure at the controller cabinet.

(g) Do not paint the stainless steel bolts on the Z-bar assembly used for mounting the enclosure.

2. DMS Interior Control

Design the local field controller to monitor and control the interior DMS environment. Design environmental control to maintain the internal DMS temperature within +/- 10º F of the outdoor ambient temperature. Provide the DMS environmental control system with four primary subsystems as follows:

(a) Internal Temperature Sensors – Provide the DMS with two internally mounted temperature sensors which are equipped with external thermocouples and which the Field Controller continuously monitors. Design the Field Controller to use this temperature information to determine when to activate and deactivate the environmental control systems described herein. Locate sensors on opposite ends of the upper 1/3 of the LED display matrix with their external thermocouples attached to and making contact with an LED pixel circuit board. Design the thermocouple and LED board to be easily detachable, in the event that one of the units requires removal and replacement. Provide sensors capable of measuring temperatures from -40° F to +185° F. Design the Field Controller to automatically shut down the LED display whenever one or both sensors indicate that LED board temperature has exceeded +140° F, and to automatically restart the LED display whenever the suspect temperature falls below +130° F. Design both shutdown and re-start temperature thresholds to be user-programmable. Design the field controller to report sensor temperatures and DMS shutdown/re-start events to the DMS Control Software.

(b) Housing Cooling System – Provide the DMS housing with a cooling system that circulates outside air into the DMS housing whenever the LED board temperature exceeds a user-programmable threshold. Provide this system with enough ventilation fans to exchange the internal DMS housing air volume at a minimum rate of 2 times per minute. Provide steel ball-bearing type fans. Mount fans in a line across the upper rear wall of the DMS housing to direct air out of the cabinet. Provide one filtered air intake port for each exhaust fan. Locate intake ports in a line across the lower rear wall of the DMS housing. Provide intake ports with a removable filter that will remove airborne particles measuring 500 microns in diameter and larger. Provide a filter that is of a size and style that is commercially readily available. Program the field controller to activate the DMS housing cooling system whenever the LED board temperature exceeds +90° F and to turn the cooling system off whenever LED board temperature falls below +85° F. On the DMS housing rear exterior wall, cover all air intake and exhaust ports on their top, front, and sides by an aluminum shroud fabricated from 0.090-inch aluminum sheeting. Taper the shrouds at the top. Securely fasten shrouds to the DMS housing, and provide gaskets at the interface to prevent water from entering the DMS. Design all air filters and fans to be removable from inside the DMS housing. Provide the DMS housing cooling system with an adjustable timer that will turn fans off after the set time has expired. Provide a timer that is adjustable to at least 4 hours, and locate it just inside the DMS housing door, within easy reach of a maintenance technician standing outside the DMS doorway.

(c) LED Display Cooling System – Provide the DMS with an LED display cooling system which directs air across the LED display modules whenever LED board temperature exceeds a user-programmable threshold. Direct fan-forced air vertically across the backside of the entire LED display matrix using multiple ball-bearing fans. Program the field controller to activate the LED cooling fan system whenever LED board temperature exceeds +90° F and to deactivate the system whenever LED board temperature falls to +85° F. Locate cooling fans so as not to hinder removal of LED display modules and driver boards.

(d) Front Face Panel Defog / Defrost System – Provide the DMS with a defog / defrost system which circulates warm, fan-forced air across the inside of the polycarbonate front face whenever LED board temperature falls below a user-programmable threshold. Provide multiple steel ball-bearing fans that provide uniform airflow across the face panel. Program the field controller to activate the defog / defrost system whenever LED board temperature falls below +40° F and to deactivate the defog / defrost system whenever LED board temperature exceeds +106° F. Mount a 100-watt pencil-style heating element in front of each defog / defrost fan to warm the air directed across the DMS face. Design heating elements to be on only when the defog / defrost fans are on.

Install additional fans and / or heaters as needed to maintain the temperature inside the DMS enclosure within the operating temperature range of the equipment within the DMS enclosure as recommended by the equipment manufacturer(s).

3. Front Panel

Protect the DMS face with contiguous, weather-tight, removable panels. These panels shall be a polycarbonate material that are ultraviolet protected, have an antireflection coating, and are a minimum of 1/8- inch thick.

Furnish polycarbonate panels with the following characteristics:

(a) Tensile Strength, Ultimate: 10,000 PSI
(b) Tensile Strength, Yield: 9,300 PSI
(c) Tensile Strain at Break: 125%
(d) Tensile Modulus: 330,000 PSI
(e) Flexural Modulus: 330,000 PSI
(f) Impact Strength, Izod (1/8", notched): 17 ft-lbs/inch of notch
(g) Rockwell Hardness: M75, R118
(h) Heat Deflection Temperature Under Load: 264 PSI at 270° F and 66 PSI at 288° F
(i) Coefficient of Thermal Expansion: 3.9X10-5 in/in/F
(j) Specific Heat: 0.30 BTU/lb/F
(k) Initial Light Transmittance: 85% minimum

(l) Change in Light Transmittance, 3 years' exposure in a Southern latitude: 3%
(m) Change in Yellowness Index, 3 years' exposure in a Southern latitude: less than 5%

For substitutes, submit one 12" x 12" sample of the proposed material together with a description of the material attributes to the Engineer for review and approval. Install a .09" aluminum mask on the front of the panel (facing the motorists) that contains a circular opening for each LED pixel. Prime and coat the front side of the aluminum mask, which faces the viewing motorists, with automotive-grade flat black acrylic enamel paint or an approved equivalent. Guarantee all painted surfaces provide a minimum outdoor service life of 20 years.

Design the panels so they will not warp nor reduce the legibility of the characters. Differential expansion of the DMS housing and the front panel must not cause damage to any DMS component or allow openings for moisture or dust. Glare from sunlight, roadway lighting, commercial lighting, or vehicle headlights must not reduce the legibility or visibility of the DMS. Install the panels so that a maintenance person can easily remove or open them for cleaning.

4. Display Modules

Manufacture each display module with a standard number of pixels, not to exceed an array of 9 x 5, which can be easily removed. Assemble the modules onto the DMS assemblies contiguously to form a continuous matrix to display the required number of lines, characters, and character height.

Design display modules that are interchangeable and replaceable without using special tools. Provide plug-in type power and communication cables to connect to a display module.

Construct each display module as a rectangular array of 5 horizontal pixels by 7 to 9 vertical pixels. Provide the module with an equal vertical and horizontal pitch between pixels, and columns that are perpendicular to the rows (i.e., no slant). Design each module to display:

(a) All upper and lower case letters
(b) All punctuation marks
(c) All numerals 0 to 9
(d) Special user-created characters

Display upper-case letters and numerals over the complete height of the module. Optimize the LED grouping and mounting angle within a pixel for maximum readability.

Furnish two (2) spare display modules per each DMS installed for emergency restoration.

5. Discrete LEDs

Provide discrete LEDs with a nominal viewing cone of **30 degrees** with a half-power angle of 15 degrees measured from the longitudinal axis of the LED. Viewing cone tolerances shall be as specified in the LED manufacturer's product specifications and shall not exceed ± 3 degrees half-power viewing angle of 30 degrees.

Provide LEDs that are untinted, non-diffused, high output solid state lamps utilizing indium gallium aluminum phosphide (InGaAlP) technology. Provide T1 ¾, 0.2-inch size LEDs that emit a true amber color at a wavelength of 590 ± 5 nm.

Provide LEDs with a MTBF (Mean Time Before Failure) of at least 100,000 hours of permanent use at an operating point of 140° F or below at a specific forward current of 20mA. Discrete LED failure is defined as the point at which the LED's luminous intensity has degraded to 50% or less of its original level.

Obtain the LEDs used in the display from a single LED manufacturer that have a single part number. Obtain them from batches sorted for luminous output, where the highest luminosity LED is not more than fifty percent more luminous than the lowest luminosity LED when the LEDs are driven at the same forward current. Do not use more than two successive and overlapping batches in the LED display. Document the procedure to be used to comply with this requirement as part of the material submittal.

Individually mount the LEDs on circuit boards that are at least 1/16" thick FR-4 fiberglass, flat black printed circuit board in a manner that promotes cooling. Protect all exposed metal on both sides of the LED pixel board (except the power connector) from water and humidity exposure by a thorough application of acrylic conformal coating. Design the boards so bench level repairs to individual pixels, including discrete LED replacement and conformal coating repair is possible.

Operate the LED display at a low internal DC voltage not to exceed 24 Volts.

Design the LED display operating range to be –20° F to +14° F at 95% relative humidity, non-condensing.

Supply the LED manufacturer's technical specification sheet with the material submittals.

6. LED Power Supplies

Power the LED Display by means of multiple regulated switching DC power supplies that operate from 120 volts AC input power and have an output of 48 volts DC or less. Wire the supplies in a redundant parallel configuration that uses multiple power supplies per display. Provide the supplies with current sharing capability that allows equal amounts of current to their portion of the LED display.

Provide power supplies rated such that if one supply fails the remaining supplies will be able to operate their portion of the display under full load conditions (i.e. all pixels on at maximum brightness) and at a temperature of 140° F.

Provide power supplies to operate within a minimum input voltage range of +90 to +135 volts AC and within a temperature range of –22° F to 140° F. Power supply output at 140° F must not deteriorate to less than 65% of its specified output at 70° F. Provide power supplies that are overload protected by means of circuit breakers, that have an efficiency rating of at least 75%, a power factor rating of at least .95, and are UL listed. Provide all power supplies from the same manufacturer and with the same model number. Design the power driver circuitry to minimize power consumption.

Design the field controller to monitor the operational status (normal or failed) of each individual power supply and be able to display this information on the Client Computer screen.

7. LED Pixels

A pixel is defined as the smallest programmable portion of a display module that consists of a cluster of closely spaced discrete LEDs. Design each pixel to be a maximum of 2 inches in diameter.

Construct the pixels with two strings of LEDs. It is the manufacturer's responsibility to determine the number of LEDs in each string to produce the candela requirement as stated herein.

Ensure each pixel produces a luminous intensity of 40 Cd when driven with an LED drive current of 20 mA per string.

Power the LEDs in each pixel in strings. Use a redundant design so that the failure of an LED in one string does not affect the operation of any other string within the pixel. Provide the sign controller with the ability to detect the failure of any LED string and identify which LED string has failed. Submit a complete schematic of the LED power and driver circuits with the material submittals.

8. Character Display

Design display modules to be easily removable without the use of tools. Position cooling fans so they do not prevent removal of an LED pixel board or driver board.

Use continuous current to drive the LEDs at the maximum brightness level. Design the light levels to be adjustable for each DMS / controller so the Engineer may set levels to match the luminance requirements at each installation site.

Design the controller to automatically detect failed LED strings or drivers and initiate a report of the event to the Control Software. Design the controller to be

able to read the internal temperature of the DMS enclosure and the ambient temperature outside the DMS enclosure and report these to the Control Software.

9. Display Capabilities

Design the DMS with at least the following message displays:

- Static display
- Flashing display with Dynamic flash rates
- At least two alternating Static and / or Flashing sequences (multi page messages)

10. DMS Mini Controller

Furnish and install a mini controller inside the DMS that is interconnected with the main controller using a fiber optic cable, CAT-5 cable, or an approved alternate. The mini controller will enable a technician to perform all functions available from the main controller. Provide the mini controller with an LCD / keypad interface. Size the LCD display screen to allow preview of an entire one-page message on one screen. Provide a 4 X 4 keypad.

Alternatively, install an EIA/TIA-232E port inside the DMS enclosure to enable a maintenance technician to communicate with the DMS main controller and obtain access to and perform all functions of the main controller using a laptop computer.

C. DMS Enclosure Structure Mounting

Mount the DMS enclosure and interconnect system securely to the support structures. Design the DMS enclosure supports to allow full access to the DMS enclosure inspection door.

Furnish and install U-bolt connections of hanger beams to overhead assembly truss chords with a double nut at each end of the U-bolt. Bring the double nuts tight against each other by the use of two wrenches.

Submit plans for the DMS enclosure, mounting description and calculations to the Engineer for approval. Have such calculations and drawings approved by a Professional Engineer registered in the state of North Carolina, and bear his signature, seal, and date of acceptance.

Provide removable lifting eyes or the equivalent on the DMS enclosure rated for its total weight to facilitate handling and mounting the DMS enclosure.

Design the DMS structure to conform to the applicable requirements of the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 6th Edition, 2013, including the latest interim specifications and the latest interim revisions, and the section titled “DMS Structure” of these Project Special Provisions.

D. DMS / DMS Controller Interconnect

Furnish and install all necessary cabling, conduit, and terminal blocks to connect the DMS and the DMS controller. Use approved manufacturer's specifications and the project plans developed by the Design-Build Team for cable and conduit types and sizes. Use fiber optic cable to interconnect sign and controller. Install fiber optic interconnect centers in the sign enclosure and cabinet to securely install and terminate the fiber optic cable. Submit material submittal cut sheets for the interconnect center.

E. DMS Controller and Cabinet

Furnish and install one DMS controller with accessories per DMS in a new equipment cabinet. Mount the controller cabinet on the DMS support structure. Install cabinet so that the height from the ground to the middle of the cabinet is four feet. Ensure a minimum of three-foot level working surface under each cabinet that provides maintenance technicians with a safe working environment.

Provide the DMS controller as a software oriented microprocessor and with resident software stored in non-volatile memory. The Control Software, controller and communications must comply with the NTCIP Standards identified in these Project Special Provisions. Provide sufficient non-volatile memory to allow storage of at least 500 multi-page messages and a test pattern program.

Furnish the controller cabinet with, but not limited to, the following:

- Power supply and distribution assembly
- Power line filtering hybrid surge protectors
- Radio Interference Suppressor
- Communications surge protection devices
- Industrial-Grade UPS system and local disconnect
- Microprocessor based controller
- Display driver and control system (unless integral to the DMS)
- Serial interface port for local laptop computer
- Local user interface
- Interior lighting and duplex receptacle
- Adjustable shelves as required for components
- Temperature control system
- All interconnect harnesses, connectors, and terminal blocks
- All necessary installation and mounting hardware

Furnish the DMS controller and associated equipment completely housed in a NEMA 3R cabinet made from 5052 H32 sheet aluminum at least 1/8” thick. Use natural aluminum cabinets. Perform all welding of aluminum and aluminum alloys in accordance with the latest edition of AWS D1.2, Structural Welding Code - Aluminum. Continuously weld the seams using Gas Metal Arc Welding (GMAW).

Slant the cabinet roof away from the front of the cabinet to prevent water from collecting on it.

Do not place a manufacturer name, logo or other information on the faces of the controller cabinet visible to the motorist.

Provide cabinets capable of housing the components and sized to fit space requirement. Design the cabinet layout for ease of maintenance and operation, with all components easily accessible. Submit a cabinet layout plan for approval by the Engineer.

Locate louvered vents with filters in the cabinet to direct airflow over the controller and auxiliary equipment, and in a manner that prevents rain from entering the cabinet. Fit the inside of the cabinet, directly behind the vents, with a replaceable, standard size, commercially available air filter of sufficient size to cover the entire vented area.

Provide a torsionally rigid door with a continuous stainless steel hinge on the side that permits complete access to the cabinet interior. Provide a gasket as a permanent and weather resistant seal at the cabinet door and at the edges of the fan / exhaust openings. Use a non-absorbent gasket material that will maintain its resiliency after long term exposure to the outdoor environment. Construct the doors so that they fit firmly and evenly against the gasket material when closed. Provide the cabinet door with louvered vents and air filters near the bottom as described in the paragraph above.

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

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

Provide a convenient location on the inside of the door to store the cabinet wiring diagrams and other related cabinet drawings. Provide a Corbin #2 main door lock made of non-ferrous or stainless steel material. Key all locks on the project alike, and provide 10 keys to the Engineer. In addition, design the handle to permit pad-locking.

Provide the interior of the cabinet with ample space for housing the controller and all associated equipment and wiring; use no more than 75% of the useable space in the cabinet. Provide ample space in the bottom of the cabinet for the entrance and exit of all power, communications, and grounding conductors and conduit.

Arrange the equipment so as to permit easy installation of the cabling through the conduit so that they will not interfere with the operation, inspection, or maintenance of the unit. Provide adjustable metal shelves, brackets, or other support for the controller unit and auxiliary equipment. Leave a three-inch minimum clearance from the bottom of the cabinet to all equipment, terminals, and bus bars.

Provide power supply monitoring circuitry to detect power failure and to automatically report the occurrence to the Control Software.

Install two 15-watt fluorescent light strips with shields, one in the top of the cabinet and the other under the bottom shelf. Design both lights to automatically turn on when the cabinet door is opened and turn off when the door closes.

Mount and wire a 120V (+10%) GFCI duplex receptacle of the 3-wire grounding type in the cabinet in a location that presents no electrical hazard when used by service personnel for the operation of power tools and work lights.

No cabinet resident equipment shall utilize the GFCI receptacle. Furnish one spare non-GFCI receptacle for future equipment.

Mount a bug-proof and weatherproof thermostatically controlled fan and safety shield in the top of the cabinet. Size the fan to provide at least for two air exchanges per minute. Fuse the fan at 125% of the capacity of the motor. The magnetic field of the fan motor must not affect the performance of the control equipment. Use a fan thermostat that is manually adjustable to turn on between 80ºF and 160ºF with a differential of not more than 10ºF between automatic turn on and turn off. Mount it in an easily accessible location, but not within 6 inches of the fan.

Install additional fans and/or heaters as needed to maintain the temperature inside the cabinet within the operating temperature range of the equipment within the cabinet as recommended by equipment manufacturer(s).

1. Wiring

The requirements stated herein apply wherever electrical wiring is needed for any DMS system assemblies and subassemblies such as controller cabinet, DMS enclosure, electrical panel boards, etc.

Neatly arrange and secure the wiring inside the cabinet. Where cable wires are clamped to the walls of the control cabinet, provide clamps made of nylon, metal, plastic with rubber or neoprene protectors, or similar. Lace and jacket all harnesses, or tie them with nylon tie wraps spaced at 6 inches maximum to prevent separation of the individual conductors.

Individually and uniquely label all conductors. Ensure all conductor labels are clearly visible without moving the conductor. Connect all terminal conductors to the terminal strip in right angles. Remove excess conductor before termination of the conductor. Mold the conductor in such a fashion as to retain its relative position to the terminal strip if removed from the strip. Do not run a conductor across a work surface with the exception of connecting to that work surface. No conductor bundles can be support by fasteners that support work surfaces. Install all connectors, devices and conductors in accordance to manufactures guidelines. Comply with the latest NEC guideline in effect during installation. No conductor or conductor bundle may hang loose or create a snag hazard. Protect all conductors from damage. Ensure all solder joints are completed using industry accepted practices and will not fail due to vibration or movement. Protect lamps and control boards from damage.

No splicing will be allowed for feeder conductors and communication cables from the equipment cabinet to the DMS enclosure.

Insulate all conductors and live terminals so they are not hazardous to maintenance personnel.

Route and bundle all wiring containing line voltage AC and / or shield it from all low voltage control circuits. Install safety covers to prevent accidental contact with all live AC terminals located inside the cabinet.

Use industry standard, keyed type connectors with a retaining feature for connections to the controller.

Label all equipment and equipment controls clearly.

Supply each cabinet with one complete set of wiring diagrams that identify the color-coding or wire tagging used in all connections. Furnish a water-resistant packet adequate for storing wiring diagrams, operating instructions, and maintenance manuals with each cabinet.

2. Power Supply and Circuit Protection

Design the DMS and controller for use on a system with a line voltage of

120V + 10% at a frequency of 60 Hz ± 3 Hz. Under normal operation, do not allow the voltage drop between no load and full load of the DMS and its controller to exceed 3% of the nominal voltage.

Blackout, brownout, line noise, chronic over-voltage, sag, spike, surge, and transient effects are considered typical AC voltage defects. Protect the DMS system equipment so that these defects do not damage the DMS equipment or interrupt their operation. Equip all cabinets with devices to protect the equipment in the cabinet from damage due to lightning and external circuit power and current surges.

3. Circuit Breakers

Protect the DMS controller, accessories, and cabinet utilities with thermal magnetic circuit breakers. Provide the controller cabinet with a main circuit breaker sized according to the NEC. Use appropriately sized branch circuit breakers to protect the controller and accessories and for servicing DMS equipment and cabinet utilities.

4. Surge Suppressor

Install and clearly label filtering hybrid power line surge protectors on the load side of the branch circuit breakers in a manner that permits easy servicing. Ground and electrically bond the surge protector to the cabinet within 2 inches.

Provide power line surge protector that meets the following requirements:

Peak surge current occurrences	20 minimum
Peak surge current for an 8 x 20 microsecond wave-shape	50,000 amperes
Energy absorption	> 500 joules
Clamp voltage	240 volts
Response time	< 1 nanosecond
Minimum current for filtered output	15 amperes for 120VAC*
Temperature range	-40ºF to +158ºF

*Capable of handling the continuous current to the equipment

5. Radio Interference Suppressor

Provide each controller cabinet with sufficient electrical and electronic noise suppression to enable all equipment in it to function properly. Provide one or more radio interference suppressors (RIS) connected between the stages of the power line surge suppressor that minimize interference generated in the cabinet in both the broadcast and the aircraft frequencies. Each RIS must provide a minimum attenuation of 50 decibels over a frequency range of 200 KHz to 75 MHz. Clearly label the suppressor(s) and size them at least at the rated current of the main circuit breaker but not less than 50 amperes.

Provide RIS that are hermetically sealed in a substantial metal case which is filled with a suitable insulating compound and have nickel plated 10/24 brass stud terminals of sufficient external length to provide space to connect #8 AWG wires. Mount them so that the studs cannot be turned in the case. Properly insulate ungrounded terminals from each other, and maintain a surface linkage distance of not less than ¼" between any exposed current conductor and any other metallic parts. The terminals must have an insulation factor of 100 200 MΩ, dependent on external circuit conditions. Use RIS designed for 120 VAC ± 10%, 60Hz, and which meet the standards of UL and the Radio Manufacturers Association.

6. Communications Surge Protector

Equip the cabinet with properly labeled hybrid data line surge protectors that meet the following general requirements:

Surge current occurrences at 2000 ampere, 8 x 20 microsecond waveform	> 80
Surge current occurrences at 400 ampere, 10 x 700 microsecond waveform	> 80
Peak surge current for 8 x 20 microsecond waveform	10,000 A (2500 A/line)
Peak surge current for 10 x 700 microsecond waveform	500 A/line

Response time	< 1 nanosecond
Series resistance	< 15 Ω
Average capacitance	1500 pF
Temperature range	-10o F to 150º F
Clamp Voltage	As required to match equipment in application

7. Lightning Arrester

Protect the system with an UL approved lightning arrester installed at the main service disconnect. It shall meet the following requirements:

Type of design	Silicon Oxide Varistor
Voltage	120 / 240 Single phase, 3 wires
Maximum current	100,000 amps
Maximum energy	3000 joules per pole
Maximum number of surges	Unlimited
Response time one milliamp test	5 nanoseconds
Response time to clamp 10,000 amps	10 nanoseconds
Response time to clamp 50,000 amps	25 nanoseconds
Leak current at double the rated voltage	None
Ground Wire	Separate

8. Uninterruptible Power Supply

Provide the cabinet with an industrial grade power conditioning UPS unit to supply continuous power to operate the equipment connected to it if the primary power fails. The UPS must detect a power failure and provide backup power within 20 milliseconds. Transition to the UPS source from primary power must not cause loss of data or damage to the equipment being supplied with backup power. Provide a UPS with at least three outlets for supplying conditioned AC voltage to the DMS controller. Provide a unit to meet the following requirements:

- Input Voltage Range: 120VAC +12%, -25%
- Power Rating: 1000 VA, 700 Watts
- Input Frequency: 45 to 65 Hz
- Input Current: 7.2A
- Output Voltage: 120VAC ± 3%
- Output Frequency: 50/60 ±1 Hz

- Output Current: 8.3A
- Output Crest Factor Ration: @50% Load Up to 4.8:1
@75% Load Up to 3.2:1
@100% Load Up to 2.4:1
- Output THD: 3% Max. (Linear)
5% Max. (Non-Linear)
- Output Overload: 110% for 10 min; 200% for 0.05 sec.
- Output Dynamic Response: +/- 4% for 100% Step Load Change
0.5 ms Recovery Time.
- Output Efficiency @ 100% Load:90% (Normal Mode)
- Operating Temperature: -40o F to +165o F
- Humidity: 0% to 95% Non-condensing
- Remote Monitoring Interface: RS-232
- Protection: Input/Output Short Circuit
Input/Output Overload
Excessive Battery Discharge
- Specifications: UL1778, FCC Class A, IEEE 587

Provide the UPS unit capable of supplying 30 minutes of continuous backup power to the equipment connected to it when such equipment are operating at full load.

9. Controller Communications Interface

Provide the controller with the following interface ports:

- An EIA/TIA-232E port for remote communication using NTCIP
- An 10/100 Ethernet port for remote communication using NTCIP
- An EIA/TIA-232E port for onsite access using a laptop
- An EIA/TIA-232E auxiliary port for communication with a field device such as a UPS
- Fiber Optic ports for communication with the sign
- RJ45 ports for communication with the sign using CAT-5 cable

- RJ45 ports for communication with mini-controller located inside the sign enclosure

10. Controller Local User Interface

Provide the controller with a Local User Interface (LUI) for at least the following functions:

- On / Off Switch: controls power to the controller.
- Control Mode Switch: for setting the controller operation mode to either remote or local mode.
- LCD Display and Keypad: Allow user to navigate through the controller menu for configuration (display, communications parameter, etc.) running diagnostics, viewing peripherals status, message creation, message preview, message activation, etc. Furnish a LCD display with a minimum size of 240 x 64 dots with LED back light.

11. Controller Address

Assign each DMS controller a unique address. Preface all commands from the Control Software with a particular DMS controller address. The DMS controller compares its address with the address transmitted; if the addresses match, then the controller processes the accompanying data.

12. Controller Functions

Design the DMS controller to continuously control and monitor the DMS independent of the Control Software. Design the controller to display a message on the sign sent by the Control Software, a message stored in the sign controller memory, or a message created on site by an operator using the controller keypad.

Provide the DMS controller with a watchdog timer to detect controller failures and to reset the microprocessor, and with a battery backed up clock to maintain an accurate time and date reference. Set the clock through an external command from the Control Software or the Local User Interface.

13. DMS Controller Memory

Furnish each DMS controller with non-volatile memory. Use the non-volatile memory to store and reprogram at least one test pattern sequence and 500 messages containing a minimum of two pages of 45 characters per page. The Control Software can upload messages into and download messages from each controller's non-volatile memory remotely.

Messages uploaded and stored in the controller's non-volatile memory may be erased and edited using the Control Software and the controller. New messages may be uploaded to and stored in the controller's non-volatile memory using the Control Software and the controller.

F. Photo-Electric Sensors

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

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

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

G. Equipment List

Provide a general description of all equipment and all information necessary to describe the basic use or function of the major system components. Include a general "block diagram" presentation. Include tabular charts listing auxiliary equipment, if any is required. Include the nomenclature, physical and electrical characteristics, and functions of the auxiliary equipment unless such information is contained in an associated manual; in this case include a reference to the location of the information. Include an itemized list of equipment costs.

Include a table itemizing the estimated average and maximum power consumption for each major piece of equipment.

H. Physical Description

Provide a detailed physical description of size, weight, center of gravity, special mounting requirements, electrical connections, and all other pertinent information necessary for proper installation and operation of the equipment.

I. Parts List

Provide a parts list that contains all information needed to describe the characteristics of the individual parts, as required for identification. Include a list of all equipment within a group and a list of all assemblies, sub-assemblies, and replacement parts of all units. Arrange this data in a table, in alpha numerical order of the schematic reference symbols, which gives the associated description, manufacturer's name, and part number, as well as alternate manufacturers and part numbers. Provide a table of contents or other appropriate grouping to identify major components, assemblies, etc.

J. Character Set Submittal

Submit an engineering drawing of the DMS character set including 26 upper case and lower case letters, 10 numerals, an asterisk (*), a dash, a plus sign (+), a designated lane diamond, a slash, an ampersand, and arrows at 0, 45, 90, 135, 180, 225, 270, and 315 degrees.

K. Wiring Diagrams

Provide a wiring diagram for each DMS and each controller cabinet, as well as interconnection wiring diagrams for the system as a whole.

Provide complete and detailed schematic diagrams to component level for all DMS assemblies and subassemblies such as driver boards, control boards, DMS controller, power supplies, and etc. Ensure that each schematic enables an electronics technician to successfully identify any component on a board or assemblies and trace its incoming and outgoing signals.

L. Routine of Operation

Describe the operational routine, from necessary preparations for placing the equipment into operation to securing the equipment after operation. Show appropriate illustrations with the sequence of operations presented in tabular form wherever applicable. Include in this section a total list of the test instruments, aids and tools required to perform necessary measurements and measurement techniques for each component, as well as set up, test, and calibration procedures.

M. Maintenance Procedures

Specify the recommended preventative maintenance procedures and checks at pre-operation, monthly, quarterly, semi-annual, annual, and "as required" periods to assure equipment operates reliably. List specifications (including tolerances) for all electrical, mechanical, and other applicable measurements and / or adjustments.

N. Repair Procedures

Include in this section all data and step by step procedures necessary to isolate and repair failures or malfunctions, assuming the maintenance technicians are capable of analytical reasoning using the information provided in the section titled “Wiring Diagrams and Theory of Operation.”

Describe accuracy, limits, and tolerances for all electrical, physical, or other applicable measurements. Include instructions for disassemblies, overhaul, and re-assemblies, with shop specifications and performance requirements.

Give detailed instructions only where failure to follow special procedures would result in damage to equipment, improper operation, danger to operating or maintenance personnel, etc. Include such instructions and specifications only for maintenance that specialized technicians and engineers in a modern electromechanical shop would perform. Describe special test set up, component fabrication, and the use of special tools, jigs, and test equipment.

O. Field Trial

At the request of the Engineer, supply a three-character demonstration module with characters of the size and type specified for the project, an appropriate control device and power supply to allow character display within 30 working days of the request. Perform a field trial on this module at a time and location selected by the Engineer.

This trial will allow the Engineer or his selected representatives to test the readability of the DMS at the maximum distance required for specified character size. Test the module with the sun directly above the DMS, and near the horizon in front of and behind the DMS (washout and back-lit conditions).

Construction Methods

A. Description

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

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

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

B. Layout

Determine the location of each Dynamic Message Sign and obtain the Engineer’s approval of the locations prior to installation. It is the Design-Build Team’s responsibility to ensure proper elevation, offset, and orientation of all DMS assemblies. The location of service poles as well as conduit lengths shown in the project plans developed by the Design-Build Team, are approximate based on available project data. Make actual field measurements to place conduit and equipment at the required location.

C. Construction Submittal

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

The "As-Built" Plans shall show: the DMS, controller, and service pole locations; DMS enclosure and controller cabinet wiring layouts; and wire and conduit routing. Show all underground conduits and cables dimensioned from fixed objects

Include detailed drawings that identify the routing of all conductors in the system by cable type, color code, and function. Clearly label all equipment in the DMS system, controller cabinet, and DMS enclosure.

D. Conduit

Install the conduit system in accordance with Section 1715 of the 2018 *Standard Specifications for Roads and Structures* and NEC requirements for an approved watertight raceway.

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

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

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

Locate underground conduit as shown in the project plans developed by the Design-Build Team in a manner consistent with these Project Special Provisions.

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

E. Wiring Methods

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

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

Bury underground circuits at the depth shown in the project plans developed by the Design-Build Team and surround it with at least 3 inches of sand or earth back fill free of rocks and debris. Compact backfill in 6 inch layers. Do not splice underground circuits unless

specifically noted in the project plans developed by the Design-Build Team and approved by the Department.

F. Equipment and Cabinet Mounting

Mount equipment securely at the locations shown in the project plans developed by the Design-Build Team, in conformance with the dimensions shown. Install fasteners as recommended by the manufacturer and space them evenly. Use all mounting holes and attachment points for attaching DMS enclosures and controller cabinets to the structures.

Drill holes for expansion anchors of the size recommended by the manufacturer of the anchors and thoroughly clean them of all debris.

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

Provide cabinets with all mounting plates, anchor bolts, and any other necessary mounting hardware in accordance with these Project Special Provisions and the project plans developed by the Design-Build Team.

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

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

G. Work Site Clean-Up

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

III. NTCIP Requirements

This section defines the detailed NTCIP requirements for the DMSs covered by these Project Special Provisions and the project plans developed by the Design-Build Team.

References

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

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

Abbreviated Number	Full Number	Title
NTCIP 1101	**NTCIP 1101:1997**	*Simple Transportation Management Framework*
NTCIP 1201	**NTCIP 1201:1997**	*Global Object Definitions*
NTCIP 1203	**NTCIP 1203:1997**	*Object Definitions for Dynamic Message Signs*
NTCIP 2001	**NTCIP 2001:1997**	*Class B Profile*
NTCIP 2101	**NTCIP 2101**	*SP-PMPP/232* *Subnet Profile for PMPP over RS-232*
NTCIP 2102	**NTCIP 2102**	*SP-PMPP/FSK* *Subnet Profile for PMPP over FSK Modem*
NTCIP 2103	**NTCIP 2103**	*SP-PPP/232* *Subnetwork Profile for PPP over RS232 (Dial Up)*
NTCIP 2104	**NTCIP 2104**	*SP-Ethernet* *Subnet Profile for Ethernet*
NTCIP 2201	**NTCIP 2201**	*TP-Null* *Transport Profile*
NTCIP 2202	**NTCIP 2202**	*TP-Internet* *Internet Transport Profile (TCP/IP and UDP/IP)*
NTCIP 2301	**NTCIP 2301**	*AP-STMF* *AP for Simple Transportation Management Framework*

General Requirements

1. Subnet Level

Ensure each serial port on each NTCIP Component supports NTCIP 2103 over a dial-up connection with a contractor provided external modem with data rates of 28.8 kbps, 19.2 kbps, 14.4 kbps, 9600 bps, 4800 bps, 2400 bps, 1200 bps,

600 bps, and 300 bps. Enable the NTCIP Component to make outgoing and receive incoming calls as necessary and support the following modem command sets:

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

Ensure each serial port on each NTCIP Component supports NTCIP 2103 over a null-modem connection with data rates of 19.2 kbps, 14.4 kbps, 9600 bps,

4800 bps, 2400 bps, 1200 bps, 600 bps, and 300 bps.

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

Ensure NTCIP components support NTCIP 2102 and NTCIP 2104.

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

2. Transport Level

Ensure each NTCIP Component complies with NTCIP 2201 and 2202.

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

3. Application Level

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

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

4. Information Level

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

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

Table 2: Modified Object Ranges for Mandatory Objects

Object	Reference	Project Requirement
ModuleTableEntry	NTCIP 1201 Clause 2.2.3	Contains at least one row with moduleType equal to 3 (software). The moduleMake specifies the name of the manufacturer, the moduleModel

		specifies the manufacturer's name of the component and the modelVersion indicates the model version number of the component.
MaxGroupAddresses	NTCIP 1201 Clause 2.7.1	At least 1
CommunityNamesMax	NTCIP 1201 Clause 2.8.2	At least 3
DmsNumPermanentMsg	NTCIP 1203 Clause 2.6.1.1.1.1	At least 1*
DmsMaxChangeableMsg	NTCIP 1203 Clause 2.6.1.1.1.3	At least 21
DmsMaxChangeableMsg	NTCIP 1203 Clause 2.6.1.1.1.4	At least 20 when no messages are stored.
DmsMessageMultiString	NTCIP 1203 Clause 2.6.1.1.1.8.3	The DMS supports any valid MULTI string containing any subset of those MULTI tags listed in Table 4
DmsMessageMultiString	NTCIP 1203 Clause 2.7.1.1.1.1	Support at least the following modes: Local External central Central Override

*** Ensure the Permanent Messages display the content shown in Table 3.**

Ensure the sign blanks if a command to display a message contains an invalid Message CRC value for the desired message.

Table 3: Content of Permanent Messages

Permanent Message Number	Description
1	Permanent Message # 1 blanks the display (i.e. consists of an empty MULTI string). It has a run-time priority of one (1)

Table 4: Required MULTI Tags

Code	Feature
f1	field 1 - time (12hr)
f2	field 2 - time (24hr)
f8	field 8 – day of month
f9	field 9 – month
f10	field 10 – 2-digit year
f11	field 11 – 4-digit year
fl (and / fl)	flashing text on a line by line basis with flash rates controllable in 0.5 second increments.
fo	Font

jl2	Justification – line – left
jl3	Justification – line – center
jl4	Justification – line – right
jl5	Justification – line – full
jp2	Justification – page – top
jp3	Justification – page – middle
jp4	Justification – page – bottom
Mv	moving text
Nl	new line
Np	new page, up to 2 instances in a message (i.e., up to 3 pages/frames in a message counting first page)
Pt	page times controllable in 0.5 second increments.

The NTCIP Component implements all mandatory and optional objects of the following optional conformance groups with FSORS.

Test Heading

a. Time Management

As defined in NTCIP 1201

b. Timebase Event Schedule

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

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

Object	Reference	Project Requirement
MaxTimeBaseScheduleEntries	NTCIP 1201 Clause 2.4.3.1	At least 28
maxDayPlans	NTCIP 1201 Clause 2.4.4.1	At least 14
maxDayPlanEvents	NTCIP 1201 Clause 2.4.4.2	At least 10

c. Report

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

Table 6: Modified Object Ranges for the Report Conformance Group

Object	Reference	Project Requirement
maxEventLogConfigs	NTCIP 1201 Clause 2.5.1	At least 50
eventConfigurationMode	NTCIP 1201 Clause 2.4.3.1	The NTCIP Component supports the following Event Configuration Modes: onChange greaterThanValue smallerThanValue
MaxEventLogSize	NTCIP 1201 Clause 2.5.3	At least 200
MaxEventClasses	NTCIP 1201 Clause 2.5.5	At least 16

d. PMPP

e. Font Configuration

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

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

Object	Reference	Project Requirement
NumFonts	NTCIP 1203 Clause 2.4.1.1.1.1	At least 4*
MaxFontCharacters	NTCIP 1203 Clause 2.4.1.1.1.3	At least 127**

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

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

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

f. DMS Configuration

As defined in NTCIP 1203.

g. MULTI Configuration

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

Table 8: Modified Object Ranges for the MULTI Configuration Conformance Group

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

h. Default Message Control as defined in NTCIP 1203

i. Pixel Service Control as defined in NTCIP 1203

j. MULTI Error Control as defined in NTCIP 1203

k. Illumination / Brightness Control

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

Table 9: Modified Object Ranges for the Illumination/Brightness Control Conformance Group

Object	Reference	Project Requirement
dmsIllumControl	NTCIP 1203 Clause 2.8.1.1.1.1	The DMS supports the following illumination control modes: photocell timer manual
dmsIllumNumBrightLevels	NTCIP 1203 Clause 2.8.1.1.1.4	At least 16

l. Auxiliary I/O

m. Scheduling

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

Table 10: Modified Object Ranges for the Scheduling Conformance Group

Object	Reference	Project Requirement
NumActionTableEntries	NTCIP 1203 Clause 2.9.1.1.1.1	At least 21

n. Sign Status as defined in NTCIP 1203

o. Status Error as defined in NTCIP 1203

p. Pixel Error Status as defined in NTCIP 1203

q. Fan Error Status as defined in NTCIP 1203

r. Power Status as defined in NTCIP 1203

s. Temperature Status as defined in NTCIP 1203

Install necessary hardware for the support of items q, r and s above.

Table 11: Some Optional Object Requirements

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

5. Documentation

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

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

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

NTCIP Acceptance Testing

Test the NTCIP requirements outlined above by a third-party testing firm. Submit to the Engineer for approval a portfolio of the selected firm. Include the name, address, and a history of the selected firm in performing NTCIP testing along with references. Also, provide a contact person's name and phone number. Submit detailed NTCIP testing plans and procedures, including a list of

hardware and software, to the Engineer for review and approval 10 days in advance of a scheduled testing date. Develop test documents based on the NTCIP requirements of these Project Special Provisions. The acceptance test shall use the NTCIP Exerciser, and / or other authorized testing tools and shall follow the guidelines established in the ENTERPRISE Test Procedures. Conduct the test in North Carolina on the installed system in the presence of the Engineer. Document and certify the results of the test by the firm conducting the test and submit to the Engineer for review and approval. In case of failures, remedy the problem and have the firm retest in North Carolina. Continue process until all failures are resolved. The Department reserves the right to enhance these tests as deemed appropriate to ensure device compliance.

IV. DMS Testing Requirements

General Test Procedure

Test the DMS system in a series of design approval and functional tests. The results of each test must meet the specified requirements. These tests shall not damage the equipment. The Engineer will reject equipment that fails to fulfill the requirements of any test. Resubmit rejected equipment after correcting non-conformities and re-testing; completely document all diagnoses and corrective actions. Modify all equipment furnished under this contract, without additional cost to the North Carolina Department of Transportation, to incorporate all design changes necessary to pass the required tests.

Provide four copies of all test procedures and requirements to the Engineer for review and approval at least 30 days prior to the testing start date.

Only use approved procedures for the tests. Include the following in the test procedures:

- A step by step outline of the test sequence, showing a test of every function of the equipment or system tested
- A description of the expected nominal operation, output, and test results, and the pass / fail criteria
- An estimate of the test duration and a proposed test schedule
- A data form to record all data and quantitative results obtained during the test.
- A description of any special equipment, setup, manpower, or conditions required by the test

Provide all necessary test equipment and technical support. Use test equipment calibrated to National Institute of Standards and Technology (NIST) standards. Provide calibration documentation upon request.

Conform to these testing requirements and the requirements of these specifications. The Engineer will reject all equipment not tested according to these requirements. It shall be the Design-Build Team’s responsibility to ensure the DMS system functions properly even after the Engineer accepts the DMS test results.

Provide 4 copies of the quantitative test results and data forms containing all data taken, highlighting any non-conforming results and remedies taken, to the Engineer for approval. An authorized representative of the manufacturer must sign the test results and data forms.

Design Approval Tests

Design Approval Tests are applicable to DMS systems not currently on the QPL.

The Design Approval Tests consists of all tests described in Section 2.2 "DMS Equipment Tests" of NEMA TS 4-2005 (Hardware Standards for Dynamic Message Signs with NTCIP Requirements). Perform all tests and submit certified results for review and approval.

PROTOTYPE – Manufacture a prototype Dynamic Message Sign and controller of the type and size described in the project special provisions. In the Engineer's presence, test the prototype according to the Design Approval and Operational Tests. When all corrections and changes (if any) have been made, the Department may accept the prototype DMS and controller as the physical and functional standard for the system furnished under this contract. The Design-Build Team may use the prototype units on this project if, after inspection and rework (if necessary), they meet all physical and functional specifications. In the case of standard product line equipment, if the Design-Build Team can provide test results certified by an independent testing facility as evidence of prior completion of successful design approval tests, then the Engineer may choose to waive these tests.

In each Design Approval Test, successfully perform the Functional Tests described below. Apply the extreme conditions to all associated equipment unless stated otherwise in these Project Special Provisions (PSP).

Operational Field Test (On-Site Commissioning)

Conduct an Operational Field Test of the DMS system installed on the project to exercise the normal operational functions of the equipment. The Operational Field Test shall consist of the following tests as a minimum:

A. Physical Examination

Examine each piece of equipment to verify that the materials, design, construction, markings, and workmanship comply with the mechanical, dimensional, and assembly requirements of these Project Special Provisions.

Perform the following tests as a minimum:

- Verify that all surfaces are free of dents, scratches, weld burns, or abrasions. Round sharp edges and corners.
- Verify bend radius of cables is not excessive or could potentially cause damage.
- Verify all modules, lamps, and components are properly secured.
- Verify that there are no exposed live terminals.

B. Continuity Tests

Check the wiring to assure it conforms to the requirements of the appropriate paragraphs of this Special Provision.

C. Functional Tests

Perform the following functional tests:

- Start-up and operate the DMS locally using a laptop computer.
- Use automatic (photo-electric sensor controlled), DMS Control Software to switch between "dim", "normal", and "bright" light levels.
- Operation of the DMS with all display elements flashing continuously for 10 minutes at the maximum flash rate.
- Exercise the DMS by displaying static messages, flashing messages, and alternating static and flashing message sequences.
- Automatically poll the DMS by the Control Software at various intervals and verify the data received by Control Software from DMS.
- Download and edit messages using Control Software.
- Execute status request on the DMS controller.
- Observe normal operations during uploading and downloading.
- Input and select messages from the sign controller's local user interface.
- Test sequence activation at chosen intervals.
- Display and verify all stored messages.
- Verify resumption of standard operation upon interruption of electrical power.
- Demonstrate detected failures and response functions.
- Demonstrate proper operation of the Failure Log.
- Set controller clock using the Control Software.
- Execute system shutdown using the Control Software and local user interface.
- Verify detection of a power failure in the DMS enclosure and the report feature of the failure to the Control Software.

Approval of Operational Field Test results does not relieve the Design-Build Team to conform to the requirements in these Project Special Provisions. If the DMS system does not pass these tests, document a correction or substitute a new unit as approved by the Engineer. Re-test the system until it passes all requirements.

30-Day Observation Period

The 30-Day Observation Period shall be part of work to be completed by the project completion date.

Upon successful completion of all project work, the component tests, the System Test, and the correction of all deficiencies, including minor construction items, the 30-day Observation Period may commence. This observation consists of a 30-day period of normal, day-to-day operations of the new field equipment in operation with the new central equipment without any failures. The

purpose of this period is to ensure that all components of the system function in accordance with the project plans developed by the Design-Build Team and these Project Special Provisions.

Respond to system and / or component failures (or reported failures) that occur during the 30-day Observation Period within twenty-four (24) hours. Correct said failures within forty-eight (48) hours. Any failure that affects a major system component as defined below for more than forty-eight (48) hours shall suspend the timing of the 30-day Observation Period beginning at the time when the failure occurred. After the cause of such failures has been corrected, timing of the 30-day Observation Period will resume. System or component failures that necessitate a redesign of any component or failure in any of the major system components exceeding a total of three (3) occurrences shall terminate the 30-day Observation Period and cause the 30-day Observation Period to be restarted from day zero when the redesigned components have been installed and / or the failures corrected. The major system components are:

- DMS Field Controller
- DMS Display Module
- DMS Workstation software

V. DMS Structure

Description

This section includes all design, fabrication, furnishing, and erection of the DMS structures, platforms, walkways, and ladders for access to the DMS inspection doors, and attachment of the DMS enclosures to the structures in accordance with the requirements of these Project Special Provisions and the project plans developed by the Design-Build Team. Fabricate the supporting DMS assemblies from tubular steel. Furnish pedestal type or overhead type DMS assemblies as shown in the project plans developed by the Design-Build Team and as approved by the Engineer.

Cantilevered and Monotube (horizontal truss) DMS structures will not be allowed.

Provide pedestal DMS structures with a minimum of 25 feet clearance from the high point of the road to the bottom of the DMS enclosure.

Provide full-span overhead DMS structures with a minimum of 20 feet clearance from the high point of the road to the bottom of the DMS enclosure.

Design the DMS assemblies (including footings), DMS mounting assemblies, maintenance platforms, and access ladders and submit shop drawings to the Engineer for approval. A Professional Engineer that is registered in the state of North Carolina will prepare such computations and drawings. These must bear his signature, seal, and date of acceptance.

The provisions of Section 900 of the NCDOT 2018 Standard Specifications for Roads and Structures apply to all work covered by this section.

The Design-Build Team shall furnish DMS S-dimension drawings for each proposed DMS to the Engineer for approval.

Material

Use materials that meet the following requirements of the NCDOT 2018 *Standard Specifications for Roads and Structures*:

Structural Steel	Section 1072
Overhead Structures	Section 1096
Signing Materials	Section 1092
Organic-Zinc Repair Paint	Article 1080 9
Reinforcing Steel	Sub-article 1070
Direct Tension Indicators	Sections 440 and 1072

Construction Methods

A. General

Fabricate the new DMS assemblies, maintenance platforms, attachment hardware, and access ladders in accordance with the details shown in the approved shop drawings prepared by the Design-Build Team and the requirements of these Project Special Provisions.

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

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

Erect the DMS in accordance with the requirements indicated on the project plans developed by the Design-Build Team and in these Project Special Provisions. Field drill two holes per connection in the Z bars for attaching the DMS to the structure. Use two bolts at each connection. Provide two (2) U-bolts at each U-bolt connections such as 1) each truss chord to sign hanger, or 2) each truss chord to platform support. Provide two (2) U-bolts at each U-bolt connection where ends of truss chords are supported. Minimum diameter of all U-bolts shall be ½ inch.

Use two coats of a zinc rich paint to touch up minor scars on all galvanized materials (Refer to Section 1076-6 of the 2018 *Standard Specifications for Roads and Structures*).

For high strength bolted connections, provide direct tension indicator washers.

B. Shop Drawings

Submit to the Engineer for approval a complete design for the DMS assemblies (including footings), maintenance platforms, access ladders, DMS assembly hardware, brackets for supporting the DMS and maintenance platforms. Base the design on the line drawings and correct wind speed in accordance with the latest edition of the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*,

6th Edition, 2013, including the latest Interim specifications and the latest interim revisions.

The manufacturer of the DMS assembly must ensure that design of the assembly is compatible with the DMSs for mounting and attachment.

Submit six copies of completely detailed shop drawings and one copy of the design computations for the DMS assembly to the Engineer for approval prior to fabrication. Show in the shop drawings complete design and fabrication details including foundations, provisions for attaching the DMS, maintenance platform and access ladders to supporting structures, applicable material specifications, and any other information necessary for procuring and replacing any part of the complete DMS assembly.

Allow a minimum of 15 working days for shop drawing approval after the Engineer receives them. If revised drawings are necessary, allow an additional 15 working days for review and approval of final shop drawings.

Approval of shop drawings by the Engineer shall not relieve the Design-Build Team of their responsibility for the correctness of drawings, or for the fit of all shop and field connections and anchors.

C. Design and Fabrication

For additional design and fabrication requirements, reference the Overhead Sign Supports Project Special Provision found elsewhere in this RFP.

1. Dynamic Message Sign Assemblies

Fabricate the supporting structures using tubular members of either aluminum or steel, using only one type of material throughout the project.

Horizontal components of the supporting structures for overhead DMS shall be of a truss design to support the DMS. Truss centerline shall coincide with the centerline of the DMS design area shown on the structure line drawing developed by the Design-Build Team. Provide permanent camber in addition to dead load camber in accordance with the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 6th Edition, 2013, including the latest interim specifications and the latest interim revisions. Indicate on the shop drawings the amount of camber provided and the method employed in the fabrication of the support to obtain the camber.

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

Fabricate the attachment assembly for mounting DMS in a manner that will ensure easy removal the DMS.

2. DMS Maintenance Platform (Walkway)

Provide a maintenance platform, a minimum of three feet wide with open skid resistant surface and safety railing on the DMS assemblies for access to the DMS inspection door. Provide platforms with fixed safety railings along both sides from the beginning of the platform to the inspection door.

Ensure the design, fabrication and installation of the access platforms on new DMS structures complies with the following:

1. The top of the platform grading surface is vertically aligned with the bottom of the DMS door. Ensure the platform extends from the DMS enclosure to the access ladder.

2. The DMS door will open 90-degrees from its closed position without any obstruction from the platform or safety handrails.

3. The platform is rigidly and directly connected to the walkway brackets and there is no uneven surface between sections.

4. Install a 4" x 4" safety angle parallel to and along both sides of the platform and extend it the entire length of the platform. Design the safety angle to withstand loading equivalent to the platform.

5. Ensure the platform design allows full access to the DMS enclosure inspection door with no interference or obstructions.

3. DMS Access Ladder

Provide a fixed ladder, of the same material as the DMS structures, leading to and ending at the access platform. Equip the ladder with a security cover (ladder guard) and lock to prohibit access by unauthorized persons. Furnish locks to operate with a Corbin #2 key and furnish two keys per lock. Design the rungs on 12-inch center to center typical spacing. The first ladder rung shall be no more than 18 inches above the landing pad. Attach the security cover approximately 6 feet above the concrete landing. Design the ladder and security cover as a permanent part of the DMS assembly and include complete design details in the DMS assembly shop drawings. Fabricate the ladder and cover to meet all OSHA requirements and applicable state and local codes, including but not limited to providing a ladder cage.

Furnish and install a level concrete pad a minimum of 4 inches deep, 24 inches wide, and 36 inches long to serve as a landing pad for accessing the ladder. Design the landing pad to be directly below the bottom rung. Access to the ladder shall not

be obstructed by the DMS foundation. Provide pre-formed or cast-in place concrete pads.

HIGH DEFINITION CCTV METAL POLE WITH CCTV LOWERING SYSTEM AND FIELD EQUIPMENT

(3-12-19) DB 08-04a

1. HIGH DEFINITION CCTV DESCRIPTION

The Design-Build Team shall provide and install High Definition (1080p) CCTV field equipment described in these Project Special Provisions. Ensure equipment is fully compatible with all features of the existing VideoPro video management software currently in use by NCDOT in this Region.

Obtain approval of the camera locations and orientation from the Engineer prior to installing the CCTV camera assemblies.

1.2 MATERIAL

General

The Design-Build Team shall provide and install new CCTV camera assemblies at the locations approved by the Engineer that consist of the following:

1. Dome CCTV camera that contains in a single enclosed unit the following:
    a. CCTV color digital signal processing camera unit with zoom lens, filter, control circuit, and accessories
    b. Motorized pan, tilt, and zoom
    c. Pole-mount camera attachment assembly.
    d. All necessary cable, connectors and incidental hardware to make a complete and operable system
2. Lightning arrestors installed in-line between the CCTV camera and the equipment cabinet components.
3. A NEMA Type 4 enclosure constructed of aluminum with a clear acrylic dome or approved equal camera unit housing.

Camera and Lens

The Design-Build Team shall provide new ¼-inch charged-coupled device (CCD) color day / night cameras. The Design-Build Team shall provide cameras with automatic gain control (AGC) for clear images in varying light levels. The camera shall meet the following minimum requirements:

- Video signal format: NTSC compatible resolution, user selectable up to a maximum of 1920 x 1080 (1080p),
- Image sensor resolution: 768 horizontal pixels by 752 vertical pixels,
- Automatic gain control (AGC): 0-20 dB, peak-average adjustable,
- White balance: Automatic through the lens with manual override,
- Electronic-shutter: Dip-switch selectable NTSC electronic shutter with speed range from 1/2 of a second (off) to 1/30,000 of a second (NTSC),
- Overexposure protection: Built-in circuitry or a protection device to prevent any damage to the camera when pointed at strong light sources, including the sun,
- Gain control: Automatic and manual,
- Sensitivity: 1.5 lux at 90% scene reflectance,
- Sync system: Internal AC line lock, phase adjustable using remote control, V-sync,
- Signal to noise ratio: Greater than 50 dB,
- Video output connection: 1-volt peak to peak, 75 ohms terminated, BNC connector, and
- Primary voltage: 120 VAC,
- Camera voltage: 24 VAC or 24 VDC, and
- Camera power: 73 VA with heater at 24 VAC or 3A at 24 VDC.

Zoom Lens

The Design-Build Team shall provide each camera with a motorized zoom lens with automatic iris control with manual override and neutral density spot filter. The Design-Build Team shall provide lenses that meet the following optical specifications:

- Automatic focus: Automatic with manual override,
- Horizontal angle of view: 55.4 degrees at 3.6 mm wide zoom and 2.9 degrees at 82 mm telephoto zoom,
- Focal length: 3.6 mm to 124 mm, 30X optical zoom, 12X electronic zoom,
- Zoom Speed: 2.9, 4.2 and 5.8 seconds,
- Lens aperture: Minimum of f/1.6,
- Maximum Sensitivity at 30 IRE: .07 lux at ½ second color, .2 lux at 1/60 second black and white, .015 lux at ½ sec. black and white,
- Preset positioning: Minimum of 128 presets.

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

Camera Housing

Furnish new dome style enclosures for the CCTV assemblies. Equip each housing with a mounting assembly for attachment to the CCTV lowering system. The enclosures must be equipped with a sunshield and be fabricated from corrosion resistant aluminum and finished in a neutral color of weather resistant enamel. The enclosure must meet or exceed NEMA 4X and IP66 ratings. The viewing area of the enclosure must be tempered glass.

Pan and Tilt Unit

Equip each new dome style assembly with a pan and tilt unit. The pan and tilt unit shall be integral to dome system. The pan and tilt unit shall be rated for outdoor operation, provide dynamic braking for instantaneous stopping, prevent drift, and have minimum backlash. The dome shall have an auto flip dome rotation to rotate and reposition camera for viewing objects passing below camera. The Design-Build Team shall provide electronic image stabilization. The pan and tilt units shall meet or exceed the following specifications:

- Pan: Continuous 360 degrees
- Tilt: +2 to -92 degrees minimum
- Presets: Minimum of 128 presets
- Preset accuracy: .1 degree
- Preset pan speed: .1 degrees / second to 200 degrees/second
- Preset tilt speed: .1 degrees / second to 400 degrees/second
- Privacy zones: Minimum of eight user configurable shapes
- Input voltage: 24 VDC or 24 VAC
- Motors: Two-phase induction type, continuous duty, instantaneous reversing
- Preset Positioning: 64 PTZ presets per camera

Control Receiver / Driver

The Design-Build Team shall provide each new camera unit with a control receiver / driver that is integral to the CCTV dome assembly. The control receiver / driver will receive serial asynchronous data initiated from a camera control unit, decode the command data, perform error checking, and drive the pan / tilt unit, camera controls, and motorized lens. As a minimum, the control receiver/drivers shall provide the following functions:

- Zoom in / out
- Automatic focus with manual override
- Tilt up / down
- Automatic iris with manual override
- Pan right / left
- Minimum 64 preset positions for pan, tilt, and zoom

In addition, each control receiver/driver shall accept status information from the pan / tilt unit and motorized lens for preset positioning of those components. The control receiver / driver will relay pan, tilt, zoom, and focus positions from the field to the remote camera control unit. The control

receiver / driver shall accept "goto" preset commands from the camera control unit, decode the command data, perform error checking, and drive the pan/tilt and motorized zoom lens to the correct preset position. The preset commands from the camera control unit will consist of unique values for the desired pan, tilt, zoom, and focus positions.

Surge Suppression

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

Protect coaxial cable from each camera by a surge protector at each end of the cable.

1.3 CONSTRUCTION METHODS

General

Mount CCTV camera units 5' from the top of the pole or as directed by the Engineer. Position the camera to enable viewing traffic in all directions and as approved by the Engineer.

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

Electrical and Mechanical Requirements

Ground all equipment as called for in the Standard Specifications, these Special Provisions, and the plans developed by the Design-Build Team.

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

2. CCTV EQUIPMENT CABINET DESCRIPTION

The Design-Build Team shall provide 336 pole mounted cabinets to house CCTV control and communications equipment. The cabinets shall consist of a cabinet housing, 19-inch EIA mounting cage, and power distribution assembly (PDA #3 as described in the CALTRANS TSCES).

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

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

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

The Design-Build Team shall provide terminal blocks for power for cabinet CCTV and communications devices as needed to accommodate the number of devices in the cabinet.

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

The Design-Build Team shall provide all conduits, shelving, mounting adapters, and other equipment as necessary to route cabling, mount equipment, and terminate conduit in equipment cabinet.

2.2 MATERIAL

Shelf Drawer

The Design-Build Team shall provide a pull out, hinged-top drawer, having sliding tracks, with lockout and quick disconnect feature in the equipment cabinet. The Design-Build Team shall provide a pullout drawer that extends a minimum of 14 inches that is capable of being lifted to gain access to the interior of the drawer. Minimum interior dimensions of the drawer are to be one inch high, 13 inches deep, and 16 inches wide. The Design-Build Team shall provide drawers capable of supporting a 40-pound device or component when fully extended.

Cabinet Light

Each cabinet shall include two (2) fluorescent lighting fixtures (one front, one back) mounted horizontally inside the top portion of the cabinet. The fixtures shall include a cool white lamp, and shall be operated by normal power factor UL-listed ballast. A door-actuated switch shall be installed to turn on the applicable cabinet light when the front door or back door is opened. The lights shall be mounted not to interfere with the upper door stay.

Surge Protection for System Equipment

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

Main AC Power Input

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

- Maximum AC line voltage: 140 VAC.
- Twenty pulses of peak current, each of which shall rise in 8 microseconds and fall in 20 microseconds to ½ the peak: 20000 Amperes.
- The protector shall be provided with the following terminals:
    - Main Line (AC Line first stage terminal).

  - Main Neutral (AC Neutral input terminal).
  - Equipment Line Out (AC line second state output terminal, 19 amps).
  - Equipment Neutral Out (Neutral terminal to protected equipment).
  - GND (Earth connection).
- The Main AC line in and the Equipment Line out terminals shall be separated by a 200 Microhenry (minimum) inductor rated to handle 10 AMP AC Service.
- The first stage clamp shall be between Main Line and Ground terminals.
- The second stage clamp shall be between Equipment Line Out and Equipment Neutral.
- The protector for the first and second stage clamp shall have an MOV or similar solid state device rated at 20 KA and shall be of a completely solid state design (i.e., no gas discharge tubes allowed).
- The Main Neutral and Equipment Neutral Out shall be connected together internally and shall have an MOV similar solid state device or gas discharge tube rated at 20 KA between Main Neutral and Ground terminals.
- Peak Clamp Voltage: 350 volts at 20 KA. (Voltage measured between Equipment Line Out and Equipment Neutral Out terminals. Current applied between Main Line and Ground Terminals with Ground and Main Neutral terminals externally tied together).
- Voltage shall never exceed 350 volts.
- The Protector shall be epoxy-encapsulated in a flame-retardant material.
- Continuous service current: 10 Amps at 120 VAC RMS.
- The Equipment Line Out shall provide power to cabinet CCTV and communications equipment and to the 24V power supply.

Ground Bus

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

Uninterruptible Power Supply (UPS)

The Design-Build Team shall provide and install one rack mounted UPS in each new cabinet that meet the following minimum specifications:

Output

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

Input

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

Battery Type

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

Typical recharge time	2 hours

Communications & Management

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

Surge Protection and Filtering

Surge energy rating	480 Joules

Environmental

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

Conformance

Regulatory Approvals	FCC Part 15 Class A, UL 1778

2.3 CONSTRUCTION METHODS

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

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

Install a UPS in each cabinet and power all CCTV cameras from the UPS.

Install a level concrete technician pad measuring a minimum four inches thick, 24 inches wide and 36 inches long at the front door of the CCTV equipment cabinet.

3. CCTV METAL POLES

3.1 Description

A. CCTV Metal Poles

The Design-Build Team shall provide and install CCTV metal poles, grounding systems, and all necessary hardware. The work covered by this special provision includes requirements for the design, fabrication, and installation of custom designed CCTV metal poles and associated foundations.

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

B. Drilled Pier Foundations

Design, furnish and install foundations for CCTV metal poles with all necessary hardware in accordance with the plans and specifications.

Design all CCTV pole foundations using actual soil conditions at each pole location. Perform soil test in accordance with sub-section (1) Soil Test of this special provision.

Any additional costs associated with a non-standard site-specific foundation including additional materials, labor and equipment will be considered incidental to the lump sum bid for the entire project. All costs for the non-standard foundation design will also be considered incidental to lump sum bid for the entire project.

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

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

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

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

When poor soil conditions are encountered which could create an excessively large foundation design, consideration may be given to allowing an exemption to the

maximum capacity design. The Design-Build Team shall gain approval from the engineer before reducing a foundation's capacity. On projects where poor soil is known to be present, it is advisable that the Design-Build Team consider getting foundations approved before releasing poles for fabrication.

Soil Test

(a) General

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

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

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

(b) Soil Test Procedure

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

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

A total of 100 blows have been applied in any 2 consecutive 6-inch intervals,

A total of 50 blows have been applied with < 3-inch penetration.

Describe each CCTV pole location along the project corridor in a manner that is easily discernible to both the Design-Build Team's designer and NCDOT reviewers. If a CCTV pole is at an intersection, label the boring the "Intersection of (*Route or SR #*), (*Street Name*) and (*Route or SR #*), (*Street Name*), _____ County, Signal Inventory No. _____". Label borings with "B- *N, S,*

E, W, NE, NW, SE or SW" corresponding to the quadrant location within the intersection.

If the CCTV pole location is located between intersections, The Design-Build Team shall provide a coordinate location and offset, or milepost number and offset. Pole numbers should be made available to the geotechnical drilling Contractor. Include pole numbers in the boring label if they are available. If they are not available, ensure the boring labels can be cross-referenced to corresponding pole numbers or pole locations. For each boring, submit a legible (hand written or typed) boring log signed and sealed by a licensed Geologist or Professional Engineer registered in North Carolina. Include on each boring the SPT blow counts and N-values at each depth, depth of the boring, and a general description of the soil types encountered.

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

Standard Foundation Determination

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

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

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

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

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

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

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

Or

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

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

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

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

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

The Design N-value is less than 4,

The drilled pier length, "L", determined from the Standard Foundations Chart, is greater than the depth of the corresponding boring.

In the case where a standard foundation cannot be used, the Design-Build Team shall be responsible for all additional design and construction costs associated with the non-standard foundation.

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

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

https://connect.ncdot.gov/resources/safety/ITS%20and%20Signals%20Resources/Standard%20Foundation%20Selection%20Form.pdf

If assistance is needed, contact the Engineer.

Non-Standard Foundation Design:

Design non-standard foundations based upon site-specific soil test information collected in accordance with sub-section (1) Soil Test above. Design drilled piers for side resistance only in accordance with Section 4.6 of the *AASHTO Standard Specifications for Highway Bridges*. Use the computer software LPILE version 6.0 or later manufactured by Ensoft, Inc. to analyze drilled piers. Use the computer software gINT version 8i or latest manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs. The Design-Build Team shall provide a drilled pier foundation for each pole with a length and diameter that result in a horizontal lateral movement of less than 1 inch at the top of the pier and a horizontal rotational movement of less than 1 inch at the edge of the pier. Submit any non-standard foundation designs including drawings,

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

3.2 MATERIALS

CCTV Metal Poles

The Design-Build Team shall provide CCTV poles that are a minimum of 50 feet tall.

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

Ensure that allowable pole deflection does not exceed that allowed per 2013 AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 6th Edition, and the latest Interim Specifications. Ensure that maximum deflection at the top of the pole does not exceed 2.5 percent of the pole height.

Use the submerged arc process or other NCDOT previously approved process suitable for poles to continuously weld pole shafts along their entire length. The longitudinal seam weld will be finished flush to the outside contour of the base metal. Ensure shafts have no circumferential welds except at the lower end joining the shaft to the pole base. In the event that a circumferential weld is necessary, prior approval is required from the Engineer and NCDOT Materials and Test Unit. The Design-Build Team shall provide welding that conforms to Article 1072-18 of the 2018 *Standard Specifications for Roads and Structures*, except that no field welding on any part of the pole will be permitted unless approved by a qualified engineer. Refer to Metal Pole Standard Drawing Sheets M2 through M5 for fabrication details. Fabricate anchor bases from plate steel meeting, as a minimum, the requirements of ASTM A 572M Gr 50, AASHTO M270 Gr 50, ASTM A709 Gr 50, or cast steel meeting the requirements of ASTM A 27M Grade 485-250 36 or an approved equivalent. Conform to the applicable bolt pattern and orientation as shown on Metal Pole Standard Drawing Sheet M2.

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

Unless otherwise required by the design, ensure each anchor rod is two-inch diameter and 60” length. The Design-Build Team shall provide ten-inch minimum thread projection at the top of the rod, and eight-inch minimum at the bottom of the rod. Use anchor rod assembly and drilled pier foundation materials that meet the *Foundations and Anchor Rod Assemblies for Metal Poles* Project Special Provision found elsewhere in this RFP.

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

The Design-Build Team shall provide a circular anchor bolt lock plate that will be secured to the anchor bolts at the embedded end with two washers and two nuts. The Design-Build Team shall provide a base plate template that matches the bolt circle diameter of the anchor bolt lock plate. Construct plates and templates from ¼-inch minimum thick steel with a minimum width of four inches. Galvanizing is not required.

The Design-Build Team shall provide four heavy hex nuts and four flat washers for each anchor bolt. For nuts, use AASHTO M291 grade 2H, DH, or DH3 or equivalent material. For flat washers, use AASHTO M293 or equivalent material.

The Design-Build Team shall provide a two-inch hole equipped with an associated coupling and weatherhead approximately five feet below the top of the pole to accommodate passage of CCTV cables from inside the pole to the CCTV camera.

The Design-Build Team shall provide a 2-inch hole equipped with an associated coupling and conduit fittings/bodies approximately 18-inches above the base of the pole accommodate passage of CCTV cables from the CCTV cabinet to the inside of the pole. Refer to Metal Pole Standard Drawing Sheet M3 for fabrication details.

The Design-Build Team shall provide a hand hole access with a watertight cover at a 42-inch height above the base of the metal pole and of the type and size required by the manufacturer of the internal CCT Lowering System to ensure smooth and efficient operation of the CCTV lowering system.

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

For each pole, The Design-Build Team shall provide a ½-inch minimum thread diameter, coarse thread stud and nut for grounding which will accommodate #4 AWG ground wire. Ensure that the lug is electrically bonded to the pole and is conveniently located inside the pole at the hand hole.

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

After fabrication, have steel poles, required mast arms, and all parts used in the assembly hot-dip galvanized per section 1076. Design structural assemblies with weep holes large enough and properly located to drain molten zinc during galvanization process. The Design-Build Team shall provide hot-dip galvanizing on structures that meets or exceeds ASTM Standard A-123. The Design-Build Team shall provide galvanizing on hardware that meets or exceeds ASTM Standard A-153. Ensure that threaded material is brushed

and retapped as necessary after galvanizing. Perform repair of damaged galvanizing that complies with the following:

Repair of Galvanizing	Article 1076-7

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

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

Comply with article 1098-1B "General Requirements" of the 2018 *Standard Specifications for Roads and Structures* for submittal requirements. The Design-Build Team shall provide shop drawings for approval. The Design-Build Team shall provide the copies of detailed shop drawings for each type of structure as summarized below. Ensure that shop drawings include material specifications for each component and identify welds by type and size on the drawing details, not in table format. Do not release structures for fabrication until shop drawings have been approved by NCDOT. The Design-Build Team shall provide an itemized bill of materials for all structural components and associated connecting hardware on the drawings.

Comply with article 1098-1A "General Requirements" of the 2018 *Standard Specifications for Roads and Structures* for Qualified Products List (QPL) submittals. All shop drawings shall include project location description, CCTV inventory number(s), and a project number or work order number on the drawings.

Summary of information required for metal pole review submittal:

Item	Hardcopy Submittal	Electronic Submittal	Comments / Special Instructions
Sealed, Approved ITS Plan / Loading Diagram	1	1	All structure design information needs to reflect the latest approved ITS plans.
Custom Pole Shop Drawings	4 sets	1 set	Submit drawings on 11" x 17" format media. Show NCDOT project number and CCTV camera number in or above the title block.
Standard Pole Shop Drawings (from the QPL)	4 sets	1 set	Submit drawings on 11" x 17" format media. Show NCDOT project number and CCTV camera number in or above the title block.
Structure Calculations	1 set	1 set	Submit calculations on 8½" x 11" format media. Show NCDOT project number and CCTV camera number in the upper right corner of each page.
Standard Pole Foundation Drawings	1 set	1 set	Submit drawings on 11" x 17" format media. Submit a completed Standard Foundation Selection form for each pole using foundation table on Metal Pole Drawing M-8.
Custom Foundation Drawings	4 sets	1 set	Submit drawings on 11" x 17" format media. Show NCDOT project number and CCTV camera number in or above the title block.
Foundation Calculations	1	1	Submit calculations on 8½" x 11" format media. Show NCDOT project number and CCTV camera number in the upper right corner of each page.
Soil Boring Logs and Report	1	1	Report should include a location plan and a soil classification report including soil capacity, water level, hammer efficiency, soil bearing pressure, soil density, etc. for each pole.

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

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

3.3 CONSTRUCTION METHODS

CCTV Metal Poles

Install anchor rod assemblies in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* Project Special Provision found elsewhere in this RFP.

Erect CCTV metal poles only after concrete has attained a minimum allowable compressive strength of 3,000 psi. For further construction methods, see construction methods for Metal Strain Pole.

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

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

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

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

Perform repair of damaged galvanizing that complies with the 2018 *Standard Specifications for Roads and Structures*, Article 1076-7 "Repair of Galvanizing."

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

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

Install CCTV metal poles, hardware, and fittings as shown on the manufacturer's installation drawings. Install poles so that when the pole is fully loaded it is within two degrees of vertical.

Drilled Pier Foundations

Construct drilled pier foundations in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* Project Special Provision found elsewhere in this RFP.

4. CCTV LOWERING SYSTEM

4.1 Description

A. CCTV Lowering System

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

B. Portable CCTV Lowering System

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

4.2 Material

A. CCTV Lowering System

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

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

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

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

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

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

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

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

Provide a connector block as specified by the manufacturer or with the lowering device. The connector block shall be equipped with modular, self-aligning and self-adjusting female and male socket contact halves. The lowering device must be equipped with enough contacts to permit operation of all required functions of the camera. The lowering device connections must carry the signals, voltages, and current required by the device(s) connected to them under full load conditions. Submit documentation to the Engineer showing pin assignment.

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

Provide cored holes in the rubber to create moisture-tight seals when mated with the male connector. All wire leads from both the male and female contacts shall be permanently molded in a body of chlorosulfonated polyethylene, or an approved equal. All current-carrying wires and signal wires shall be minimum #18 AWG stranded copper cable. All contacts shall be self-wiping with a shoulder at the base of each male contact so that it is recesses in the female block, thereby giving each contact a rain-tight seal when mated.

B. Portable CCTV Lowering System

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

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

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

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

4.3 Construction Methods

A. CCTV Lowering System

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

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

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

FOUNDATIONS AND ANCHOR ROD ASSEMBLIES FOR METAL POLES

(1-17-12) (Rev. 11-22-17) 9,14,17 DB9 R05

Description

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

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

This provision does not apply to foundations for signal pedestals; see Section 1743 of the 2018 *Standard Specifications for Roads and Structures* and 2018 Roadway Standard Drawing No. 1743.01.

Materials

Refer to the 2018 *Standard Specifications for Roads and Structures.*

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

Provide Type 3 material certifications in accordance with Article 106-3 of the 2018 *Standard Specifications for Roads and Structures* for conduit, rollers, chairs and anchor rod assemblies. Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store foundation and anchor rod assembly materials so materials are kept clean and free of damage. Bent, damaged and / or defective materials shall be rejected.

Use conduit type in accordance with the contract. Use Class A concrete for footings and pedestals, Class Drilled Pier concrete for drilled piers and Class AA concrete for grade beams and wings including portions of drilled piers above bottom of wings elevations. Corrugated temporary casings may be accepted at the discretion of the Engineer. A list of approved polymer slurry products is available from:

https://connect.ncdot.gov/resources/Geological/Pages/Products.aspx

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

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

Do not use lock washers. Use steel anchor rods, nuts and washers that meet ASTM F1554 for Grade 55 rods and Grade A nuts. Use steel plates and washers embedded in concrete with a thickness of at least 1/4". Galvanize anchor rods and exposed nuts and washers in accordance with Article 1076-4 of the 2018 *Standard Specifications for Roads and Structures*. It is not necessary to galvanize nuts, plates and washers embedded in concrete.

Construction Methods

Install the required size and number of conduits in foundations in accordance with the plans developed by the Design-Build Team and accepted submittals. Construct top of piers, footings, pedestals, grade beams and wings flat, level and within 1" of elevations shown in the plans

developed by the Design-Build Team or approved by the Engineer. Provide an Ordinary Surface finish in accordance with Subarticle 825-6(B) of the 2018 *Standard Specifications for Roads and Structures* for portions of foundations exposed above finished grade. Do not remove anchor bolt templates or pedestal or grade beam forms or erect metal poles or upright trusses onto foundations until concrete attains a compressive strength of at least 3,000 psi.

(A) Drilled Piers

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

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

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

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

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

Contain and dispose of drilling spoils and waste concrete as directed and in accordance with Section 802 of the 2018 *Standard Specifications for Roads and Structures*. Drilling spoils consist of all materials and fluids removed from excavations.

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

If temporary casings become stuck or the Design-Build Team proposes leaving casings in place, temporary casings shall be installed against undisturbed material. Unless otherwise approved, do not leave temporary casings in place for mast arm poles and cantilever signs. The Engineer will determine if casings may remain in place. If the Design-Build Team proposes leaving temporary casings in place, do not begin drilling until a casing installation method is approved.

Use polymer slurry and additives to stabilize holes in accordance with the slurry manufacturer’s recommendations. Provide mixing water and equipment suitable for polymer slurry. Maintain the required slurry properties at all times except for sand content.

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

Remove soft and loose material from bottom of holes using augers to the satisfaction of the Engineer. Assemble rebar cages and place cages and Drilled Pier concrete in accordance with Subarticle 411-4(E) of the 2018 *Standard Specifications for Roads and Structures*, except for the following:

(1) Inspections for tip resistance and bottom cleanliness are not required,

(2) Temporary casings may remain in place if approved, and

(3) Concrete placement may be paused near the top of pier elevations for anchor rod assembly installation and conduit placement or

(4) If applicable, concrete placement may be stopped at bottom of grade beam or wings elevations for grade beam or wing construction.

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

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

If drilled piers are questionable, pile integrity testing (PIT) and further investigation may be required in accordance with Article 411-5 of the 2018 *Standard Specifications for Roads and Structures*. A drilled pier shall be considered defective in accordance with Subarticle 411-5(D) of the 2018 *Standard Specifications for Roads and Structures* and drilled pier acceptance shall be based in part on the criteria in Article 411-6 of the 2018 *Standard Specifications for Roads and Structures* except for the top of pier tolerances in Subarticle 411-6(C) of the 2018 Standard Specifications for Roads and Structures.

If a drilled pier is under further investigation, do not grout core holes, backfill around the pier or perform any work on the drilled pier until the Engineer accepts the pier. If the drilled pier is accepted, dewater and grout core holes and backfill around the pier with approved material to finished grade. If the Engineer determines a pier is unacceptable, remediation shall be required in accordance with Article 411-6 of the 2018 *Standard*

Specifications for Roads and Structures. No extension of completion date or time will be allowed for remediation of unacceptable drilled piers or post repair testing.

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

(B) Footings, Pedestals, Grade Beams and Wings

Excavate as necessary for footings, grade beams and wings in accordance with the plans developed by the Design-Build Team, accepted submittals and Section 410 of the 2018 *Standard Specifications for Roads and Structures*. If unstable, caving or sloughing materials are anticipated or encountered, shore foundation excavations as needed with an approved method. Notify the Engineer when foundation excavation is complete. Do not place concrete or reinforcing steel until excavation dimensions and foundation material are approved by the Engineer.

Construct cast-in-place reinforced concrete footings, pedestals, grade beams and wings with the dimensions shown in the plans developed by the Design-Build Team and in accordance with Section 825 of the 2018 *Standard Specifications for Roads and Structures*. Use forms to construct portions of pedestals and grade beams protruding above finished grade. Provide a chamfer with a 3/4" horizontal width for pedestal and grade beam edges exposed above finished grade. Place concrete against undisturbed soil or backfill and fill in accordance with Article 410-8 of the 2018 *Standard Specifications for Roads and Structures*. Proper compaction around footings and wings is critical for foundations to resist uplift and torsion forces.

(C) Anchor Rod Assemblies

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

Protect anchor rod threads from damage during storage and installation of anchor rod assemblies. Before placing anchor rods in foundations, turn nuts onto and off rods past leveling nut locations. Turn nuts with the effort of one workman using an ordinary wrench without a cheater bar. Report any thread damage to the Engineer that requires extra effort to turn nuts.

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

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

(1) Turn leveling nuts onto anchor rods to a distance of one nut thickness between the top of foundation and bottom of leveling nuts. Place washers over anchor rods on top of leveling nuts.

(2) Determine if nuts are level using a flat rigid template on top of washers. If necessary, lower leveling nuts to level the template in all directions or if applicable, lower nuts to tilt the template so the metal pole or upright truss will lean as shown in the plans developed by the Design-Build Team. If leveling nuts and washers are not in full contact with the template, replace washers with galvanized beveled washers.

(3) Verify the distance between the foundation and leveling nuts is no more than one nut thickness.

(4) Place base plate with metal pole or upright truss over anchor rods on top of washers. High mount luminaires may be attached before erecting metal poles but do not attach cables, mast arms or trusses to metal poles or upright trusses at this time.

(5) Place washers over anchor rods on top of base plate. Lubricate top nut bearing surfaces and exposed anchor rod threads above washers with beeswax, paraffin or other approved lubricant.

(6) Turn top nuts onto anchor rods. If nuts are not in full contact with washers or washers are not in full contact with the base plate, replace washers with galvanized beveled washers.

(7) Tighten top nuts to snug-tight with the full effort of one workman using a 12" wrench. Do not tighten any nut all at once. Turn top nuts in increments. Follow a star pattern cycling through each nut at least twice.

(8) Repeat (7) for leveling nuts.

(9) Replace washers above and below the base plate with galvanized beveled washers if the slope of any base plate face exceeds 1:20 (5%), any washer is not in firm contact with the base plate or any nut is not in firm contact with a washer. If any washers are replaced, repeat (7) and (8).

(10) With top and leveling nuts snug-tight, mark each top nut on a corner at the intersection of two flats and a corresponding reference mark on the base plate. Mark top nuts and base plate with ink or paint that is not water-soluble. Use the turn-of-nut method for pretensioning. Do not pretension any nut all at once. Turn top nuts in increments for a total turn that meets the following nut rotation requirements:

NUT ROTATION REQUIREMENTS (Turn-of-Nut Pretensioning Method)	
Anchor Rod Diameter, inch	**Requirement**
≤ 1 1/2	1/3 turn (2 flats)
> 1 1/2	1/6 turn (1 flat)

Follow a star pattern cycling through each top nut at least twice.

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

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

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

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

(13) Do not grout under base plate.

OVERHEAD AND DYNAMIC MESSAGE SIGN FOUNDATIONS

(9-11-17) DB9 R07

Description

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

Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 6th Edition, 2013, including the latest interim specifications and the latest interim revisions.

Materials

Use sign foundation materials that meet the *Foundations and Anchor Rod Assemblies for Metal Poles* Project Special Provision found elsewhere in this RFP.

Subsurface Conditions

A subsurface investigation shall be required if the Engineer determines these assumed subsurface conditions do not apply to a sign location and the sign cannot be moved. No extension of completion date or time will be allowed for subsurface investigations.

Subsurface Investigations

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

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

Sign Foundation Designs

Design sign foundations for the wind zone and clearances shown in the plans developed by the Design-Build Team and the slope of finished grade at each sign location. Use the assumed soil parameters and groundwater elevation above for sign foundation designs unless a subsurface investigation is performed or required by the Engineer. For sign locations requiring a subsurface investigation, design sign foundations for the subsurface conditions at each sign location. Design footings, pedestals, drilled piers, grade beams and wings in accordance with the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 6th Edition, 2013, including the latest interim specifications and the latest interim revisions. In some instances, conflicts with drainage structures may dictate sign foundation types.

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

Design drilled piers for side resistance only in accordance with Section 4.6 of the AASHTO *Standard Specifications for Highway Bridges* except reduce ultimate side resistance by 25% for uplift. Use the computer software LPILE version 2016 or later manufactured by Ensoft, Inc. to analyze drilled piers. Provide drilled pier designs with a horizontal deflection of less than 1" at top of piers. For cantilever signs with single drilled pier foundations supporting metal poles, use wings to resist torsion forces. Provide drilled pier designs with a factor of safety of at least 2.0 for torsion.

For drilled pier sign foundations supporting upright trusses, use dual drilled piers connected with a grade beam having a moment of inertia approximately equal to that of either pier. The Broms' method is acceptable to analyze drilled piers with grade beams instead of LPILE. Use a safety factor of at least 3.5 for the Broms' design method in accordance with C13.6.1.1 of the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 6th Edition, 2013, including the latest interim specifications and the latest interim revisions.

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

Construction Methods

Construct footings, pedestals, drilled piers, grade beams and wings and install anchor rod assemblies for sign foundations in accordance with the Foundations and Anchor Rod Assemblies for Metal Poles Project Special Provision found elsewhere in this RFP. Submit boring logs, if any, working drawings and design calculations for acceptance in accordance with Article 105-2 of the 2018 NCDOT *Standard Specifications for Roads and Structures*. Submit working drawings showing plan views, required foundation dimensions and elevations and typical sections with reinforcement, conduit and anchor rod assembly details. Include all boring logs, design calculations and LPILE output for sign foundation design submittals. Have sign foundations designed, detailed and sealed by an engineer licensed in the state of North Carolina.

ROADWAY LIGHTING FOUNDATIONS

(9-12-17) DB9 R09

Description

Roadway lighting foundations include foundations for high mount and light standards. High mount foundations for high mount standards and standard foundations for light standards consist of drilled piers or footings with pedestals, conduit and anchor rod assemblies. Construct roadway lighting foundations in accordance with the contract, 2018 *Roadway Standard Drawings* and accepted submittals. Define "high mount foundation" as a drilled pier including the conduit and anchor rod assembly that meets 2018 Roadway Standard Drawing No. 1402.01. Define "standard foundation" as a drilled pier or footing with pedestal including the conduit and anchor rod assembly that meets 2018 Roadway Standard Drawing No. 1405.01.

Materials

Use roadway lighting foundation materials that meet the *Foundations and Anchor Rod Assemblies for Metal Poles* Project Special Provision found elsewhere in this RFP. Provide metal shrouds for median mounted light standards in accordance with Subarticle 1400-4(I) of the 2018 *Standard Specifications for Roads and Structures*.

Roadway Lighting Foundations

(A) High Mount Foundations

Construct high mount foundations for the wind zone and high mount heights shown in the plans developed by the Design-Build Team unless the following assumed site conditions are not applicable to high mount locations:

1) Soil with unit weight (γ) $\geq$ 120 pcf and friction angle (ϕ) $\geq$ 30°,
2) Groundwater at least 7 feet below finished grade and
3) Slope of finished grade 6:1 (H:V) or flatter.

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

(B) Standard Foundations

Construct standard foundation types for the light standard types shown in the plans developed by the Design-Build Team and the site conditions at each light standard location. When weathered or hard rock, boulders or obstructions conflict with standard foundations, submit an alternate standard foundation design for acceptance in accordance with Article 105-2 of the 2018 *Standard Specifications for Roads and Structures*. No extension of completion date or time will be allowed for alternate standard foundations.

Subsurface Investigations

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

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

High Mount Foundation Designs

Design high mount foundations for the wind zone and high mount heights shown in the plans and the slope of finished grade and subsurface conditions at each high mount location. Design drilled piers, footings and pedestals in accordance with the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*, 6th Edition, 2013, including the latest interim specifications and the latest interim revisions.

Design drilled piers for side resistance only in accordance with Section 4.6 of the AASHTO *Standard Specifications for Highway Bridges*. Use the computer software LPILE version 2016 or later manufactured by Ensoft, Inc. to analyze drilled piers. Provide drilled pier designs with a horizontal deflection of less than 0.5" at top of piers.

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

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

Construction Methods

Grade around roadway lighting locations with cut and fill slopes as shown on 2018 Roadway Standard Drawing No. 1402.01 or 1405.01. Construct drilled piers, footings and pedestals and install anchor rod assemblies for roadway lighting foundations in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* Project Special Provision found elsewhere in this RFP.

For median mounted light standards, place concrete for median barriers and underlying pedestals in the same pour. Construct concrete barriers in accordance with the contract and make concrete median barriers continuous through standard foundations. Coordinate construction of median mounted light standards with sign structures, concrete barriers, drainage structures, etc. to avoid conflicts.

LIGHTING

(6-24-2018) DB14 R02-2

1.00 DESCRIPTION

The work covered by this Section consists of furnishing, installing, connecting, and placing into satisfactory operating condition roadway lighting at locations shown on the plans. Perform all work in accordance with these Special Provisions, the Plans, the National Electrical Code, and the North Carolina Department of Transportation "Standard Specifications for Roads and Structures" (*2018 Standard Specifications*).

Perform all work in conformance with Division 14 of the *2018 Standard Specifications* except as modified or added to by these Special Provisions. Install all bore pits outside the clear zone, as defined in the AASHTO Roadside Design Guide or as directed by the Engineer.

In addition to the requirements of Division 1400, other specific Sections of the *2018 Standard Specifications* applicable to the work on this project are listed below.

Section 1404	Light Standards
Section 1407	Electric Service Pole and Lateral
Section 1408	Light Control System
Section 1409	Electrical Duct
Section 1410	Feeder Circuits
Section 1411	Electrical Junction Boxes
Section 1412	Underpass Lighting

2.00 LIGHT STANDARD LIGHT EMITTING DIODE (LED) LUMINAIRES

2.10 DESCRIPTION

Furnish, install and place into satisfactory operation luminaire, either on a bracket arm or directly mounted to the standard, complete with all light sources, drivers, wiring inside standard from circuit conductors to luminaire, in-line breakaway fuseholders and fuses and ground wiring at the pole on light standards less than 55 ft. in height.

Type	HPS Replacement Equivalent	Color Temp	Min. % of initial output at 70k hours	Min. Maintained Delivered Lumens
185W LED	250W	3500K ±500K	83%	15,500
285W LED	400W	3500K ±500K	83%	19,150

Third party certified photometric files in IES format are required to be submitted with the catalog cuts for the proposed LED roadway luminaire. Photometric files must show that proposed luminaire will meet or exceed the design shown in the plans.

The manufacturer shall state the Light Loss Factor (LLF) used in the photometric calculations for the proposed luminaire. LLF shall be calculated as follows:

LLF = Lamp Lumen Depreciation (LLD) x Luminaire Dirt Depreciation (LDD)

- Lamp Lumen Depreciation (LLD) shall be the value calculated and reported by the manufacturer based on the LM-80 and TM-21 reports for the proposed fixture for 70,000 hours at 25° C.
- Luminaire Dirt Depreciation (LDD) = 0.90

2.20 MATERIALS

2.21 LUMINAIRE REQUIREMENTS

A. General Requirements

- LM-79 photometric test reports shall be provided for all LED luminaires. LM-79 luminaire photometric reports shall be produced by an independent test laboratory and include the following:
    - Name of test laboratory. The test laboratory must hold National Voluntary Laboratory Accreditation Program (NVLAP) accreditation for the IES LM-79 test procedure or must be qualified, verified, and recognized through the U.S. Department of Energy's CALiPER program.
    - Report number
    - Date
    - Complete luminaire catalog number. Catalog number tested must match the catalog number of the luminaire submitted, except for variations which do not affect performance.
    - Description of luminaire, LED light source(s), and LED driver(s)
    - Goniophotometry
    - Colorimetry
- LM-80 lumen maintenance test report shall be provided for each respective LED light source.
- Luminaire shall be constructed of a single piece die cast aluminum housing. Each luminaire shall be finished gray in color unless otherwise noted.
- The luminaire shall have a 7 pin ANSI C136.41 compliant photocontrol receptacle for future expansion capabilities.
- Provide a summary of reliability testing performed for LED driver.
- Luminaires maximum total power consumption shall not exceed the values shown in the table above. Nominal luminaire input wattage shall account for nominal applied voltage and any reduction in driver efficiency due to sub-optimal driver loading.
- Luminaire shall have a maximum Backlight, Uplight & Glare (BUG) rating of 3-0-3 and an IESNA distribution of Type II or Type III as required to meet the spacing, the average maintained foot-candle level and the average to minimum uniformity ratio requirements shown on the plans. The same BUG rating and distribution type shall be used throughout the project.

- Minimum Ingress Protection (IP) dust and moisture ratings for the luminaire electrical components (driver and surge protection) and luminaire optical components shall be IP65 and IP66, respectively, as specified in ANSI C136.25.

- Luminaire shall have external and internal labels per ANSI C136.15 and ANSI C136.22, respectively. Internal label shall identify the manufacturer, year and month of manufacture and the manufacturer's part number.

- Luminaire shall have an internal bubble level.

- Luminaires shall start and operate in -20°C to +40°C ambient.

- Luminaires shall be rated for continuous service at an ambient temperature of 40°C (104°F)

- Electrically test fully assembled luminaires before shipment from factory.

- Effective Projected Area (EPA) and weight of the luminaires shall not exceed 1.4 square feet and 46 lbs.

- Luminaires shall be designed for ease of electrical component replacement.

- Luminaires shall be rated for minimum 2G vibration, minimum, per ANSI C136.31.

- LED light sources and drivers shall be RoHS compliant.

- The luminaire manufacturer shall have no less than five (5) years of experience in manufacturing LED-based lighting products and the manufacturing facility must be ISO 9001 certified.

- Luminaire shall have a 1.25" to 2.0" adjustable tenon mount for connection to luminaire bracket arm assembly.

- Pole hardware, nuts, bolts, and washers, etc. shall be made from 18-8 stainless steel, or steel conforming to ASTM A307 galvanized in accordance with ASTM A153.

- Grommets shall be installed in cable entry holes. Cable entry holes shall be free from sharp edges which might cut conductors or an ungloved hand.

- All conductors inside the luminaire shall be neatly secured with tie-wraps as needed to prevent pinch points and assist in trouble shooting.

B. Driver

- Shall be 0V-10V dimmable.

- Rated case temperature shall be suitable for operation in the luminaire operating in the ambient temperature range of -20°C to +40°C.

- Shall be rated for 480VAC at 50/60 Hz, and shall operate normally for input voltage fluctuations of ± 10%.

- Shall have a minimum Power Factor (PF) of 0.90 at full input power and across specified voltage range.

- Shall provide UL Class II output.

C. Surge Suppression

- Integral surge protection shall meet ANSI/IEEE C62.45 procedures based on ANSI/IEEE C62.41.2 definitions for standard and optional waveforms for location category C-High 10kV/10kA test, IEC 61000-4-2 (Electrostatic Discharge) 8kV Air/4kV Contact test and IEC 61000-4-4 (Fast Transients).

D. Electromagnetic interference

- Luminaires shall have a maximum Total Harmonic Distortion (THD) of 20% at full input power and across specified voltage range.

- Luminaires shall comply with FCC 47 CFR part 15 non-consumer RFI/EMI standards.

E. Electrical safety testing

- Luminaires shall be listed for wet locations.

- Luminaires shall be UL listed and labeled.

F. Finish

- Luminaires shall be painted with a corrosion resistant polyester powdered paint with a minimum 2.0 mil thickness.

- Luminaires shall exceed a rating of six per ASTM D1654 after 1000 hours of salt spray fog testing per ASTM B117.

- The coating shall exhibit no greater than 30% reduction of gloss per ASTM D523, after 500 hours of QUV testing at ASTM G154 Cycle 6.

- Exterior surfaces shall be smooth and free of burrs.

G. Thermal management

- Mechanical design of protruding external surfaces (heat sink fins) on roadway luminaries shall facilitate hose-down cleaning and discourage debris accumulation.

- Liquids or moving parts will not be allowed for thermal management.

H. Color Quality

- Minimum Color Rendering Index (CRI) of 70 with a Correlated Color Temperature (CCT) of 3000K to 4000K

I. Optics

- Transmissive optical components shall be applied in accordance with OEM design guidelines to ensure suitability for the thermal/mechanical/chemical environment.

J. The following shall be in accordance with corresponding sections of ANSI C136.37

- All internal components shall be assembled and pre-wired using modular electrical connections.

- Terminal blocks shall be used for incoming AC lines. Terminal blocks shall be easily accessible to installers or repair personnel. Wire nuts are prohibited inside the luminaire housing.

K. Latching and hinging

- Refractor and housing door holders and hinges shall be designed to maintain positive control of door to the luminaire body so as not to allow the accidental disengagement of either door.

- Drivers shall be mounted to a housing door designed to be opened from the bottom of the luminaire. Housing door shall allow easy removal for troubleshooting/repair on the ground.

L. Manufacturer or local sales representative shall provide installation and troubleshooting support via telephone and/or email.

2.30 WARRANTY

Provide a minimum ten-year warranty covering maintained integrity and functionality of the luminaire housing, wiring, and connections, LED light source(s) and LED driver. Negligible light output from more than 10 percent of the LED packages constitutes luminaire failure.

Warranty period shall begin after project acceptance by the Department. Supplier shall furnish documentation of warranty procedures to the Design-Build Team stating that warranty is for NCDOT.

2.40 CONSTRUCTION METHODS

Level and secure each luminaire in all directions. Adjust any luminaires, as directed by the Engineer, to provide optimal illumination distribution.

All LED packages on all luminaires must be operating normally at contract completion. Any luminaire displaying improper operating characteristics prior to contract completion will be replaced by the Design-Build Team at no additional cost to the Department.

3.00 LIGHTING CONTROL SYSTEM

3.10 DESCRIPTION

The work covered under this section consists of furnishing and installing an entire control system, including enclosure, control panel, breakers, terminal blocks, wiring, conduits, lightning arrester, a concrete foundation, metal pole and galvanized slotted channel is also included.

The control system will be standard electrical components in a stainless steel enclosure mounted on a metal pole with a concrete foundation as shown in the contract.

3.20 MATERIALS

Refer to Division 10 of the *2018 Standard Specifications*.

Item	**Section**
Conduit	1091-3
Portland Cement Concrete, Class A	1000-4
Wire and Cable	1091-2, 1400-2

Provide concrete foundations and wire in accordance with the *2018 Standard Specifications*.

Use a piece of 4” rigid galvanized steel conduit (RGC), embedded in concrete as shown in the plans, for mounting the control system.

Provide a NEMA type 3R stainless steel enclosure with external stainless mounting flanges, drip shield, back panel and continuous hinge door with a print pocket. Provide a door closing mechanism interlocked with a flange mounted operator handle to prevent the opening of the door with the service circuit breaker in the ON position, except by use of safety override devices.

Provide an enclosure approximately 36" (h) x 30" (w) x 10" (d) unless noted otherwise in the plans. Provide only openings necessary for the entrance of conduits as shown in the plans. Do not use knockouts. Ensure the enclosure conforms with NEC Article 312 and mount the devices so the NEC clearances will be provided, except use 1.5" where not specified or noted in the tables for minimum wire bending space.

Use minimum 1-5/8” x 1-5/8” galvanized slotted steel framing channel with straps and bolts for the mounting brackets and hardware for attaching the enclosure. Use galvanized finish on the brackets and hardware and coat all field cuts or scratches with organic zinc repair paint.

Provide a neutral bar, bonded to the panel, with sufficient box lug type terminals to accept the required number of wires.

Mount components to the back panel with manufacturer supplied mounting brackets or permanently attached screw studs.

Use a service circuit breaker providing a minimum interrupting rating of 22,000 A. Provide thermal magnetic, molded case, permanent trip breakers. Provide multi-tap, solderless, load side box lugs or distribution terminal blocks of the appropriate size. Use insulating material approved for NEMA 3R applications. Provide a breaker with a voltage and amperage rating as indicated in the plans.

Use feeder circuit breakers which are rated 14,000 A minimum interrupting capacity and have an open type molded case with a non-adjustable thermal magnetic trip setting as noted in the plans.

Where Communication Gateways are required, provide a single pole, open type gateway circuit breaker rated at 240 VAC phase to ground with a minimum interrupting current capacity of 5,000 A and a high magnetic trip setting of 15 A.

Use a Type 1 surge protection device (SPD) meeting UL 1449 and UL 96A, designed to contain and arrest an arc of 20,000 A. Install the SPD on the load side of the service breaker.

Use terminals and lugs rated for the connection of the appropriate size copper conductors. All conductors shall be made of copper and neatly wrapped in bundles or run in plastic raceways.

Perform all galvanizing in accordance with Section 1076.

Provide a drawing to scale showing the location, brand and catalog number of each component of the control system for approval. The completed light control system shall be marked "Suitable for Use as Service Equipment", in a prominent location in the enclosure, in accordance with NEC Article 409.110. If the control system is not made in a certified UL 60947-4-1A Panel Shop, a third party, recognized by the Department of Insurance as having the authority, shall label the control systems.

3.30 CONSTRUCTION METHODS

Construct the new control system foundation at the new location as shown in Standard Drawing 1408 of the Roadway Standard Drawings, with the top of the foundation 3 inches above finished grade.

Fasten the enclosure to the pole by means of a galvanized bracket assembly as shown in the plans. Make all cuts square and remove all rough edges. Have mounting holes match existing mounting holes of the enclosure.

Arrange all conduits entering the enclosure in a neat symmetrical manner and extend directly downward into the foundation. Install six RGC feeder circuit conduits as shown in the Roadway Standard Drawings.

Install a Control System Junction Box as shown in the plans. Stub all feeder circuit conduits and spare conduits from Control System in the Control System Junction Box. See Section 1412 of the *2018 Standard Specifications* for junction box construction methods. See plans for conduit sizes. Place pull cord in any unused conduits and cap unused conduit in junction box.

To prevent the creation of electrically parallel paths, install a bonded conduit choke on the underground termination point of the system grounding conductor conduit in accordance with NEC Article 250.64(E). Do not terminate the system grounding conduit under the concrete foundation pad.

Install a grounding electrode system consisting of a minimum of two ground rods spaced not less than 6 feet apart at all new lighting control system panels. Connect ground rods with an appropriately sized bonding jumper.

Apply two coats of organic zinc repair paint to all field cut metal and conduit threads as specified in Article 1076-7 of the *2018 Standard Specifications*.

Install a 4" to 2" galvanized reducing bushing to the top of the 4" RGC the control system enclosure is mounted to. Install a 10' section of 2" RGC on the reducing bushing and install a cap on the top of the 2" RGC.

4.00 COMMUNICATION GATEWAY

4.10 DESCRIPTION

The Design-Build Team shall provide and install a communication gateway at the lighting control panels noted on the plans. The communication gateway will be used to provide communication from the control nodes on the luminaires to a centralized monitoring software package. The communication gateway will be mounted on a piece of rigid galvanized conduit installed above the lighting control panel.

4.20 MATERIAL

The communication gateway shall be a GE LightGrid gateway rated for the voltage shown in the plans.

Use conduit and conductors as specified in Article 1400-2 of the *2018 Standard Specifications*.

Provide stainless steel straps, galvanized conduit hangers, galvanized bolts, washers and nuts, and liquid-tight flexible metallic conduit (LFMC).

4.30 CONSTRUCTION METHODS

Mount the communication gateway to the 2" RGC pole, installed as part of the control system special provision, using the bands included with the gateway. Remove an existing cable gland in the bottom of the gateway enclosure and replace with a ½" RGC fitting. Install ½" RGC and appurtenances required to route conduit to bottom of lighting control panel enclosure. Transition RGC to LFMC to make the turn into the bottom of the enclosure. Secure LFMC to bottom of

enclosure using a weatherproof fitting. Install a bonding bushing on the LFMC fitting inside the enclosure and attach to bonding jumper inside the enclosure.

Strap standoffs with rigid conduit hangers to the 2" RGC and secure ½" conduit to the conduit hanger. Install #12 THWN conductors inside the ½" RGC for power from the gateway circuit breaker in the control system enclosure to the gateway. Use a UV resistant cable tie to secure the magnetic GPS antenna to the frame.

See Section 6.00 below for commissioning requirements.

5.00 CONTROL NODE

5.10 DESCRIPTION

The Design-Build Team shall provide and install a communication node with each LED luminaire on the project. The communication node will be used to interface with the Department's Statewide lighting control system.

5.20 MATERIALS

The communication node shall be a GE LightGrid version 2.0 (or higher) node rated for the same service voltage as the luminaire. No other materials are required for this section.

5.30 CONSTRUCTION METHODS

Install communication node on the seven-pin photocell receptacle of the luminaire. The communication node utilizes a twist-lock connection to ensure positive connection to the luminaire.

See Section 6.00 below for commissioning requirements.

6.00 SMART CONTROL SYSTEM INITILIZATION AND COMMISSIONING

6.10 DESCRIPTION

The Communication Gateway(s) and Control Nodes as described in the prior sections require commissioning to enable communication with the existing Statewide lighting control system.

The Design-Build Team shall coordinate with Brady/Trane Services (Brady) at 919-232-5764 or warranty.request@bradyservices.com to have Brady commission the smart controls system, incorporate new gateways and smart nodes into the LightGrid infrastructure and troubleshoot communication issues. Brady shall bill the Design-Build Team directly for these services.

6.20 MATERIALS

No materials are required for this section.

6.30 CONSTRUCTION METHODS

As part of this contract, the Design-Build Team shall provide new GE LightGrid gateways and control nodes. See Sections 4.00 and 5.00, respectfully, of these Project Special Provisions for gateway and control node requirements.

As a function of the LightGrid system, the Design-Build Team is unable to turn the lights on for testing during the day. The luminaires installed as part of this project are powered 24/7; however, the control node installed on each luminaire has an integral photocontrol, preventing the luminaire from operating during daylight hours.

The Design-Build Team shall notify Brady at least two weeks prior to beginning the construction work. Brady will remotely commission the new LightGrid system, override the internal control node photocontrol and turn all of the control nodes on for 24/7 operation for the duration of the lighting construction. This will allow the Contractor to turn the lighting circuits on and off during the day via the breakers in the lighting control panel.

The Design-Build Team shall notify Brady again when lighting work is complete. At that point Brady will remotely confirm that there is communication between the control nodes and the gateway, and will place the system to normal dusk to dawn operation.

In the event that a communication failure of some, or all, smart nodes or the gateway is encountered, the Design-Build Team shall coordinate with Brady to troubleshoot and resolve the failure.

6.40 MEASUREMENT AND PAYMENT

The Design-Build Team will be reimbursed by the Department for the actual verified cost of charges by Brady for LightGrid service charges. The service charges may include efforts by Brady to: commission the newly installed gateways and control nodes; place the GE LightGrid system into 24/7 operation; place the system in normal dusk to dawn operation; troubleshoot communication issues with the LightGrid system.

7.00 UNDERPASS LIGHTING

7.10 DESCRIPTION

Same as Article 1412-1 of the *2018 Standard Specifications*, except include a photocell receptacle.

7.20 MATERIALS

Same as Article 1412-2 except as amended below:

- Modify the last sentence of lines 1 and 2 of page 14-23 of the *2018 Standard Specifications* to read “Provide sealed, directional LED light engines covered by a glass refractor.”

- Add the following to the last paragraph of Article 1412-2 of the *2018 Standard Specifications*. “Provide a 7-pin photocontrol receptacle securely mounted to the enclosure.”

7.30 CONSTRUCTION METHODS

Same as Article 1412-3 of the *2018 Standard Specifications*, except add the following:

Install the photocontrol receptacle either directly to the top of the enclosure, or use a standoff bracket. If a standoff bracket is used, the conductor from the photocontrol receptacle to the disconnect panel shall be enclosed and secured in liquid-tight flexible metallic conduit.

Install a GE LightGrid smart node, as described in Section 5.00 of these Special Provisions, on the photocontrol receptacle and integrate with the existing Statewide lighting control system, as described in Section 6.00 above.

See Section 6.00 above for commissioning requirements.

7.40 MEASUREMENT AND PAYMENT

Same as Article 1412-4 of the *2018 Standard Specifications*. The GE LightGrid smart node and integration shall be paid for in other Sections of these Special Provisions.

EPOXY PAVEMENT MARKING MATERIAL
(12-15-15)

Description

This work shall consist of applying black epoxy pavement marking material on concrete or asphalt pavements.

Materials

Epoxy Pavement Marking Material shall conform to the requirements of Section 1087 of the 2018 *Standard Specifications for Roads and Structures* and the following:

Epoxy Composition

Epoxy pavement marking shall conform to the following materials:

Component	By Weight
Binder - Epoxy Resin	77% Max.
Titanium Dioxide (ASTM D-476-73 Type II & III)	18% Min.
Chrome Yellow (for yellow markings) (ASTM D-211 Type III)	23% Min.

The epoxy resin proportion of component A white, and component A yellow shall be identical, if the same component B is used for both white and yellow.

Combine the two components of the resin in the manner and proportions as recommended by the manufacturer based on tested pavement marking performance.

Epoxy Pavement Marking Material

(A) Formulation

Use epoxy pavement marking material consisting of 100% solid two-part system formulated and designed to provide a simple volumetric mixing ratio of the two components.

(B) Epoxide Value: ASTM D1652

WPE of the epoxy resin shall be 250 ± 50 for both white and yellow component A on a pigment free basis.

(C) Amine Value: ASTM D2074

The total amine value of the curing agent (component B) shall be 450 ± 50

(D) Requirements

(1)	Color	
	Black:	Shall meet ASTM standard
(2)	Hardness:	ASTM D2240
	Minimum Shore D hardness:	80
(3)	Abrasion Resistance:	ASTM C-501
	Minimum wear index of catalyzed sample:	80
(4)	Adhesion to Concrete:	ASTM D4541
	At 100% concrete failure:	greater than 325 psi
(5)	Tensile Strength:	ASTM D638
	Minimum average tensile strength:	6000 psi
(6)	Compressive Strength:	ASTM D695
	Minimum compressive strength:	12000 psi
(7)	Drying Time:	ASTM D711
	Maximum drying time at 75±2º F:	10 minutes
(8)	Gel Time:	ASTM D2471

Maximum gel time: 3 minutes

(E) Material Certification:

Type 3 Material Certification and Type 4 Material Certification

Construction Methods

Epoxy Pavement Marking Material shall conform to the requirements of Section 1205 of the 2018 *Standard Specifications for Roads and Structures*.

(A) Application Equipment

Use epoxy application equipment, which is equipped with or capable of the following:

Precisely metering the two components in the ratio of proportion recommended by the manufacturer.

Producing the required amount of heat at the mixing head and gun tip.

Maintaining temperatures within the tolerances recommended.

Gauges for each proportioning pump so that any pressure difference can be easily monitored.

A minimum 24" long static mixer unit for proper mixing of the two components of the epoxy marking material.

Each component of the epoxy pavement marking shall be in a homogeneous state prior to mixing,

Have the capability to totally mix component A with component B immediately prior to the marking application.

Have the capability to spray both yellow and white pavement marking material and have the equipment mounted on a truck of sufficient size and stability with an adequate power source to produce uniform lines of the specified dimension.

A metering device to register the accumulated installed footage for each gun

(B) Weather Limitations

Apply epoxy pavement marking only when the ambient air temperature and the pavement surface temperature is a minimum of 35º F and rising.

(C) Application

Produce epoxy pavement marking lines that have a minimum dry thickness of 15 mils when placed on concrete pavements and 20 mils when placed on asphalt pavements.

Use **Type I** epoxy material (fast dry) for epoxy pavement markings except when otherwise specified in the contract documents.

Type II epoxy material may be used with lane closures as approved by the Engineer to allow for curing time.

Do not place epoxy markings on fresh asphalt pavements until 15 days have elapsed after the last asphalt layer is placed.

Using the epoxy application equipment, apply the pavement marking materials simultaneously. Hot-spray the epoxy resin, mixed in accordance with the manufacturer's recommendations, onto the pavement surface within an application temperature range recommended by the manufacturer. Inject retroreflective glass beads into the molten (liquid) Epoxy Marking.

Individual Components: Before mixing, heat the individual components to within the temperature range of 100º F to 170º F. Do not exceed the upper limit of the manufacturer's recommended heating temperature at any time under any circumstances.

Mixed Material: After mixing, ensure that the application temperatures for the combined materials at the gun tip are within the temperature range recommended by the manufacturer for the particular product used.

Produce marking, which upon cooling, has the ability to resist deformation caused by traffic throughout its entire length.

(D) Observation Period

Epoxy pavement markings shall be subject to a 30-day observation period.

Maintain responsibility for the pavement markings for a 30-day observation period beginning upon the satisfactory completion of all work required in the plans developed by the Design-Build Team. Guarantee the markings under the payment and performance bond in accordance with Article 105-17 of the 2018 *Standard Specifications for Roads and Structures*.

Have traffic operating on the facility during the entire 30-day observation period unless otherwise directed.

Provide pavement marking material, which during the 30-day observation period, shows no signs of failure due to blistering, excessive cracking, chipping, bleeding, staining, discoloration, oil content of the pavement materials, smearing or spreading under heat, deterioration due to contact with grease deposits, oil, diesel fuel, or gasoline drippings, spilling, poor adhesion to the pavement materials, vehicular damage, debonding and normal wear.

Replace, at no additional expense to the Department, any pavement markings that do not perform satisfactorily under traffic during the 30-day observation period.

SOUND BARRIER WALL

(3-6-15) (Rev. 9-11-17)

(A) Description

This work consists of furnishing precast panels, structural steel, concrete columns, and all other materials; handling, transporting, fabricating, galvanizing, and storing materials; furnishing erection drawings, pile excavation, backfilling, erecting and installing the sound barrier wall members and all other materials as required by the plans developed by the Design-Build Team, the 2018 *Standard Specifications for Roads and Structures* and this Project Special Provision.

Unless otherwise approved by the Engineer, the Design-Build Team has a choice of ten or 15-foot pile spacing. Pile spacing greater than 15 feet will not be permitted. Provide consistent pile spacing the entire length of the wall. Use odd pile spacing, if necessary, only at the ends of the wall and at turning points, as approved by the Engineer.

A maximum one-foot drop or rise in top of wall elevation between wall sections will be permitted. Elevation changes greater than one foot, if necessary, will be allowed only at the end of the wall. Top of wall elevation changes that result in a jagged appearance shall not be allowed. Unless otherwise approved by NCDOT, the wall shall adhere to the Design Noise Report developed by the Design-Build Team.

(B) Alternating Pile Spacing

As an alternate, the Design-Build Team may submit plans for pile spacing greater than 10 feet and less than 15 feet for review and approval. A submittal reducing the post spacing shall include the material and design specifications. The submittal shall also include an elevation view depicting the revised post spacing and proposed top of wall elevations. The proposed top of wall elevations shall be equal to or greater than the dimensions shown in the Design Noise Report developed by the Design-Build Team. The excavated hole diameter, excavation depth and reinforcing steel shall be equal to the amount required for 15-foot pile spacing. A variance in the reinforcing steel will be allowed for the length of horizontal and number of vertical reinforcement bars in the precast panel for the alternate pile spacing.

Submit two sets of detailed plans for review. Include all details in the plans developed by the Design-Build Team, including the size and spacing of required reinforcement necessary to fabricate the precast panels. Have a North Carolina Registered Professional Engineer check, seal and date the aforementioned plans.

(C) Alternative Wall Type

Walls that have been assigned “Approved” or “Approved for Provisional Use” status by the Product Evaluation Program will be considered for substitution to the detailed Standard Sound Barrier Wall only when approved by the Department. Alternate walls shall meet all design and construction requirements of this RFP. Alternate wall structural stability and

connection details shall conform to the current edition of the AASHTO LRFD Bridge Design Specifications.

Prior to submittal of Working Drawings, as described herein, submit a copy of the signed NCDOT Product Status Notification Letter and two sets of preliminary plans for review and acceptance. Include material specifications for all components. Once preliminary plans are accepted, submit Working Drawings in accordance with all applicable portions of the requirements herein, including details necessary to fabricate and construct the proposed alternate.

Have a North Carolina Registered Professional Engineer check, seal and date the plans developed by the Design-Build Team and, when requested, calculations.

(D) **Materials and Fabrication**

Provide materials and fabricate members in accordance with the Architectural Concrete Surface Treatment Project Special Provision found elsewhere in this RFP, and the requirements of Division 2 of the 2018 *Standard Specifications for Roads and Structures*.

Provide precast panels that are nominally 4 inches ± ¼ inch thick with a simulated stone masonry textured surface on both faces. All texture shall extend outward from the nominal panel thickness. Furnish three 24" x 24" samples for approval which establish the acceptable variations in color, texture and uniformity. After the color, texture and uniformity of the furnished samples are approved, produce a full-scale panel unit meeting design requirements. This mock-up and the furnished samples establish the standard quality for determining approval of the panels. When producing the final installed panels, use fine and coarse aggregate, retarder, and cement from the same source as those used in the approved sample panels.

(E) **Construction Methods**

Complete the final survey of existing ground profile after clearing the sound barrier wall area, but prior to submitting any Working Drawings. Submit the final ground line survey with the Working Drawings.

Excavate holes with the diameters shown on the plans developed by the Design-Build Team. Perform pile excavation to the depths shown on the aforementioned plans and install piles as shown on the plans developed by the Design-Build Team with a tolerance of ½-inch per foot from vertical. Backfill excavations with concrete after placing piles.

1. Pile Excavation

   Use equipment of adequate capacity and capable of drilling through soil and non-soil including rock, boulders, debris, man-made objects and any other materials encountered. Blasting shall not be permitted to advance the excavation. Blasting for core removal shall only be permitted when approved by the Engineer. Dispose of drilling spoils in accordance with Section 802 of the 2018 *Standard Specifications for Roads and Structures* and as directed by the Engineer. Drilling

spoils shall consist of all excavated material, including but not limited to water removed from the excavation either by pumping or drilling tools.

If unstable, caving or sloughing soils are anticipated or encountered, stabilize excavations with either slurry or steel casing. When using slurry, submit slurry details including product information, manufacturer's recommendations for use, slurry equipment information and written approval from the slurry supplier that the mixing water is acceptable before beginning drilling. When using steel casing, use either the sectional type or one continuous corrugated or non-corrugated piece. Steel casings shall consist of clean watertight steel of ample strength to withstand handling and driving stresses and the pressures imposed by concrete, earth or backfill. Use steel casings with an outside diameter equal to the hole size and a minimum wall thickness of ¼-inch.

2. Concrete Placement

Before placing concrete, center and support the pile in the excavation and check the water inflow rate in the excavation after any pumps have been removed. If the inflow rate is less than six inches per half hour, remove any water and free fall the concrete into the excavation. Ensure that concrete flows completely around the pile. If the water inflow rate is greater than six inches per half hour, propose a concrete placement procedure to the Engineer. The Engineer shall approve the concrete placement procedure before placing any concrete.

Fill the excavation with Class A concrete in accordance with Section 1000 of the 2018 *Standard Specifications for Roads and Structures*, except as modified herein. Provide concrete with a slump of six to eight inches. Use an approved high-range water reducer to achieve this slump. Place concrete in a continuous manner and remove all casings.

(F) **Working Drawings**

In accordance with Article 1077-2 of the 2018 *Standard Specifications for Roads and Structures*, submit casting drawings for the precast face panels for approval prior to casting. Show the inserts, method of handling, and support details used for transportation on casting drawings. Submit metalwork fabrication drawings for approval prior to fabrication of steel wall components. Submit an erection plan and concrete face panel placing plan, including location of various heights of panels, for review and acceptance prior to fabrication of metalwork. Submit five sets of detail drawings for review and acceptance.

ARCHITECTURAL CONCRETE SURFACE TREATMENT

(1-28-15) (Rev. 11-16-17)

1.0 GENERAL

The work covered by this Project Special Provision shall consist of constructing a stained, simulated stone masonry textured surface on both faces of pre-cast concrete panels used in sound barrier walls and retaining walls as indicated on the plans developed by the Design-Build Team and herein. The Design-Build Team shall furnish all materials, labor, equipment and incidentals necessary for the construction of architectural concrete surface treatment using simulated stone masonry form liners (molds) and a compatible concrete coloring system.

The Design-Build Team shall use the same source of form liner and color stains for all sound barrier wall panels and retaining walls. The architectural concrete surface treatment shall match the appearance (stone size, stone shape, stone texture, pattern and relief) of natural stone to resemble an ashlar stone pattern with panel staining on both sides to match the Grey Palette Color # FS 36376 found in the *Federal Standard 595B – Colors Used in Government Procurement*. Such color shall be submitted to the Department for final acceptance prior to implementation. All texture shall be in addition to the nominal thickness of the wall panels of four inches ± ¼ inch. Maximum relief of the textured surface shall be 1¼ inch or less. The top 1'-0" of the top panel within each sound barrier wall segment shall have a smooth, non-textured and non-stained finish to resemble faux coping. Concrete columns shall remain unstained in their natural concrete color. There shall be an appreciable contrast between the colors of the unstained concrete columns and the stained panels. For information purposes only, sources of form liners in the ashlar stone pattern include, but are not limited to:

Scott System, Inc.
10777 E. 45th Avenue
Denver, Colorado 80239
http://www.scottsystem.com/
Pattern: Ashlar Stone # 167B

Architectural Polymers, Inc.
1220 Little Gap Road
Palmerton, Pennsylvania 18071
http://www.architecturalpolymers.com/
Pattern: Ashlar Stone # 904A

Fitzgerald Form Liners
1500 East Chestnut Avenue
Santa Ana, California 92701
http://formliners.com/
Pattern: Georgia Ashlar # 16999

The Design-Build Team has the option of supplying an alternative pattern of simulated stone form liner, as long as the pattern selected is approved, in writing, as an equal or approved alternative by the Engineer.

2.0 SUBMITTALS

Shop Drawings – The Design-Build Team shall submit for review and acceptance, plan and elevation views and details showing overall simulated stone pattern, joint locations, form tie locations, and end, edge or other special conditions. The drawings shall include typical cross sections of applicable surfaces, joints, corners, stone relief, stone size, pitch / working line, mortar joint and bed depths. If necessary, the Design-Build Team shall revise the shop drawings until the proposed form liner patterns and arrangement have been accepted by the Engineer. Shop drawings shall be of sufficient scale to show the detail of all stone and joint patterns. The size of the sheets used for the shop drawings shall be 22" x 34".

The form liner shall be patterned such that long continuous horizontal or vertical lines do not occur on the finished exposed surface. The line pattern shall be random in nature and shall conceal construction joint lines. Special attention shall be given to details for wrapping form liners around corners.

Shop drawings shall be reviewed and accepted prior to fabrication of any form liners.

Sample Sound Wall Panels – After shop drawings have been reviewed and accepted by the Engineer, the Design-Build Team shall construct three 24" x 24" transportable sample panel(s) at the project site. The materials used in construction of the sample panel(s) shall comply with Section 420 of the 2018 Standard Specifications for Roads and Structures. The sample panel(s) shall be constructed using form liners approved by the Engineer. Any sample panel that is not approved by the Engineer shall be removed from the project site and a new sample panel produced at no additional expense to the Department.

After the color, texture and uniformity of the furnished samples are approved by the Engineer, produce a full-scale unit meeting the design requirements. This mock-up and the furnished samples shall establish the standard quality for determining the panel approval.

Architectural surface treatments and patterns of the finished work shall achieve the same final effect as demonstrated on the approved sample panel(s). Upon approval by the Engineer, the sample panel(s) shall be used as the quality standard for the project. After the approval of the completed structure, the Design-Build Team shall dispose of the sample panels, as directed by the Engineer.

3.0 MATERIAL REQUIREMENTS

Form Liner – The form liner shall be a high quality, reusable product manufactured of high strength urethane rubber or other approved material which attaches easily to the form work system, and shall not compress more than ¼-inch when concrete is poured at a rate

of ten vertical feet per hour. The form liners shall be removable without causing deterioration of the surface or underlying concrete.

Form Release Agent – Form release agent shall be a non-staining petroleum distillate free from water, asphaltic, and other insoluble residue, or an equivalent product. Form release agents shall be compatible with the color system applied and any special surface finish.

Form Ties – Form ties shall be set back a minimum of two inches from the finished concrete surface. The ties shall be designed so that all material in the device to a depth of at least two inches back of the concrete face (bottom of simulated mortar groove) can be disengaged and removed without spalling or damaging the concrete. The Design-Build Team shall submit the type of form ties to the Engineer for approval.

Concrete Color System / Stain – Special surface color system shall be performed using approved coloring systems / stains suitable for the purpose intended and applied in a manner consistent with the design intent of the project. The approved sample panel shall be the basis for determining the appropriate color / stain application.

Color stains shall be a special penetrating stain mix as provided by the manufacturer and shall be medium to dark gray to achieve a full, natural color in the finished surface. The stain shall create a surface finish that is breathable (allowing water vapor transmission), and that resists deterioration from water, acid, alkali, fungi, sunlight, and / or weathering. Stain mix shall meet the requirements for mildew resistance of Federal Test Method Standard 144, Method 6271, and requirements for weathering resistance of 1,000 hours accelerated exposure measures by Weatherometer, in accordance with ASTM G 26. Color samples shall be submitted for approval by the Engineer. Final coloring system and the Grey Palette Color # FS 36122 shall be subject to approval by the Engineer.

Anti-Graffiti Coating – The Design-Build Team shall apply anti-graffiti coating that is compatible with the concrete color system / stain. After application, the anti-graffiti coating shall be dry to the touch within one hour and shall achieve a final cure within three hours. The color of the anti-graffiti shall be clear after full cure. The Design-Build Team shall provide one gallon of graffiti remover, thinners, dryers and all necessary components recommended by the manufacturer to the North Carolina Department of Transportation Materials and Tests Unit, Chemical Testing Engineer.

Quality Standards – Manufacturer of simulated stone masonry form liners and custom coloring system shall have at least five years' experience making stone masonry molds and color stains to create formed concrete surfaces to match the natural stone shapes, surface textures and colors.

The Design-Build Team shall schedule a pre-installation conference with a manufacturer representative and the Engineer to assure understanding of simulated stone masonry form liner use, color application, requirements for construction of sample panel(s), and to coordinate the work. The Design-Build Team shall disclose their source of simulated stone masonry manufacturer and final coloration contractor at the Preconstruction Conference.

4.0 CONSTRUCTION

Form Liner Preparation – Prior to each concrete pour, the form liners shall be clean and free of build-up. Each liner shall be visually inspected for blemishes and tears. Repairs shall be made in accordance with the manufacturer's recommendations. Repairs shall be approved by the Engineer before being used. Form liner panels that do not perform as intended or are no longer repairable shall be replaced.

Form Liner Attachment – Form liners shall be securely attached to forms in accordance with the manufacturer's recommendations, with less than a ¼-inch seam. Blend form liner butt joints into the stone pattern and finish off the final concrete surface. Create no visible vertical or horizontal seams or conspicuous form liner butt joint marks. At locations where the form liners are joined, carefully blend to match the balance of the stone pattern. Form liners shall be installed to withstand anticipated concrete placement pressures without leakage and without causing physical or visual defects. Wall ties shall be coordinated with the form liner system. The Design-Build Team shall have a technical representative from the form liner manufacturer on site for technical supervision during the installation and removal of form liners. Unless allowed by the Engineer, installation and removal of form liners shall not be permitted if the aforementioned technical representative is not present.

Form Release Agent – Form release agent shall be applied in accordance with the manufacturer's recommendations. The material shall be compatible with the form liner material and the concrete coloring system and in accordance with this Project Special Provision. Form release agent shall be worked into all areas, especially pattern recesses.

Patching – Using patching materials and procedures in accordance with the manufacturer's recommendations, all form tie holes and other defects in finished uncolored surface shall be filled or repaired within 48 hours of form removal.

Surface Finish – All surfaces that are to receive coloring agent application shall be free of all laitance, dirt, dust, grease, efflorescence, paint or any other foreign material prior to the application of coloring agent. Cleaning of surfaces shall be accomplished by pressure washing with water set at 3000 psi to remove laitance. The fan nozzle shall be held perpendicular to the surface at a distance of one to two feet. Sandblasting shall not be permitted.

Final surface shall be free of blemishes, discolorations, surface voids, and other irregularities. All patterns shall be continuous without visual disruption.

Reinforced concrete shall be finished in accordance with the 2018 *Standard Specifications for Roads and Structures*, except that curing of concrete shall be done to accommodate the application of coloring and surface finish treatment.

Grout Pattern Joints – Grout pattern joints shall be constructed to simulate the appearance of mortared joints produced in laid up masonry work. Grout pattern joints shall be produced in accordance with the form liner / concrete color system manufacturer.

Color / Stain Application – Finished concrete and patches shall stand in place 30 days after form liners are removed prior to application of coloring / staining agent. Maintain the concrete

temperature between 40° F and 85° F during color / stain application and for 48 hours after color / stain application. Consult the manufacturer's recommendations for preparation, application, curing and storage of coloring agents / stains. The Design-Build Team shall provide a Color Application Artist who is trained in the special techniques to achieve realistic surface appearances, if requested by the Engineer. Treated surfaces located adjacent to exposed soil or pavement shall be temporarily covered to prevent dirt or soil splatter from rain.

Anti-Graffiti Coating Application – The Design-build Team shall apply anti-graffiti coating after full cure of the color coating. The anti-graffiti coating shall be applied by brush, roller or airless spray when the ambient temperature is between 45° F and 90° F, and the surface temperature is between 50° F and 100° F. Ensure the surface is clean and dry before applying the anti-graffiti coating. The minimum dry film thickness of the anti-graffiti coating shall be 2.0 mils.

Following the completion of all work, repairs of any damage made by other construction operations shall be made to the form lined and colored surfaces, as directed by the Engineer.

Experience and Qualifications – The Design-Build Team shall have a minimum of three consecutive years' experience in architectural concrete surface treatment construction on similar types of projects. The Design-Build Team shall furnish to the Engineer five references who were responsible for supervision of similar projects and will testify to the successful completion of these projects. Include name, address, telephone number, and specific type of application.

APPLICATION OF BASE AND PERMANENT ANTI-GRAFFITI COATING

(6-2-16) SP

GENERAL

This work consists of preparing and cleaning concrete and galvanized surfaces as well as furnishing and applying a colored base coating with a compatible permanent anti-graffiti finish coating to the surfaces described herein. The base coating and anti-graffiti coating shall be applied to all surfaces indicated on the plans developed by the Design-Build Team and / or as directed by the Engineer and shall be applied only after the surface preparation specified herein has been completed, inspected and approved by the Engineer.

Alternate coating methods may be submitted for review and approval.

MATERIALS

The base coating shall be compatible with the permanent anti-graffiti finish coating and must be designed specifically for coating galvanized surfaces or damp, uncured concrete. The coating material shall be delivered to the job site in sealed containers bearing the manufacturer's original labels. The brand, color, and type shall be clearly marked on each container. A copy of the manufacturer's Materials Safety Data Sheet and a copy of the manufacturer's printed instructions shall be presented to the Engineer at the time of delivery.

The coating material shall be stored in airtight, upright containers. The containers shall be stored in a dry location where the temperature remains above 40° F and below 100° F.

The coating material shall have a shelf life of not less than 12 months. After application, the base coating shall be dry to the touch within 48 hours and shall achieve a final cure within two to three weeks. After application, the permanent anti-graffiti coating shall be dry to the touch within one hour and shall achieve a final cure within three hours.

The color of the base coating and area of application shall be in accordance with the Federal Standard 595.

The color of the permanent anti-graffiti coating shall be clear after full cure.

Prior to application, provide one gallon of graffiti remover, thinners, dryers and all necessary components recommended by the manufacturer to the NCDOT Materials and Tests Unit, Chemical Testing Engineer for review and acceptance.

MATERIAL TESTING AND CERTIFICATION

Prior to applying coating material, a Type 2 certification shall be provided to the Engineer attesting that the product furnished is in accordance with the same formula as that previously subjected to the tests specified below and approved. Copies of the current tests reports shall be attached to the certification. Reports for tests made more than four years prior to shipment to the project site will not be accepted.

All testing shall be performed by a qualified commercial testing laboratory that has been approved by the NCDOT Materials and Tests Unit.

Prior to application, the coating shall be subjected to, and shall satisfy, the requirements of the tests listed below:

Freeze-Thaw

1. Three concrete specimens, not less than four inches by six inches by six inches, of the mix design for the structure shall be cast and cured. Fourteen days moist curing with a drying period at room temperature, 60° F to 80° F, for 24 hours shall be required before applying the coating material to the specimens. Caution shall be taken that there be no excessive oil on specimen forms. The coating shall be applied to the sides of specimens at a spreading rate of 50 ± 10 square feet per gallon. Brush application will be permitted. Cementitious coatings shall be cured at room temperature and 30 percent relative humidity for 24 hours; at room temperature and 90 percent relative humidity for 48 hours; and at room temperature and 50 percent relative humidity for four days; for a total curing time of seven days.

2. The specimens shall be immersed in water at room temperature for three hours, then removed.

3. The specimens shall be placed in cold storage at -15° F for one hour and then removed.

4. The specimens shall be thawed at room temperature for one hour.

5. Steps 3 and 4 shall be repeated for a total of 250 cycles. At the end of 250 cycles, the specimens shall show no visible defects.

Accelerated Weathering

Coating shall be subjected to a 7,500-hour exposure test in a Twin-Carbon-Arc-Weatherometer, ASTM G 23, Type D, at an opening temperature of 145° F. The test shall be made at 20-minute cycles consisting of 17 minutes of light; and three minutes of water spray plus light. At the end of the exposure test, the exposed samples shall show no chipping, flaking, or peeling. The panels for this test shall be prepared by applying the coating at a spreading rate of 50 ± 10 square feet per gallon to both sides and edges of panels cut from asbestos cement shingles in accordance with Federal

Specification S-S-346, Type I. Curing time shall be in accordance with Freeze-Thaw Test curing time.

Fungus Growth Resistance

In accordance with Federal Specification TT-P-29g, coating shall pass a fungus resistance test. Fungus growth shall not be indicated after a minimum incubation period of 21 days.

Abrasion Resistance

In accordance with Method 6191 Abrasion Resistance-Falling Sand, Federal Test Method Standard 141a, ASTM D968-81, coating shall pass the 2,000 liter sand abrasion test. The specimens for this test shall be prepared by applying the coating to a cleaned steel panel at a spreading rate of 50 ± 10 square feet per gallon. The specimens shall be cured at room temperature for 21 days.

Impact Resistance

Coating shall be applied to a concrete panel prepared in accordance with the Federal Test Method Standard 141a, Method 2051, at a spreading rate of 50 ± 10 square feet per gallon, and allowed to cure for 21 days at room temperature. The test shall then be run using the Gardner Mandrel Impact Tester in accordance with ASTM D 2794, using a one-half inch indenter with an impact load of six inch-pounds. The coating shall show no chipping under this impact load.

Salt-Spray Resistance

A concrete specimen shall be coated at the rate of 50 ± 10 square feet per gallon and cured for 21 days at room temperature. In accordance with ASTM B 117, the coated specimen shall be exposed to a five percent salt solution for 2,500 hours where the atmospheric temperature is maintained at 90° ± 2 °F. At the end of the 2,500 hours of exposure, the coating shall show no ill effects, loss of adhesion, or deterioration.

Flexibility

A sheet metal specimen shall be coated at a rate of 50 ± 10 square feet per gallon and allowed to cure for 48 hours at room temperature. The coated specimen shall be bent at 180 degrees over a one-inch round mandrel. After bending, the coating shall show no breaking.

In addition to the certification and test reports required above, a service record shall be supplied showing that the coating material has a satisfactory service record on concrete and, when applicable, galvanized surfaces for a period of not less than five years prior to the date of submission of the service record. The coating shall also have shown satisfactory service characteristics without peeling, chipping, flaking, and non-uniform change in texture or color. The structure for the specific product shall be named in the service record.

In addition to the above requirements, each batch delivered to the project shall be sampled and tested for color and the following product analysis data submitted:

(a) Weight per gallon
(b) Viscosity in Kreb units
(c) Weight percent pigment
(d) Weight percent vehicle solids
(e) Infrared spectra of vehicle solution
(f) Drying time

SURFACE PREPARATION

Prepare concrete surfaces and galvanized surfaces in accordance with Section 420-17(B) and Section 442-13 of the 2018 *Standard Specifications for Roads and Structures*, respectively, or the manufacturer's recommendations, whichever is more restrictive. All surfaces to be coated shall be free of efflorescence, flaking coatings, dirt, oil, curing compounds, release agents and other deleterious substances prior to the application of the coating.

Concrete curing compounds and release agents shall be removed. Water blasting will be allowed; however, the blasting operation shall not remove or damage the concrete.

Prior to application of the coating, all concrete surfaces to be coated shall be sprayed with water. If the water soaks into the concrete surfaces, the coating may be applied once all surfaces dry. If the water beads up and is repelled, the surfaces require further cleaning before application of the coating.

APPLICATION

The coating application, including equipment used, shall be in accordance with the manufacturer's recommendations. The coating shall be applied by qualified personnel with previous experience similar to the work outlined in the plans developed by the Design-Build Team.

The material shall be thoroughly mixed in its original container and shall not be thinned. Containers with coatings that have formed skins shall not be permitted for use.

The base coating may be applied over damp, but not wet concrete surfaces and shall be applied at a rate of 50 ± 10 square feet per gallon. The application rate shall produce a uniform color texture. The base coating shall be applied only when the ambient temperature is between 40° F and rising, and 100° F. It shall not be applied over frozen surfaces or if rain is imminent. If a freshly applied surface is damaged by rain, re-coating may be necessary based solely on the Engineer’s assessment of the damage.

Schedule the application of the base coating as one of the final finishing operations or when construction-generated dust will be minimal. To prevent lap marks, a wet edge shall be maintained at all times. Stopping and starting in mid-sections will not be allowed. Start or end at natural breaks in the surface (e.g. at panel edges, corners or joints). When applying the base coating with a roller, the material shall be applied in vertical strokes initially, cross rolled for even film and appearance, and then finished with vertical strikes.

Apply the permanent anti-graffiti coating by brush, roller or airless spray when the ambient temperature is between 45° F and 90° F, and the surface temperature is between 50° F and 100° F. Ensure the surface is clean and dry before applying the anti-graffiti coating.

FINISHED PRODUCT

All coating material in the finished state shall be capable of accommodating the thermal and elastic expansion ranges of the concrete or, when applicable, galvanized surfaces without cracking.

The texture of the completed finish coat shall be similar to that of rubbed concrete. The completed finished coating shall be tightly bonded to the structure and present a uniform appearance and texture. Additional coats may be required by the Engineer in order to produce the desired surface texture and uniformity.

Coatings shall be entirely removed from the structure and reapplied if there is failure to positively adhere as evident by chipping, flaking, peeling, or the desired surface appearance is not achieved.

The average thickness of the completed finish coating shall not exceed 1/8 of an inch. The minimum dry film thickness of the anti-graffiti coating shall be 2.0 mils.

CUTTING OF STEEL SIGN HANGERS ON OVERHEAD SIGNS

(2-29-16) SPI

Description

Cut and dispose of the portion of the sign hangers that is extended below the bottom edge of the signs for the mounting of sign lighting. Cut and dispose of the portion of the sign hangers that extends above the top edge of the signs that have been repositioned on the overhead sign structure.

Materials

Organic Non-Aerosol Zinc Repair Paint ……...……Article 1080-9

Construction Methods

The sign hangers shall be cut at a distance specified by the Engineer. The hangers shall be cut in a manner that does not damage existing signing components or roadway facility. Areas disturbed or damaged in performance of this work shall be repaired by the Design-Build Team at no cost to the Department.

Cutting of the sign hangers shall be done by a method approved by the Engineer. Oxygen cutting shall be done in accordance with Section 1072-11 of the 2018 *Standard Specifications for Roads and Structures*. Repair the cut and / or any damaged members of the sign hangers with two coats of an approved organic non-aerosol zinc repair paint. Paint materials used shall be in accordance with Section 1080-9 of the 2018 *Standard Specifications for Roads and Structures*.

All material shall be removed and disposed of in accordance with State and Local codes, regulations, and ordinances and shall be in accordance with the Section 907 of the 2018 *Standard Specifications for Roads and Structures*.

HIGH VISIBILITY TRAFFIC CONTROL DEVICES

(7/10/2018)

Description

In accordance with this RFP, the Design-Build Team shall furnish and install High Visibility devices for projects on Interstates and Freeways with durations of 24 months or more. High Visibility devices include drums, stationary work zone signs and portable work zone signs. All of these devices shall be new. Used devices are not acceptable.

The purpose of High Visibility devices is to enhance the conspicuity of the devices in order to improve both safety and mobility through the Interstate and Freeway work zones. In addition, using new devices help to ensure they remain in compliance with required retroreflective properties for the full life of the project and to improve the overall appearance of Significant Work Zones throughout the State.

Materials

A) General

Use materials in accordance with the Manufacturer's recommendations that will retain both durability and retroreflectivity as described elsewhere in this project special provision for a period of at least 36 months.

The following are required High Visibility devices to be used for Work Zone Performance applications.

- Drums (Type XI fluorescent orange sheeting)
- Stationary Work Zone Signs
- Rigid Portable Work Zone Signs

All drums shall be new and meet the existing requirements of Section 1089-5 of the 2018 NCDOT *Standard Specifications for Roads and Structures* and shall have Type XI fluorescent orange sheeting that meets the retroreflective requirements of Section 1092-2 of the 2018 NCDOT *Standard Specifications for Roads and Structures*.

All stationary work zone signs shall be new and meet the existing requirements of Section 1089-1 of the 2018 NCDOT *Standard Specifications for Roads and Structures*. Legend overlays are prohibited and shall not be accepted on the Interstate/Freeway or associated intersecting roadways.

All portable work zone signs shall be new and have composite substrates as described in Section 1089-1 of the 2018 NCDOT *Standard Specifications for Roads and Structures*. The remainder of the existing requirements of Section 1089-1 of the 2018 NCDOT *Standard Specifications for Roads and Structures* remain. Used sign stands are acceptable.

B) Material Qualifications / Certifications

Only use materials as listed above that are on the NCDOT Approved Products List. In addition, provide a Type 3 Material Certification for all materials in accordance with Section 106-3 and Section 1087-4 of the 2018 NCDOT *Standard Specifications for Roads and Structures*.

(C) Performance

Poor performance of any device or sign at any site, whether or not related to a specific contract may be grounds for removing the material from the NCDOT Approved Products List and / or removing from any project under contract.

Construction Methods

All requirements of Section 1110-3 and Section 1130-3 of the 2018 NCDOT Standard Specifications for Roads and Structures shall apply except roll up signs are not permitted for use. The use of skinny drums is prohibited for any nighttime lane closures on Interstates and Freeways.

Maintenance

Replace any sign or drum that prematurely fails due to any damage or defect that causes it to perform unsatisfactorily with an "in kind" device of similar quality and age according to the guidelines set forth in the American Traffic Safety Service Association's (ATSSA) Quality Guidelines for Work Zone Traffic Control Devices. An "in kind" replacement sign or drum is not required to be new, however, it shall be less than 1 year old and have 100% of its original sheeting area and at least 85% of the retroreflective qualities of a new device, so that it is undetectable adjacent to the original devices and signs placed on the project.

SEQUENTIAL FLASHING WARNING LIGHTS:

(10/08/2016)

Description

In accordance with this RFP, the Design-Build Team shall furnish and install Sequential Flashing Warning Lights on drums used for merging tapers during nightly work activities on interstates and freeways with speed limits greater than 55 MPH and or facilities that have significant traffic volumes.

The purpose of these lights is to assist the motorist in determining which direction to merge when approaching a lane closure. It's also designed to reduce the number of late merges resulting in devices being struck and having to be reset to maintain positive guidance at the merge point. The successive flashing of the lights shall occur from the upstream end of the merging taper to the downstream end of the merging taper in order to identify the desired vehicle path.

Materials

The Sequential Flashing Warning Lights shall meet all of the requirements for warning lights within the current edition of the *Manual of Uniform Traffic Control Devices* (MUTCD).

Each light unit shall be capable of operating fully and continuously for a minimum of 200 hours when equipped with a standard battery set.

Each light in the sequence shall be flashed at a rate of not less than 55 times per minute and not more than 75 times per minute. The flash rate and flash duration shall be consistent throughout the sequence.

Supply a Type 3 Certification (Independent Test Lab results) documenting all actual test results for the specified parameters contained in the Institute of Transportation Engineer's (ITE's) *Purchase Specification for Flashing and Steady Burn Warning Lights*. The laboratory shall also identify all manufacturer codes and part numbers for the incandescent lamp or LED clusters, lenses, battery, and circuitry, and the total width of the light with the battery in place. The complete assembly shall be certified as crashworthy when firmly affixed to the channelizing device.

All Sequential Flashing Warning Lights shall be on the NCDOT Work Zone Traffic Control Approved Products List.

Construction Methods

Sequential Flashing Warning Lights are to be used for night time lane closures.

These lights shall flash sequentially beginning with the first light and continuing until the final light.

The Sequential Flashing Warning Lights shall automatically flash in sequence when placed on the drums that form the merging taper.

The number of lights used in the drum taper shall equal the number of drums used in the taper.

Drums are the only channelizing device allowed to mount sequential flashing warning lights.

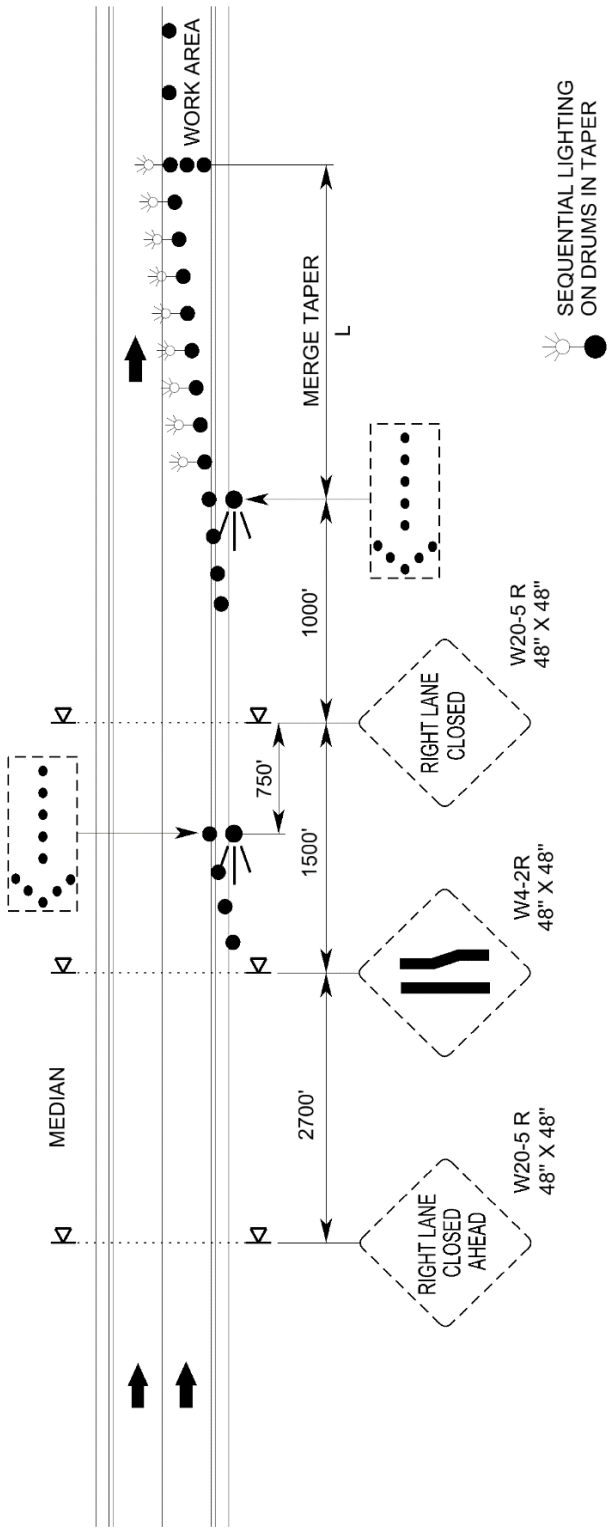
The Sequential Flashing Warning Lights shall be weather independent and visual obstructions shall not interfere with the operation of the lights.

The Sequential Flashing Warning Lights shall automatically sequence when placed in line in an open area with a distance between lights of 10 to 100 feet. A 10-foot stagger in the line of lights shall have no adverse effect on the operation of the lights.

If one light fails, the flashing sequence shall continue. If more than 1 light fails, all of the lights are to be automatically turned to the “off” mode. Non-sequential flashing is prohibited.

When lane closures are not in effect, the Sequential Flashing Warning Lights shall be deactivated.

SEQUENTIAL FLASHING WARNING LIGHTS



WORK ZONE DIGITAL SPEED LIMIT SIGNS:

(10/08/2016)

Description

In accordance with this RFP, the Design-Build Team shall furnish and install Work Zone Digital Speed Limit Signs on interstates and freeways with speed limits greater than 55 MPH and or facilities that have significant traffic volumes and impacts. These signs are regulatory speed limit signs with LED displays for the speed limit numbers. The purpose of Digital Speed Limit signs is to easily change work zone speed limits between activities that necessitate the need for a lower speed limit and the ones that do not.

Materials

Digital Speed Limit Signs shall be a minimum 36” wide x 48” high. The speed limit sign (R2-1) shall be black on white with high intensity white prismatic sheeting.

The Digital Speed Limit sign shall be mounted such that the bottom of the sign is 7’ above roadway.

The LED panel shall be a minimum of 18” wide x 28” high. The display on the LED panel shall be amber or white.

The LED numbers shall have a minimum 5 wide by 7 high pixel array with a minimum height of 18”.

The LED panel shall have auto brightness/dimming capability.

The black on orange “WORK ZONE” sign shall be mounted above the Speed Limit sign. It shall be 36” wide x 24” high with high intensity prismatic orange sheeting.

The black on white “$250 FINE” sign shall be mounted below the Speed Limit sign. It shall be 36” wide x 24” high with high intensity prismatic white sheeting.

All digital speed limit systems shall have operational software and wireless communications that allows for remote operation and data monitoring. It shall be configured to allow access by the Engineer or his designee to change each sign independently or change the speed limit on all signs at once from a PC, tablet or cellular phone application.

Digital Speed Limit Signs may be trailer mounted or stationary mounted. The unit shall be Solar powered and have the ability to operate continuously. It shall be supplemented with a battery backup system which includes a 110/120 VAC powered on-board charging system.

The batteries, when fully charged; shall be capable of powering the display for 20 continuous days with no solar power. The unit shall be capable of being powered by standard 110/120 VAC power source.

Store the battery bank and charging system in a lockable, weather and vandal resistant box.

Optional Equipment/Capabilities

Work Zone Digital Speed Limit systems may include speed data collection. If provided, this information is to be available in a spreadsheet format and accessed remotely from a secure cloud location.

The Work Zone Digital Speed Limit systems may have radar equipment to detect approaching speeds.

The Work Zone Digital Speed Limit systems may have flashing beacons. If used, the beacons are to be 12" diameter LED circular yellow. They may be mounted either above, beside or below the sign assemblies and are to be centered horizontally. If used, the beacons shall alternately flash at rates not less than 50 or more than 60 times per minute.

All Work Zone Digital Speed Limit equipment shall be on the NCDOT Work Zone Traffic Control Approved Products List.

Construction Methods

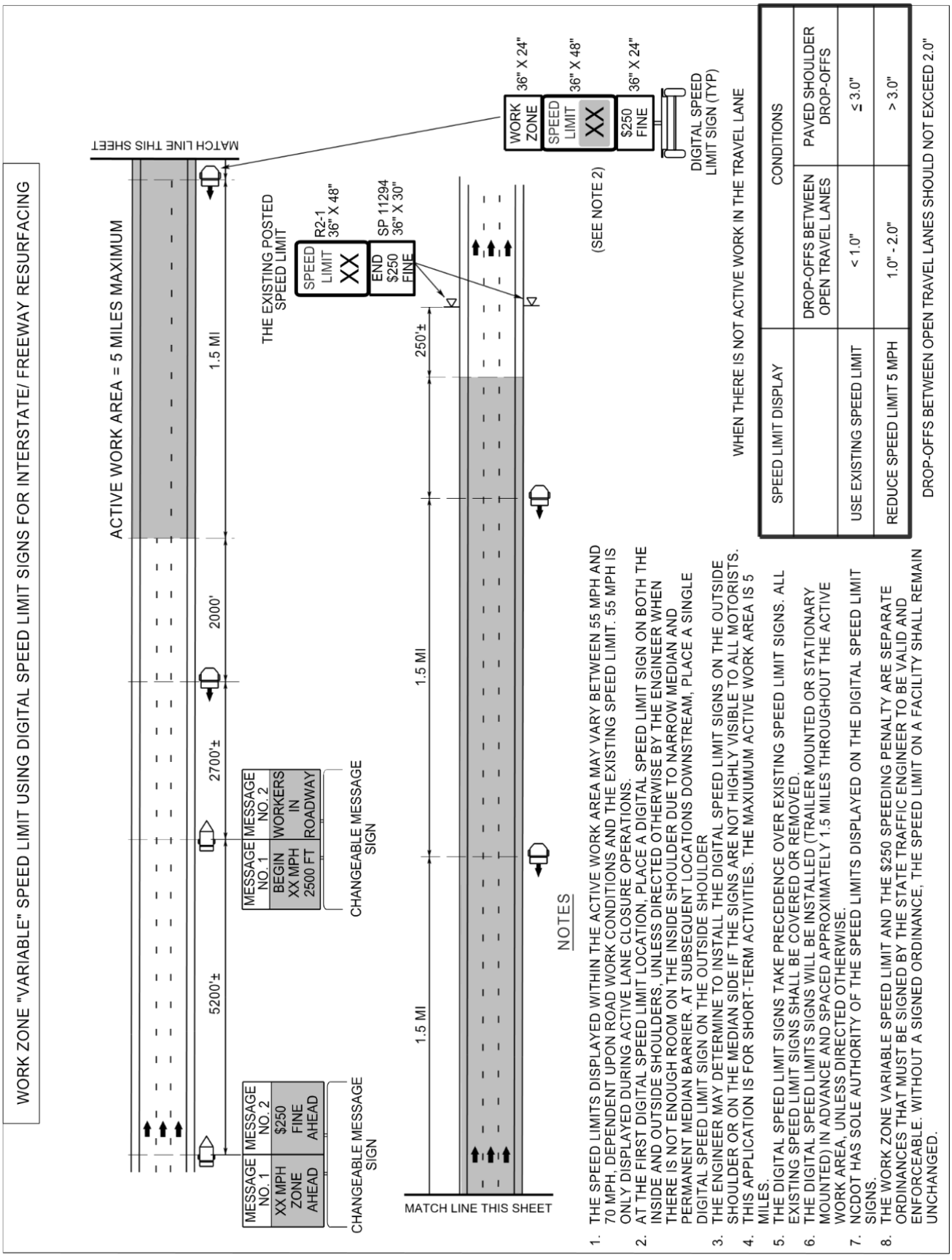
The Speed Limit shall be continuously displayed on the signs. The speed limits are the sole authority of the NCDOT. All speed limits are to be ordinanced by the State Traffic Engineer in order to have a lawfully enforceable speed limit.

The Regional Traffic Engineering Office and the Division Construction Engineer in coordination with the Work Zone Traffic Control Section will provide all Work Zone Speed Limit recommendations based on activities and conditions.

The Contractor will be responsible for coordinating with the Engineer when the Work Zone Speed Limits are to be changed and will have to seek approval by the Engineer or his designee before the Speed Limit is changed.

If the system has radar equipment and flashing beacons, the Digital Speed Limit systems shall have beacons activated when the "55 MPH" speed limit is being displayed. At all other speed limit displays (60 MPH, 65 MPH, 70 MPH), the beacons are not to be automatically activated until approaching speeds are detected to be 7 MPH or higher above the posted speed limit.

Whenever possible, each trailer mounted unit shall be placed on the paved shoulder and shall have the capability of being leveled.


WORK ZONE "VARIABLE" SPEED LIMIT USING DIGITAL SPEED LIMIT SIGNS FOR INTERSTATE/ FREEWAY RESURFACING
ACTIVE WORK AREA = 5 MILES MAXIMUM
MATCH LINE THIS SHEET
MATCH LINE THIS SHEET
1.5 MI
1.5 MI
1.5 MI
5200'±
2700'±
2000'
250'±
MESSAGE NO. 1
XX MPH ZONE AHEAD
MESSAGE NO. 2
$250 FINE AHEAD
CHANGEABLE MESSAGE SIGN
MESSAGE NO. 1
BEGIN XX MPH 2500 FT
MESSAGE NO. 2
WORKERS IN ROADWAY
CHANGEABLE MESSAGE SIGN
THE EXISTING POSTED SPEED LIMIT
SPEED LIMIT XX
R2-1 36" X 48"
END $250 FINE
SP 11294 36" X 30"
WORK ZONE
36" X 24"
SPEED LIMIT XX
36" X 48"
$250 FINE
36" X 24"
(SEE NOTE 2)
DIGITAL SPEED LIMIT SIGN (TYP)
WHEN THERE IS NOT ACTIVE WORK IN THE TRAVEL LANE
NOTES
1. THE SPEED LIMITS DISPLAYED WITHIN THE ACTIVE WORK AREA MAY VARY BETWEEN 55 MPH AND 70 MPH, DEPENDENT UPON ROAD WORK CONDITIONS AND THE EXISTING SPEED LIMIT. 55 MPH IS ONLY DISPLAYED DURING ACTIVE LANE CLOSURE OPERATIONS.
2. AT THE FIRST DIGITAL SPEED LIMIT LOCATION, PLACE A DIGITAL SPEED LIMIT SIGN ON BOTH THE INSIDE AND OUTSIDE SHOULDERS, UNLESS DIRECTED OTHERWISE BY THE ENGINEER WHEN THERE IS NOT ENOUGH ROOM ON THE INSIDE SHOULDER DUE TO NARROW MEDIAN AND PERMANENT MEDIAN BARRIER. AT SUBSEQUENT LOCATIONS DOWNSTREAM, PLACE A SINGLE DIGITAL SPEED LIMIT SIGN ON THE OUTSIDE SHOULDER
3. THE ENGINEER MAY DETERMINE TO INSTALL THE DIGITAL SPEED LIMIT SIGNS ON THE OUTSIDE SHOULDER OR ON THE MEDIAN SIDE IF THE SIGNS ARE NOT HIGHLY VISIBLE TO ALL MOTORISTS.
4. THIS APPLICATION IS FOR SHORT-TERM ACTIVITIES. THE MAXIUMUM ACTIVE WORK AREA IS 5 MILES.
5. THE DIGITAL SPEED LIMIT SIGNS TAKE PRECEDENCE OVER EXISTING SPEED LIMIT SIGNS. ALL EXISTING SPEED LIMIT SIGNS SHALL BE COVERED OR REMOVED.
6. THE DIGITAL SPEED LIMITS SIGNS WILL BE INSTALLED (TRAILER MOUNTED OR STATIONARY MOUNTED) IN ADVANCE AND SPACED APPROXIMATELY 1.5 MILES THROUGHOUT THE ACTIVE WORK AREA, UNLESS DIRECTED OTHERWISE.
7. NCDOT HAS SOLE AUTHORITY OF THE SPEED LIMITS DISPLAYED ON THE DIGITAL SPEED LIMIT SIGNS.
8. THE WORK ZONE VARIABLE SPEED LIMIT AND THE $250 SPEEDING PENALTY ARE SEPARATE ORDINANCES THAT MUST BE SIGNED BY THE STATE TRAFFIC ENGINEER TO BE VALID AND ENFORCEABLE. WITHOUT A SIGNED ORDINANCE, THE SPEED LIMIT ON A FACILITY SHALL REMAIN UNCHANGED.
SPEED LIMIT DISPLAY
CONDITIONS
DROP-OFFS BETWEEN OPEN TRAVEL LANES
PAVED SHOULDER DROP-OFFS
USE EXISTING SPEED LIMIT
< 1.0"
≤ 3.0"
REDUCE SPEED LIMIT 5 MPH
1.0" - 2.0"
> 3.0"
DROP-OFFS BETWEEN OPEN TRAVEL LANES SHOULD NOT EXCEED 2.0"

WORK ZONE PERFORMANCE PAVEMENT MARKINGS:

(06/04/2015)

Description

In accordance with this RFP, the Design-Build Team shall furnish and install Work Zone Performance pavement markings that delineate the travel way for work zone traffic patterns on high speed (greater than 55 MPH) facilities and or facilities that have significant traffic volumes and impacts. The purpose of Work Zone Performance pavement marking is to provide a more durable work zone pavement marking that will last the full duration of a traffic pattern during any particular phase of construction without having to be replaced or reapplied for a period of up to 12 months. In addition, they are to provide a higher performance level for both initial and residual retroreflectivity than standard traffic paints to improve nighttime work zone visibility.

Materials

A) General

Use materials in accordance with the Manufacturer's recommendations that will retain both durability and a minimum retroreflectivity as described elsewhere in this specification for a period of up to 12 months.

In addition, it shall be manufactured to bond successfully to both concrete and asphalt pavements. The pavement marking materials shall be applied in a single application. The following are approved materials to be used for Work Zone Performance pavement marking applications.

- Polyurea
- Thermoplastic (Extruded and Sprayed)
- Epoxy
- Polymer (Single System)
- Cold Applied Plastic (Type IV)

B) Material Qualifications/Certifications

Only use Work Zone Performance pavement marking materials as listed above that are on the NCDOT Approved Products List. In addition, provide a Type 3 Material Certification for all materials and a Type 3 and Type 4 certification for all reflective media in accordance with Article 106-3, and Section 1087-4 of the North Carolina Standard Specifications for Roads and Structures.

C) Performance

Poor performance of Work Zone Performance pavement marking materials at any site, whether or not related to a specific contract may be grounds for removing the material from the NCDOT Approved Products List and or removing from any project under contract.

Construction Methods

Do not use hand applied methods or any other non-truck mounted application equipment /device to install Work Zone Performance pavement markings for applications longer than 1000 feet. All Work Zone Performance pavement markings are to be installed in a single application.

A) Testing Procedures

All Work Zone Performance pavement markings will be tested by the Department through an independent Mobile Retroreflective Contractor. The Work Zone Performance pavement markings will be scanned to ensure the retroreflectivity requirements in Section C of this specification are met.

B) Application Equipment

See Section 1205 of the NCDOT *Standard Specifications for Roads and Structures.*

C) Material Application

The Work Zone Performance pavement marking material shall be applied at the following minimum thicknesses:

Polyurea =	20 mils wet
Epoxy =	20 mils wet
Thermoplastic =	50 mils (Extruded or Sprayed)
Polymer =	20 mils wet
Cold Applied Plastic (IV) =	Manufacturer's recommendation

Unless otherwise stated in the plans, the line widths are as follows:

Edge lines, Solid Lane Lines, Skip and Mini-Skip Lines =	4"
Gorelines =	8"

"No track" dry times for the liquid systems shall be 10 minutes or less. Traffic shall not be placed on any material until it's sufficiently dry/cured to eliminate wheel tracking. The minimum level of retroreflectivity for any Work Zone Performance pavement marking system selected is as follows:

Reflectometer Requirements for Work Zone Performance Pavement Markings

Color	Initial	6 Months
White	375 mcd/lux/m2	275 mcd/lux/m2
Yellow	250 mcd/lux/m2	150 mcd/lux/m2

The above chart describes the retroreflectivity levels the work zone performance pavement markings are required to meet during initial placement and maintain for a minimum of 6 months.

Initial retroreflective measurements will be taken with a mobile retroreflectometer within 30 days after initial placement. The Contractor shall notify the Engineer 7-10 days prior to the installation of new pavement marking lines. Accordingly, the Engineer will notify the Signing and Delineation Unit's Standards Engineer so the Mobile Retroreflective Contractors can be scheduled to measure the pavement markings for compliance.

In addition, work zone performance pavement markings are intended to maintain hardy retroreflective levels for the full 12-month duration. If the markings appear to be non-performing within the first 6 months, the Engineer may request additional retroreflectivity readings be taken.

If and when this becomes necessary, the same notification procedure as described above will be used to have markings read by the Mobile Retroreflective Contractors.

If measured and found not to be in reasonable compliance, the markings are to be replaced at no cost to the Department.

If Work Zone Performance pavement markings are snowplowed within their 12-month expected life, the material shall be durable to withstand a single snow event without showing excessive fatigue in both bond and retroreflectivity. However, if excessive damage has occurred during a single event or multiple snow plow events, resulting in more than 25% of the pavement marking edgelines or skips being physically removed, then the Work Zone Performance pavement markings are to be replaced at the contract unit price unless the traffic pattern is to change within 30 days.

Unless the Work Zone Performance pavement marking is replaced due to excessive damage, it shall meet the following minimum retroreflectivity values within the single snow event.

Reflectometer Requirements for Work Zone Performance Pavement Markings After Single Snow Event

Color	MINIMUM
White	150 mcd/lux/m2
Yellow	100 mcd/lux/m2

If the work zone experiences more than more than 1 snow event requiring snowplowing, the retroreflectivity numbers in the chart no longer apply. The Engineer will determine if the pavement markings are still performing adequately or if replacement is necessary due to excessive damage caused by snowplow activities. If the markings are found to be deficient, they shall be replaced at the contract unit price unless the traffic pattern is to change within 30 days.

D) Surface Preparation

All pavement surfaces to receive Work Zone Performance pavement markings are to be swept clean and prepared in accordance with the Manufacturer's recommendation.

E) Temperature and Weather Limitations

Do not apply Work Zone Performance pavement markings unless the ambient air temperature and the pavement temperature is 50°F or higher for thermoplastic and is 40°F or higher for all other materials. Do not install unless the pavement surface is completely dry and not within 4 hours of a heavy rain event such as a thunderstorm with rainfall intensities greater than 1 inch/per hour.

In the event a traffic shift has to take place when the air and pavement temperatures are below the required minimums or if a rain event occurs prior to or during a planned traffic shift, upon approval by the Engineer, an acceptable alternative is to install temporary pavement marking. Use 1 application of standard traffic paint to produce a 4" line with at 15 mils (wet). Beads shall also be applied to provide proper retroreflectivity until the "performance" material can be installed. The Work Zone Performance pavement markings shall be applied within 90 days of installation of the temporary pavement markings.

Maintenance

Replace any Work Zone Performance pavement material that prematurely fails due to debonding or excessive wearing where it doesn't maintain its retroreflectivity for the required 12-month duration. Any traffic control and Work Zone Performance pavement marking costs due to replacement is at no cost to the Department unless it's due to excessive damage caused by snowplow damage.

TYPICAL MEDIAN ACCESS AREAS:

(12/18/18)

Description

Perform the work covered by this section including, but not limited to, constructing, maintaining, and removing Typical Median Access Areas for construction vehicle ingress to and egress from the median to/from active travel lanes on controlled access facilities.

Typical Median Access Areas are not required when construction vehicle ingress and egress is conducted using lane closures as shown on detail 1101.05, Sheet 2 of 2 of the *2018 Roadway Standard Drawings*.

Materials

Refer to Divisions 6, 10, 11, 12, and 17 in the 2018 *Standard Specifications for Roads and Structures*.

Provide temporary traffic control devices listed on the NCDOT Approved Products List (APL).

Provide Work Zone Performance Pavement Markings for Design-Build Projects (See Project Special Provision)

Provide High Visibility Devices (See Project Special Provision)

Flashing Beacon and Detection System:

(A) General

Provide flashing beacon and detection system components listed on the NCDOT ITS and Signals Qualified Products List (QPL).

Provide a trailer mounted flashing beacon and warning sign assembly that meets or exceeds the physical and operational requirements of the MUTCD, or other mounting method approved by the Department. The following specifications supplement those basic requirements.

Provide a totally mobile complete unit capable of being located as traffic conditions demand.

The warning sign height shall comply with detail 1110.01, sheet 1 of 3 of the *2018 Roadway Standard Drawings* when raised in the upright position.

The flashing beacon housing assembly shall be of weather resistant construction.

(B) Power System

Provide a unit that is solar powered and supplemented with a battery backup system that includes a 110/120 VAC powered on-board charging system.

The unit shall also be capable of being powered by standard 110/120 VAC power source.

The batteries, when fully charged, shall be capable of powering the display for 20 continuous days with no solar power.

Store the battery bank and charging system in a lockable, weather, and vandal resistant box.

(C) Controller

Provide automatic brightness/dimming of the display and a manual override dimming switch.

The controller shall provide a battery-charge status indicator.

Mobile radio or any other radio transmissions shall not affect the controller.

Store the controller in a lockable, weather and vandal resistant box.

(D) Trailer

Finish all exterior metal surfaces with Federal orange enamel per Federal Standard 595a, color chip ID# 13538 or 12473 respectively. The trailer shall be able to support a 100-mph wind load with the display fully extended.

The trailer shall be equipped with leveling jacks capable of stabilizing the unit in a horizontal position when located on slopes 6:1 or flatter.

The trailer shall be properly equipped in compliance with North Carolina Law governing motor vehicles.

Provide a minimum 4-inch wide strip of fluorescent orange retroreflective sheeting to the frame of the trailer. Apply the sheeting to all sides of the trailer. The retroreflective sheeting shall be Grade B that conforms to Article 1092-2 in the 2018 *Standard Specifications for Roads and Structures*. Drums may be supplemented around the unit in place of the sheeting.

(E) Reliability

Provide a sign unit, flashing beacons, and detection system with all components rated to operate at temperatures ranging from -30°F to 165°F.

Construction Methods

See Typical Median Access Detail (attached).

Temporary Acceleration Lane

Construct a temporary acceleration lane with a minimum length of 1720’ and a minimum clear width of 12’ for the full length of the temporary acceleration lane. At least 920’ of parallel merge/diverge area is required adjacent to the active travel lanes. The detection zone will be located from the beginning of the paved area to within 100’ of the end of the PCB. It shall have protection separating it from active travel lanes for the first 500’.

The Temporary Acceleration Lane shall use either existing or proposed pavement, where available. If existing or proposed pavement is not available, construct temporary pavement as follows: 1.25” S9.5B, 2.5” I19.0C, and 8” ABC. Install and maintain pavement in accordance with Division 6.

Using Work Zone Performance Pavement Markings, install 12” yellow diagonals lines (2:1 slope) at 100’ intervals throughout the upstream half of the parallel merge/diverge area, and at 55’ intervals throughout the downstream half of the parallel merge/diverge area. Remove any conflicting markings in accordance with Section 1205.

Flashing Beacons and Detection System

Provide High Visibility advance warning signage as shown in the attached detail. Provide a flashing beacon system with two (2) flashing lights per sign to alert motorists in the active travel lanes of work vehicles entering from the median.

Provide a non-intrusive detection system capable of detecting vehicles in the work area at least 100’ in advance of the parallel merge/diverge area. The detection system shall be programmed such that passing public traffic in active travel lanes and vehicles in the work area not intending to use the parallel merge/diverge area are not detected.

Once detection occurs, the beacons on the advance warning sign(s) shall begin flashing immediately at a rate of not less than 50 or more than 60 times per minute. The beacons on the advance warning sign(s) shall flash continuously in an alternating pattern at all times that work vehicles are detected. The beacons shall continue flashing for thirty (30) seconds after detection ceases before turning off, and personnel on site shall have the ability to adjust this time based on field conditions. The flashing beacon system shall remain dark when idle.

Expedite repairs due to failure, malfunction or damage to the flashing beacons and/or detection system. Furnish another flashing beacon system or detection system approved by the Department during the repair time. Repair or replace flashing beacon system and/or detection systems immediately; otherwise, suspend all construction activities requiring the use of the Median Access Area until the flashing beacon system and/or detection system is restored to operation.

Perform all maintenance operations recommended by the manufacturer of the flashing beacon system and detection system.

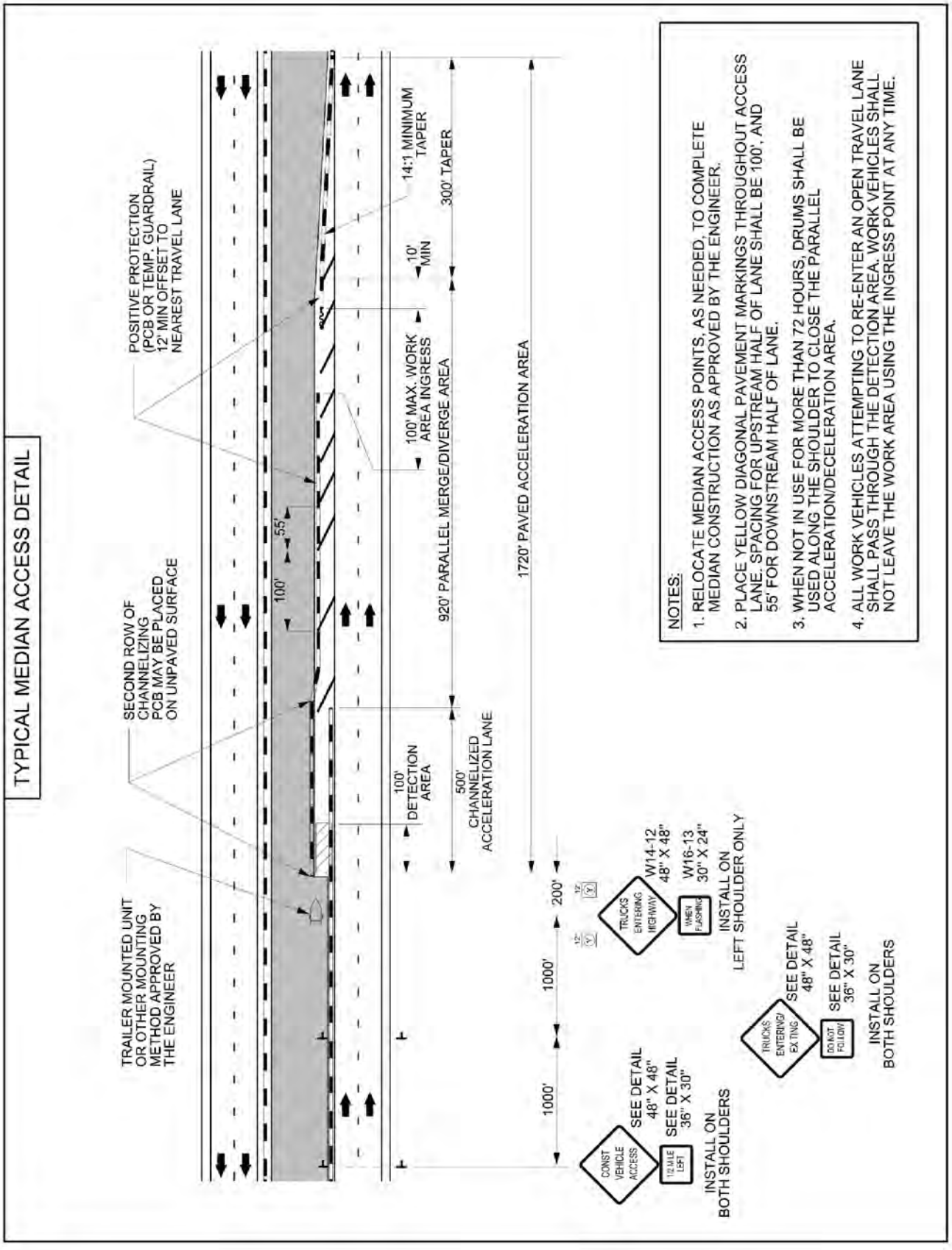
Location, Placement, and Use

Typical Median Access Areas shall not be located within one-half (1/2) mile of any interchange acceleration or deceleration lanes, unless approved by the Department. All proposed locations for Typical Median Access Areas shall be reviewed and approved by the Department prior to installation.

Work vehicles using a particular Median Access Area shall not utilize any interchange ramp (on-ramp or off-ramp) within one (1) mile of the Median Access area.

Typical Median Access Areas installed in accordance with this section will not require the use of temporary lane closures for ingress/egress of work vehicles.

The Contractor shall comply with multiple and single vehicle hauling restrictions as shown in the TMP when performing hauling of equipment or materials to or from the project while using Typical Median Access Areas.


TYPICAL MEDIAN ACCESS DETAIL
TRAILER MOUNTED UNIT OR OTHER MOUNTING METHOD APPROVED BY THE ENGINEER
SECOND ROW OF CHANNELIZING PCB MAY BE PLACED ON UNPAVED SURFACE
POSITIVE PROTECTION (PCB OR TEMP. GUARDRAIL) 12' MIN OFFSET TO NEAREST TRAVEL LANE
100'
55'
100' DETECTION AREA
500' CHANNELIZED ACCELERATION LANE
920' PARALLEL MERGE/DIVERGE AREA
100' MAX. WORK AREA INGRESS
10' MIN
14:1 MINIMUM TAPER
300' TAPER
1720' PAVED ACCELERATION AREA
1000'
1000'
200'
12' (Y)
12' (Y)
CONST VEHICLE ACCESS
SEE DETAIL 48" X 48"
12 MILE LEFT
SEE DETAIL 36" X 30"
INSTALL ON BOTH SHOULDERS
TRUCKS ENTERING HIGHWAY
W14-12 48" X 48"
WHEN FLASHING
W16-13 30" X 24"
INSTALL ON LEFT SHOULDER ONLY
TRUCKS ENTERING/ EXITING
SEE DETAIL 48" X 48"
DO NOT FOLLOW
SEE DETAIL 36" X 30"
INSTALL ON BOTH SHOULDERS
NOTES:
1. RELOCATE MEDIAN ACCESS POINTS, AS NEEDED, TO COMPLETE MEDIAN CONSTRUCTION AS APPROVED BY THE ENGINEER.
2. PLACE YELLOW DIAGONAL PAVEMENT MARKINGS THROUGHOUT ACCESS LANE. SPACING FOR UPSTREAM HALF OF LANE SHALL BE 100', AND 55' FOR DOWNSTREAM HALF OF LANE.
3. WHEN NOT IN USE FOR MORE THAN 72 HOURS, DRUMS SHALL BE USED ALONG THE SHOULDER TO CLOSE THE PARALLEL ACCELERATION/DECELERATION AREA.
4. ALL WORK VEHICLES ATTEMPTING TO RE-ENTER AN OPEN TRAVEL LANE SHALL PASS THROUGH THE DETECTION AREA. WORK VEHICLES SHALL NOT LEAVE THE WORK AREA USING THE INGRESS POINT AT ANY TIME.

SIGN NUMBER: WZTC
TYPE: STATIONARY
QUANTITY: SEE PLANS

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

DESIGN BY: J.Navarrete
PROJECT ID: I5922

CHECKED BY:
LOCATION:

Mar 14, 2018
DIV:WZTC

SIGN WIDTH: 5'-6"
HEIGHT: 5'-6"
TOTAL AREA: 30.3 Sq.Ft.

BORDER TYPE: INSET
RECESS: 0"
WIDTH: 0"
RADII: 0"

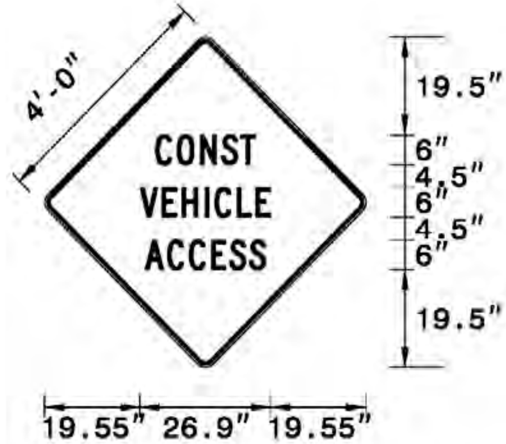
NO. Z BARS: 2
LENGTH: 58.0

SYMBOL	X	Y	WID	HT

MAT'L: 0.080" (2.0 mm) ALUMINUM

USE NOTES: 1,2

1. Legend and border shall be direct applied black non-reflective sheeting.
2. Background shall be NC GRADE B fluorescent orange retroreflective sheeting.



Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

									Series/Size Text Length
	C	O	N	S	T				C 2000
22.7	4.4	4.7	4.4	3.9	3.1	22.7			20.5
	V	E	H	I	C	L	E		C 2000
19.6	4.6	4.1	4.7	2	4.6	3.9	3.1	19.6	26.9
	A	C	C	E	S	S			C 2000
20.6	4.6	4.4	4.6	3.8	4.1	3.4	20.6		24.8

FILENAME: I5922 Sign Designs

NORTH CAROLINA D.O.T. SIGN DETAIL

SIGN NUMBER: WZTC
TYPE: STATIONARY
QUANTITY: SEE PLANS

SIGN WIDTH: 3'-0"
HEIGHT: 2'-6"
TOTAL AREA: 7.5 Sq.Ft.

BORDER TYPE: INSET
RECESS: 0.47"
WIDTH: 0.63"
RADII: 1.5"

NO. Z BARS:
LENGTH:

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

SYMBOL	X	Y	WID	HT

MAT'L: 0.080" (2.0 mm) ALUMINUM

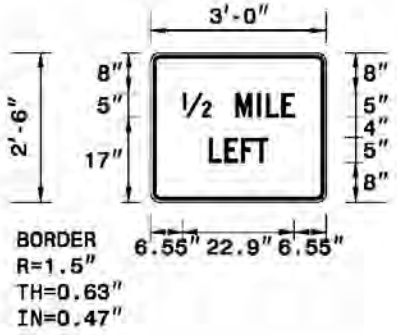
USE NOTES: 1,2

1. Legend and border shall be direct applied black non-reflective sheeting.
2. Background shall be NC GRADE B fluorescent orange retroreflective sheeting.

DESIGN BY: J.Navarrete
PROJECT ID: I5922

CHECKED BY:
LOCATION:

Mar 14, 2018
DIV:WZTC



Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

																											Series/Size Text Length
		1/2		M	I	L	E																				C 2000
	6.6	5.9	5	4.4	1.8	3.3	2.6	6.6																			22.9
		L	E	F	T																						C 2000
	12	3.3	3.4	2.8	2.8	12																					12.1

FILENAME: I5922 Sign Designs

NORTH CAROLINA D.O.T. SIGN DETAIL

SIGN NUMBER: WZTC
TYPE: STATIONARY
QUANTITY: SEE PLANS

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

SIGN WIDTH: 5'-6"
HEIGHT: 5'-6"
TOTAL AREA: 30.3 Sq.Ft.

BORDER TYPE: INSET
RECESS: 0"
WIDTH: 0"
RADII: 0"

NO. Z BARS: 2
LENGTH: 58.0

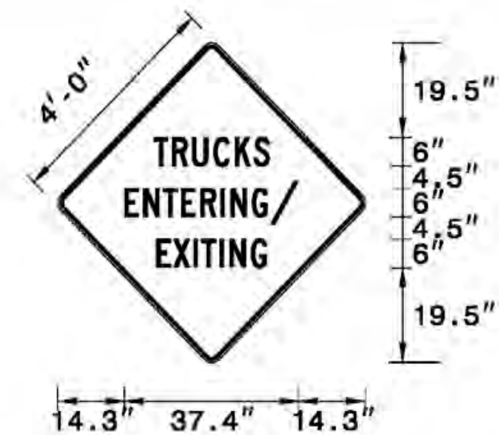
SYMBOL	X	Y	WID	HT

MAT'L: 0.080" (2.0 mm) ALUMINUM

DESIGN BY: J.Navarrete
PROJECT ID: 15922
CHECKED BY:
LOCATION:
Mar 14, 2018
DIV: DIV

USE NOTES: 1,2

1. Legend and border shall be direct applied black non-reflective sheeting.
2. Background shall be NC GRADE B fluorescent orange retroreflective sheeting.



Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

											Series/Size Text Length
	T	R	U	C	K	S					C 2000
20.6	3.9	4.4	4.6	4.6	4.1	3.4	20.6				24.8
	E	N	T	E	R	I	N	G	/		C 2000
14.3	4.1	4.2	3.9	4.1	4.4	2.2	4.6	3.9	6.1	14.3	37.4
	E	X	I	T	I	N	G				C 2000
21.2	3.6	4.4	1.7	3.9	2.2	4.6	3.4	21.2			23.6

FILENAME: 15922 Sign Designs

NORTH CAROLINA D.O.T. SIGN DETAIL

SIGN NUMBER: WZTC
TYPE: STATIONARY
QUANTITY: SEE PLANS

SIGN WIDTH: 3'-0"
HEIGHT: 2'-6"
TOTAL AREA: 7.5 Sq.Ft.

BORDER TYPE: INSET
RECESS: 0.47"
WIDTH: 0.63"
RADII: 1.5"

NO. Z BARS:
LENGTH:

BACKG COLOR: Fluorescent Orange
COPY COLOR: Black

SYMBOL	X	Y	WID	HT

MAT'L: 0.080" (2.0 mm) ALUMINUM

USE NOTES: 1,2

1. Legend and border shall be direct applied black non-reflective sheeting.
2. Background shall be NC GRADE B fluorescent orange retroreflective sheeting.

DESIGN BY: J.Navarrete
PROJECT ID: I5922
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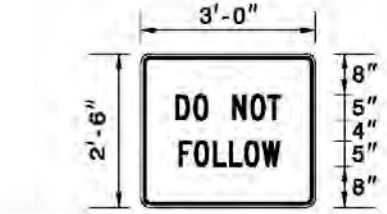
Mar 14, 2018
DIV:WZTC



BORDER
R=1.5"
TH=0.63"
IN=0.47"

Spacing Factor is 1 unless specified otherwise

LETTER POSITIONS

Letter spacings are to start of next letter

																											Series/Size Text Length
		D	O		N	O	T																				C 2000
	7.2	3.7	3	5	3.8	3.6	2.6	7.2																			21.6
		F	O	L	L	O	W																				C 2000
	7.9	3.1	3.9	3.3	3.2	3.8	3.8	7.2																			20.9

FILENAME: I5922 Sign Designs

NORTH CAROLINA D.O.T. SIGN DETAIL

FAA NOTIFICATION OF CONSTRUCTION

The Design-Build Team shall adhere to the requirements of Title 14 of the Code of Federal Regulations (14 CFR) Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace,* and Advisory Circular 70/7460-1L Change 2, *Obstruction Marking and Lighting*. The Design-Build Team shall submit a Notice of Proposed Construction or Alteration (Form 7460-1) at least 60 days prior to the planned construction through the Federal Aviation Administration (FAA) Obstruction Evaluation / Airport Airspace Analysis (OE/AAA) portal found here:

https://oeaaa.faa.gov/oeaaa/external/portal.jsp

The Design-Build Team shall be responsible for all work and costs associated with the FAA forms and approvals required for construction of the project. This shall include, but is not limited to, preparation and submittal of forms 7460-1 and 7460-2. The electronic submittal portal, forms and instructions can be found at the website listed above. No construction operations impacted by the FAA requirements shall begin until Forms 7460-1 and 7460-2 have been issued approvals.

NCDOT Division of Aviation

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Coastal Carolina Regional Airport Authority

Andy Shorter
Airport Director
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New Bern, NC 28564
Telephone: 252-638-8591 x232

The Design-Build Team shall include both parties listed above in project status meetings including agendas, meeting minutes, and other stakeholder related communications throughout the project.

In addition, the Design-Build Team shall adhere to the Craven County ordinances and height zoning permitting requirements found at the websites listed below and shall submit the required applications at least 60 days prior to the planned construction:

https://cravencountync.gov/1391/Permit-Applications

https://library.municode.com/nc/craven_county/codes/code_of_ordinances?nodeId=CD_ORD_APXFCOCAREAIZOHECOOR#TOPTITLE

UNMANNED AIRCRAFT SYSTEM (UAS)

The Design-Build Team shall adhere to all Federal, State and Local regulations and guidelines for the use of Unmanned Aircraft Systems (UAS). This includes but is not limited to US 14 CFR Part 107 *Small UAS Rule*, NC GS 63-95 *Training required for the operation of unmanned aircraft systems*, NC GS 63-96 *Permit required for commercial operation of unmanned aircraft system,* and the NCDOT UAS Policy. The required operator certifications include possessing a current Federal Aviation Administration (FAA) Part 107 Remote Pilot Certificate, a NC UAS Operator Permit as well as operating a UAS registered with the FAA.

To learn more about these requirements visit the following website:

https://www.ncdot.gov/aviation/uas/

All contractors or subcontractors utilizing UAS shall be pre-qualified for UAS discipline codes 551 (UAS Operator) and 552 (UAS Operations Manager). In addition, the Contractor Approval Form shall be completed and approved prior to using an UAS on this project. This form requires signatures of both parties and ensures contractors are qualified to operation UAS.

All UAS operations shall be approved by the Engineer a minimum of one week prior to beginning the operations.

All contractors or subcontractors operating UAS shall have UAS specific general liability insurance to cover all operations under this contract.

GENERAL

The State will not be bound by oral explanations or instructions given at any time during the bidding process or after award. Only information that is received in response to this RFP will be evaluated; reference to information previously submitted will not suffice as a response to this solicitation.

NO CONTACT CLAUSE

To ensure that information is distributed equitably to all short-listed Design-Build Teams, all questions and requests for information shall be directed to the Division through the Project-specific e-mail address. This precludes any Design-Build Team member, or representative, from contacting representatives of the Department, other State Agencies or Federal Agencies either by phone, e-mail or in person concerning the Design-Build Project.

USE OF TERMS

Throughout this RFP and all manuals, documents and standards referred to in the RFP the terms Contractor, Bidder, Design-Builder, Design-Build Team, Team, Firm, Company and Proposer are synonymous.

Throughout this RFP and all manuals, documents and standards referred to in the RFP, the terms NCDOT, Department, Engineer and State are synonymous. All references to Division mean Highways Division 2 of the North Carolina Department of Transportation.

Throughout this RFP and all documents referred to in the RFP, references to the Technical Proposal include all Technical Proposal supplemental information that may be submitted in response to a Best and Final Offer RFP.

DESIGN REFERENCES

Design references developed and published by NCDOT and those developed and published by other agencies and adopted for use by NCDOT which are to be used in the design of this project may be obtained by contacting Contract Standards and Development Unit within the Technical Services Division. Standard prices for materials, which the Department normally sells for a fee, will be in effect. The Design-Build Team shall be responsible for designing in accordance with the applicable documents and current revisions and supplements thereto.

REVIEW OF SUBMITTALS

Major design milestones and required design submittals shall be identified as activities on a CPM, bar chart or other scheduling tool. This schedule shall be submitted to the Division and Resident Engineer concurrently with the first design submittal, or within 30 days of the contract award, whichever is earlier. The schedule shall be revised and resubmitted as design milestones change or as directed by the Division. Submittals will be reviewed within ten working days (15 days for temporary structures, overhead sign assemblies, MSE walls, FEMA compliance documents, curved steel girder working drawings and temporary shoring) from the date of receipt by NCDOT

unless otherwise stipulated in the scope of work. All submittals shall be prepared and submitted in accordance with the Design-Build Submittal Guidelines, which by reference are incorporated and made a part of this contract. All submittals shall be made simultaneously to the Division and the Resident Engineer. The Department will not accept subsequent submittals until prior submittal reviews have been completed for that item. The Design-Build Team shall inform the Division in writing of any proposed changes to the NCDOT preliminary designs, Technical Proposal and / or previously reviewed submittals and obtain approval prior to incorporation. The Design-Build Team shall prioritize submittals in the event that multiple submittals are made based on the current schedule. All submittals shall include pertinent Special Provisions. No work shall be performed prior to Department review and acceptance of the design submittals.

OVERVIEW

The Design-Build Project U-5713 / R-5777A & B consists of upgrading US 70 along its existing alignment to a controlled-access highway in compliance with interstate standards. The project will provide a six-lane divided facility with a 22-foot paved median from the eastern approach of the Neuse River Bridge to SR 1121 (Garner Road); and a four-lane divided facility with a 46-foot median from Garner Road to approximately one (1) mile east of SR 1116 (Thurman Road). The Project will also convert at-grade intersections to grade-separated interchanges at the US 70 intersections with SR 1167 (Williams Road), SR 1131 (Airport Road), SR 1124 (Grantham Road), SR 1922 (Taberna Way), and Thurman Road; and two-way access roads on both sides of US 70 to connect existing service roads and maintain access to side streets and abutting properties.

Project services shall include, but are not limited to:

- **Design Services** – completion of construction plans.
- **Construction Services** – necessary to build and ensure workmanship of the designed facility.
- **Intelligent Transportation System** – design and construction of ITS components, including CCTV cameras, dynamic message signs (DMS), fiber-optic communications cable and conduit, and ITS integration.
- **Permit Preparation / Application** - development of all documents for required permits.
- **Right of Way** – acquisition of right of way necessary to construct project.
- **As-Constructed Drawings**.
- **As-Built Plans**.

Construction Engineering Inspection will be provided by the NCDOT Division personnel or will be performed under a separate contract.

The following project planning documents have been completed:

- A Type III (Ground Disturbing) Categorical Exclusion Action was approved by FHWA on July 2, 2018.

GENERAL SCOPE

The scope of work for this Project includes all aspects required to design and construct a controlled-access facility along the existing alignment of US 70 in compliance with interstate standards from the eastern approach of the Neuse River Bridge to approximately one (1) mile east of SR 1116 (Thurman Road). Between the eastern approach of the Neuse River Bridge and SR 1121 (Garner Road), the Project will provide a six-lane divided facility with a 22-foot paved median. From Garner Road to approximately one (1) mile east of Thurman Road, the Project will provide a four-lane divided facility with a 46-foot median. The Project will also convert at-grade intersections to grade-separated interchanges at the U.S. 70 intersections with S.R. 1167 (Williams Road), S.R. 1131 (Airport Road), S.R. 1124 (Grantham Road), S.R. 1922 (Taberna Way), and Thurman Road; and two-way access roads on both sides of U.S. 70 to connect existing service roads and maintain access to side streets and abutting properties.

Unless allowed otherwise elsewhere in this RFP, the designs shall meet all appropriate latest versions of AASHTO *A Policy on Geometric Design of Highways and Streets*, AASHTO *LRFD Bridge Design Specifications*, *Manual of Uniform Traffic Control Devices* and all NCDOT design policies that are current as of the Technical and Price Proposal submittal date or the Best and Final Offer submittal date, whichever is later.

Unless noted otherwise elsewhere in this RFP, all documents referenced herein shall be the edition / version, including all interim revisions, effective on the Technical and Price Proposal submittal date or the Best and Final Offer submittal date, whichever is later.

Construction shall include, but not be limited to, all necessary clearing, grading, roadway, drainage, structures, utility coordination and relocation, and erosion and sediment control work items for the proposed four-lane facility and installation of the control of access fence. Construction engineering and management shall be the responsibility of the Design-Build Team. Construction shall comply with 2018 NCDOT *Standard Specifications for Roads and Structures* and any special provisions.

Areas of work required for this project shall include, but are not limited to the following items:

- Roadway Design
- Structure Design
- Permit Application
- Hydraulic Design
- Geotechnical Engineering
- GeoEnvironmental
- Railroad Coordination
- Foundation Design for Structures and Roadway
- Erosion and Sedimentation Control Design and Implementation
- Transportation Management Plan Design and Implementation
- Pavement Marking Design
- Intelligent Transportation Systems (ITS) Design
- Sign Design

- Traffic Signals and Signal Timing Plans
- Construction
- Project Management
- Design and Construction Management
- Lighting (Construction Only)
- Utility Construction
- R/W Utilities, Conflicts and / or Construction
- Construction Surveying
- Location and Surveys
- Right of Way Acquisition
- Public Involvement and Information

All designs shall be in Microstation format using Geopak software (current version used by the Department).

DESIGN AND CONSTRUCTION PERFORMED BY DESIGN-BUILD TEAM

The design work consists of the preparation of all construction documents for constructing approximately 5.1 miles of freeway along the existing alignment of U.S. 70 within the project limits as outlined in the General Scope section of this RFP. The Design-Build Team shall prepare final designs, construction drawings and special provisions.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall acknowledge that project documents furnished by the Department are preliminary and provided solely to assist the Design-Build Team in the development of the project design. The Design-Build Team shall be fully and totally responsible for the accuracy and completeness of all work performed under this contract and shall save the State harmless and shall be fully liable for any additional costs and all claims against the State which may arise due to errors, omissions and negligence of the Design-Build Team in performing the work required by this contract.

There shall be no assignment, subletting or transfer of the interest of the Design-Build Team in any of the work covered by the Contract without the written consent of the State, except that the Design-Build Team may, with prior written notification of such action to the State, sublet property searches and related services without further approval of the State.

The Design-Build Team shall certify all plans, specifications, estimates and engineering data furnished by the Team.

All work by the Design-Build Team shall be performed in a manner satisfactory to the State and in accordance with the established customs, practices, and procedures of the North Carolina Department of Transportation, and in conformity with the standards adopted by the American Association of State Highway Transportation Officials, and approved by the U.S. Secretary of Transportation as provided in Title 23, U.S. Code, Section 109 (b). The decision of the Engineer / State / Department shall control in all questions regarding location, type of design, dimension of design, and similar questions.

Alternate designs, details and / or construction practices (such as those employed by other states, but not standard practice in NC) are subject to Department review and approval, and will be evaluated on a case by case basis.

The Design-Build Team shall not change team members, subconsultants or subcontractors identified in the Statement of Qualifications (SOQ) or Technical Proposal without written consent of the Engineer or the State Contract Officer. In addition, subconsultants and subcontractors not identified in the SOQ or Technical Proposal shall not perform any work without written consent by the Engineer. Individual offices of the Design-Build Team not identified in the Statement of Qualifications or the Technical Proposal submitted shall not perform any work without written consent by the Engineer. Failure to comply with this requirement may be justification for removing the Team from further consideration for this project and disqualification from submitting on future Design-Build Projects.

All firms shall be prequalified by the Department for the work they are to perform. Joint Ventures, LLCs or any legal structures that are different than the existing prequalification status must be prequalified prior to the Technical and Price Proposal submittal deadline. Subcontractors need only be prequalified prior to performing the work. Design firms should be prequalified prior to the Technical and Price Proposal submittal deadline. If not prequalified at the time of the Technical and Price Proposal submittal deadline, the prime contractor shall be solely responsible for either (1) ensuring that the design firm is prequalified prior to its first design submittal or (2) replacing that firm with a prequalified firm. Design firms and Natural Systems firms are prequalified by the particular office performing the work. If the work is to be performed by an office other than the one that is prequalified, that office shall be prequalified prior to any design submittals.

ACCESS TO PROVIDED MATERIALS

To facilitate distribution of documents that may be helpful to the Design-Build Teams in their development of a Technical and Price Proposal and subsequent designs, project material will be made accessible through a secure web portal. The Design-Build Project Manager for each short-listed team shall provide a list of team members that will require access to this portal. This list shall include the name, e-mail address and North Carolina Identity Management (NCID) for each individual team member. Once the list is complete, it shall be submitted to the Design-Build e-mail address (**jamescitydesignbuild@ncdot.gov**). No distribution of Provided Materials will be possible prior to this list being submitted and the access privileges established as noted herein.

To create an NCID account, each individual shall go to NCDOT's Connect website (https://connect.ncdot.gov) and click on the "How to get an Account" link and then, "Create NCID".

The Department will obtain access rights for these individuals and notify the Design-Build Project Manager accordingly. Individuals may then re-enter the "Connect" site and login with their NCID account. Once logged in, the Teamsite "U-5713_R-5777AB" link will be apparent on the left side of the webpage.

Please note that all material provided, including the material provided through this portal, is provided for informational purposes only and is provided solely to assist the Design-Build Team in the development of the project design unless noted otherwise elsewhere in this RFP. By submitting a Technical Proposal and Price Proposal, the Design-Build Team acknowledges that they are fully and totally responsible for the project design, including the use of portions of the Department design, modification of such design, or other designs as may be submitted by the Design-Build Team, unless noted otherwise elsewhere in this RFP. The Design-Build Team further acknowledges that they are fully and totally responsible for the accuracy and completeness of all work performed, including the determination of the accuracy of the information provided through this portal, and to the extent that the Design-Build Team chooses to rely on such information.

ELECTRONIC PLAN SUBMITTALS AND E-SIGNATURES

The Design-Build Team shall submit all Release for Construction Plans in accordance with the NCDOT e-Signature requirements, including but not limited to providing signed and sealed searchable .pdf files. Reference the website noted below for additional information:

https://connect.ncdot.gov/business/consultants/Pages/Guidelines-Forms.aspx

ETHICS POLICY

Employees employed by the Design-Build Team or employees employed by any subconsultant for the Design-Build Team to provide services for this project shall comply with the Department's Ethics Policy. Failure to comply with the Ethics Policy will result in the employee's removal from the project and may result in removal of the Company from the Department's appropriate prequalified list.

APPROVAL OF PERSONNEL

The Department will have the right to approve or reject any personnel, assigned to the Project by the Design-Build Team.

In the event of engagement of a former employee of the Department, the Design-Build Team or their subcontractors shall restrict such person or persons from working on any of the Design-Build Team's contracted projects in which the person or persons were "formerly involved" while employed by the State. The restriction period shall be for the duration of the contracted project with which the person was involved. *Former Involvement* shall be defined as active participation in any of the following activities:

Drafting the contract
Defining the contract scope
Design-Build Team selection
Negotiation of the contract cost (including calculating manhours or fees)
Contract administration

An exception to these terms may be granted when recommended by the Secretary and approved by the Board of Transportation.

The Design-Build Team and their subconsultants / subcontractors shall restrict all personnel embedded within the Department, including but not limited to Design Units and Divisions, from working on any Design-Build procurement / project. Except as allowed otherwise below, the Design-Build Team shall provide a list of all embedded personnel to the Department and a signed Confidentiality Agreement for each embedded employee, as well as their employer and NCDOT Unit Manager. If the Design-Build Team has previously provided a signed Confidentiality Agreement for an embedded employee whose employer and / or NCDOT Unit Manager have not changed, the Design-Build Team shall 1) indicate on the aforementioned list when the original Confidentiality Agreement was provided to the Division (date and TIP Project); and 2) provide a copy of the original signed Confidentiality Agreement, or 3) provide a new signed Confidentiality Agreement. The Design-Build Team shall submit the aforementioned list and Confidentiality Agreements to Mr. Ronald E. Davenport, Jr., P.E., State Contract Officer, within ten business days of the issuance of the Industry Draft RFP, and provide updated lists and Confidentiality Agreements, as appropriate, throughout the project procurement / duration.

Failure to comply with the terms stated above in this section may be grounds for termination of this contract and / or not being considered for selection of work on future contracts for a period of one year.

SUBMITTAL OF TECHNICAL AND PRICE PROPOSALS

Technical and / or Price Proposals that do not adhere to all the requirements noted below may be considered non-responsive and may result in the Department not considering the Design-Build Team for award of the contract or reading their Price Proposal publicly.

GENERAL

Technical Proposals will be accepted until **4:00 p.m. Local Time on Monday, August 19, 2019**, and Price Proposals will be accepted until **4:00 p.m. Local Time on Monday, August 26, 2019**, at the office of the State Contract Officer:

Mr. Ronald E. Davenport, Jr., P.E.
Contract Standards and Development
1020 Birch Ridge Drive
Century Center Complex - Building B
Raleigh, NC 27610

No Proposals will be accepted after the time specified.

Proposals shall be submitted in two separate, sealed parcels containing the Technical Proposal in one and the Price Proposal in the other parcel.

TECHNICAL PROPOSAL - Hard Copies

Hard copies of the Technical Proposal shall be submitted in a sealed package. The outer wrapping shall clearly indicate the following information:

Technical Proposal – Hard Copies
Submitted By: (Design-Build Team's Name)
Design-Build Team Address
Contract Number C 204225
TIP Number U-5713 / R-5777A & B
Craven County
U.S. 70 Improvements in James City

If delivered by mail, the sealed envelope shall be placed in another sealed envelope and the outer envelope addressed to the Contract Officer as stated in the Request for Proposals. The outer envelope shall also bear the statement "Technical Proposal for the Design-Build of State Highway Contract No. C 204225".

Technical Proposal Requirements

12 Copies

8 ½-inch by 11-inch pages

No fold out sheets allowed – 24-inch by 36-inch fold out sheets shall only be allowed to present interchange plans in the 11-inch by 17-inch plan sheets

Printed on one side only

Double-spaced

Font size 12 - Within embedded tables, charts, and graphics only, minimum font size 10 is permissible

Excluding the introductory letter to Mr. Ronald E. Davenport, Jr., P.E. (two-page maximum length) and the 11-inch by 17-inch appropriate plan sheets, the maximum number of allowable pages shall be 51 pages.

The aforementioned introductory letter to Mr. Ronald E. Davenport, Jr., P.E. shall include a statement acknowledging that the NCDOT may destroy all Technical Proposals not retained by the Department, or a statement that the NCDOT should return all Technical Proposals not retained by the Department.

Project team members, identified in the Statement of Qualifications, shall not be modified in the Technical Proposal without written approval of the Department. Any such request should be sent to the attention of Mr. Ronald E. Davenport, Jr., P.E., at the address below:

NCDOT- Contract Standards and Development
Century Center Complex - Building B
1020 Birch Ridge Drive
Raleigh, NC 27610

TECHNICAL PROPOSAL - Electronic Copy

An electronic copy of the Technical Proposal shall be submitted in a sealed package. The electronic copy shall be created by converting the original MicroStation / GeoPak files into PDF format. The electronic copy shall be scaled to reproduce to the appropriate page format, as defined above. The outer wrapping shall clearly indicate the following information:

Technical Proposal – Electronic Copy
Submitted By: (Design-Build Team's Name)
Design-Build Team Address
Contract Number C 204225
TIP Number U-5713 / R-5777A & B
Craven County
U.S. 70 Improvements in James City

If delivered by mail, the sealed envelope shall be placed in another sealed envelope and the outer envelope addressed to the Contract Officer as stated in the Request for Proposals. The outer envelope shall also bear the statement "Technical Proposal for the Design-Build of State Highway Contract No. C 204225"

PRICE PROPOSAL

Price Proposals shall be submitted in a sealed package. The outer wrapping shall clearly indicate the following information:

Price Proposal
Submitted by (Design-Build Team's Name)
Design-Build Team Address
Contract Number C 204225
TIP Number U-5713 / R-5777A & B
Craven County
U.S. 70 Improvements in James City

The Price Proposal shall be submitted by returning the Request for Proposals with the item sheets completed, and all required signatures and bonds. Failure to execute the required documents may render the Price Proposal non-responsive.

If delivered by mail, the sealed envelope shall be placed in another sealed envelope and the outer envelope addressed to the Contract Officer as stated in the Request for Proposals. The outer envelope shall also bear the statement "Price Proposal for the Design-Build of State Highway Contract No. C 204225".

EVALUATIONS

Decisions based on cost alone will not establish the design standards for the project. Technical Proposals shall address the technical elements of the design and construction of the project. The Technical Review Committee will consider the understanding of the project, the anticipated problems and the solutions to those problems, in addition to other evaluation criteria identified herein.

The Design-Build Team's Technical Proposal shall be developed using narratives, tables, charts, plots, drawings and sketches as appropriate. The purpose of the Technical Proposal is to document the Design-Build Team's understanding of the project, demonstrate the Design-Build Team's capabilities to complete the project, document their selection of appropriate design criteria and state their approach and schedule for completing all design and construction activities.

The review of design plans by the Department is not intended to reflect a reviewer's personal preferences, but rather to ensure that all contract requirements are met, sound engineering judgment is exercised by the Design-Build Team, and that the Design-Build Team adheres to all referenced documents, including but not limited to, design standards, codes, memos and manuals. As such, the Award of the Design-Build contract does not in any way imply that the NCDOT accepts the details of the Technical Proposal submitted by the Design-Build Team.

The Technical Proposal will be evaluated in each of the following major categories:

	EVALUATION FACTORS	POINTS
1.	Management	4
2.	Responsiveness to Request for Proposal	20
3.	Long Term Maintenance	2
4.	Schedule and Milestones	35
5.	Innovation	2
6.	Maintenance of Traffic and Safety Plan	35
7.	Oral Interview	2

TECHNICAL PROPOSAL EVALUATION CRITERIA

1. Management – 4 points

Provide a comprehensive Organizational Chart that identifies the design, quality and construction management, and the relationships with subconsultants / subcontractors. The Chart shall identify all firms and personnel changes (additions, substitutions, deletions) to the Design-Build Team since submittal of the Statement of Qualifications.

Design-Build Team Management

- Describe the Design-Build Team's concept of design management, and identify key positions and subordinate organizational units.

- Describe how the various design disciplines will be coordinated, including how designs developed by different firms and offices will be integrated / consistent.

- Describe how design personnel will interface with the construction personnel.

- List projects, including description and similarity to the subject project that the Design-Build Team's designer(s) have developed Transportation Management Plans; Pavement Marking Plans; ITS, Traffic Signal, and Signal System Timing Plans; and Signing Plans.

- List projects, including description and similarity to the subject project, that the Design-Build Team's right of way firm has performed right of way acquisition services.

Quality Management

- Describe how the Design-Build Team will comply with the design and construction quality control requirements. Specifically, include a narrative that describes the Design-Build Team's understanding of the Department's quality control philosophy and how the Design-Build Team will implement it for this project.

- Describe any significant design and / or construction quality control issues experienced on NCDOT projects in the last ten years and how those issues will be addressed for this project.

Construction Management

- Describe the Design-Build Team's concept of the project construction management organization and how it interrelates with the other elements of the Design-Build Team's organization for the project.

- Provide a brief narrative of the Design-Build Team's proposed plan for performing construction. This description shall include at least the following:

    - Indicate if, and how, the Design-Build Team intends to divide the project into work segments to enable optimum construction performance.

    - Identify operations, if any, that will be performed at night and the reason(s) why.

    - Describe the work categories that the Design-Build Team anticipates will be performed by the Design-Build Team's own direct labor force and those categories that will be performed by subcontractors.

    - Describe the Design-Build Team's plans and procedures to insure timely deliveries of materials to achieve the project schedule.

    - Describe the Design-Build Team's approach to site access and material staging to limit the number of dump trucks intermingling with commuter traffic.

Engagement of Local Workforce

As part of the ongoing partnering with the James City Community, the Design-Build Team shall make every reasonable effort to engage and utilize locally-owned businesses and local labor (skilled or unskilled) during the design and construction of the Project. For clarity, a locally-owned business is a business owned by a resident of the James City community; local labor (skilled or unskilled) means a person who's place of residence is within the James City community; and the James City community refers to the census-designated place and unincorporated area in Craven County, North Carolina.

- The Design-Build Team shall submit an approach stating how the Design-Build Team will engage and utilize locally-owned businesses and local labor during the design and construction of the Project. Such approach shall be no longer than one page and will become a part of the Design-Build contract between the Design-Build Team and the Department.

2. Responsiveness to RFP – 20 points

Natural Environmental Responsibility

- Describe the Design-Build Team's approach to addressing environmental concerns within the project boundaries.

- Describe the efforts to minimize excavation within the contaminated sites and associated disturbance to underlying soil.

- Identify efforts to minimize impacts on wetlands, streams, riparian buffers and other environmentally sensitive areas. Describe any temporary impacts and associated minimization approaches.

- Describe the Design-Build Team's understanding of the overall approach to permitting and the Team's comfort level with obtaining the required permits within the allowed timeframe.

- Identify methods of construction in wetlands, streams and riparian buffers.

- Describe all project / construction related Notice of Violations (NOVs) received by any team member within the last five years on projects in the United States and the disposition of each listed NOV.

- Describe the Design-Build Team's approach to Sedimentation and Erosion Control for the project.

- Provide a narrative overview of the Design-Build Team's Vegetation Management Procedure

Design Features

- Show plan view of design concepts with key elements noted.
- Identify preliminary horizontal and vertical alignments of all roadway elements.
- Identify the appropriate design criteria for each feature, if not provided herein.
- Identify proposed design exceptions and justify why the design exception is necessary.
- Identify proposed deviations to the preliminary design provided by the Department.
- Show mainline typical sections.
- Specify the mainline pavement Alternate chosen. The pavement Alternate chosen for the mainline will not be a part of the Technical Proposal evaluation and the selection thereof will not impact the Technical Scores.
- Specify the proposed subgrade stabilization, or combination, with approximate limits of each type.
- If applicable, specify where all underlying longitudinal joints will be located and demonstrate how the underlying longitudinal joint location will minimize reflective cracking.
- Indicate how longitudinal joints will be located on a lane line or lane midpoint.
- "If applicable, specify the extent of impacts to properties with contaminated soils, indicating the anticipated contamination excavation limits."
- Identify drainage modifications and designs to be implemented.
- Identify all hydraulically deficient storm drainage systems and the proposed mitigation on the plans.
- Identify all hydraulically deficient storm drainage systems within the existing / proposed right of way and their proposed mitigation.
- Identify the months the Department should schedule the interagency hydraulic design review meeting and interagency permit impacts meeting.
- Provide a *Box Culverts and Cross Pipes Hydraulic Assessment Table* that contains the box culvert and cross pipe attributes noted in the *Hydraulics* Scope of Work found elsewhere in this RFP.
- Provide a *Box Culverts and Cross Pipes Hydraulic Deficiency Assessment and Proposed Mitigation Table* that contains the box culvert and cross pipe attributes noted in the *Hydraulics* Scope of Work found elsewhere in this RFP.

- Discuss the extent and limits of the rise in water elevation in the floodplain(s), identify potentially impacted insurable structures, specify areas anticipated to require additional surveys and estimate the anticipated additional right of way impacts outside the project construction limits.

- Identify all bridge types to be constructed, including any special design features or construction techniques needed.

- Indicate the type and number of bridge expansion joints.

- Identify types of any retaining walls and / or sound barrier walls, if applicable.

- Identify locations of any proposed sound barrier walls on the plans sheets, if applicable.

- Describe any geotechnical investigations to be performed by the Design-Build Team and note any deviations to NCDOT requirements for subsurface investigations noted in the *Geotechnical Engineering* Scope of Work found elsewhere in this RFP.

- Specifically identify any soil improvement techniques that will be utilized to overcome poor soil conditions. If multiple techniques are utilized, identify each technique and the location that technique will be utilized.

- Identify any aesthetic considerations not required herein that will be part of the design.

- Describe how utility conflicts will be addressed and any special utility design considerations. Describe how the Design-Build Team's design and construction methods minimize the Department's utility relocation costs.

- Describe how the design will affect the Department's right of way costs.

- Provide a Preliminary Signing Concept Map that includes, at a minimum, all anticipated DMS locations, all proposed overhead sign structure locations, all overhead signs, and all ground mounted guide signs.

    - Describe how the Design-Build Team will maintain or reduce the right of way acquisitions and impacts shown in the Preliminary Roadway Plan provided by the Department. If additional right of way beyond those acquisitions shown in the Preliminary Roadway Plans is required, explain why such additional acquisitions are needed and provide a list of impacted properties that includes property owner's name, property address, property owner's address (if other than the impacted property address), and approximate acquisition area.

3. Long Term Maintenance – 2 points

- Describe any special materials, not referenced elsewhere in this RFP, incorporated into the project that would result in long term reduction in maintenance.

- Describe any special designs or construction methods that would reduce future maintenance costs to the Department.

- Estimate a minimum ten-year cost saving resulting from incorporation of these special materials, design or construction methods into the project.

4. Schedule and Milestones – 35 points

- Provide a detailed schedule for the project including both design and construction activities. The schedule shall show the sequence and continuity of operations, as well as the month of delivery of usable segments of the project.

- Indicate how the Design-Build Team will maintain the project schedule if the right of way acquisition process, railroad agreements and / or utility relocations are delayed.

- Identify any self-imposed liquidated damages and associated Intermediate Contract Time(s), if applicable.

- Describe how operations will be performed to alleviate any sections being left idle while traffic is in an altered pattern. Specifically, describe anticipated duration of settlement periods, how they can be reduced, and what operation(s) will be performed during the settlement periods to reduce the overall schedule.

- Describe where concurrent operations on major items of work can occur and where multiple crews can be utilized to reduce the overall schedule and limit the length of an altered traffic pattern and its respective duration.

- The schedule shall also include the Design-Build Team's final completion date and, if proposed, their substantial completion date. **These dates shall be clearly indicated on the Project Schedule and labeled "Final Completion Date" and "Substantial Completion Date"**.

5. Innovation – 2 points

- Identify any aspects of the design or construction elements that the Design-Build Team considers innovative. Include a description of alternatives that were considered whether implemented or not.

6. Maintenance of Traffic and Safety Plan – 35 points

Maintenance of Traffic

- Provide a Transportation Management Phasing Concept (TMPC).

- Identify the type of positive median cross-over protection proposed and replacement / resetting requirements.

- Describe the traffic control measures that will be used for each construction phase.
- Describe how traffic will be maintained as appropriate and describe the Design-Build Team's understanding of any time restrictions noted in the RFP.
- Specifically describe how business, school, residential and airport access will be maintained in an acceptable condition at all times.
- Describe how service road traffic will be kept separate from the mainline through traffic and how access to each parcel will be maintained.
- Identify alternate routes that could be utilized during construction and describe how the Design-Build Team will advertise these alternate routes through public outreach, Changeable Message Signs, work zone signs and/or other means or methods.
- Address how hauling will be conducted, including but not limited to, hauling of materials to and from the site and hauling of materials within NCDOT right of way and what measures will be taken to mitigate the impacts to through traffic. Specifically, describe the team's approach to addressing the amount of borrow that is expected on this project.
- Describe the Design-Build Team's approach to providing the public with communication access to project personnel to inquire as to traffic impacts, including vehicular and pedestrian.
- If a temporary portable barrier system will be utilized, provide the type and why it is needed.
- If temporary shoring will be required, provide the type and why it is required.
- Include all proposed road closure detour routes, justifications and durations.
- Identify the need for a Work Zone Speed Limit Reduction Ordinance.
- Identify the need for a Speeding Penalty Ordinance.
- Address where and how law enforcement officers will be used.
- Describe how pedestrian traffic will be maintained during construction.

Safety Plan

- Describe the safety considerations specific to the project.
- Discuss the Design-Build Team's overall approach to safety for its personnel, pedestrians, and the motoring public.

- Describe any proposed improvements that will be made prior to or during construction that will enhance the safety of the work force and / or travelling public both during and after the project construction.

7. Oral Interview – 2 points

- The Design-Build Team's Project Management Team shall present a brief introduction of the project team and design / construction approach.

- Introductory comments shall be held to no more than 30 minutes.

- The Department will use this interview to ask specific questions about the Design-Build Team's Technical Proposal, background, philosophies and project approach.

- Presentation, questions, and answers shall not exceed 90 minutes. No more than ten people from the Design-Build Team may attend.

The Department will use the information presented in the oral interview to assist in the Technical Proposal evaluation.

Additional Warranty and / or Guarantee

- **The Extra Credit for this project shall be a Maximum of 5 Points.**

A twelve-month guarantee, as outlined in the *Twelve-Month Guarantee* Project Special Provision found elsewhere in this RFP, is required for this project. However, the Design-Build Team may provide additional warranties and / or guarantees at their discretion. The Design-Build Team may be awarded additional points as "extra credit" to be added to the Technical Score.

The Design-Build Team may provide warranties and / or guarantees for major components of the project. Examples of major components are pavements, bridge components and sign structures. If additional warranties and / or guarantees are offered, the Design-Build Team shall indicate in the Technical Proposal the general terms of the warranties and / or guarantees, a list of the items covered, performance parameters, notification and response parameters for corrective action, and evaluation periods. The Department will be responsible for annual inspections of the components covered by all warranties and / or guarantees offered by the Design-Build Team that extend beyond the required Twelve-Month Guarantee. The warranties and / or guarantees shall also define how disputes will be handled. Prior to the first partial payment, the Design-Build Team shall submit a document that provides additional warranty / guarantee specifics in sufficient detail that allows the document to be made a part of the contract through supplemental agreement.

No direct payment will be made for warranties and / or guarantees. Payment will be considered incidental to the lump sum price for the contract.

SELECTION PROCEDURE

There will be a Technical Review Committee (TRC) composed of five or more senior personnel from involved engineering groups that will evaluate the Technical Proposal on the basis of the criteria provided in the Request for Proposals.

The selection of a Design-Build Team will involve both technical quality and price. The Technical Proposals will be presented to the TRC for evaluation. The TRC shall first determine whether the proposals are responsive to the requirements of the Request for Proposals. The Department reserves the right to ask for clarification on any item in the Technical Proposal. A written response to this request for clarification shall be provided to the Department prior to the opening of the Price Proposals. The contents of the written response may affect the Technical Review Committee's determination of the Technical Proposal's responsiveness and / or the overall evaluation of the Technical Proposal. If any commitments or clarifications provided in the written response conflict with the contents of the Technical Proposal, the contents of the written response will govern and be incorporated into the contract.

Each responsive Technical Proposal shall be evaluated based on the rating criteria provided in the Request for Proposals. The TRC will submit an overall consensus Technical Proposal score for each Design-Build Team to the State Contract Officer.

Quality Credit Evaluation Factors for Technical Proposals

Management	4
Responsiveness to Request for Proposal	20
Long Term Maintenance	2
Schedule and Milestones	35
Innovation	2
Maintenance of Traffic and Safety Plan	35
Oral Interview	2
Maximum Score	**100**

The State Contract Officer will use a table based on the maximum quality credit percentage to assign a Quality Credit Percentage to each proposal based on the proposal's overall Technical Score. The maximum quality credit percentage for this project will be **25%**. The Technical Review Committee may elect to assign point values to the nearest one-half of a point (e.g. 90.5). In this event, the Quality Credit Percentage will be determined by linearly interpolating within the table entitled "Quality Credit Percentage for Technical Proposals".

Quality Credit Percentage for Technical Proposals

Technical Score	Quality Credit (%)	Technical Score	Quality Credit (%)
100	25.00	84	11.67
99	24.17	83	10.83
98	23.33	82	10.00
97	22.50	81	9.17
96	21.67	80	8.33
95	20.83	79	7.50
94	20.00	78	6.67
93	19.17	77	5.83
92	18.33	76	5.00
91	17.50	75	4.17
90	16.67	74	3.33
89	15.83	73	2.50
88	15.00	72	1.67
87	14.17	71	0.83
86	13.33	70	0.00
85	12.50		

The maximum Technical Score, including any extra credit given for warranties or guarantees, shall not exceed 100 points in determining the Quality Credit percentage.

If any of the Technical Proposals are considered non-responsive, the State Contract Officer will notify those Design-Build Teams of that fact. The State Contract Officer shall publicly open the sealed Price Proposals and multiply each Design-Build Team's Price Proposal by the Quality Credit Percentage earned by the Design-Build Team's Technical Proposal to obtain the Quality Value of each Design-Build Team's Technical Proposal. The Quality Value will then be subtracted from each Design-Build Team's Price Proposal to obtain an Adjusted Price based upon Price and Quality combined. Unless all Proposals are rejected or the Department elects to proceed with the Best and Final Offer process, the Department will recommend to the State Transportation Board that the Design-Build Team having the lowest adjusted price be awarded the contract. The cost of the Design-Build contract will be the amount received as the Price Proposal.

The following table shows an example of the calculations involved in this process.

An Example of Calculating Quality Adjusted Price Ranking

Proposal	Technical Score	Quality Credit (%)	Price Proposal ($)	Quality Value ($)	Adjusted Price ($)
A	95	20.83	3,000,000	624,900	2,375,100
B	90	16.67	2,900,000	483,430	2,416,570
C *	90	16.67	2,800,000	466,760	2,333,240
D	80	8.33	2,700,000	224,910	2,475,090
E	70	0.00	2,600,000	0	2,600,000
* Successful Design-Build Team – Contract Cost $2,800,000					

Opening of Price Proposals

Prior to opening the Price Proposals, the State Contract Officer will provide to each Design-Build Team their Technical Score in a sealed envelope. The sealed envelope will contain that Team's score only.

At the time and date specified, the State Contract Officer will open the Price Proposals and calculate the percentage difference between the Price Proposals submitted and the Engineer's Estimate.

Should all of the Price Proposals be within an acceptable range or below the Engineer's Estimate the State Contract Officer will proceed to calculate the quality credit and publicly read the Price Proposal, Technical Score and Adjusted Price as outlined in the selection procedure above.

Should any one or more of the Price Proposals be within an acceptable range or below the Engineer's Estimate and the remaining Price Proposals exceed an acceptable range of the Engineer's Estimate the State Contract Officer will go to a separate location to calculate the quality credit and determine if the Design-Build Team with the lowest Adjusted Price is within an acceptable range of the Engineer's Estimate. Should the Price Proposal of the Design-Build Team with the lowest Adjusted Price be within an acceptable range of the Engineer's Estimate or below the Engineer's Estimate the State Contract Officer will proceed to publicly read the Price Proposals, Technical Scores and Adjusted Prices. Should the Price Proposal of the Design-Build Team with the lowest Adjusted Price exceed an acceptable range of the Engineer's Estimate the State Contract Officer will publicly read the Price Proposals only and the Department will then determine whether to proceed to request a Best and Final Offer (BAFO) as outlined below.

Should all Price Proposals submitted exceed an acceptable range of the Engineer's Estimate the State Contract Officer will publicly read the Price Proposals only. The Department will then determine whether to proceed to request a Best and Final Offer (BAFO) as outlined below.

In the event that the Department elects to not proceed with a Best and Final Offer (BAFO), then the State Contract Officer will schedule a date and time to publicly reiterate all Price Proposals, and read all Technical Scores and Adjusted Prices.

Provided the Department elects to proceed to request a Best and Final Offer (BAFO), at the date and time specified, the State Contract Officer will open the Best and Final Offer Price Proposals and proceed to publicly read all Price Proposals, Technical Scores and Adjusted Prices.

Best and Final Offer

In the event initial Price Proposals exceed an acceptable range of the Engineer's Estimate or if the Department feels it is necessary for any reason the Department may choose to make amendments to the details of the RFP and request a Best and Final Offer from all of the previously short-listed teams. Alternately, the Department may choose to redistribute to the short-listed Design-Build Teams another RFP for the project with no amendments to the RFP scope.

After receipt of the redistributed RFP, the Design-Build Team has the option of changing their Technical Proposal details. If the Design-Build Team changes any component of the Technical Proposal, the TRC will review those amended components of the Technical Proposal and reevaluate the scores accordingly. The Design-Build Team shall highlight the changes to bring them to the Department's attention. A revised total score will be calculated, if appropriate, based on these amendments to the Technical Proposal.

Additional oral interviews will not be held. The Design-Build Teams shall submit both a revised Price Proposal and a revised Technical Proposal (if applicable) at the time, place and date specified in the redistributed RFP. A revised Quality Credit Percentage (if required) and Adjusted Price will be determined. This will constitute the Design-Build Team's Best and Final Offer. Award of the project may be made to the Design-Build Team with the lowest Adjusted Price on this Best and Final Offer.

Stipend

A stipulated fee of **$75,000** will be awarded to each short-listed Design-Build Team that provides a responsive, but unsuccessful, Design-Build Proposal. If a contract award is not made, all short-listed Design-Build Teams that provide a responsive Design-Build Proposal shall receive the stipulated fee. Once award is made, or a decision is made not to award, unsuccessful Design-Build Teams can apply for the stipulated fee by notifying the State Contract Officer in writing and providing an original invoice within 60 days of Award. If the Design-Build Team accepts the stipulated fee, the Department reserves the right to use any ideas or information contained in the Design-Build Proposal and / or Alternative Technical Concepts, whether incorporated into the Design-Build Proposal or not, in connection with any contract awarded for the project, or in connection with any subsequent procurement, with no obligation to pay additional compensation to the unsuccessful Design-Build Team. The stipulated fee shall be paid to eligible Design-Build Teams within ninety days after the award of the contract or the decision not to award. Unsuccessful Design-Build Teams may elect to refuse payment of the stipulated fee and retain any rights to its Design-Build Proposal and the ideas and information contained therein.

In the event that the Department suspends or discontinues the procurement process prior to the Design-Build Proposal submittal date current at the time of the suspension, no stipulated fee will be paid.

ROADWAY SCOPE OF WORK (1-3-2018)

1. General

1.1 Unless allowed otherwise in this RFP, roadway designs shall be in accordance with the following documents in order of precedence:

(a) The requirements of this RFP;

(b) 2011 AASHTO A Policy on Geometric Design of Highways and Streets, 2013 Errata.

(c) NCDOT Roadway Design Manual, including all revisions effective on the Technical Proposal submittal date;

(d) 2018 NCDOT Standard Drawings, or as superseded by the detail sheets found at:

https://connect.ncdot.gov/resources/Specifications/Pages/2018-Roadway-Standard-Drawings.aspx

1.2 All pavement designs shall be in accordance with the Pavement Management Scope of Work found elsewhere in this RFP.

1.3 All limits of construction along the Mainline, Cross Streets, Service Roads and Ramps shall be of sufficient length to tie into existing conditions based upon the documents set forth in Section 1.1 of this Roadway Scope of Work.

1.4 Crown points and cross slopes along the Mainline, Cross Streets, Service Roads and Ramps shall be in accordance with the Hydraulics Scope of Work, found elsewhere in this RFP and with the documents set forth in Section 1.1 of this Roadway Scope of Work. The Hydraulics Scope of Work shall take precedence over the documents set forth in Section 1.1.

1.5 Unless otherwise noted in this RFP, the Design-Build Team shall design and construct the Mainline, all Cross Streets, Ramps, and Service Roads providing the same or better access, widening, improvements, and traffic measures of effectiveness, in the Department's sole discretion, included in the Preliminary Roadway Plans Provided by the Department.

1.6 Unless otherwise required in this RFP, all new curb and gutter along outside edge of pavement and within the Project limits shall be 2' – 6" curb and gutter in accordance with Standard #846.01 (*Roadway Standard Drawing for Concrete Curb, Gutter and Curb & Gutter*) of the 2018 *Roadway Standard Drawings*.

1.7 The Design-Build Team shall design and construct all medians within the Project limits as monolithic concrete islands in accordance with Standard #852.01

(*Roadway Standard Drawing for Concrete Islands*) and associated standard drawings of the 2018 *Roadway Standard Drawings*. Planted medians will not be permitted.

1.8 The Design-Build Team shall design and construct all Cross Streets and Service Roads such that the through movement is not required to change lanes throughout the Project limits except where tying into existing.

1.9 NSR / NCRR At-Grade Railroad Crossings with -Y- Lines:

(a) if any portion of the design and / or construction of the -Y- Lines comes within 10 feet of the centerline of the NSR / NCRR railroad tracks running parallel to the Mainline, the Design-Build Team shall upgrade the existing signals at such at-grade crossings.

1.10 A longitudinal zero percent grade along the roadway profile is acceptable under temporary conditions only. The final, permanent longitudinal grade shall be no less than 0.3%.

1.11 Throughout this Roadway Scope of Work, the following definitions shall apply:

(a) the term "**Mainline**" or "**-L- Line**" refers to US 70.

(b) the terms "**Cross Streets**" and **"-Y- Lines**" refers to the following streets:

Cross Streets (-Y- Lines) as shown on the Preliminary Roadway Plans	
R-5777A & B	**U-5713**
Day Star Lane (SRY21C2)	Garner Road (Y1)
Thurman Road (Y21)	Grantham Road (Y2)
Taberna Way (Y22)	Airport Road (Y3)
	Williams Road (Y4)
Note: The Design-Build Team is advised that the alignment names herein shown are for illustrative purposes only, not contractual and shown in accordance with the definition of Preliminary Roadway Plans. The Design-Build Team has the option to utilize the alignment names herein shown or use new alignment names that fit the need of its proposed designs.	

(c) the term "**Service Roads**" refers to the following alignments shown in the Preliminary Roadway Plans:

Service Roads as shown on the Preliminary Roadway Plans	
R-5777A & B	**U-5713**
SRY21B	SR1
SRY21B2	SR2
SRY21AY22B	SR3_ALT
SRY22A	SR4
SRY21C	SR5

SRY21D	SR6
SRY22D	SR7
Note: The Design-Build Team is advised that the alignment names herein shown are for illustrative purposes only, not contractual and shown in accordance with the definition of Preliminary Roadway Plans. The Design-Build Team has the option to utilize the alignment names herein shown or use new alignment names that fit the need of its proposed designs.	

(d) the term "**Ramps**" refers to the following alignments shown in the Preliminary Roadway Plans:

Ramps as shown on the Preliminary Roadway Plans	
R-5777A & B	**U-5713**
Y21RPA	RPAY2
Y21RPB	RPBY2
Y21RPC	RPCY2
Y21RPD	RPDY2
Y22RPA	RPAY3
Y22RPB	RPBY3
Y22RPC	RPCY3
Y22RPD	RPDY3
	RPAY4
	RPBY4
	RPCY4
	RPDY4
	RPA55
	RPB55
Note: The Design-Build Team is advised that the alignment names herein shown are for illustrative purposes only, not contractual and shown in accordance with the definition of Preliminary Roadway Plans. The Design-Build Team has the option to utilize the alignment names herein shown or use new alignment names that fit the need of its proposed designs.	

2. Preliminary Roadway Plans provided by the Department

2.1 Throughout this Roadway Scope of Work, any references to the Preliminary Roadway Plans shall include the following, in order of precedence:

(a) the preliminary roadway plans with corresponding roadway profiles, roadway cross sections and typical cross sections for each alignment encompassing STIP Projects U-5713 and R-5777A & B provided by the Department; and

(b) the most recent public meeting maps provided by the Department.

2.2 Except were indicated in this Roadway Scope of Work, the Preliminary Roadway Plans are provided by the Department for reference only and shall not be a part of the Design-Build contract between the Design-Build Team and the Department. Any references to the Preliminary Roadway Plans throughout this Roadway Scope of Work are for illustrative purposes only and are not intended to be contractual.

The Department shall not be responsible for any omissions, errors, or any information shown or stated on the Preliminary Roadway Plans.

2.3 The Design-Build Team is allowed and encouraged to proposed modifications to the Preliminary Roadway Plans. Such proposed modifications by the Design-Build Team:

(a) shall not reduce the posted speed limit of the Mainline;

(b) shall fully comply with the Project commitments outlined in the Categorical Exclusion document for U-5713 / R-5777A & B provided by the Department;

(c) shall not place the Cross Streets alignments over the Mainline, under any circumstances. Alternative Technical Concepts proposing Cross Street alignments over the Mainline will be rejected; and

(d) shall comply with the interchange type set forth in Section 4.2 of this Roadway Scope of Work.

2.4 Modifications to the Roadway Preliminary Plans that are in compliance with items 2.3(a) through 2.3(d) shall not require the submittal of an Alternative Technical Concept, unless an Alternative Technical Concept is required due to deviations from the requirements included in other sections of this RFP.

2.5 Design Exceptions in the Preliminary Roadway Plans:

(a) The Department is aware of the following design exceptions:

R-5777A & B	
Service Road -SRY21AY22B-	PI Sta. 63+66.57 Design Speed = 25 mph
U-5713	
Service Road -SR4-	PI Sta. 25+68.10 Design Speed = 20 mph
Service Road -SR7-	PI Sta. 18+82.38 Design Speed = 20 mph
Service Road -Y3-	PI Sta. 27+30.29 Design Speed = 20 mph (stop condition)
Mainline -L- Northbound and Southbound	Distance between ramps in both directions, between Airport Road and Williams Road shall be no less than the distance shown in the Preliminary Roadway Plans.
Grantham Road -Y2-	Storage length for left turn movement into Service Road -SR1- shall be no less than 275 feet.

Ramp -RPAY4-	Minimum width of ramp inside shoulder shall be no less than 4 feet.
Ramp -RPBY4-	
Ramp -RPCY4-	

(b) All design exceptions, whether included in Section 2.5(a) of this Roadway Scope of Work, or as proposed by the Design-Build Team that are not included in the list provided under Section 2.5(a), shall undergo the design exceptions process established by the Department.

3. Mainline Specifications

3.1 Mainline Project Limits:

(a) The overall project limit on the south side of the Project is approximately one (1) mile east of Thurman Road, generally station 212+00 on the Preliminary Roadway Plans.

(b) At the south end of the Project, the Department notes the following:

1. The Mainline Project limit at the south end of the Project is Mainline station 245+00;

2. the limit for Service Road -SRY21C- goes east to approximately Mainline station 217+80.00, beyond the Mainline project limit. The intent is to provide a continuation to the existing service road from approximately -SRY21C- station 10+00.00 to -SRY21C- station 20+00.00;

3. the existing access apron between the existing service road and the Mainline, between Mainline stations 212+00 and 216+50, shall be removed; and

4. the Design-Build Team shall mark the Project limit at the south end of the Project as Mainline station 212+00.

(c) The overall project limit on the north side of the Project is approximately 0.7 mile north of Williams Road, generally station 155+00 on the Preliminary Roadway Plans.

(d) The limit of construction along the ramps on the northern terminus of the project are as follows: for ramp -RPB55-, the project limit shall be approximately -RPB55- station 22+58.81. For ramp -RPA55-, the project limit shall be approximately -RPA55- station 22+54.55.

3.2 The Mainline shall be designed and constructed to meet a 60-mph design speed for a level urban freeway (in an urban area with right of way constraints) designed to interstate standards, except where as specified in this RFP. A maximum grade of 4% along the Mainline is allowable.

3.3 The width of mainline travel lanes throughout the length of the Project shall be 12 feet.

3.4 Mainline superelevation shall be designed and constructed in accordance with AASHTO *A Policy on Geometric Design of Highways and Streets*, Table 3-10b (Minimum Radii for Design Superelevation Rates, Design Speeds, and e_{max}=8%). The Design-Build Team shall provide all other design criteria in the Technical Proposal.

3.5 For the transition between segments R-5777A & B and U-5713 (between the Taberna Way and the Grantham Road interchanges, and around Garner Road), the Design-Build Team shall design and construct all appropriate transitions and taper lengths in accordance with the documents set forth in Section 1.1 of this Roadway Scope of Work.

3.6 To the extent practicable, all lane drops and / or lane additions shall be on the outside of the Mainline.

3.7 R-5777A & B:

(a) From the south project limit to Garner Road (R-5777A & B), the typical cross section for the Mainline consists of a four-lane divided facility with a 46-foot median, which shall be cable guiderail divided.

(b) For the transition between the proposed condition and the existing condition at the southern project terminus (between Mainline station 245+00.00 and Thurman Road), the Design-Build Team shall design and construct all appropriate transitions and taper length in accordance with the documents set forth in Section 1.1 of this Roadway Scope of Work.

(c) The total width for outside Mainline shoulders along segment R-5777A & B shall be 12 feet of clear, usable width. The 12 feet shall be measured from edge of the travelled way to either face of barrier or shoulder breakpoint. The 12-foot minimum width shall be held, at a minimum, to the back of the gore, prior to the transition to the eight-foot shoulder width minimum.

(d) The total width for inside Mainline shoulders (median side) along segment R-5777A & B shall be six (6) feet of which 4 feet shall be full depth paved shoulder.

(e) All median features designed and constructed by the Design-Build Team shall be in accordance with all documents set forth in Section 1.1 of this Roadway Scope of Work.

(f) The inside shoulder of the bridges carrying the Mainline over Thurman Road and Taberna Way shall be governed by the requirement set forth in Section 3.9(b) of this Roadway Scope of Work.

3.8 U-5713:

(a) From Garner Road to the north project limit (U-5713), the typical cross section for the Mainline consists of a six-lane divided facility with a 22-foot paved median, which shall include a Type "T" double-faced concrete median barrier along the center.

(b) The transition from the proposed condition at the north terminus of the project to the existing condition at the south approach of the Neuse River Bridge, for both the Mainline and ramps, shall be of sufficient length in accordance with the documents set forth in Section 1.1 of this Roadway Scope of Work.

(c) The total width for outside Mainline shoulders along segment U-5713 shall be no less than 12 feet of clear, usable width. The 12 feet shall be measured from edge of the travelled way to either face of barrier or shoulder breakpoint. The 12-foot minimum width shall be held, at a minimum, to the back of the gore, prior to the transition to the eight-foot shoulder width minimum.

(d) The total width for inside Mainline shoulders along U-5713 shall be no less than 10 feet.

(e) All median features designed and constructed by the Design-Build Team shall be in accordance with all requirements of this RFP, and with documents set forth in Section 1.1 of this Roadway Scope of Work.

(f) The Department is aware that the distance between the interchanges of the Mainline with Airport Road and Williams Road, as shown on the Preliminary Roadway Plans, is not in compliance with the documents set forth in Section 1.1 of this Roadway Scope of Work. The Department notes that the Design-Build Team is not required to address this non-compliance. The Design-Build Team, however, shall not further reduce the distance between interchanges, ramps and ramp elements, beyond what is shown on the Preliminary Roadway Plans.

(g) The Design-Build Team shall design and construct 12-foot auxiliary lanes, in both directions, between the interchanges of the Mainline with Airport Road and Williams Road, in accordance with the documents set forth in Section 1.1 of this Roadway Scope of Work. The minimum shoulder width along this segment shall be 12 feet in accordance with Section 3.8(c) of this Roadway Scope of Work.

3.9 Mainline Bridges

(a) The Design-Build Team shall design and construct the bridges carrying the Mainline over Thurman Road, Taberna Way, Grantham Road, Airport Road, and Williams Road in accordance with the Structures Scope of Work found elsewhere in this RFP.

(b) The inside shoulder of the bridges carrying the Mainline over Thurman Road and Taberna Way shall be of sufficient width to accommodate future inside widening (toward the Mainline median) of a third 12-foot lane plus shoulder. Such future shoulders shall be designed and constructed in accordance with the documents set forth in Section 1.1 of this Roadway Scope of Work. However, at final completion the bridges carrying the Mainline over Thurman Road and Taberna Way shall provide pavement marking for the Mainline's two (2) through lanes in each direction. The future third lane and shoulder shall be considered and marked as shoulder.

3.10 Mainline Access:

(a) The Design-Build Team shall design and construct the Mainline as a full control of access facility.

(b) All access from the Mainline onto existing or proposed service roads and / or properties within the Mainline project limits shall be removed.

(c) In addition to the requirements of the preceding item 3.10(b), Mainline access at approximately Mainline stations 216+00.00, 227+35.00 and 240+25.00 shall be removed.

(d) All median crossovers within the Mainline project limits shall be removed, including the median crossover at approximately Mainline station 240+25.00.

(e) The at-grade intersection of the Mainline and Garner Road shall be removed and no access shall be provided from the Mainline onto Garner Road.

3.11 Retaining Walls:

(a) The Design-Build Team shall design and construct all required retaining walls along the Mainline, Ramps and Service Roads in accordance with the Structures Scope for Work found elsewhere in this RFP. Traffic protection for retaining wall shall be in accordance with the documents set forth in Section 1.1 of this Roadway Scope of Work.

(b) The length and amount of retaining walls within the project limits shall depend the Design-Build Team's design.

(c) The Design-Build Team shall design and construct all retaining walls a minimum of ten (10) feet inside the right of way. If an exception for the offset distance between the edge of the traveled way and the retaining wall or noise wall, as the case may be, is required, the Design-Build Team shall submit such design exception request to the Department and seek Department's acceptance for such design exception prior to its implementation.

4. Interchanges

4.1 The Design-Build Team shall design and construct interchanges at the following intersections along the Mainline:

(a) Thurman Road;
(b) Taberna Way;
(c) Grantham Road;
(d) Airport Road; and
(e) Williams Road.

4.2 The Design-Build Team shall design and construct all compact diamond interchanges (CDI).

4.3 Alternative Technical Concepts for different types of interchanges may be submitted.

4.4 Without exception, all interchanges shall be designed and constructed with the Mainline over the intersecting roadway. No Alternative Technical Concepts proposing any portion of the Mainline under an intersecting roadway will be accepted.

4.5 Ramps:

(a) The Design-Build Team shall design and construct all ramps in accordance with AASHTO *A Policy on Geometric Design of Highways and Streets*, Table 10-1 (Guide Values for Ramp Design Speed as Related to Highway Design Speed). The maximum longitudinal grade for ramps within the U-5713 segment shall be 7%. Ramps within the R-5777A & B segment shall comply with the documents set forth in Section 1.1 of this Roadway Scope of Work.

(b) The minimum storage length for all ramps (as defined in Section 9-1 of the NCDOT *Roadway Design Manual*) shall be the most conservative length of either the storage length required in the U-5713 & R-5777 A/B Traffic Operations Analysis Technical Memorandum or the length shown in the Preliminary Roadway Plans. In any case, the storage length shall be no less than the minimum required in Section 9-1 of the NCDOT *Roadway Design Manual*.

(c) For single-lane ramps, the minimum width for ramp lanes shall be 16 feet.

(d) In those areas where ramps have two (2) or more lanes, the minimum lane width shall be 12 feet.

(e) Minimum width for ramp shoulders shall be 4 feet for inside shoulders and 8 feet for outside shoulders.

5. Service Roads

5.1 Unless specified elsewhere in this RFP, the minimum lane width for Service Roads shall be 14 feet, except where tying into existing, in which case the appropriate transition length and taper as required by the documents set forth in Section 1.1 of this Roadway Scope of Work shall be utilized.

5.2 All Service Roads shall consist of a two-lane cross section, with one lane in each direction, and 2'-6" curb and gutter.

5.3 All Service Roads within segment R-5777A & B shall be designed and constructed to meet a minimum speed of 30 mph, except where indicated in Section 2.5(a) of this Roadway Scope of Work. Within this segment, all superelevation along Service Roads shall be in accordance with AASHTO *A Policy on Geometric Design of Highways and Streets, Table 3-8 (Minimum Radii for Design Superelevation Rates*, Design Speeds, and e_{max}=4%).

5.4 All Service Roads within segment U-5713 shall be designed and constructed to meet a minimum design speed of 25 mph, except where indicated in Section 2.5(a) of this Roadway Scope of Work. Within this segment, all superelevation along Service Roads shall be in accordance with AASHTO *A Policy on Geometric Design of Highways and Streets, Table 3-8 (Minimum Radii for Design Superelevation Rates*, Design Speeds, and e_{max}=4%).

5.5 The Design-Build Team shall do an evaluation for the need of glare screens and provide recommendations for mitigation. Glare screens shall be installed as required by the NCDOT Design Manual. Methodology of installation shall be consistent with the design for the area (i.e. guardrail mounted versus barrier mounted).

5.6 Service Road -SRY21C- (southeast quadrant of the Mainline / Thurman Road interchange): The construction limit for Service Road -SRY21C- starts approximately 0. 5 mile east of the Mainline reconstruction limit.

5.7 Service Roads -SRY21B- and -SRY21B2- (southwest quadrant of the Mainline / Thurman Road interchange):

(a) This Service Road shall extend from Thurman Road south to approximately station 240+00.00 of the Mainline.

(b) At least one point of access shall be provided at each of the parcels within the length of the Service Road, and between the Mainline right of way and the North Carolina Railroad right of way.

(c) To the greatest extent possible, the design and construction of the Service Road shall avoid the wetlands shown on the Preliminary Roadway Plans.

(d) This Service Road shall be designed and constructed to meet a minimum design speed of 50 mph. All superelevation along this Service Road shall be in accordance with AASHTO *A Policy on Geometric Design of Highways and Streets, Table 3-8 (Minimum Radii for Design Superelevation Rates*, Design Speeds, and e_{max}=4%).

5.8 All service roads shall be designed and constructed so as to provide access to properties and side streets in accordance with NCDOT standards and guidelines.

5.9 Service Road Study:

(a) The Design-Build Team shall conduct a Service Road Study to determine whether parcels that no longer have direct access will be provided access to the service roads or will become a total take.

(b) The Design-Build Team shall submit such Service Road Study to the Division Construction Engineer and Resident Engineer for review and approval prior to finalizing the designs.

(c) If the Design-Build Team demonstrates, to the Department's sole satisfaction, that additional service road(s) are required, the design and construction of the service road(s), including all associated NEPA requirements, will be paid for as extra work in accordance with Subarticle 104-8(A) of the NCDOT Standard Specifications for Roads and Structures.

(d) If the Design-Build Team's design and construction methods require additional service road(s), the design and construction of the service road(s), as well as associated NEPA requirements, shall be included in the Design-Build Team's lump sum bid for the entire project.

5.10 The following Service Roads shall, at a minimum, receive a 1.5" overlay with a typical normal section, and maintain the existing drainage features:

(a) Service Road on the east side of, and running parallel to, US 70, between Garner Road and Grantham Road (approximately Mainline stations 17+00.00 to 50+00.00);

(b) Service Road on the east side of, and running parallel to, US 70, between Grantham Road and Airport Road (approximately Mainline stations 54+00.00 to 87+50.00);

(c) Service Road on the east side of, and running parallel to, US 70, between Airport Road and Williams Road (approximately Mainline stations 92+00.00 to 116+50.00); and

(d) Service Road on the east side of, and running parallel to, US 70, between SR 1915 (Oak Street) and SR 1139 (Plum Street), (approximately Mainline stations 130+00.00 to 147+00.00).

6. Cross Streets

6.1 Along segments that include one single lane in each direction, the minimum lane width for Cross Streets shall be 14 feet. Along segments that include two or more lanes in either direction, the minimum lane width for Cross Streets shall be 12 feet.

6.2 The Design-Build Team shall design and construct all cross streets to meet the following minimum design speeds:

(a) Day Star Lane: 40 mph
(b) Thurman Road: 40 mph
(c) Taberna Way: 30 mph
(d) Garner Road: 40 mph
(e) Grantham Road: 40 mph
(f) Airport Road: 50 mph
(g) Williams Road: 50 mph

6.3 Day Star Lane:

(a) The Design-Build Team shall remove and replace Day Star Lane. The new Day Star Lane shall be within the Department's right of way, except for the 300 feet closest to Old Cherry Point Road, where the new Day Star Lane shall align with the existing Gibbs Road centerline.

6.4 Thurman Road:

(a) Reconstruction limits for Thurman Road shall be, at a minimum, the intersecting points with proposed Service Roads east and west of the Mainline.

(b) Between the intersecting points of Thurman Road with proposed Service Roads east and west of the Mainline, Thurman Road shall be designed and constructed with a minimum of two (2) through lanes in each direction and a raised median of variable width.

(c) At its eastern limit, past the intersecting point with proposed Service Roads -SRY21C- and -SRY21D-, Thurman Road shall transition from a 4-lane cross section to the existing 2-lane cross section. Such transition shall be of sufficient length to tie into existing and in accordance with the documents set forth in Section 1.1 of this Roadway Scope of Work.

(d) At the intersection of Thurman Road with the interchange ramps, turning lanes and channelization in the form of raised concrete islands shall be provided in accordance with the documents set forth in Section 1.1 of this Roadway Scope of Work.

6.5 Taberna Way

(a) The western reconstruction limit for Taberna Way shall be, at a minimum, the intersecting point with proposed Service Roads -SRY21AY22B- and -SRY22A-.

(b) The eastern reconstruction limit for Taberna Way shall be Old Cherry Point Road. The new alignment of Taberna Way east of the Mainline shall connect with Old Cherry Point Road. This new intersection with Old Cherry Point Road does not need to include turning lanes, unless specifically requested by the Department.

(c) Between the intersecting points of Taberna Way with proposed Service Roads east and west of the Mainline, Taberna Way shall be designed and constructed with a minimum of two (2) through lanes in each direction and raised median of variable width.

(d) At its eastern limit, past the intersecting point with proposed Service Road -SRY22D-, Taberna Way shall transition from a 4-lane cross section to a 2-lane cross section. Such transition shall be of the length required by the documents set forth in Section 1.1 of this Roadway Scope of Work.

(e) At the intersection of Taberna Way with the interchange ramps, turning lanes and channelization in the form of raised concrete islands shall be provided in accordance with the documents set forth in Section 1.1 of this Roadway Scope of Work.

6.6 Garner Road

(a) The existing intersection of the Mainline and Garner Road will be eliminated, including the existing paved median cross over on the Mainline shall be removed.

(b) Garner Road, east and west of the Mainline shall be connected to the Service Roads.

(c) Reconstruction limits for Garner Road east and west of the Mainline shall be limited to new intersections with Service Roads, as generally shown in the Preliminary Roadway Plans, and match the existing condition on Garner Road.

6.7 Grantham Road:

(a) Reconstruction limit for Grantham Road west of the Mainline shall be at -Y2- station 12+00.00.

(b) Reconstruction limit for Grantham Road east of the Mainline shall be the point of intersection with the proposed Service Road north of the Mainline (-SR7-).

(c) Through the Mainline interchange, Grantham Road shall provide a minimum of two (2) through lanes in each direction.

(d) At the intersection of Grantham Road with the interchange ramps, turning lanes and channelization in the form of raised concrete islands shall be provided in accordance with the documents set forth in Section 1.1 of this Roadway Scope of Work.

(e) All transitions along Grantham Road from the proposed condition back into existing shall be of sufficient length to tie into existing and in accordance with the documents set forth in Section 1.1 of this Roadway Scope of Work.

6.8 Airport Road:

(a) Reconstruction limit for Airport Road west of the Mainline shall be approximately at -Y3- station 8+60.00.

(b) Reconstruction limit for Airport Road east of the Mainline shall be its intersection with Old Cherry Point Road. The Design-Build Team shall be required to install appropriate signage at the intersection of Airport Road and Old Cherry Point Road, however, the Design-Build Team is not required to reconstruct or reconfigure the entire intersection, except where indicated (i.e. the west leg, or Airport Road leg, of the intersection with Old Cherry Point Road). The Design-Build Team is not required to add turning lanes to Old Cherry Point Road, unless specifically requested by the Department. In the event the Department requests turning lanes at the intersection of Old Cherry Point Road with Airport Road, such revisions to the plans, along with any additional studies required shall be paid by the Department as extra work in accordance with Subarticle 104-8(A) of the NCDOT Standard Specifications for Roads and Structures.

(c) Between the proposed Service Road west of the Mainline, going across the Mainline, and continuing to Old Cherry Point Road east of the Mainline, Airport Road shall provide two (2) through lanes in each direction.

(d) West of the Mainline, from the proposed Service Road going west to Airport Road's reconstruction limit approximately at -Y3- station 8+60.00, Airport Road shall transition into existing. Such transition shall be of sufficient

length to tie into existing and shall be in accordance with the documents set forth in Section 1.1 of this Roadway Scope of Work.

(e) At the intersection of Airport Road with the interchange ramps, turning lanes and channelization in the form of raised concrete islands shall be provided in accordance with the documents set forth in Section 1.1 of this Roadway Scope of Work.

6.9 Williams Road:

(a) Reconstruction limit for Williams Road west of the Mainline shall be approximately at -Y4- station 11+18.00.

(b) Reconstruction limit for Williams Road east of the Mainline shall be its intersection with Old Cherry Point Road. The Design-Build Team shall be required to install appropriate signage at the intersection of Williams Road and Old Cherry Point Road, however, the Design-Build Team is not required to reconstruct or reconfigure the entire intersection except where indicated (i.e. the west leg, or Williams Road leg, of the intersection with Old Cherry Point Road). The Design-Build Team is not required to add turning lanes to Old Cherry Point Road, unless specifically requested by the Department. In the event the Department requests turning lanes at the intersection of Old Cherry Point Road with Williams Road, such revisions to the plans, along with any additional studies required shall be paid by the Department as extra work in accordance with Subarticle 104-8(A) of the NCDOT Standard Specifications for Roads and Structures.

(c) Between the proposed Service Road west of the Mainline, going across the Mainline, and continuing to Old Cherry Point Road east of the Mainline, Williams Road shall provide a minimum of two (2) through lanes in each direction.

(d) West of the Mainline, from the proposed Service Road going west to Williams Road's reconstruction limit approximately at -Y4- station 11+18.00, Williams Road shall transition into existing. Such transition shall be of sufficient length to tie into existing and shall be in accordance with the documents set forth in Section 1.1 of this Roadway Scope of Work.

(e) At the intersection of Williams Road with the interchange ramps, turning lanes and channelization in the form of raised concrete islands shall be provided in accordance with the documents set forth in Section 1.1 of this Roadway Scope of Work.

6.10 Elder Street:

(a) The existing access from Elder Street into the northbound lanes of the Mainline (i.e. pavement between Plum Street and the Mainline providing access onto Elder Street) shall be removed.

(b) East of the Mainline, Elder Street shall end at its intersection with Plum Street. No work on Elder Street shall be required on the west side of the Mainline.

(c) No bridge carrying the Mainline over Elder Street will be required at this location. The Design-Build Team may design and construct the Mainline to match the existing US 70 vertical alignment at this location.

7. Pedestrian Accommodations

7.1 All existing sidewalk impacted by the Project shall be replaced in kind and in accordance with the documents set forth in Section 1.1 of this Roadway Scope of Work.

7.2 Without exception, the following Cross Streets must include sidewalk along both sides:

(a) Grantham Road;
(b) Airport Road; and
(c) Williams Road.

7.3 Alternative Technical Concepts that eliminate sidewalks at the locations stated in Item 7.2 will be rejected.

7.4 All new sidewalk within the Project limits shall only be added at those locations shown on the Preliminary Roadway Plans, and shall be designed and constructed in accordance with the documents set forth in Section 1.1 of this Roadway Scope of Work. All new sidewalk shall have a minimum width of 5 feet plus a 2-foot utility strip between the sidewalk and back of curb. Berm widths for sidewalk areas shall be the 10-foot standard width.

7.5 Sidewalk transitions, from proposed sidewalk width to existing sidewalk width, shall be a minimum of 50 feet.

8. Additional Requirements

8.1 Due to right of way constraints, the Design-Build Team will be allowed to design and construct minimum ditch widths for the facility functional classification.

8.2 Unless noted otherwise elsewhere in this RFP, all bridge rail offsets shall be the greater of 1) the bridge rail offset as indicated in the NCDOT Roadway Design Manual, 2) the approach roadway paved shoulder width, or 3) the offset required to achieve stopping sight distance (maximum 12-foot). Narrower bridge rail offsets based on bridge length will not be allowed.

8.3 For all intersection design modifications, the Design-Build Team shall provide a traffic analysis that adheres to the July 1, 2015 NCDOT Congestion Management Capacity Analysis Guidelines for the Department's review and acceptance.

8.4 At all intersections with restricted movements impacted by the Design-Build Team's design and / or construction methods, excluding resurfacing or overlays, the Design-Build Team shall provide five-inch keyed-in concrete monolithic channelization islands, regardless of the island dimensions. (Reference Roadway Standard Drawing No. 852.01.)

8.5 The mainline is a full control of access facility. The Design-Build Team shall bring to the Division's attention any deviations from the proposed control of access shown on the Preliminary Roadway Plans provided by the Department. The proposed right of way and / or control of access limits may deviate in proximity to cultural, historic, or otherwise protected landmarks, including cemeteries, to eliminate / minimize impacts. Prior to negotiating right of way, easement and / or control of access with property owners, the Department shall accept the Right of Way Plans developed by the Design-Build Team.

8.6 Prior to installation, the Design-Build Team shall be responsible for coordinating with, and obtaining approval from, the NCDOT for the control of access fence placement. The Design Build Team shall be responsible for installation of woven wire control of access fence as noted below:

(a) Throughout the construction limits, excluding areas that consist solely of pavement marking obliterations / revisions, the Design-Build Team shall remove and dispose of all existing control of access fence, and install new control of access fence.

(b) The Design-Build Team shall replace all control of access fence damaged during construction.

(c) The Design-Build Team shall install all missing control of access fence.

8.7 Except as required elsewhere in this RFP and / or to eliminate a design exception, the Design-Build Team shall not further impact any cultural, historical or otherwise protected landmark or topographic feature beyond that shown on the Preliminary Roadway Plans provided by the Department.

8.8 The Design-Build Team shall provide milled rumble strips along the mainline outside and median paved shoulders, including ramp and loop terminals, and acceleration, deceleration and auxiliary lanes, in accordance with the NCDOT Roadway Standard Drawings No. 665.01.

8.9 For all bridges, the Design-Build Team shall submit vertical and horizontal clearance design calculations at all critical points. The Design-Build Team shall submit post construction survey points for the aforementioned critical points that verify construction adhered to the vertical and horizontal clearances accepted by the Department. The Design-Build Team shall be responsible for all costs associated with correcting vertical and horizontal clearances resulting from any construction variation from the design accepted by the Department.

8.10 Roundabouts:

(a) The design and construction of roundabouts will be permitted at all intersections identified as warranting traffic signals, per the Traffic Signals Recommendations (Revised) memorandum by Regional Traffic Safety Engineer Bailey Harden, PE, dated March 21, 2019. All other intersections within the project limits not warranting traffic signals shall be stop-controlled.

(b) The Design-Build Team shall design all roundabouts within the project limits for projected average daily traffic volumes for year 2040. However, the Design-Build Team shall construct all roundabouts within the project limits to accommodate existing traffic volumes, and with no more than one (1) circulating lane, with the exception that right turn lanes may be added for an approach if current traffic volumes require such addition. Teardrop designs are preferred at ramp intersections.

(c) If design year (2040) traffic volumes warrant roundabouts with dual circulating lanes, the Design-Build Team shall acquire all necessary right of way to accommodate the full build-out of such roundabouts with dual circulating lanes.

(d) In the event the Design-Build Team elects to employ roundabout designs at ramp intersections, the Design-Build Team shall design and construct roundabouts at both ramp intersections for the same interchange (WB and EB US 70). Combinations of roundabouts and traffic signals at ramp intersections for a single interchange will not be permitted.

(e) The length of all bridges along US 70 shall be able to accommodate, at a minimum, the typical cross section along all -Y- lines shown in the Preliminary Roadway Plans provided by the Department; meet all the project commitments included in Section H (*Project* Commitments) of the Type III (Ground Disturbing) Categorical Exclusion Action for U-5713 / R-5777A & B approved by FHWA on July 2, 2018; and the requirements of this RFP.

(f) An ATC will not be required to replace signal-controlled intersections with roundabouts. The Department reserves the right to require modifications to the roundabout designs if deemed necessary.

9. Noise Abatement

The Department will provide an approved Traffic Noise Report (TNR) and associated Preliminary Noise Wall Recommendation Memorandum that is based on the Department's preliminary design. The Design-Build Team shall evaluate the entire Project and develop the Design Noise Report (DNR) based on the plans developed by the Design-Build Team, regardless of changes to the Department's preliminary design. The DNR shall be developed in accordance with the NCDOT 2016 *Traffic Noise Policy* and the NCDOT 2016 *Traffic*

Noise Manual; and be reviewed and accepted by NCDOT. Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall include all design and construction costs for all sound barrier walls required by the accepted DNR, as well as all costs associated with performing any additional geotechnical investigations necessary to design the foundations, in the lump sum price bid for the entire project. However, the Design-Build Team will not be required to include any designs associated with the proposed sound barrier walls in the Technical Proposal. Prequalification under Discipline Code 441 shall be required for the firm developing the DNR.

The Design-Build Team is cautioned that the TNR and Preliminary Noise Wall Recommendation Memorandum are provided to show the general location of potential walls. Thus, as with all information provided by the Department, the TNR and Preliminary Noise Wall Recommendation Memorandum are provided for informational purposes only and; the Department will not honor any requests for additional contract time or compensation for any variations between the approved TNR and the approved DNR.

The Department will ballot all benefited receptors to determine which sound barrier walls recommended in the accepted DNR will be constructed. The Design-Build Team shall (1) develop and provide the information required by the Department to complete the balloting process, and (2) attend and / or speak at all balloting meetings and workshops. The Department will require four months to complete the balloting process. The Department will not honor any requests for additional contract time or compensation for the sound barrier wall construction unless the aforementioned four-month timeframe is exceeded. If time were granted, it would only be for that time exceeding the four-month period, which shall begin on the date the Department accepts the DNR developed by the Design-Build Team. The Design-Build shall not construct any sound barrier walls until the balloting process has been completed by the Department.

In accordance with Subarticle 104-8(A) of the 2018 Standard Specifications for Roads and Structures, if the accepted DNR and balloting process require more than 50,000 square feet (sf) of sound barrier wall, the amount over 50,000 sf will be paid for as extra work at the unit price of $40.00 per square foot. All work tasks required to design and construct the additional sound barrier walls, including but not limited to traffic control, pavement, drainage, concrete barrier, geotechnical investigation and earthwork shall be considered inclusive in the aforementioned unit price. The amount of extra work shall be determined by deducting all additional sound barrier wall square footage required as a result of horizontal and / or vertical alignment changes to the Preliminary Roadway Plans provided by the Department from the accepted DNR and balloting process sound barrier wall total square footage.

The Design-Build Team shall only credit the Department the construction cost of all sound barrier walls eliminated by the balloting process. The construction costs of all sound barrier walls eliminated solely by the balloting process shall be deducted from the lump sum amount bid for the entire project.

The Design-Build Team shall design and construct all proposed sound barrier walls to accommodate the future widening of one additional 12-foot lane and a six-foot buffer as

generally shown in the Preliminary Roadway Maps provided by the Department, without requiring any relocations / adjustments. At all sound barrier walls, the Design-Build Team shall provide 1) a four-foot berm between the wall and fill / cut slopes steeper than 6:1 and 2) a parallel concrete ditch at locations where the final grade slopes toward the wall.

To satisfy the FHWA's Abatement Measure Reporting requirements, the Design-Build Team shall prepare and concurrently submit a summary of the sound barrier walls to be constructed on the project with the final sound barrier wall working drawings submittal. The Design-Build Team shall submit the sound barrier wall summary directly to the NCDOT Traffic Noise and Air Quality Group and include the information noted in Title 23 Code of Federal Regulations Part 772 Section 772.13(f), including but not limited to overall cost and unit cost per square foot.

10. Driveway Access

10.1 Excluding undeveloped properties and / or those properties identified as a total take, as determined by the Service Road Study, the Design-Build Team shall design and construct a minimum of one driveway per parcel.

10.2 The Design-Build Team shall design and construct all driveways in accordance with the most recent version of the NCDOT P*olicy on Street and Driveway Access to North Carolina Highways*, and with the following minimum requirements:

(a) The Design-Build Team shall provide horizontal and vertical alignments for all driveways that require 100 feet or longer to tie to existing.

(b) Excluding grades required to tie to an existing limiting condition, the maximum driveway grade shall be 10.0%.

(c) For shoulder sections, the minimum driveway turnout for residential and commercial properties shall be 16'-0" and 24'-0", respectively, or the existing width, whichever is greater.

(d) For curb and gutter sections, the minimum driveway turnout for residential and commercial properties shall be 20'-0" and 28'-0", respectively, or the existing width, whichever is greater.

GEOTECHNICAL ENGINEERING SCOPE OF WORK (3-25-19)

GENERAL

All geotechnical data, tests, computations and supporting subsurface investigations and documentation submitted by the Design-Build Team shall be provided in English Units.

Obtain the services of a firm prequalified for geotechnical work by the NCDOT Geotechnical Engineering Unit at:

https://www.ebs.nc.gov/VendorDirectory/default.html

The prequalified geotechnical firm shall prepare foundation design recommendation reports for use in designing structure foundations, roadway foundations, retaining walls, sound barrier foundations, and overhead sign structure foundations, and temporary structures.

The Engineer of Record who prepares the foundation design recommendation reports shall be a Professional Engineer registered in the State of North Carolina who has completed a minimum of three geotechnical design projects of scope and complexity similar to that anticipated for this project using the load and resistance factor design (LRFD) method and in accordance with the latest edition of the AASHTO *LRFD Bridge Design Specification*.

The prequalified geotechnical firm shall also determine if additional subsurface information, other than that required and noted elsewhere in this RFP, is required based upon the subsurface information provided by the NCDOT and the final roadway and structure designs. If a determination is made that additional subsurface information is required; the Design-Build Team shall use a prequalified geotechnical firm to perform all additional subsurface investigation and laboratory testing in accordance with the current NCDOT Geotechnical Engineering Unit *Guidelines and Procedures Manual for Subsurface Investigations*. Submit additional information collected by the Design-Build Team to the Geotechnical Engineering Unit, via the Division Construction Engineer or designee, for review and acceptance. The Design-Build Team shall provide the final Subsurface Investigation report in electronic and hardcopy format to the NCDOT for its records.

Unless noted otherwise herein, the Design-Build Team shall design foundations (except for sign foundations), embankments, slopes, retaining walls, and sound barrier walls in accordance with the current edition of the AASHTO *LRFD Bridge Design Specifications*, NCDOT *LRFD Driven Pile Foundation Design Policy,* all applicable NCDOT Geotechnical Engineering Unit Standard Provisions, NCDOT *Structures Management Unit Manual* and NCDOT *Roadway Design Manual*. The NCDOT *LRFD Driven Pile Foundation Design Policy* is located on the NCDOT Geotechnical Engineering Unit's website at:

https://connect.ncdot.gov/resources/Geological/Pages/default.aspx

For *Geotechnical Guidelines For Design-Build Projects*, the Design-Build Team shall adhere to the guidelines located at the following website:

https://connect.ncdot.gov/letting/Pages/Design-Build-Resources.aspx

A minimum of 2 standard penetration test (SPT) shall be required per bent for all bent lengths of 50 feet or less. Additional SPT borings shall be required across the roadway typical section for each bent more than 50 feet long and the borings shall be spaced no greater than 50 feet apart. All borings for pile-supported bents shall be located within 25 feet of the centerline of each bent location to be counted for these minimum requirements. For structure sites with multiple bridges, borings may be performed between bridges along the bent projection provided the distance between any two borings does not exceed 50 feet. The Design-Build Team shall extend all borings to a depth of 15 feet or four foundation element diameters, whichever is greater, below the foundation element to show a complete subsurface profile. The Design-Build Team shall be responsible for obtaining the borings noted above for all bents where subsurface information is not sufficient or is warranted by variability in the geology unless the prequalified geotechnical firm submits documented justification that the subsurface investigation provided by the NCDOT is adequate for design purposes and the justification is acceptable to the Department. Any deviations to the requirements noted above shall require acceptance from the NCDOT Geotechnical Engineering Unit prior to the foundation design submittal.

The maximum spacing between borings for retaining walls and sound barrier walls shall be 200 feet, with a minimum of two borings; one at each end of the wall. Drill borings for retaining walls a minimum depth below the bottom of the wall equal to twice the maximum wall height. Boring depths for sound barrier walls shall be to a minimum depth below the bottom of the wall equal to the maximum wall height or to SPT refusal.

ADDITIONAL DESIGN REQUIREMENTS

A. Structure Foundations

- Support all bridge bents on deep foundations.
- Use abutment walls for all bridge end bents.
- Moment slab barriers are required on top of or as close as workable for all abutment walls. Address possible differential settlement between the moment slab and the wall facing.
- All retaining walls must be included in the aesthetics package as to be submitted for review and acceptance by the Division.

B. Roadway Foundations

- Unless noted otherwise herein, all unreinforced proposed fill slopes, shall be 3:1 (H:V) or flatter. Unless the slopes are designed with adequate reinforcement to provide the required stability, all proposed soil cut slopes shall be 3:1 (H:V) or flatter. Reinforced soil slopes shall only be used if 1) the NCDOT Geotechnical Standard Details 1803.1 and / or 1803.2 are applicable, or 2) detailed design calculations and a slope stability analysis are submitted for review and acceptance prior to construction.

- Reinforced soil fill slopes shall only be used to minimize impacts to existing structures, and / or cultural, historical or otherwise protected landmark or topographic features.

- Check the overall final condition stability of reinforced and non-reinforced earth slopes including bridge abutments. Include internal, external, compound, and global investigations in the overall stability check. Meet the following performance criteria for fills slopes, cut slopes, and bridge abutments constructed under this Contract:

    - Global stability calculations: minimum Safety Factor of 1.5 for bridge abutments

    - Global stability calculations: minimum Safety Factor of 1.3 embankment fills

    - Global stability calculations: minimum Safety Factor of 1.5 for cut slopes

    - Lateral squeeze calculations: minimum Safety Factor of 2.0

- Design and construct bridge approach fills such that no more than 1 inch of settlement occurs, measured at the back of the approach slab, from the time the approach slab is cast until the end of the 12-month warranty period.

- Identify any settlement impacts for storm drainage, pipe culverts, and box culverts and mitigate these impacts in the design. Settlement for any existing pipe structures to be maintained in a temporary condition for construction shall also be evaluated and mitigated. The settlement evaluation and mitigation developed by the design build team will be reviewed and approved by the Department.

- Identify any settlement impacts for utilities and mitigate these impacts in the design. Allowable settlement for utilities shall be determined by the utility owners.

- Mitigate all unsuitable soils to the extent required to improve the stability of the proposed embankment or subgrade. Use any suitable material to backfill undercut areas except when employing shallow undercut in accordance with Section 505 of the NCDOT 2018 *Standard Specifications for Roads and Structures* which requires the use of Select Material, Class IV. For undercut backfilling in water, use Select Material, Class III.

- Proofrolling of subgrade with a 35-ton roller is required.

C. Ground Improvement Methods

Ground improvement techniques to mitigate long term settlement problems or to transfer the embankment load to a deeper bearing stratum are acceptable means to accelerate construction and minimize settlement. Design roadway embankments

such that no more than 2" of settlement is calculated from substantial completion to 15 years after substantial completion.

All ground improvement techniques shall follow the current industry standard practices and the guidelines of *Geotechnical Engineering Circular No. 13 Ground Modification Methods Reference Manual FHWA publication FHWA-NHI-16-027 and FHWA-NHI-16-028* or *Geosynthetic Design and Construction Guidelines FHWA-HI-95-038*. For Geofoam design and construction, use the Geofoam Applications in the Design and Construction of Highway Embankments, Prepared for National Cooperative Highway Research Program (NCHRP) Project 24-11, Transportation Research Board of the National Academies, July, 2004 and Guideline and Recommended Standard for Geofoam Applications in Highway Embankments, National Cooperative Highway Research Program (NCHRP) Report 529, Transportation Research Board of the National Academies, 2004.

- Submit ground improvement designs recommendations and calculations including the Geotechnical Instrumentation and Monitoring Plan to the NCDOT Geotechnical Engineering Unit for acceptance 30 days prior to beginning embankment construction. Only the following Ground Improvement Methods or combination of methods are allowed to improve the foundation soil conditions:
    - Excavation and replace with granular soils
    - Wick drains and/or surcharge and/or waiting periods
    - Lightweight fill – Lightweight Aggregate
    - Lightweight fill – foamed (cellular) lightweight concrete
    - Lightweight fill – expanded polystyrene (EPS Geofoam Blocks)
    - Column Supported Embankments (CSE) – Columns may consist of aggregate columns as defined in Chapter 5 of FHWA GEC 013, vibro concrete columns (VCC), controlled modulus columns (CMC), or stiff piles as defined in 3.1.1 (first three paragraphs) of Chapter 6 of FHWA GEC 013. Helical Screw Piles are not allowed for columns. Aggregate columns must consist of coarse aggregate. A Load Transfer Platform (LTP) is required for CSEs, refer to FHWA GEC 013 Chapter 6 for design of the LTP.

D. Geotechnical Instrumentation and Monitoring Plan (GIMP)

- Include in the Geotechnical Instrumentation and Monitoring Plan (GIMP) a detailed program for monitoring settlement where ground improvement methods are used. Provide and monitor instrumentation starting at the beginning of structure / embankment construction to capture results and to compare with the predictions of the geotechnical design. Continue monitoring embankments and abutment walls until the project is substantially complete. Use a geotechnical firm

to install inclinometers and piezometers with experience installing this type of geotechnical instrumentation on similar projects.

- Develop, implement, and maintain a GIMP to include the following information:
    - Instrument types to be used
    - Locations of each instrument
    - Installation procedures
    - Zone of influence for each instrument
    - Critical readings and frequency of readings
- Collect data at least once a week and record data on a website accessible by the Engineer.
- At a minimum, monitor the following parameters:
    - Settlement profile under or near the bottom of each abutment wall at the end of the approach slab. Use a horizontal inclinometer to collect settlement profile data.
    - Pore water pressures except for embankments supported by stiff columns.
    - Vertical and horizontal movement and tilt of abutment walls measured at 5 points (End of approach slab both sides, both corners of the wall, and centerline for each abutment wall.
- Provide plan, profile, and cross section sheets showing the program instrumentation, including locations (X, Y, Z) of sensors, cables, and associated cabinets. Show sensor types, measurement ranges, and related data on the plans. Conduct a meeting to coordinate details of the monitoring program with NCDOT and program implementation staff.

E. Permanent Retaining Wall Structures

- For design and construction of mechanically stabilized earth (MSE) retaining walls, refer to the NCDOT *Policy for Mechanically Stabilized Earth Retaining Walls* which can be found at the NCDOT Geotechnical Engineering Unit's website at:

  https://connect.ncdot.gov/resources/Geological/Pages/Products.aspx

  Limit transverse differential settlement for MSE walls to 1/200 from face of wall to back of strips. Where abrupt changes in settlement are anticipated, provide vertical slip joints.

Provide drainage for all walls and connect to a drainage feature.

- With the exception of walls covered by a Geotechnical Engineering Unit Standard Detail, design and construct permanent retaining walls in accordance with the applicable NCDOT Geotechnical Engineering Unit Project Special Provisions, which can be provided upon request by the Design Build Team. Geotechnical Provisions and Notes can be found at the NCDOT Geotechnical Engineering Unit's website at:

  https://connect.ncdot.gov/resources/Geological/Pages/Geotech_Provisions_Notes.aspx

- Submit a wall layout and design for each retaining wall. The wall layout submittal shall include at least the following:

  - Wall envelope with top of wall, bottom of wall, existing ground, and finished grade elevations at incremental stations
  - Wall alignment with stations and offsets
  - Typical sections showing top and bottom of wall, drainage, embedment, slopes, barriers, fences, etc.
  - Roadway plan sheets showing the wall (half size)
  - Roadway cross sections sheets showing the wall (half size)
  - Traffic Control Plans showing the wall (half size)

- For project retaining walls requiring a design not covered by a Geotechnical Engineering Unit Standard Detail, the wall layout submittal shall also include the following:

  - Calculations for bearing capacity, global stability, and settlement
  - Details of conflicts with utilities and drainage structures

- Locate retaining walls at toes of slopes unless restricted by right of way limits. The Design-Build Team shall submit global stability calculations for slopes at retaining walls and obtain acceptance from the NCDOT prior to construction. All slopes behind walls shall be 4:1 (H:V) or flatter.

- Drainage over the top of retaining walls shall not be allowed. Direct runoff above and below walls away from walls, if possible, or collect runoff at the walls and transmit it away. Curb and gutter or cast-in-place single faced barrier with paving up to the wall shall be required when runoff cannot be directed away from the back or front of the wall. In accordance with the NCDOT *Roadway Design Manual* – Section 6-7A, Figure 3, the Design-Build Team shall design and construct a paved

concrete ditch, with a minimum 12-inch depth, at the top of all retaining walls with slopes draining towards the wall, and a four-foot bench between the wall and fill / cut slopes steeper than 6:1 (H:V).

- Cast-in-place coping shall be required for walls without a cast-in-place face with the exception of when a barrier is integrated into the top of the wall. Extend coping or cast-in-place face a minimum of 12 inches above where the finished or existing grade intersects the back of the wall.

- When using abutment retaining walls with deep foundations, the end bent deep foundation shall be designed and constructed with one of the following and include any lateral loading resulting from the pile deflection in the design of the MSE walls:

    - A single row of plumb piles with brace piles battered toward the wall

    - A single row of plumb piles with MSE reinforcement connected to the back of the cap

    - An integral abutment with a single row of plumb piles and no reinforcement connected to the back of the cap in accordance with FHWA GEC 11 pages 6-8 through 6-10

- All deep foundations for end bents with abutment retaining walls shall extend a minimum of ten feet below the retaining wall foundation or leveling pad.

D. Temporary Structures

- Design temporary retaining structures, which include earth retaining structures and cofferdams, in accordance with current allowable stress design AASHTO *Guide Design Specifications for Bridge Temporary Works*, the *Temporary Shoring* Standard Special Provision found elsewhere in this RFP and the applicable NCDOT Project Special Provisions available upon request by the Design-Build Team. The only submittal required to use the standard sheeting design is the "Standard Shoring Selection Form".

- Traffic control barrier on top of walls shall be in accordance with the NCDOT Work Zone Traffic Control Unit details available upon request by the Design-Build Team. If anchored barrier is required, then anchor the barrier in accordance with NCDOT 2018 Roadway Standard Drawing No. 1170.01.

ADDITIONAL CONSTRUCTION REQUIREMENTS

- The Design-Build Team shall investigate, propose, and submit proposed remedial measures to the NCDOT Geotechnical Engineering Unit for review and acceptance (prior to incorporating recommended remedial measures into the project) for any construction problems related to the following:

    - Foundations

- Retaining walls
- Sound barrier walls
- Subgrades
- Settlement
- Slopes
- Construction vibrations

- The prequalified geotechnical firm which prepares the foundation designs shall review and approve all pile driving equipment and criteria. After the prequalified geotechnical firm has approved these submittals, the Design-Build Team shall submit them to the NCDOT for review and acceptance prior to beginning construction. Hammer approvals shall be submitted prior to performing any pile driving and shall be performed using GRLWEAP Version 2010 or later.

- The prequalified geotechnical firm which prepares the original foundation designs shall be responsible for any necessary changes to the foundation designs revising analysis, recommendations, and reports as needed. All changes shall be based upon additional information, subsurface investigation and / or testing. Send copies of revised designs, including additional subsurface information, calculations and any other supporting documentation to the NCDOT for review and acceptance.

- The Design-Build Team shall be responsible for any damage and / or claim caused by construction, including but not limited to damage caused by vibration (see Article 107-14 of the NCDOT 2018 *Standard Specifications for Roads and Structures*). The Design-Build Team shall be responsible for deciding if any pre- and post-construction monitoring and inventories need to be conducted. Any monitoring and inventory work shall be performed by a prequalified consulting firm.

- Use Pile Driving Analyzer (PDA) testing on a minimum of two piles for each pile size and type for each bridge with driven piles using the approved hammer driving system for the pile. The two test piles shall not be located at the same bent. PDA test piles shall be spread out across the bridge to provide data across the entire bridge site. Drive criteria at each bent shall be based on the PDA test pile most representative of the conditions at the bent and shall be approved by NCDOT. PDA testing shall be performed during initial drive and as necessary for re-strikes of the tested pile. Changes in hammer driving systems and / or additional similar hammer driving systems shall require additional PDA testing. Additional PDA testing may be warranted based on AASHTO *LFRD Bridge Design Specifications* and shall be recommended as needed by the geotechnical foundation design engineer and submitted to the NCDOT for review and acceptance.

- The PDA Consultant shall perform PDA testing, provide PDA reports, and develop pile driving inspection charts or tables. All recommendations shall be submitted to NCDOT for review and acceptance prior to driving any production piles at the applicable bridge.

- The geotechnical grade point shall be defined as the location where the proposed subgrade and natural ground intersect. At all geotechnical grade points, the Design-Build Team shall

undercut the existing soils within two feet of the bottom of the proposed subgrade in accordance with the requirements below.

- The undercut shall extend along the profile to a point where the elevation difference from the bottom of the proposed subgrade to natural ground is greater than two feet, or to 25 feet on each side of the geotechnical grade point, whichever is less.

- The lateral extent of the undercut shall extend to a point where the elevation difference from the bottom of the proposed subgrade to natural ground is greater than two feet or to one foot outside of the paved shoulder / face of curb of the proposed roadway typical section, whichever is less.

- The base of the undercut shall parallel the proposed subgrade.

- Send copies of any inspection forms related to foundations, settlement, sound barrier walls, or retaining wall to the NCDOT for review and acceptance.

PAVEMENT MANAGEMENT SCOPE OF WORK (12-10-2018)

**** NOTE ** The Department will not consider Alternative Technical Concepts that provide an alternate pavement design.**

The pavement design for the US 70 mainline travel lanes, mainline median shoulders and mainline outside shoulders shall consist of one of the following alternates:

Alternate 1	**Alternate 2**
3.0" S9.5C	3.0" S9.5C
3.5" I19.0C	3.0" I19.0C
7.0" B25.0C	4.0" B25.0C
	8.0" ABC

The mainline travel lanes, mainline median shoulder and mainline outside shoulder pavement design chosen shall be used throughout the limits noted above. The Design-Build Team shall specify the pavement alternate to be used in the Technical Proposal.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall mill the existing US 70 mainline pavement, including travel lanes and structurally acceptable paved shoulders, to be retained to a depth of 2.5", replace with 2.5" I19.0C and resurface with a minimum of 3" S9.5C. (Reference the Roadway Scope of Work found elsewhere in this RFP). The Design-Build Team shall remove and dispose of / recycle the existing US 70 right turn lane /left turn lane pavement structures within the footprint of the permanent mainline travel lanes or full depth paved shoulder to the top of the soil subgrade.

Other pavement designs for this project are listed in the Tables 1 and 2 below:

Table 1

Line (U-5713)	Surface	Intermediate	Base	ABC
-RPAY2-, -RPBY2-, -RPCY2-, -RPDY2-, -RPAY3-, -RPBY3-, -RPCY3-, -RPDY3-, -RPAY4-, -RPBY4-, -RPCY4-, -RPDY4-,	3.0" S9.5C	4.0" I19.0C	4.0" B25.0C	-
SR 1124 (Grantham Road, -Y2-), SR 1131 (Airport Road, -Y3-), SR 1167 (Williams Road, -Y4-)	3.0" S9.5B	4.0" I19.0C	4.0" B25.0C	-
-SR1-, -SR2-, -SR3_ALT-, -SR4-, -SR5-, -SR6-	3.0" S9.5B	4.0" I19.0C	4.0" B25.0C	-
Other Service Roads	3.0" S9.5B	-	-	8.0" *

* Use prime coat at normal application rate.

Table 2

Line (R-5777A/R-5777B)	Surface	Intermediate	Base	ABC
-Y21RPA-, -Y21RPB-, -Y21RPC-, -Y21RPD-, -Y22RPA-, -Y22RPB-, -Y22RPC-, -Y22RPD-,	3.0" S9.5C	4.0" I19.0C	4.0" B25.0C	-
SR 1116 (Thurman Road, -Y21-), Taberna Way (-Y22-)	3.0" S9.5B	4.0" I19.0C	4.0" B25.0C	-
-SRY21C-, -SRY21B-, -SRY21D-, -SRY21C2-, -SRY21AY22B-, -SPY22A-, -SPY22D-	3.0" S9.5B	4.0" I19.0C	4.0" B25.0C	-
Other Service Roads	3.0" S9.5B	-	-	8.0" *

* Use prime coat at normal application rate.

For the -Y- Lines, ramps, loops and service road pavement designs noted in the table above, the Design-Build Team may substitute an ABC layer for an asphalt base course layer. If such an alternative is proposed, the thickness of the ABC layer, used as a substitute for the asphalt base course layer, shall be equal to twice the proposed asphalt base course layer thickness specified for the roadway. If an asphalt surface course is placed directly on the ABC layer, the Design-Build Team shall apply prime coat.

The Design-Build Team shall maintain the same pavement design throughout the -Y- Line, ramps, loops, and service road construction limits. In the Technical Proposal, the Design-Build Team shall specify the base option chosen (ABC or asphalt) for all -Y- Lines, ramps, loops, and service roads. The Design-Build Team may substitute an asphalt base course layer for an ABC layer, as described above, for tie-ins and narrow widening.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall resurface the existing pavement of all -Y- Lines, ramps, loops and service roads in accordance with Section 5.9 of the Roadway Scope of Work found elsewhere in this RFP.

Throughout the construction limits that consist solely of pavement marking obliterations and / or revisions, the Design-Build Team shall uniformly overlay the existing pavement with a minimum pavement depth that equals half the full thickness of the surface course as provided in the tables above.

On all ramps and loops, the adjacent through lane pavement design shall extend to the back of the gore (12-foot width).

Longitudinal joints of all surface course layers shall not be located in the final traffic pattern wheel path. If applicable, the Design-Build Team shall indicate in the Technical Proposal where all underlying longitudinal joints will be located and demonstrate how the underlying longitudinal joint location will minimize reflective cracking.

Unless noted otherwise elsewhere in this RFP, the minimum narrow widened width shall be six feet. The minimum narrow widened width may be reduced to four feet only if the Design-Build Team demonstrates that their equipment properly compacts narrow widening and obtains prior Department written approval. Tapers that tie proposed pavement to existing pavement are excluded from the narrow widening requirements noted above.

In areas where the existing paved shoulders are proposed to be incorporated into a permanent travel lane or full depth paved shoulder, the Design-Build Team shall be responsible for evaluating the existing paved shoulder regarding its suitability for carrying the projected traffic volumes. In the event that the existing paved shoulder is found to be inadequate, the Design-Build Team shall be responsible for upgrading the existing paved shoulder to an acceptable level or replacing the existing paved shoulder. The Design-Build Team shall submit their evaluation and proposed use of existing paved shoulders to the Division Construction Engineer or designee Unit for review and acceptance or rejection.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall pave from 1) the edge of all paved shoulders to the face of all single face barrier / guardrail, excluding median locations that the NCDOT Roadway Standard Drawings do not require paving to the face of guardrail; 2) from the edge of all paved shoulders to the edge of all expressway / shoulder berm gutter; and 3) from the edge of all paved shoulders to the face of proposed retaining walls and sound barrier walls located on the outside shoulder with 6" of ABC (or 4" B25.0C), a split seal and at least two lifts of surface course. If a split seal is not used, the ABC pavement design shall require prime coat at the normal application rate. In these areas, the Design-Build Team's installation of ABC or black base shall be consistent with the pavement type for the specific roadway. As an alternative to the above pavement design for paving the shoulders to the face of the aforementioned features, the Design-Build Team may use the adjacent travel lane pavement design. In addition, the Design-Build Team shall place at least 6" of ABC or 4" B25.0C under all single face barrier, expressway / shoulder berm gutter and curb and gutter.

All driveways, up to the radius point, shall be constructed with the full-depth pavement design of the intersecting roadway. The entire impacted length of all non-concrete driveways with a 10% grade shall be constructed with 1.5" S9.5B and 8" ABC with prime coat. Unless otherwise noted above, the Design-Build Team shall adhere to the following for all driveway construction:

- For existing gravel and soil driveways, use 8" ABC.
- For existing asphalt driveways, use 1.5" S9.5B and 8" ABC with prime coat, or 2.0" S9.5B and 6" ABC without prime coat.
- For existing concrete driveways, use 6" jointed concrete reinforced with woven wire mesh.

The Design-Build Team shall be responsible for the design of all temporary pavements and for the evaluation of existing shoulders and roadways regarding their suitability for carrying traffic during construction, if necessary. In the event that the existing shoulders and / or roadways are found to be inadequate for the proposed temporary traffic volumes and duration, the Design-Build Team shall be responsible for upgrading the pavement to an acceptable level. Temporary pavements shall be designed in accordance with the most recent version of the NCDOT *Pavement Design Procedure*. Temporary pavement designs and associated calculations shall be submitted for review and acceptance using the Design-Build submittal process prior to incorporation. The expected duration for traffic on temporary pavement must be included as part of the submittal.

The rate of application and the maximum and minimum thickness per application and layer shall be in accordance with the NCDOT Roadway Design Manual.

Shoulder drains, including the maintenance of existing shoulder drains, will not be required.

When a resurfacing grade ties to an existing curb, bridge and / or pavement, the Design-Build Team shall perform incidental milling, such that the new pavement ties flush with the existing feature(s). When tying to the aforementioned feature(s), the Design-Build Team shall not reduce the minimum required surface layer pavement thickness noted above. At existing pavement ties, the Design-Build Team shall perform incidental milling for a minimum distance of 25 feet at bridges and six feet at curb sections. The Design-Build Team shall not perform incidental milling more than 72 hours prior to placement of the asphalt surface layer.

RAILROAD COORDINATION SCOPE OF WORK (6-28-2018)

I. RAILROAD COORDINATION AND AGREEMENTS

The Design-Build Team shall not enter into or onto the Norfolk Southern Railway and / or the North Carolina Railroad rail corridors until an Agreement is executed, insurance requirements are met and all required written authorizations have been received from Norfolk Southern Railway and North Carolina Railroad.

The Design-Build Team shall be responsible for coordinating with Norfolk Southern Railway (the leasing railroad) and North Carolina Railroad (the railroad owner), herein referred to jointly as the railroads, to secure all agreements necessary for the proposed highway work encroaching on the railroad's Right of Way and work that will impact highway-rail grade crossings or trackage owned, operated, or maintained by the railroads. The Design-Build Team shall be responsible for all modifications to these agreements and the highway design plans and specifications that may be necessary based on their design and / or construction methods. The Design-Build Team shall be responsible for coordination of all design and construction details on railroads' Right of Way and any necessary agreements required by the NCDOT and / or the railroads.

A. Crossing Signals: As detailed herein, the Design-Build Team shall coordinate with the railroads to obtain partially executed authorizations for construction and authorizations for preliminary engineering for crossing signal work. All agreements, and any modifications thereto, shall include necessary Force Account items, including but not limited to preliminary engineering; construction engineering; crossing signals materials and construction including gates, bells, flashing lights, track approach circuitry and any required overhead cantilever structures.

B. Crossing Surfaces and Encroachments: As detailed herein, the Department will provide the Design-Build Team with a draft encroachment agreement for submittal to the railroads. The Design-Build Team shall be responsible for all coordination necessary with the railroads and the Department to obtain partial execution by the railroads of this agreement and any required modifications to the agreement. All agreements, and any modifications thereto, shall include necessary Force Account items, including but not limited to preliminary engineering, construction engineering, crossing surfaces, track materials and construction, and flagging.

The Design-Build Team shall be responsible for coordinating all construction with the railroads including force account work to be performed by the railroads.

Railroad traffic shall be maintained at current levels at all times. The Design-Build Team shall verify the number and types of trains per day and the maximum speed allowed with the railroads. Railroad inspection and maintenance requirements, in addition to normal train operations, will occur that may impact construction activities.

II. RAILROAD RELATED COSTS

NCDOT will be responsible for Railroad related costs associated with this project, including Preliminary Engineering (PE) pursuant to current PE Agreements and all construction performed by the Railroads and / or their contractors, including, but not limited, to materials.

The Design-Build Team shall be responsible for all other railroad related costs associated with this project including all Railroad construction performed by the Design-Build Team, required insurances, Railroad flagging and construction observers, Railroad Construction Engineering and Railroad submittal reviews pursuant to the Construction Agreements.

The Design-Build Team shall be responsible for all construction required except permanent track construction, and grade crossing signals and gates, which will be completed by the Railroad using Railroad provided materials. The Railroad will not incur cost, and the Design-Build Team shall not enter into or onto the NCRR / NSR corridor until a Right of Entry Agreement has been executed, insurance requirements are met, and the Railroad receives written authorization to incur cost.

III. APPLICABLE STANDARDS AND SPECIFICATIONS

The Design-Build Team shall comply with the following applicable documents unless a design exception is received from the railroads and NCDOT:

- *Manual on Uniform Traffic Control Devices,* latest edition
- AREMA *Manual for Railway Engineering,* latest edition
- Norfolk Southern Railway *Standard Specifications for Materials and Construction,* latest edition
- Norfolk Southern Railway *Public Projects Manual,* latest edition
- *Federal Aid Policy Guide 23 CFR 140I*
- *Federal Aid Policy Guide 23 CFR 646*
- NCDOT *Construction Manual* Section 105-8
- NCDOT Standard *Specifications for Roads and Structures,* Section 107-9 (Excluding Paragraph 2)
- *North Carolina Administrative Code* Section T19A: 02B, 0150 through 015

IV. INSURANCE REQUIREMENTS

The Design-Build Team shall not commence any work on the railroads' Right of Way or easements until all agreements have been executed, insurance acquired and approved in accordance with the railroads' policies and procedures, and all construction plans have been approved by NCDOT, Norfolk Southern Railway, and the North Carolina Railroad Company. The Design-Build Team shall make the necessary arrangements with the railroads that are required to protect against property damage that may result in loss of service, expense, property, or life. The Design-Build Team shall be responsible for all damage to the railroads resulting from their operations and the railroads may issue a stop order until all dangerous situations are remedied.

The Design-Build Team shall be responsible for providing Railroad Protective Liability Insurance for Bodily Injury Liability, Property Damage Liability, and Physical Damage to Property to the railroads, identifying each of the railroads as the insured party, during the duration of the time work is being performed on or over the railroads Right of Way and easements. The Design-Build Team shall be responsible for verifying and obtaining the appropriate insurance and coverage with the railroads. The Design-Build Team shall be responsible for all required Roadway Worker Protection training and certifications.

V. UTILITIES

Prior to any utility installation, removal, or relocation across the railroad's Right of Way and easements, including but not limited to pipelines, and electrical and communication cable routings over or under railroad-owned facilities, the Design-Build Team shall coordinate with the railroads and private utility owners to obtain the necessary permits and secure the appropriate Encroachment Agreements. At a minimum, the Design-Build Team shall assist the private utility owners in obtaining their respective Encroachment Agreements in the private utility owner's name. In accordance with the requirements noted herein and the railroads' specifications, the private utility owner will be responsible for all associated fees and provide the necessary insurance coverage,

All work associated with any utility installation across the railroads' Right of Way and easements shall adhere to the requirements noted herein and the railroads' specifications.

VI. CROSSING SIGNALS AND SURFACES COORDINATION

The Design-Build Team shall prepare and submit to the Department's Rail Division completed highway-rail crossing signalization planimetrics and 60% roadway plans for the proposed roadway work for review and approval.

A. Crossing Signals: The Department will review the planimetric within 2 weeks of its receipt. The Design-Build Team will address all comments received and obtain approval of the planimetric from the Rail Division prior to transmitting to the railroads. The Design-Build Team shall submit the planimetrics to the Norfolk Southern Railway requesting railroad-prepared design, engineering, materials list, and cost estimate of the highway-way rail grade crossing signalization including required authorizations for construction and preliminary engineering. The Design-Build Team will be responsible for coordinating any comments received by Norfolk Southern Railway with the Rail Division and addressing all comments including any necessary modifications to the Department-approved planimetric as well as final execution of the authorizations for construction and preliminary engineering by the Department.

B. Crossing Surfaces and Encroachment: Within 2 weeks of receipt of the 60% roadway plans, the Department will provide the Design-Build Team with a draft encroachment agreement for the Design-Build Team's handling and coordination. The Design-Build Team shall be responsible for all coordination and negotiations necessary with the railroads and the Department to obtain partial execution of the agreement by the railroads. After negotiations between the Department, the

Design-Build Team, and the railroads have been finalized, the Design-Build Team shall submit partially executed agreements and plans to NCDOT's Rail Division for final agreement execution by the Department, prior to authorizing railroad work. For informational purposes, the Design-Build Team is advised that traditionally Norfolk Southern Railway signs the agreement first, then the North Carolina Railroad, and finally, the Department. After final execution of the agreement and railroad work is authorized by Rail Division, the agreements will be distributed by Rail Division to the railroads with copies provided to the Design-Build Team and Department's Resident Engineer, prior to any construction work by the Design-Build Team or the railroads.

VII. COORDINATION WITH NORFOLK SOUTHERN RAILWAY

The Design-Build Team shall coordinate with Norfolk Southern Railway, 1200 Peachtree Street, NE Atlanta, GA 30309 to obtain plan approvals, engineering and estimations, insurance requirements, and agreement coordination. Contact is Scott Overbey at telephone number 404-582-5588. Plan approval may necessitate multiple submittals including at minimum a preliminary plan submittal (60% plans) and a 90% plan submittal.

The preliminary plan submittal to the Norfolk Southern Railway shall include at a minimum appropriate roadway plan sheets showing impacts to the right of way / easement, erosion control plans, and drainage calculations for any drainage on or across the railroads' right of way / easement, and preliminary general drawings. The 90% plan submittal shall include all necessary details, insets, and notes for construction with no substantial changes to the alignments or layout shown in the preliminary plan submittal and all supporting design calculations.

An electronic copy (pdf format) of all review plans and associated data shall be submitted to Norfolk Southern Railway through the Design-Build Team. If any re-submittals of plans or any additional information is required, an electronic copy (pdf format) shall be submitted by the Design-Build Team to the Norfolk Southern Railway.

Roadway Final Construction Plans shall be submitted to and approved by NSR before construction begins. For Roadway Final Construction Plans, an electronic copy of the plans (pdf format) shall be submitted by the Design-Build Team to the Norfolk Southern Railway.

Working Drawings affecting the Norfolk Southern Railway's operations or Right of Way and easements shall follow the submittal process as outlined in the 2018 NCDOT *Standard Specifications for Roads and Structures* or Special Provisions. The Department will review all agreement modifications prior to submittal to Norfolk Southern Railway.

VIII. COORDINATION WITH THE NORTH CAROLINA RAILROAD

The Design-Build Team shall coordinate with the North Carolina Railroad Company, 2809 Highwoods Boulevard, Suite 100, Raleigh, NC 27604, telephone number 919-954-7601 to obtain plan approval and execution of the legal agreements by NCRR for all work on the North Carolina Railroad Corridor. Contacts are Jim Kessler, PE, Vice President – Engineering (For plan review and approval) and Andrew Tate, Vice President – Real Estate (for property issues and agreements).

Plan approval may be based on multiple submittals including at a minimum a preliminary plan submittal (60% plans) and 90% plan submittal. The plan submittals to the North Carolina Railroad shall include the same information provided in the submittals to Norfolk Southern Railway.

An electronic copy (pdf format) of all review plans and associated data shall be submitted to the North Carolina Railroad Company by the Design-Build Team. If any re-submittals of plans or any additional information is required, an electronic copy (pdf format) shall be submitted by the Design-Build Team to the North Carolina Railroad Company.

Roadway Final Construction Plans shall be submitted to and approved by the North Carolina Railroad Company before construction begins. For Roadway Final Construction Plans, an electronic copy of the plans (pdf format) shall be submitted by the Design-Build Team to the North Carolina Railroad Company. All plans, specifications and contract documents shall be approved by the North Carolina Railroad Company in writing prior to the start of any work on the North Carolina Railroad Company corridor.

IX. COORDINATION WITH THE DEPARTMENT'S RAIL DIVISION

In addition to the prior mentioned requirements, all plans, correspondences, and transmittals submitted to Norfolk Southern Railway and / or the North Carolina Railroad Company shall be submitted to the NCDOT Rail Division.

X. REMOVAL OF THE NORFOLK SOUTHERN AT-GRADE SPUR LINE RAILROAD TRACK

The Design-Build Team shall remove the Norfolk Southern At-Grade Spur Line Railroad Track crossing US 70 at approximately station 145+40.00 as shown in the Preliminary Roadway Plans provided by the Department, and assist the Division in the required coordination for such removal.

For the purpose of cost estimation, the Design-Build Team shall consider the limits of removal for such Spur to be only within the Department's right of way (i.e. within the US 70 corridor). If it is determined by the Department that Spur removal is necessary beyond the Department's right of way limits, such additional work will be paid as extra work in accordance with Subarticle 104-8(A) of the NCDOT Standard Specifications for Roads and Structures.

It shall be the responsibility of the Design-Build Team to properly dispose of all material and debris resulting from the removal of such Spur. Such cost shall be included in the Design-Build Team's lump sum bid for the entire project.

TRANSPORTATION MANAGEMENT SCOPE OF WORK (5-24-2019)

I. Project Requirements

A. Laws, Standards and Specifications

The Design-Build Team shall design the Transportation Management Plan (TMP) in accordance with the requirements of this RFP and the version of the standards listed below that are effective on the time of Technical Proposal submittal date.

- NCDOT *Standard Specifications for Roads and Structures*
- NCDOT *Roadway Standard Drawings*
- NCDOT *Supplement to the Manual on Uniform Traffic Control Devices* (NCSMUTCD)
- FHWA *Manual on Uniform Traffic Control Devices* (MUTCD)
- NCDOT *Roadway Design Manual*
- Americans with Disabilities Act of 1990 (ADA)
- AASHTO *A Policy on Geometric Design of Highways and Streets*
- AASHTO *Roadside Design Guide*
- FHWA *Standard Highway Signs*
- NCDOT *Guidelines for Preparation of Traffic Control and Pavement Marking Plans for Design-Build Projects*
- NCDOT *Design-Build Submittal Guidelines*
- FHWA *Rule on Work Zone Safety and Mobility* (23 CFR 630 Subpart J and K)
- Transportation Research Board *Highway Capacity Manual*

B. References

The Design-Build Team shall use the references provided on the site below as supplementary guidelines and requirements for the design and implementation of the TMP.

WZTC Website:
https://connect.ncdot.gov/projects/WZTC/Pages/default.aspx

C. Transportation Management Plans

The Design-Build Team shall prepare TMP that include Temporary Traffic Control Plans (TTCP) and Traffic Operations Plan (TOP). The TOP shall include demand management strategies, corridor network management strategies, work zone safety management strategies and traffic incident management and enforcement strategies. In accordance with the Public Involvement and Information Scope of Work found elsewhere in this RFP, the Design-Build Team shall assist the Department in the development of a Public Information Plan (PIP).

The Design-Build Team shall produce TMP for each phase of work that impacts road users. The TMP shall include details of all planned detours, traffic control devices, striping, and signage applicable to each phase of work. The information on the TMP shall be of sufficient detail to allow verification of design criteria and safety requirements, including, but not limited to, typical sections, alignment, striping layout, drop off conditions, and temporary drainage. The Design-Build Team shall develop TMPs that include procedures to communicate TMP information to the public about road and travel conditions within the work zone and affected roadway network.

A Transportation Management Phasing Concept (TMPC) shall be prepared by the Design-Build Team to present the Design-Build Team's approach to all areas covered under the TMP, including but not limited to hauling of materials to, from, and within the project right of way (ROW). The Design-Build Team shall include the TMPC in the Technical Proposal. The TMPC shall comply with requirements herein. The Design-Build Team shall submit the TMPC for Department review and acceptance and shall address NCDOT comments on the TMPC prior to commencing production of the TMP for each phase of work or any construction. Any changes to the TMPC after acceptance by NCDOT shall require a submittal for review and acceptance prior to any future phasing submittals.

The Design-Build Team shall select a Private Engineering Firm (PEF) that has experience developing TMP on comparable projects for the North Carolina Department of Transportation (NCDOT) and shall list these comparable projects in the Technical Proposal. The PEF selected by the Design-Build team to develop the TMP shall be prequalified through NCDOT in Work Code 541 – Traffic Management Plan – Level 1 and 2.

In the event any self-imposed liquidated damages are included in the Technical Proposal, Intermediate Contract Time(s) shall be established.

D. General Requirements

The Design-Build Team is encouraged to begin construction activities south of Williams Road to allow motorists to adjust to an altered traffic pattern. The existing traffic pattern shall not be altered north of Station 107+00 (U-5713 segment, from just south of the Williams Road interchange to the northern project limit) until traffic has been in an altered pattern South of this location for a minimum of 30 days.

Unless permitted otherwise elsewhere in this RFP, maintain the existing number of travel lanes on all roads, including but not limited to acceleration, deceleration, auxiliary, and turn lanes.

On US 70 two through lanes must be maintained in each direction at all times and shall have travel lanes that are a minimum width of 11 feet.

For existing travel lanes that are 11-foot wide or wider, maintain a minimum of 11-foot travel lanes at all times. For existing travel lanes that are narrower than 11 feet, maintain the existing travel lane widths at all times. Unless permitted otherwise elsewhere in this RFP, maintain existing shoulder widths (paved and unpaved). Unless temporary barrier is placed on the paved shoulder, maintain existing should widths (paved and unpaved). Under structures only, maintain a minimum two-foot wide paved shoulder adjacent to the mainline through lanes and a minimum one-foot wide paved shoulder adjacent to ramps.

As a minimum, the Design-Build Team shall maintain the US 70 Service Roads, parallel to US 70 in a one lane, one-way pattern separated by PCB from US 70. The one-way direction will be approved by the Division.

Unless allowed otherwise elsewhere in this RFP, the Design-Build Team's construction methods and / or construction activities on all -Y- lines, Service Roads, ramps and loops, including timing for temporary signals, shall not create a queue that impacts the flow of traffic on US 70.

The Design-Build Team shall maintain access to all properties not being purchased as part of this project.

Unless permitted otherwise elsewhere in this RFP, all traffic control devices, including bridge barrier rails, shall be placed / located a minimum two-foot offset (shy distance) from the edge of an open travel lane.

Placement of temporary barrier systems shall be shown on the TMPC. Temporary barrier systems shall be designed in accordance with the following requirements:

- Determine the need for temporary barrier in accordance with the FHWA *Rule on Temporary Traffic Control Devices* (23 CFR 630 Subpart K). Reference the NCDOT Work Zone Traffic Control website noted below for examples and Guidelines on the Use of Positive Protection in Work Zones.

  https://connect.ncdot.gov/projects/WZTC/Pages/Design-Resources.aspx

- The Design-Build Team shall adhere to the AASHTO Roadside Design Guide in determining the length of need, flare rate, and clear zone. The Design-Build Team shall adhere to the possible deflection of the proposed temporary barrier system in accordance with NCHRP-350 *Recommended Procedures for the Safety Performance Evaluation of Highway Features* deflections from crash testing and MASH (2016 AASHTO Manual for Assessing Safety Hardware). Providing less than the minimum deflection distance shall require the use of anchored temporary barrier systems in accordance with the NCDOT 2018 *Standard Specifications for Roads and Structures*.

- The Design-Build Team shall not place temporary barrier systems utilized for traffic control on unpaved surfaces.

- The Design-Build Team shall not place temporary barrier within 200 feet of any merging taper, including but not limited to, existing and proposed ramp merges, lane drop merges, and / or temporary lane closure merges. All lanes shall first be closed using channelizing devices and pavement markings.

- The Design-Build Team shall not place temporary barrier along any shifting taper, including but not limited to, existing, temporary, and / or proposed shifting tapers.

- When barrier is placed on a roadway shoulder, the Design-Build Team shall install shoulder closure signs and devices in advance of the barrier in accordance with the NCDOT Roadway Standard Drawings.

Excluding short term median crossovers, the design speed for temporary alignments of US and NC routes shall not be lower than the current posted speed limit. The minimum allowable design speed for temporary alignments on secondary roads shall be the higher of 10 mph below the posted speed limit or 35 mph.

The 2018 *Roadway Standard Drawing* No. 1101.11 shall be used to calculate the length of temporary merges for lane closures and temporary traffic shifts. For temporary traffic patterns that will remain in place for a period longer than three days, including but not limited to traffic shifts, merges, and temporary alignments, breaks in the superelevation and / or breaks in a normal crown section will not be allowed within the shifting taper. Excluding the aforementioned temporary traffic patterns, breaks in the super elevation and / or crown breaks in a normal crown section shall only occur on a lane line or lane midpoint, and shall not exceed 0.04.

Temporary traffic shifts that are not covered by a standard or require vertical grades shall be considered a temporary alignment. All temporary alignments shall adhere to the NCDOT *Roadway Design Manual*, including all revisions, 2011 AASHTO, *A Policy on Geometric Design of Highways and Streets* and the most current Transportation Research Board *Highway Capacity Manual*.

Maintain access to all residences, schools, bus stops, mass transit facilities (park and ride lots), emergency services and businesses at all times. Prior to incorporation, obtain written approval from the Engineer on method to maintain access. Access to all existing transit stop locations shall be maintained during construction or alternative locations that are accepted by NCDOT shall be provided and specified within the TMP. The Design-Build Team shall coordinate with the State and Local Transit Agencies for all traffic control phasing that will affect existing transit stops or transit routes.

In accordance with the Department's Policy on Evaluating Temporary Accommodations for Pedestrians during Construction, found on the website noted below, the Design-Build Team shall maintain pedestrian accommodations in all areas as follows:

Roadway	Minimum Level of Pedestrian Accommodation
US 70	Absence of Need
All other roadways	Basic

https://connect.ncdot.gov/projects/WZTC/Work%20Zone%20Traffic%20Control%20Documents/AccomPedinWZProc.pdf

Through traffic traveling in the same direction shall not be split. (i.e. separation by any type of barrier, bridge piers, existing or proposed median, etc.).

Prior to incorporation, obtain written approval from the Engineer for all road and / or access point closures.

Prior to incorporation, all offsite detour routes shall receive Department written approval and shall adhere to the following requirements:

- Except as allowed in ICT #4 and ICT #5, and elsewhere in this RFP, all roads, including ramps and loops shall not be closed.

- Unless permitted otherwise elsewhere in this RFP, the Design-Build Team shall not permanently close any existing ramp / loop until 1) the proposed ramp / loop that will carry the corresponding traffic is open to traffic and fully operational; and 2) any proposed traffic signal at the proposed ramp / loop terminal for the corresponding traffic is operational.

- The Design-Build Team shall not concurrently close adjacent -Y- Lines.

- The Design-Build Team shall not concurrently close -Y- Lines with overlapping detours.

- The Design-Build Team shall investigate all detour routes including but not limited to, analyzing traffic capacity, investigating impacts to emergency services and schools, analyzing design characteristics to ensure the design supports the traffic volumes (existing traffic volumes plus detoured traffic volumes), and investigating pavement structural adequacy including any bridge postings on the detour route. The Design-Build Team shall submit recommendations resulting from the aforementioned investigations / analysis for the Department's review and acceptance.

- As determined by the Engineer, the Design-Build Team shall provide improvements required to accommodate detoured traffic prior to utilizing detour routes.

- Offsite detours that have non-signalized at-grade railroad crossings shall not be allowed.

- Submit detour routes and all associated sign designs for review and acceptance prior to incorporation.

- All proposed road closures, detour routes, durations and justifications shall be incorporated into the Technical Proposal. (All proposed road closures, detour routes, durations and justifications incorporated into the Technical Proposal shall require Department approval.)

- Unless approved otherwise by the controlling government entity, in writing, use only state maintained roads for off-site detour routes.

On all roadways within the project limits, the Design-Build Team shall provide safe access for wide-loads and oversized permitted vehicles through the work zone. Safe access shall entail, but is not limited to, a sufficient pavement structure (Reference the Pavement Management Scope of Work found elsewhere in this RFP), maintaining the existing vertical clearance of overhead structures, providing the required vertical clearance of proposed overhead structures, and providing the minimum horizontal clear widths as follows:

Roadway	Minimum Clear Width
US routes, NC Routes, and all ramps and loops	20 feet
All other roadways	18 feet

The Design-Build Team shall also maintain safe access on US 70 -Y- lines and service roads within the project corridor. Safe access shall include maintenance and repair of the existing pavement structure by performing operations including but not limited to patching, milling, strengthening, and overlay within 5 calendar days of notification. The Design-Build Team should consider increased traffic due to adjacent projects.

The Design-Build Team shall coordinate with the Division Maintenance Engineer, Resident Engineer, Division Traffic Engineer, the Rail Division and Statewide Transportation Operations Center (STOC) to manage traffic operations within the work zone and other roadways within the network that may be affected by the work zone activities. Coordination shall include, but not be limited to, providing notification of planned lane or road closures, traffic detours, public information, traffic management, access management, incidents, etc.

On all roads, the Design-Build Team shall make all modifications to existing pavement markings, markers and / or signing located outside the project limits that are necessitated by the TMP. Additionally, the Design-Build Team shall readjust the markings, markers, and / or signing located outside the project limits to the existing / proposed pattern when the temporary changes are no longer needed.

The Design-Build Team shall not place traffic on lanes containing rumble strips.

All on-site detours shall meet the minimum number of existing lanes per direction and shall adhere to all temporary alignment requirements noted elsewhere in the RFP. A pavement transition, suitable for the posted speed limit shall be provided at all on-site detour interfaces.

The Design-Build Team shall take steps to minimize disruptions to existing roadway facilities during construction and shall demonstrate how the traffic control phasing, minimizes inconvenience to motorists on all roads.

The Design-Build Team shall provide and utilize Changeable Message Signs (CMS) as follows:

- The Design-Build Team shall provide CMSs that have the functionality to be operated locally in the field and controlled remotely from the STOC. All CMSs provided must be fully NTCIP compliant and operate with full functionality via remote communications from the STOC. All CMSs must be able to be controlled remotely using the existing software utilized by the STOC staff at the time of deployment. No vendor specific or third party software will be allowed. CMSs must be approved for use in ITS operations before they are deployed. STOC staff will operate all devices displaying travel information to the public. The Design-Build Team shall not begin any construction that involves lane closures on any road until all CMSs and all other devices are installed and communicating with the STOC.

- For traffic control purposes during construction, the Design-Build Team shall provide and operate a minimum of one CMS per direction on the mainline that provides general information about the construction activities within the project limits. This CMS shall be in addition to any other CMSs required by the NCDOT Roadway Standard Drawings and / or required for incident management use.

- The Design-Build Team shall provide and operate a minimum of 12 speed sensors and 12 CMSs to display alternate route information ahead of the project detour points for incidents on the project. The positioning of these incident management CMSs shall be coordinated with the STOC and the Engineer. These CMSs shall be in addition to any other devices provided by the Department and operated by the STOC. The Design-Build Team shall coordinate with the STOC when alternate route information needs to be displayed. In the event of an incident, STOC will take remote control of the applicable CMSs to provide incident management information to motorists. Upon incident clearance and resumption of normal traffic flow, STOC will allow the Design-Build Team to regain control of the CMS boards.

- The Design-Build Team shall coordinate on 24-hour basis with the STOC to provide relevant and timely travel information throughout the work zone and along alternate routes.

- The Design Build Team will be responsible for ensuring the alternate routes are signed with either existing stationary alternate route signing or provide temporary stationary alternate route signing to guide detoured motorists along the alternate route back to the original road. The Design-Build Team shall provide a plan for STOC and NCDOT approval that shows the STOC's alternate routes with the approximate locations of the CMSs to be used for incident management, along with their respective messages, and the approximate locations of the existing stationary alternate route signing and temporary stationary alternate route signing.

- The Design-Build Team shall fabricate, install, relocate, and maintain the CMSs and stationary signs during construction. Upon completion of the project, or completion of their usefulness, the Design-Build Team shall remove and dispose of the CMSs and stationary signs.

- The plan for all incident management CMSs and ground mounted signing for alternate routes shall be approved by STOC and NCDOT and installed before beginning any construction. Primary locations shall include ground mounted guide signs at the junction of US 70/US 17 west of New Bern, at US 70/NC 24 in Morehead City and along the alternate route back to US 70. The Design/Build Teams shall have a minimum of 2 ground mounted alternate route signs in advance of the of US 70/US17 interchange and the US 70/NC 24 intersection.

E. Lane Closure Notice (LCN)

The Design-Build Team shall issue a Lane Closure Notice (LCN) to NCDOT and affected government entities a minimum of fourteen (14) calendar days prior to the publication of any notices or placement of any traffic control devices associated with lane closures, detour routing or other change in traffic control requiring lane closures. The Design-Build Team will be allowed to issue a single LCN for multiple / consecutive lane closures that occur in the same location.

For a LCN utilizing a non-NCDOT controlled facility, the Design-Build Team shall secure concurrence, in writing, from the controlling government entity. A LCN shall contain the estimated date, time, duration and location of the proposed work. The Design-Build Team shall keep NCDOT informed of any and all changes or cancellations of proposed lane closures prior to the date of their implementation.

If an emergency condition should occur, a LCN shall be provided to NCDOT within two (2) days after the event. For non-NCDOT controlled facilities, the Design-Build Team shall immediately notify the controlling government entity.

F. Road Closure Notice (RCN)

Proposed road closures on any road shall be approved by the Engineer prior to incorporation in the TMP.

The Design-Build Team shall issue a Road Closure Notice (RCN) to NCDOT and affected government entities a minimum of thirty (30) calendar days prior to the publication of any notices or placement of any traffic control devices associated with road closures, detour routing or other change in traffic control requiring road closures.

For a RCN utilizing a non-NCDOT controlled facility, the Design-Build Team shall secure concurrence in writing from the controlling government entity. A RCN shall contain the estimated date, time, duration, and location of the proposed work. The Design-Build Team shall keep NCDOT and any other affected government entity informed of any and all changes or cancellations of proposed Road Closures prior to the date of their implementation.

If an emergency condition should occur, a RCN shall be provided to NCDOT within two (2) days after the event. For non-NCDOT controlled facilities, the Design-Build Team shall immediately notify the controlling government entity.

II. Project Operations Requirements

The following are Time Restrictions and notes that shall be included with the Transportation Management Plan General Notes, unless noted otherwise elsewhere in this RFP:

A. Time Restrictions

1. Intermediate Contract Times #1 through #3 for Lane Narrowing, Lane Closure, Holiday and Special Event Restrictions.

Except as allowed otherwise elsewhere in this RFP, the Design-Build Team shall maintain the existing traffic pattern and shall not close or narrow a single lane of traffic during the times below.

Intermediate Contract Time #1:

Between September 16th and May 14th, the time restrictions in ICT #1 shall apply.

Road Name	Day	Time Restrictions
US 70 and all ramps and loops	Monday through Friday	6:00 a.m. to 7:00 p.m.

Intermediate Contract Time #2:

Between May 15th and September 15th, the time restrictions in ICT #2 shall apply.

Road Name	Day	Time Restrictions

US 70 and all ramps and loops	Monday through Thursday	6:00 a.m. to 7:00 p.m.
	Friday through Sunday	Starting on Friday at 6:00 a.m. and ending on Sunday at 7:00 p.m.

Intermediate Contract Times #3:

Road Name	Day	Time Restrictions
Williams Road	Monday through Friday	6:00 a.m. to 7:00 p.m.
All other -Y- lines and Service Roads	Monday through Friday	6:00 a.m. to 9:00 a.m. and 4:00 p.m. to 7:00 p.m.

The Design-Build Team shall not install, reset and / or remove any traffic control device during the times listed above.

In addition, the Design-Build Team shall not close or narrow a lane of traffic on the aforementioned facilities, detain, and / or alter the traffic flow on or during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy unless allowed otherwise elsewhere in this RFP. At a minimum, these requirements / restrictions shall apply to the following schedules:

(a) For New Year's between the hours of 6:00 a.m. December 31st and 7:00 p.m. January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday then until 7:00 p.m. the following Tuesday.

(b) For Easter, between the hours of 6:00 a.m. Thursday and 7:00 p.m. Monday.

(c) For Memorial Day, between the hours of 6:00 a.m. Friday and 7:00 p.m. Tuesday.

(d) For Independence Day, between the hours of 6:00 a.m. July 3rd and 7:00 p.m. July 5th. If Independence Day is on a Friday, Saturday, Sunday or Monday, then between the hours of 6:00 a.m. the Thursday before Independence Day and 7:00 p.m. the Tuesday after Independence Day.

(e) For Labor Day, between the hours of 6:00 a.m. Friday and 7:00 p.m. Tuesday.

(f) For Thanksgiving Day, between the hours of 6:00 a.m. Wednesday and 7:00 p.m. Monday.

(g) For Christmas, between the hours of 6:00 a.m. the Friday before the week of Christmas Day and 7:00 p.m. the following Tuesday after the week of Christmas Day.

Liquidated Damages for Intermediate Contract Time #1 for the above lane narrowing, lane closure, holiday and special event time restrictions for US 70 and all ramps and loops are $2,500.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #2 for the above lane narrowing, lane closure, holiday and special event time restrictions for US 70 and all ramps and loops are $2,500.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #3 for the above lane narrowing, lane closure, holiday and special event time restrictions for Williams Road are $1,250.00 per 15-minute period or any portion thereof.

2. Intermediate Contract Times #4 and #5 for Road Closure Restrictions for Construction Operations

Unless allowed otherwise elsewhere in this RFP, at a minimum, the Design-Build Team shall maintain the existing traffic pattern and follow the road closure restrictions for all roadways listed below. When a temporary road closure is used, the Design-Build Team shall reopen the travel lanes by the end of the road closure duration to allow the traffic queue to deplete before re-closing the roadway.

Unless allowed otherwise elsewhere in this RFP, the Design-Build Team shall 1) not close any direction of travel on the following roads or any ramps / loops during the times noted below; and 2) only close the following roads or any ramps / loops for the operations listed in this intermediate contract time restriction.

A crossover providing one lane in each direction on US 70 will be allowed for the purpose of bridge demolition, and girder, overhang, and falsework installation and / or removal during the times set forth below. No other roads shall be put in a crossover pattern for these same purposes. If the Design-Build team elects to use a crossover for the aforementioned activities, during the times set forth below, the crossover shall be designed and constructed to meet a design speed of no more than 20 MPH below the posted speed limit prior to implementation of a reduced work zone speed limit. Unless approved otherwise by the Engineer, in writing, the maximum allowable distance between the cross-overs shall be 2,750 feet. The Design-Build Team shall monitor the traffic queue during operation of the crossover. Should the traffic queue extend to the advance warning signs, traffic shall be returned to the existing number of lanes in each

direction until the traffic queue is depleted. Traffic shall be returned to the normal pattern at the end of each work period.

Intermediate Contract Times #4 and #5

Road Name	Day	Time Restrictions
US 70 and all existing ramps and loops	Monday through Sunday	5:00 a.m. until 12:00 a.m. (midnight)
All Other Roads	Monday through Sunday	5:00 a.m. until 11:00 p.m.

For the operations noted below, the maximum road closure duration shall not exceed **thirty (30) minutes** without an approved offsite detour. With an approved offsite detour, the roadways listed may be closed during the time listed above for the operations listed below.

- Bridge demolition
- Girder, overhang, and falsework installation and / or removal
- Installation of overhead sign assemblies and / or work on existing overhead sign assemblies over travel lanes
- Railroad signal and crossing work (Railroad crossings shall not be closed simultaneously)

Proposed road closures for any road within the project limits shall be approved by the Engineer, in writing, prior to incorporation in the Transportation Management Plans.

Liquidated Damages for Intermediate Contract Time #4 for the above road closure time restrictions for US 70 and all existing ramps and loops are $5,000.00 per 15-minute period or any portion thereof.

Liquidated Damages for Intermediate Contract Time #5 for the above road closure time restrictions for All Other Roads are $2,500.00 per 15-minute period or any portion thereof.

B. Hauling Restrictions

The Design-Build Team shall adhere to the hauling restrictions noted in the 2018 NCDOT *Standard Specifications for Roads and Structures*.

The Design-Build Team shall conduct all hauling operations as follows:

- The Design-Build Team shall not conduct any hauling operations against the flow of traffic of an open travelway unless an approved temporary traffic barrier or guardrail separates the traffic from the hauling operation.
- The Design-Build Team shall not haul during the holiday and special events time restrictions listed in ICT #1 through ICT #3 unless the hauling operation occurs completely behind temporary traffic barrier or guardrail and does not impact traffic operations.
- All hauling entrances, exits and crossings shall be shown on the TMP and be in accordance with the 2018 NCDOT Roadway Standard Drawings, Typical Median Access Special Provision, or the Design-Build Team may develop a median access plan for existing US 70, consistent with the Median Access Special Provision, as approved by the Department. All hauling entrances, exits, and median access point locations shall be approved by the Department prior to installation.
- Haul vehicles shall not enter and / or exit an open travel lane at speeds more than 10 mph below the posted speed limit.
- Hauling operations that perpendicularly cross a roadway shall require a TMP and shall be subject to the time restrictions, and holiday and special event time restrictions listed in ICT #1 through ICT #3.

Excluding hauling operations that are conducted entirely behind a temporary traffic barrier or guardrail, multi-vehicle hauling of vehicles exceeding 15,000 lb of gross vehicle weight shall not be allowed ingress and egress from any open travel lane during the time restrictions listed in ICT #6 and ICT #7.

Intermediate Contract Times #6

Between September 16th and May 14th, the following hauling restrictions in ICT #6 will apply.

Road Name	Day	Time Restrictions
US 70 and all ramps and loops	Monday through Friday	6:00 a.m. to 8:00 a.m. and 4:00 p.m. to 7:00 p.m.

Road Name	Day	Time Restrictions
Williams Road	Monday through Friday	8:00 a.m. to 7:00 p.m.

Intermediate Contract Times #7

Between May 15th and September 15th, the following hauling restrictions in ICT #7 will apply.

Road Name	Day	Time Restrictions
US 70 and all ramps and loops	Monday through Thursday	6:00 a.m. to 8:00 a.m. and 4:00 p.m. to 7:00 p.m.

	Friday through Sunday	Starting on Friday at 6:00 a.m. and ending on Sunday at 7:00 p.m.

Road Name	Day	Time Restrictions
Williams Road	Monday through Friday	8:00 a.m. to 7:00 p.m.

Liquidated Damages for Intermediate Contract Time #6 for the above multi-vehicle hauling time restrictions for US 70 and all interchange ramps (once open to traffic), and Williams Road are $300.00 per vehicle.

Liquidated Damages for Intermediate Contract Time #7 for the above multi-vehicle hauling time restrictions for US 70 and all interchange ramps (once open to traffic), and Williams Road are $400.00 per vehicle.

The Design-Build Team shall address how hauling will be conducted in the Technical Proposal, including but not limited to, hauling of any materials to and from the site and hauling material within the NCDOT right of way.

C. Lane and Shoulder Closure Requirements

On two-lane, two-way facilities, the Design-Build Team shall not install more than one (1) mile of lane closure in any one direction on any roadway within the project limits or in conjunction with this project, measured from the beginning of the merge taper to the end of the lane closure.

On multi-lane facilities, the Design-Build Team shall not install more than two (2) miles of lane closure in any one direction, measured from the beginning of the merge taper to the end of the lane closure. The Design-Build Team shall not install more than two simultaneous lane closures in any one direction and shall provide a minimum of two (2) miles between lane closures, measured from the end of one closure to the first sign of the next lane closure.

The Design-Build Team shall remove lane closure devices from the lane when work is not being performed behind the lane closure or when a lane closure is no longer needed.

When barrier is placed on the roadway shoulder, the Design-Build Team shall install shoulder closure signs and devices in advance of the barrier using the 2018 NCDOT Roadway Standard Drawings.

When personnel and / or equipment are working within 15 feet of an open travel lane, the Design-Build Team shall close the nearest open shoulder using the 2018 NCDOT Roadway Standard Drawings, unless the work area is protected by an approved temporary traffic barrier or guardrail.

When personnel and / or equipment are working on the shoulder adjacent to an undivided facility and within five feet of an open travel lane, the Design-Build Team shall, at a minimum, close the nearest open travel lane using the 2018 NCDOT Roadway Standard Drawings, unless the work area is protected by an approved temporary traffic barrier or guardrail.

When personnel and / or equipment are working on the shoulder adjacent to a divided facility and within ten feet of an open travel lane, the Design-Build Team shall, at a minimum, close the nearest open travel lane using the NCDOT 2018 Roadway Standard Drawings, unless the work area is protected by an approved temporary traffic barrier or guardrail.

When personnel and / or equipment are working within a lane of travel of an undivided or divided facility, the Design-Build Team shall, at minimum, close the lane using the NCDOT 2018 Roadway Standard Drawings. The Design-Build Team shall conduct the work so that all personnel and / or equipment remain within the closed travel lane.

The Design-Build Team shall not perform work involving heavy equipment within 15 feet of the edge of travel way when work is being performed behind a lane closure on the opposite side of the travel way.

D. Pavement Edge Drop off Requirements

Using suitable compacted material, the Design-Build Team shall backfill at a 6:1 slope up to the edge and elevation of the existing pavement in areas adjacent to an open travel lane that has an edge of pavement drop-off as follows:

- Elevation differences that exceed two inches on roadways with posted speed limits of 45 mph or greater and a paved shoulder four-foot wide or less.
- Elevation differences greater than three inches on roadways with posted speed limits less than 45 mph and with a paved shoulder four-foot wide or less.
- Refer to the current AASHTO Roadside Design Guide for proper treatment of all other conditions.

Do not exceed a difference of two inches in elevation between open lanes of traffic for nominal lifts of 1.5 inches. Install advance warning “UNEVEN LANES” signs (W8-11) 500 feet in advance and a minimum of every half mile throughout the uneven area.

E. Traffic Pattern Alterations

The Design-Build Team shall notify the Engineer, in writing, at least thirty (30) calendar days prior to any traffic pattern alteration. (Reference the Public Involvement and Information Scope of Work found elsewhere in this RFP for additional public information requirements)

F. Signing

The Design-Build Team shall install advance work zone warning signs when work is within 40 feet from the edge of travel lane and no more than three days prior to the beginning of construction.

When no work is being conducted for a period longer than one week, the Design-Build Team shall remove or cover all advance work zone warning signs, as directed by the Engineer. Stationary work zone warning signs shall be covered with an opaque material that prevents reading of the sign at night by a driver traveling in either direction.

When portable work zone signs are not in use for periods longer than 30 minutes, the Design-Build Team shall lay the portable work zone sign flat on the ground and collapse the sign stand and lay it flat on the ground.

The Design-Build Team shall install and maintain all detour signing and devices required for road closures. The Design-Build Team shall cover or remove all detour signs and devices required for road closures within and off the project limits when a detour is not in operation.

The Design-Build Team shall ensure proper signing (including but not limited to guide signs) is in place at all times during construction, as required by the MUTCD. All temporary signing shall be shown on the Traffic Control Plans or a Temporary Signing Plans to be reviewed and approved by the Work Zone Traffic Control Section and / or the Signing and Delineation Unit prior to incorporation.

G. Traffic Barrier

The Design-Build Team shall use only an NCDOT approved temporary traffic barrier system and adhere to the following requirements:

- Install temporary traffic barrier system a maximum of two (2) weeks prior to beginning work in any location. Once the temporary traffic barrier system is installed at any location, proceed in a continuous manner to complete the proposed work in that location.

- Place all temporary barrier used for traffic control directly on an asphalt or concrete surface.

- Temporary barrier used for traffic control shall not act as a retaining wall.

- Once the temporary traffic barrier system is installed and no work has been or will be performed behind the temporary traffic barrier system for a period longer than two (2) months, remove / reset the temporary traffic barrier system unless the barrier is protecting traffic from a hazard.

- Excluding water filled barrier, protect the approach end of temporary traffic barrier system at all times during the installation and removal of the barrier by either a truck mounted impact attenuator (maximum 72 hours) or a temporary crash cushion.

- Excluding water filled barrier, protect the approach end of temporary traffic barrier system from oncoming traffic at all times by a temporary crash cushion unless the approach end of temporary traffic barrier system is offset from oncoming traffic as follows:

Posted speed limit (mph)	Minimum offset (feet)
40 or less	15
45 – 50	20
55	25
60 mph or higher	30

- Install temporary traffic barrier system with the traffic flow, beginning with the upstream side of traffic. Remove the temporary traffic barrier system against the traffic flow, beginning with the downstream side of traffic.

- Install drums to close or keep closed tangent sections of the roadway until the temporary traffic barrier system can be placed or after the temporary barrier system has been removed. The distance, in feet, between drums shall be no greater than twice the posted speed limit (mph).

- The Design-Build Team shall minimize the presence of portable concrete barrier along acceleration ramps / loops. Thus, justification, in the Department's sole discretion, shall be provided in the TMP for the placement of portable concrete barrier along acceleration ramps / loops. At existing and proposed ramp merges, lane drop merges, and / or temporary lane closure merges, the Design-Build Team shall install temporary traffic barrier system in a manner that provides a minimum of 200 feet from the end of the pavement marking taper to the beginning of the barrier taper.

- The Design-Build Team shall be responsible for providing proper connection between the existing bridge rail and the temporary barrier system and include this information in the appropriate plans.

H. Traffic Control Devices

The Design-Build Team shall use traffic control devices that conform to all NCDOT requirements and are listed on the NCDOT Approved Products List. The Approved Products List is may be referenced on the website noted below:

https://apps.dot.state.nc.us/vendor/approvedproducts/

The use of any devices that are not shown on the NCDOT Approved Products List shall require written approval from the Division Construction Engineer or designee prior to incorporation.

Channelizing device spacing shall not exceed a distance in feet equal to twice the posted speed limit. Channelization devices shall be spaced ten feet on-center in radii. Channelization devices shall be two feet off the edge of an open travelway, when lane closures are not in effect. Skinny drums shall only be allowed as defined in Section 1180 of the NCDOT 2018 *Standard Specifications for Roads and Structures*.

Place Type III barricades, with "ROAD CLOSED" signs (R11-2) attached, of sufficient length to close entire roadway. Stagger or overlap barricades to allow for ingress or egress.

Place sets of three drums perpendicular to the edge of the travelway on 500-foot centers when unopened lanes are closed to traffic. These drums shall be in addition to channelizing devices.

Portable changeable message signs should be placed off the shoulder of the roadway and behind a traffic barrier, if practical. Where a traffic barrier is not available to shield the portable changeable message sign, it shall be placed off the shoulder and outside of the clear zone. If a portable changeable message sign must be placed on the roadway shoulder or within the clear zone, it shall be delineated with retroreflective temporary traffic control (TTC) devices. When portable changeable message signs are not being used to display TTC messages, they shall be relocated such that they are outside of the clear zone or shielded behind a traffic barrier and turned away from traffic. If relocation or shielding is not practical, the portable changeable message signs shall be delineated with retroreflective TTC devices.

I. Temporary Pavement Markings, Markers and Delineation

**US ROUTES, AND NC ROUTES,
INCLUDING ALL RAMPS AND LOOPS**

The Design-Build Team shall show temporary pavement markings on the TMP that meet the requirements of the *Work Zone "Performance" Pavement Markings on US Routes and NC Routes* Section below and the *Guidelines for Preparation of Traffic Control and Pavement Marking Plans for Design-Build Projects*.

The Design-Build Team shall install pavement markings and markers in accordance with the NCDOT 2018 *Standard Specifications for Roads and Structures*, and in accordance with the manufacturer's procedures and specifications.

In accordance with the requirements below, the Design-Build Team shall install Work Zone "Performance" pavement markings on the interim surface for temporary traffic patterns. The Design-Build Team shall install temporary raised pavement markers on the interim surface for temporary traffic patterns.

The Design-Build Team shall not place temporary markings on the final asphalt pavement surface unless the temporary markings are placed in the exact location of the final pavement markings.

Temporary pavement markings on concrete surfaces shall only be removed by hydro blasting.

Prior to shifting traffic to a new pattern, the Design-Build Team shall remove all conflicting markings and remove all conflicting markers and snowplowable marker castings. Should the removal of the pavement markings create "ghost markings" on the pavement surface which can create motorist confusion, the Design-Build Team shall mill and fill the section with a minimum 1.5" layer of asphalt surface course

The Design-Build Team shall tie proposed pavement marking lines to existing pavement marking lines.

By the end of each day's operation, the Design-Build Team shall, remove, or mill and fill, as appropriate, all conflicting markings, replace all damaged markings, and remove / replace all conflicting / damaged markers.

WORK ZONE "PERFORMANCE" PAVEMENT MARKINGS ON US ROUTES AND NC ROUTES, INCLUDING ALL RAMPS AND LOOPS

Description

The Design-Build Team shall furnish and install Work Zone "Performance" pavement markings that delineate the travel way for work zone traffic patterns on the mainline, US Routes, and NC Routes, including all ramps and loops. The purpose of Work Zone "Performance" pavement marking is to provide a more durable work zone pavement marking that shall last the full duration of a traffic pattern without requiring replacement or reapplication for a period of up to 12 months. The Work Zone "Performance" pavement markings shall also provide a higher performance level, for both initial and residual retroreflectivity, than standard traffic paints to improve nighttime work zone visibility.

Materials

a) General

Use materials in accordance with the Manufacturer's recommendations that shall retain both durability and a minimum retroreflectivity, as described elsewhere in this RFP, for a period of at least 12 months.

On concrete pavement, the Design-Build Team shall provide black contrast "Performance" pavement markings that contrast the white skip line along through lanes and ramp lanes. The black contrast "Performance" pavement marking shall immediately follow the white skip line at the same width and half the length, or border the long edges of the white skip line at a width of 1.5 inches. Black contrast "Performance" pavement markings shall be matte and non-retroreflective.

The Work Zone "Performance" pavement markings shall be manufactured to bond successfully to both concrete and asphalt pavements. The pavement marking materials shall be applied in a single application. The following are approved materials to be used for Work Zone "Performance" pavement markings:

- Polyurea
- Thermoplastic (Extruded and Sprayed)
- Epoxy
- Polymer (Single System)
- Cold Applied Plastic Type 4

When using Cold Applied Plastic Type 4 pavement markings, place temporary raised markers half on and half off edge lines and centerlines to help secure the tape to the roadway. Markers shall be spaced the appropriate distance apart as described by the 2018 Roadway Standard Drawing 1250.01, Sheet 1 of 3.

b) Material Qualifications / Certifications

The Design-Build Team shall only use Work Zone "Performance" pavement marking materials, as listed above, that are on the NCDOT Approved Products List at the time of installation. In accordance with Article 106-3, and Section 1087-4 of the NCDOT 2018 *Standard Specifications for Roads and Structures*, the Design-Build Team shall provide a Type 3 Material Certification for all materials, and a Type 3 and Type 4 certification for all reflective media.

Construction Methods

The Design-Build Team shall not use hand applied methods or any other non-truck mounted application equipment / device to install Work Zone "Performance" pavement markings for applications longer than 1,000 feet.

All Work Zone "Performance" pavement markings shall be installed in a single application.

a) Testing Procedures

All Work Zone "Performance" pavement markings shall be tested by the Department through an independent Mobile Retroreflective Contractor. The Work Zone "Performance" pavement markings will be scanned to ensure the retroreflectivity requirements in Section c below are met.

b) Application Equipment

Application equipment shall be in accordance with Section 1205 of the NCDOT 2018 Standard Specifications for Roads and Structures.

c) Material Application

The Work Zone "Performance" pavement marking material shall be applied at the following minimum thicknesses:

- Polyurea = 20 mils wet
- Epoxy = 20 mils wet
- Thermoplastic (Extruded or Sprayed) = 50 mils wet
- Polymer = 20 mils wet
- Cold Applied Plastic (IV) = Manufacturer's recommendation

The Work Zone "Performance" pavement marking line widths shall be as follows:

- Edge lines, Solid Lane Lines, Skip and Mini-Skip Lines = 4"
- Gorelines = 8"

"No track" dry times for the liquid systems shall be ten minutes or shorter. Traffic shall not be placed on any material until it is sufficiently dry / cured to eliminate wheel tracking.

The minimum level of retroreflectivity for all Work Zone "Performance" pavement marking system selected shall be as follows:

Reflectometer Requirements for Work Zone "Performance" Pavement Markings

Color	Initial	6 Months	12 Months
White	375 mcd/lux/m2	275 mcd/lux/m2	150 mcd/lux/m2
Yellow	250 mcd/lux/m2	150 mcd/lux/m2	100 mcd/lux/m2

For the durations noted in the chart above, the Work Zone "Performance" pavement markings shall adhere to the corresponding retroreflectivity levels.

The Design-Build Team shall notify the Engineer, in writing, a minimum of 7 - 10 days prior to the installation of Work Zone "Performance" pavement markings. The Department will measure initial retroreflectivity

levels with a mobile retroreflectometer within 30 days after placement to ensure compliance with the reflectivity levels in the chart above.

Work Zone "Performance" pavement markings shall maintain the retroreflectivity levels for the durations noted above. If the markings appear to be non-performing, in the Engineer's sole discretion, the Engineer may request additional retroreflectivity readings. If and when this becomes necessary, the same notification procedure as described above shall be used to have Work Zone "Performance" pavement markings measured by a Mobile Retroreflective Contractor.

If measured and found to be noncompliant, the Design-Build Team shall replace the Work Zone "Performance" pavement markings at no cost to the Department.

All Work Zone "Performance" pavement markings shall be durable enough to withstand a single snow event without showing excessive fatigue in either bonding or retroreflectivity. The Design-Build Team shall replace the Work Zone "Performance" pavement markings if a single snowplow event results in more than 25% of the pavement marking edgelines or skips being physically removed and / or the Work Zone "Performance" pavement markings do not meet the following minimum retroreflectivity values:

Reflectometer Requirements for Work Zone "Performance" Pavement Markings after a Single Snowplowed Event

Color	MINIMUM
White	150 mcd/lux/m2
Yellow	100 mcd/lux/m2

Unless the temporary traffic pattern is to be modified within 30 days, the Design-Build Team shall replace all non-compliant Work Zone "Performance" pavement markings within 30 days of determining they are non-compliant.

If the work zone experiences more than one snow event requiring snowplowing, the retroreflectivity values in the chart above will no longer apply. The Engineer will determine if the pavement markings are performing adequately and / or if replacement is necessary due to excessive damage caused solely by snowplow activities. If the Work Zone "Performance" pavement markings are found to be deficient, solely in the Engineer's discretion, they shall be replaced. In such case, the Work Zone "Performance" pavement markings will be paid for as extra work in accordance with Subarticle 104-8-(A) of the NCDOT 2018 *Standard Specifications for Roads and Structures* at the unit price of $0.40 per linear foot. Unless the temporary traffic pattern is to be modified within 30 days, the Design-Build Team shall replace all Work Zone "Performance"

pavement markings damaged due to multiple snowplow events within 30 days.

If the Work Zone "Performance" pavement markings need to remain in place longer than 12 months, the markings shall be scanned by a Mobile Retroreflective Contractor. If the Work Zone "Performance" pavement markings meet or exceed the 12-month retroreflectivity requirements noted above, the markings can remain in place. If the Work Zone "Performance" pavement markings do not meet or exceed the 12-month retroreflectivity requirements noted above, the Design-Build Team shall replace the Work Zone "Performance" pavement markings within 15 days of the 12-month duration date at no cost to the Department. If and when this becomes necessary, the same notification procedure as described above shall be used to have Work Zone "Performance" pavement markings measured by a Mobile Retroreflective Contractor.

d) Surface Preparation

Prior to installation, all pavement surfaces to receive Work Zone "Performance" pavement markings shall be swept clean and prepared in accordance with the Manufacturer's recommendation.

e) Temperature and Weather Limitations

Work Zone "Performance" pavement markings shall only be applied when the ambient air temperature and the pavement temperature are 50□F or higher for thermoplastic and are 40□F or higher for all other materials. The Design-Build Team shall not install Work Zone "Performance" pavement markings unless the pavement surface is completely dry. The Design-Build Team shall not install Work Zone "Performance" pavement markings within four hours of a heavy rain event, (rainfall intensities equal to or greater than 1 inch /per hour).

In the event a traffic shift must occur when the air and / or pavement temperatures are below the aforementioned minimums and / or a rain event occurs four hours prior to or during a planned traffic shift, the Design-Build Team may install temporary pavement marking paint, at the Engineer's sole discretion. Temporary pavement marking paint shall be applied in one application and shall produce a four-inch wide line at 15 mils (wet). Beads that provide the following minimum retroreflectivity shall be applied to the temporary pavement marking paint:

White: 225 mcd / lux / m2
Yellow: 200 mcd / lux / m2

The temporary pavement marking paint with beads shall maintain the minimum retroreflectivity noted above until placement of the Work Zone "Performance" pavement markings

The Design-Build Team shall replace / reapply temporary pavement marking paint with beads that does not adhere to the retroreflectivity requirements noted above at no cost to the Department. The Design-Build Team shall apply the Work Zone "Performance" pavement markings within 90 days of installing the temporary pavement marking paint with beads.

Excluding damage due solely to snowplow events, the Design-Build Team shall replace all Work Zone "Performance" pavement material that debonds and /or does not adhere to the retroreflectivity levels for the corresponding durations noted above at no cost to the Department.

ALL OTHER ROADS AND STRUCTURES

The Design-Build Team shall show temporary pavement markings on the Transportation Management Plans that meet the requirements of the RFP and the *Guidelines for Preparation of Traffic Control and Pavement Marking Plans for Design-Build Projects*.

The Design-Build Team shall only use pavement marking and marker products that conform to all NCDOT requirements and are listed on the NCDOT Approved Products List. The use of any devices that are not shown on the NCDOT Approved Products List shall require written approval from the Division Construction Engineer or designee prior to incorporation.

The Design-Build Team shall install pavement markings and markers in accordance with the 2018 NCDOT *Standard Specifications for Roads and Structures*, and in accordance with the manufacturer's procedures and specifications.

The Design-Build Team shall install temporary pavement markings that are the same width as existing pavement markings. For roadways that do not have existing pavement markings, the Design-Build Team shall install temporary pavement markings that are the same width as required for the final pavement markings in the Pavement Markings Scope of Work found elsewhere in this RFP.

The Design-Build Team shall install temporary pavement markings and temporary pavement markers on the interim surface or temporary pattern as follows:

Road	Marking	Marker
All roads and structures, except US Routes, NC Routes, and ramps and loops	Any Marking on the Approved Product List	Raised Temporary

The Design-Build Team may use any type of pavement markings on the NCDOT Approved Products List for temporary patterns. However, the Design-Build Team shall maintain a minimum retroreflectivity for pavement markings (existing and temporary markings) at all times during construction, as follows:

White: 125 mcd / lux / m2

Yellow: 100 mcd / lux / m2

When using Cold Applied Plastic Type 4 pavement markings, place temporary raised markers half on and half off edge lines and centerlines to help secure the tape to the roadway. Markers shall be spaced the appropriate distance apart as described by the 2018 *Roadway Standard Drawing* 1250.01, Sheet 1 of 3.

The Design-Build Team shall tie proposed pavement marking lines to existing pavement marking lines.

By the end of each day's operation, the Design-Build Team shall remove all conflicting markings, replace all damaged markings, and remove / replace all conflicting / damaged pavement markers.

The Design-Build Team shall trace existing and / or proposed monolithic island locations with the proper color pavement marking prior to removal and / or installation. The Design-Build Team shall place drums to delineate existing and / or proposed monolithic islands after the removal and / or before installation.

The Design-Build Team shall not place temporary markings other than Cold Applied Plastic Type 4 – Removable Tape on any final pavement surface unless the temporary markings are placed in the exact location of the final pavement markings.

Temporary pavement markings on concrete surfaces shall only be removed by hydroblasting.

Prior to shifting traffic to a new pattern, the Design-Build Team shall remove all conflicting markings, replace all damaged markings, and remove / replace all conflicting / damaged pavement markers and snowplowable marker castings.

Unless noted otherwise in this RFP, removal of the temporary pavement markings on asphalt surfaces (other than the mainline, US Routes, NC Routes, and all ramps and loops) shall be accomplished by an NCDOT approved system to minimize damage to the road surface. Temporary pavement markings shall not be obliterated with any type of Black Pavement Markings (paint or other material). The Design-Build Team shall remove all temporary pavement markings without removing more than 1/32 inch of the pavement surface.

J. Temporary Traffic Signals

Use the following notes if the Design-Build Team proposes temporary traffic signals for maintenance of traffic:

- Notify the Engineer in writing a minimum of two months before a temporary traffic signal installation is required.

- Shift and revise all signal heads as shown on the accepted Traffic Signal Plans.

K. Traffic Shifts

All straight-line traffic shifts shall be designed for the full L distance (L=width of traffic shift X speed limit in mph). In addition, solid white line pavement markings shall be used to separate the travel lanes in the straight-line traffic shift for any road having two (2) or more travel lanes in a direction.

L. Traffic Control Supervisor

The Design-Build Team shall furnish a Traffic Control Supervisor for the project who is knowledgeable of TMP design, devices and application, and has full authority to ensure traffic is maintained in accordance with the plans and specifications developed by the Design-Build Team.

The Traffic Control Supervisor shall be on the project site overseeing all road closures and median crossover operations to ensure traffic control devices are properly installed and adjusted as necessary. The Traffic Control Supervisor shall also make necessary changes to the traffic control operations and aide in the monitoring of traffic queuing.

The Design-Build Team shall identify a Traffic Control Supervisor in their Technical Proposal that has the following qualifications:

(1) A minimum 24 months of On-the-Job Training in supervision and work zone set up and implementation on similar projects.

(2) Be certified by responsible party (contractor or NCDOT) to have the required experience and training and is qualified to perform the duties of this position. If certified by the Contractor, a notarized certification letter shall be furnished to the Engineer at the preconstruction meeting. The letter shall state the Traffic Control Supervisor is qualified, and state that the Traffic Control Supervisor has the authority to ensure traffic is maintained in accordance with the contract documents.

The Traffic Control Supervisor for the project shall perform the following:

(1) During construction, be available or on call 24 hours per day, 7 days per week to direct / make any necessary changes in the traffic control operations in a timely and safe manner. The Design-Build Team shall provide NCDOT the name of the Traffic Control Supervisor and support personnel, and the phone number(s) where they can be reached 24 hours per day, seven days per week.

(2) Coordinate and cooperate with traffic control supervisors of adjacent, and overlapping construction projects, as well as construction projects in proximity to the subject project, to ensure safe and adequate traffic control setup is maintained throughout the project at all times, including periods of construction inactivity.

(3) Coordinate and cooperate with the NCDOT Statewide Operations Center (STOC) to ensure proper messages are displayed on the CMSs and DMSs

(4) Coordinate with the following agencies and services:

- School Buses: The Design-Build Team shall coordinate with Craven County Schools prior to construction activities that may result in substantial delays to school buses.

- Craven Area Regional Transit (CARTS): The Design-Build Team shall coordinate with CARTS prior to construction to determine if service is being provided within the project limits. In the event CARTS service is being provided within the project limits, the Design-Build Team shall coordinate with CARTS any detours and construction delays that may impact service.

- Business Outreach and Bike MS: the Design-Build Team shall coordinate with the New Bern Area Chamber of Commerce regarding business impacted by construction, and to the Bike MS organizers prior to project construction. Such outreach activities shall be coordinated in accordance with the requirements of the *Public Information* Scope of Work found elsewhere in this RFP.

- Fire Departments and Emergency Medical Services (EMS): the Design-Build Team shall coordinate with local emergency service providers, including No. 7 Township Fire and Rescue and Craven County Emergency Services, regarding potential detour routes, and prior to any construction that may result in substantial delays for emergency vehicles.

- Marine Corps Air Station at Cherry Point: U.S. 70 is a designated STRAHNET route and serves military commuters. Because the project is expected to have temporary impacts on mobility during construction, the Design-Build Team shall coordinate with the Commanding Officer of the Marine Corps Air Station at Cherry Point prior to project construction.

- Hospitals, and Law Enforcement Department throughout construction to alert these entities to traffic control impacts that may affect their services.

(4) Provide traffic control setup that ensures safe traffic operations and workers' safety throughout the construction area.

(5) Attend all scheduled traffic control coordination meetings, as required by the Engineer.

(6) Monitor traffic delays and backups within the work zone.

M. Portable Temporary Lighting

The Design-Build Team shall provide portable temporary lighting to conduct night work in accordance with the 2018 NCDOT Standard Specifications for Roads and Structures.

Work Zone Sequential Flashing Warning Lights

In addition to the requirement above, the Design-Build Team shall furnish and install Sequential Flashing Warning Lights on drums used for merging tapers to assist motorist in determining which direction to merge and to decrease late lane merging. (Reference the *Sequential Flashing Warning Lights* Project Special Provisions found elsewhere in this RFP.)

N. Drainage

The Design-Build Team shall provide proper drainage for all temporary alignments and / or traffic shifts.

O. Law Enforcement

Law enforcement officers shall be used during any rolling road block operation and to direct traffic when installing / removing / shifting traffic signal heads at intersections. Law enforcement officers may be used to maintain traffic through the work area and / or intersections. The use of law enforcement officers shall adhere to the following requirements:

- The Design-Build Team shall be responsible for coordinating with the law enforcement agency for the use of law enforcement officers.
- The Design-Build Team shall only utilize officers who are outfitted with law enforcement uniforms and marked vehicles, which are equipped with proper lights mounted on top of the vehicle and agency emblems.
- The Design-Build Team shall coordinate with the Engineer where and how law enforcement officers will be used during construction.

The Design-Build Team shall address where and how law enforcement officers will be used in the Technical Proposal.

P. No Parking / Tow Away Zone Ordinance

Prior to construction, the Department will obtain a No Parking / Tow Away Zone Ordinance on the mainline. The Design-Build Team shall provide and install proper signing for the No Parking / Tow Away Zone Ordinance as follow:

- 1000 feet in advance of the “Begin Road Work” signs
- On all on-ramps within the project limits
- A minimum of every 3000 feet in each direction

Q. On-Call Towing

The Design-Build Team shall provide an on-call towing service for all disabled vehicles within the project limits and one mile outside of the Begin and End Project Limits on the mainline.

The towing service shall relocate disabled vehicles to secure pre-arranged locations outside of the project limits and off the NCDOT right of way.

The towing service shall provide tow vehicles capable of towing automobiles and light trucks (up to 10,000-pound gross vehicle weight) and medium and heavy-duty trucks (greater than 10,000-pound gross vehicle weight). All tow vehicles shall be able to tow using the "wheel lift" method and the conventional boom lift method.

The Design-Build Team shall immediately place a lime green Tow Sticker (provided by the Department) on all disabled vehicles. The Design-Build Team shall provide pertinent information on the sticker, including the designated tow location and the signature and agency of the person authorizing the tow.

The towing service shall tow a disabled vehicle within 20 minutes of placement of the lime green Tow Sticker. The towing service shall only tow vehicles displaying a lime green Tow Sticker.

For all vehicles towed, the Design-Build Team shall keep a record of the approximate disabled vehicle location, vehicle type, including make and color, and the vehicle license plate number. The Design-Build Team shall also maintain a record of the information on the lime green Tow Stickers, including the exact time the vehicle was removed and the exact location of where the vehicle was towed. The Design-Build shall immediately give all the aforementioned information to the Resident Engineer.

Within 30 minutes of a vehicle being towed, the Design-Build Team shall contact the Law Enforcement Agency that is responsible for enforcement on the mainline and provide them with the information necessary for their Database. The towing service shall commence the date construction begins and shall operate 24 hours a day, seven days a week until the project is completed.

Prior to any construction activity, the Design-Build Team shall arrange and attend a towing coordination meeting. The Design-Build Team shall coordinate this meeting with the Division and the Division Construction Engineer or designee. During this meeting, the locations where vehicles will be towed will be determined, the towing requirements will be confirmed and the process by which specific

towing information will be conveyed to the appropriate personnel will be determined.

The towing service base of operation shall have a publicly accessible published telephone number that shall be manned, or have call forwarding to an employee on call, during the aforementioned towing service operation times.

The Design-Build Team shall coordinate placement of the towing operation information on the project website with the NCDOT Communications Office. (Reference the *Public Information* Scope of Work found elsewhere in this RFP) This information shall include, but not be limited to vehicle tow locations, reasons for work zone towing, time frame allowed before the abandoned vehicle will be towed, how to retrieve the vehicle and any necessary phone numbers for retrieval.

R. Shoulder Sweeping

At a minimum, the Design-Build Team shall conduct monthly sweeping operations on shoulders within the project and a minimum of one mile beyond the project limits in each direction on the mainline.

S. Work Zone Speed Limit Reduction and $250 Speeding Penalty Ordinances

If, at the Department's sole discretion, the Design-Build Team can justify that the TMPs cannot be designed to adhere to the existing mainline posted speed limit requirements, the Design-Build Team shall submit a formal Work Zone Speed Limit Reduction Ordinance request to the Division Construction Engineer or designee for approval. The request shall state the type of ordinance requested, why the ordinance is needed and why the TMPs cannot be designed to avoid the need. The request shall also include an Engineering Study that justifies the need for a Work Zone Speed Limit Reduction Ordinance. (Reference the criteria listed in the NCDOT Work Zone Traffic Control Guidelines) Upon receipt of the formal request, the Design-Build Team shall allow six weeks for the Work Zone Speed Limit Reduction Ordinance to be approved. The Design-Build Team shall provide and install proper signing for all approved Work Zone Speed Limit Reduction Ordinances. The Design-Build Team shall identify the need for a Work Zone Speed Limit Reduction Ordinance in the Technical Proposal.

The Department may grant a $250 Speeding Penalty Ordinance for the mainline provided the project meets or exceeds the required criteria. If the TMP cannot be designed to eliminate the need for a Speeding Penalty Ordinance and meet the criteria listed in the NCDOT Work Zone Traffic Control Guidelines, the Design-Build Team shall prepare an Engineering Study. The Design-Build Team shall submit a formal Speeding Penalty Ordinance request to the Division Construction Engineer or designee that states why the ordinance is needed and why the TMP cannot be designed to avoid the need. Upon receipt of the formal request, the Design-Build Team shall allow six weeks for the Speeding Penalty Ordinance to

be approved. The Design-Build Team shall identify the need for a Speeding Penalty Ordinance in the Technical Proposal.

T. Project Coordination

The Design-Build Team shall coordinate with all Contractors and NCDOT Resident Engineers in charge of any project in the vicinity of this project for any work that may affect the construction, traffic operations, and placement of temporary traffic control devices (including advance warning signs) on all roads within the project limits and associated with this project.

At a minimum, the Design-Build Team shall coordinate with the Division Traffic Engineer, the Rail Division, Law Enforcement, Emergency Services and the Work Zone Traffic Control Section to schedule and attend Traffic Safety and Operations Meetings. These meetings shall be held to monitor and assess safety and mobility during construction. The Traffic Safety and Operations Meetings shall be held on an as needed basis during project construction. Additional Traffic Safety and Operations Meetings shall be held to address any specific issue, as directed by the Engineer.

U. Temporary Shoring

The Design-Build Team shall be responsible for all required temporary shoring, including but not limited to designing, providing, installing, maintaining and removing. Temporary shoring for the maintenance of traffic shall be defined as shoring necessary to provide lateral support to the side of an excavation or embankment parallel to an open travelway when a theoretical 2:1 (H:V) slope from the bottom of the excavation or embankment intersects the existing ground line closer than five feet from the edge of pavement of the open travelway. The Design-Build Team shall identify locations where temporary shoring for maintenance of traffic will be required on the Transportation Management Phasing Concept. The Design-Build Team shall install temporary traffic barrier as shown on the PCB at Temporary Shoring Locations detail available on the Work Zone Traffic Control website noted below. The aforementioned detail provides design information on the temporary traffic barrier location in relation to the temporary shoring and traffic location. (Notes related to Temporary Shoring are not required in the General Notes sheet for the TMP)

The NCDOT Geotechnical Engineering Unit and Work Zone Traffic Control websites have more information on temporary shoring. The Design-Build Team shall adhere to the additional shoring requirement located on the Work Zone Traffic Control and Geotechnical Engineering Unit websites noted below:

https://connect.ncdot.gov/projects/WZTC/Pages/default.aspx

https://connect.ncdot.gov/resources/Geological/Pages/default.aspx

The Design-Build Team shall identify on the appropriate traffic control details where temporary shoring will be used by providing station limits, offsets, cut sections, the type of shoring and where temporary traffic barrier will be located, if needed.

UTILITIES COORDINATION SCOPE OF WORK (4-5-2018)

The Design-Build Team shall obtain the services of a Professional Services Firm (PSF) knowledgeable in the NCDOT Utility Coordination Process involved with utility relocation / installation and highway construction. The aforementioned PSF shall be responsible for coordinating all utility relocations, removals and / or adjustments where the Design-Build Team and utility owner, with concurrence from the Department, determine that such work is essential for highway safety and performance of the required highway construction. Coordination shall be for all utilities whether or not they are specifically identified in this Scope of Work and shall include any necessary utility agreements when applicable. NCDOT will be the approving authority for all utility agreements and approval of plans.

During the procurement phase, the Department will allow no direct contact, either by phone, e-mail or in person, between the Design-Build Team and utility owners until after the meetings between each individual proposer and the affect utility owners. After the aforementioned meetings, the Design-Build Team will only be allowed direct contact with the utility owners when the aforementioned PSF is present. (Reference the *Individual Meeting with Proposers* Project Special Provision found elsewhere in this RFP.)

In accordance with the requirements herein, the Design-Build Team shall relocate / coordinate the relocation of all existing facilities that are 1) parallel to a roadway in full control of access, 2) in physical conflict with the construction, 3) beneath the existing or proposed pavement structure and structurally inadequate, and / or 4) beneath the existing or proposed pavement structure and consist of unacceptable material. Proposed / relocated underground facilities that are located beneath the pavement structure shall only be allowed to cross the roadway as close to perpendicular as possible.

The Design-Build Team shall identify all new and existing Utilities that are affected by embankments and shall evaluate settlement impacts on these affected Utilities. The Design-Build Team shall evaluate the impacts of abandoned Utilities on anticipated settlements and impacts to proposed structures. The Design-Build Team shall design new and relocated Utilities to accommodate the anticipated settlements and to operate effectively during construction and throughout the design life of the structure. Allowable settlement of the utilities shall be determined by the utility owners. The effects of settlement on NCDOT infrastructure shall be reviewed and approved by the Department.

Project Details

The Design-Build Team shall be responsible for verifying the utility locations, type of facilities, and identifying the utility owners in order to coordinate the relocation of any utilities, known and unknown, in conflict with the project. The following utilities are known to be located within the project construction limits:

Utility Owner	Utility Type	Cost Responsibility
Craven County	Telecommunications	Craven County
CenturyLink	Communications	CenturyLink
Craven County	Water	NCDOT (normally)
City of New Bern	Water & Sewer	NCDOT (normally)
Spirit/MCNC	Communications	Spirit
Piedmont Natural Gas	Gas	PNG(normally)
Spectrum	Communications	Spectrum
Suddenlink	Communications	Suddenlink
City of New Bern	Communications	City of New Bern
City of New Bern	Electric	NCDOT (prior rights)
NCDOT	Signalization	Design Build Team

Water and Sewer

If the Design-Build Team's design and / or construction requires the relocation and / or encasement of existing water and / or sewer facilities, designs shall be coordinated with the Division Utility Engineer or designee All costs associated with the design and construction for relocation and / or encasement of these existing water and / or sewer facilities shall be the responsibility of the Design-Build Team and shall be included in the lump sum bid for the project. The Design-Build Team shall develop designs; prepare all plans for needed agreements and permits; submit permits directly to the agencies and obtain approval from the agencies. The Design-Build Team shall be responsible for all permit fees.

For all parcels with access to existing water and / or sewer facilities that the project subdivides, the Design-Build Team shall design and construct water / sewer facility extensions to all sub-divided parcels, including but not limited to the sub-divided parcel with the existing water / sewer access, if necessary. The aforementioned water facility extensions shall be installed completely within the right of way. The aforementioned sewer facility extensions shall be installed completely within the right of way or a recorded easement. All costs associated with the design and construction of water / sewer facility extensions to sub-divided parcels shall be included in the Design-Build Team’s lump sum bid for the project.

Designs shall be coordinated with the Division Utility Engineer or designee and the utility owners or their representatives. In .pdf format, the Design-Build Team shall electronically submit one half-size set and one full size set of utility construction drawings to the Division Utility Engineer or designee, via the Division, for further handling. Each set shall include a title sheet, plan sheets, profiles and special provisions, if required. Once accepted by the Division Utility Engineer or designee, the plans, with the appropriate agreement, will be sent to the utility owner for their review and concurrence.

The relocation and / or encasement of all water and sewer facilities shall be done in accordance with the NCDOT policies and standards and in accordance with the facility owner’s standards. In the event of conflicting design parameters in the requirements noted above, the proposed design shall adhere to the most conservative values. The materials and appurtenances proposed by the

Design-Build Team shall require approval by both NCDOT and the aforementioned appropriate utility owner prior to installation.

Utility Relocation Plans

Excluding water and sewer conflicts, if the Design-Build Team's design and / or construction create a utility conflict, the Design-Build Team shall request that the utility owner submit relocation plans (Highway Construction Plans to be provided by the Design-Build Team to utility owners) that show existing utilities and proposed utility relocations for approval by the NCDOT.

In .pdf format, the Design-Build Team shall electronically submit one half-size set and one full size set of the Utility Relocation Plans to the NCDOT State Utilities Manager, via the Division, for review and approval. The Department shall approve the Utility Relocation Plans prior to any utility relocation work beginning. The Design-Build Team shall also be responsible for submitting the appropriate agreements to be used with the Utility Relocation Plans (See Agreements Section found elsewhere in this Scope of Work). After the review process is complete, the Division Utility Engineer or designee will submit an electronic copy of the authorization letter to the Design-Build Team. The Division Utility Engineer or designee will also submit an electronic copy of the approved Utility Relocation Plans, estimate and agreement to the Department's Resident Engineer. If the Utility Relocation Plans are approved subject to changes, it shall be the Design-Build Team's responsibility to coordinate these changes with the appropriate utility owner.

Cost Responsibility

The Design-Build Team shall be responsible for all costs associated with relocating and / or encasing water and sewer facilities, as described in the Water and Sewer Section of this Scope of Work.

The NCDOT will be responsible for all other non-betterment utility relocation cost when the utility owner has prior rights of way / compensable interest. The utility owner shall be responsible for the relocation costs if they cannot furnish evidence of prior rights of way or a compensable interest in their facilities. The Design-Build Team shall be responsible for verifying / determining the cost responsibility (prior rights and compensable interest) for the utility relocations. The Design-Build Team shall be responsible for all costs associated with utility relocations due to haul roads and / or any other temporary conditions resulting from the Design-Build Team's methods of operation or sequence of work.

Compensable Interest

Typically, affidavits, recorded easements or NCDOT agreements can serve as evidence of prior rights. A compensable interest is identified as follows:

(A) Existing or prior easement rights within the limits of the project, either by recorded right of way or adverse possession (Utility occupying the same location for twenty (20) plus years outside the existing highway rights of way).

(B) Entities covered under General Statute 136-27.1 and 136-27.2. Statute requires the NCDOT to pay the non-betterment cost for certain water, sewer and gas relocations.

(C) Utilities that have a joint-use agreement that constitutes a compensable interest with entities that have existing or prior easements rights within the project limits.

Work Performed by Design-Build Team for Utility Owners

If the Design-Build Team elects to make arrangements with a utility owner for proposed utility construction not required herein, in which the utility owner shall be responsible for the costs of work to be performed by the Design-Build Team, the Design-Build Team shall be responsible for negotiating all costs associated with the proposed construction. Once the Design-Build Team and the utility owner agree on a plan and a lump sum estimated cost for the utility construction, the Design-Build Team shall electronically submit one half-size set and one full size set of the utility construction drawings, in .pdf format, to the Division Utility Engineer or designee, via the Division, for further handling. Each set shall include a title sheet, plan sheets, profiles and special provisions, if required. Also, a letter from the utility owner agreeing to the plans and lump sum cost must accompany this package. The NCDOT will reimburse the Design-Build Team the estimated lump sum cost under a Supplemental Agreement. The necessary Utility Construction Agreement (UCA) to the utility owner for reimbursement shall be a two-party agreement between the NCDOT and the utility owner; and will be developed and executed by the Department.

If the Design-Build Team is requested, in writing, by a utility owner to relocate facilities not impacted by the project's construction, and / or upgrade or incorporate new facilities as part of the highway construction, designs shall be coordinated with the utility owner and Division Utility Engineer or designee. The associated design and construction costs shall be negotiated and agreed upon between the Design-Build Team and the utility owner. The Design-Build Team shall develop designs; prepare all plans for needed agreements and permits; submit permits directly to the agencies and obtain approval from the agencies. The Design-Build Team shall be responsible for all permit fees.

Cable TV

The cost in relocating CATV due to highway construction shall be the responsibility of the CATV Company; however, 1) if the CATV Company can validate a recorded easement for facilities outside the maintained NCDOT right of way, the Department will bear the relocation expense; and 2) if the adjustment is needed on existing utility poles to accommodate a proposed NCDOT Signals and Intelligent Transportation Systems (ITS) Fiber Optic Communication Cable Project, the Design-Build Team shall be responsible for the relocation cost.

The NCDOT will not permit CATV to place poles within the highway right of way but will allow down guys for their facilities within the highway right of way. Under most circumstances, the CATV Company will continue a joint-use attachment with the local power and telephone company. If the CATV proposed relocation places buried facilities within the highway right of way, then plans and encroachment agreements shall be required by the NCDOT.

Communication Cables / Electrical Services for ITS

Prior to establishing the location for new meter poles, the Design-Build Team shall coordinate with the local power distribution company concerning accessibility of E/C service and safety in maintenance of the meter.

Prior to installation, the Design-Build Team shall provide plans for review and approval for all service taps that require a parallel installation within the control of access (C/A).

Parallel service installation within a C/A shall be buried and located as close to the right of way line as practical. Only due to unusual circumstances will parallel aerial service installations within the C/A be allowed. The Design-Build Team shall justify the allowance of parallel aerial service installation and obtain NCDOT approval prior to installation

The Design-Build Team shall be responsible for all coordination activities, including deposit fees, required for the utility company to provide service taps. Prior to the Design-Build Team developing the associated design and / or instructing the utility company to proceed with providing the service taps, the Design-Build Team shall obtain written approval of the service tap locations from the Resident Engineer.

The Design-Build Team shall be responsible for all costs associated with providing communication cables / electrical service from the service tap to the ITS devices.

Adjusting Existing Utilities due to Proposed Signals and Intelligent Transportation Systems (ITS) **Fiber Optic Communications Cables**

The Design-Build Team shall be responsible for all costs for coordinating and adjusting any utilities that are in conflict with any proposed communication cables.

Requirements for Attachments to Existing and / or Proposed Structures

The Design-Build Team shall avoid attachments to structures where feasible. Attachments shall only be considered when other alternatives are cost prohibitive and / or are not feasible due to environmental or geographical features. All utility related attachments must be evaluated and approved by the Division Utility Engineer or designee, including any existing attachments to any structure(s) that require modification or replacement. Attachments shall be prohibited under the following conditions:

(A) No attachments shall be allowed to a bridge located parallel within the C/A carrying the freeway over streams, other roadways or railroads. (No parallel utility installations within the C/A)

(B) No attachments shall be allowed to cored-slab bridges.

(C) No attachments shall be allowed to curved bridges.

Attachments to structures, if approved by the Division Utility Engineer or designee, shall meet the following criteria:

(A) No attachments shall be allowed below the bottom of the beams and / or girders.

(B) Drilling of, or attachments to, beams and / or girders shall not be allowed. Attachments shall only be allowed to the bottom of the bridge deck.

(C) For water and sewer force mains, only restrained joint ductile iron pipe shall be allowed.

(D) A minimum of 18" of clearance to beams and / or girders shall be maintained if possible.

Documentation of adverse conditions or cost estimates of all feasible alternatives shall be submitted to the Division Utility Engineer or designee, via the Division, when seeking approval of a structure attachment. Cost estimates shall consider all costs involved with each alternative and impacts to the utility and the highway project as a whole.

City of New Bern Pump Assist Sewage Lift Station located in between Hwy 70W and the service road at the intersection with Garner Road

If the Design-Build Team's project design impacts the operation of the CoNB pump assist sewage lift station, as determined by the Department, then the Design-Build Team shall design and re-locate said lift station according to the specifications and standard of the Department or the City of New Bern, whichever are more stringent.

GENERAL

The Design-Build Team shall not commence work at points where the highway construction operations are adjacent to utility facilities, until making arrangements with the utility owner to protect against damage that might result in expense, loss, disruption of service or other undue inconvenience to the public or utility owner. The Design-Build Team shall be responsible for damage to the existing or relocated utilities resulting from the Design-Build Team's operations. In the event of interruption of any utilities by the project construction, the Design-Build Team shall promptly notify the utility owner and cooperate with the utility owner in the prompt restoration of service.

The utility information provided in this Request-For-Proposal is based off of the most current information available at the time. It is the sole responsibility of the Design-Build Team to investigate / verify the accuracy of the utility information provided by facility owners and included in this Request For Proposal. The cost for any third-party investigation will be borne by the Design-Build Team.

The Design-Build Team shall accommodate utility adjustments, reconstruction, new installation and routine maintenance work that may be underway or take place during the progress of the contract.

The Design-Build Team shall coordinate service outages and cutovers with the airport to maintain utility services during operating hours.

If total property acquisition is unavoidable due to encroachment into wells and / or septic systems, the Design-Build Team shall investigate and determine if extending water and / or sewer lines to

the affected property is cost effective. If the Department concurs with the determination that a utility extension is cost effective, the costs associated with the utility design and construction shall be addressed in accordance with Article 104-7 of the 2018 NCDOT *Standard Specifications for Roads and Structures*.

The Design-Build Team shall be required to use the guidelines as set forth in the following:

(A) *NCDOT Utility Manual - Policies & Procedures for Accommodating Utilities on Highway Rights of Way* and the NCDOT *Utilities Policy Manual*. If the two aforementioned manuals contradict each other, the *Utilities Policy Manual* shall govern. Reference the website noted below for the current version of the NCDOT utility manuals, and additional information on the transition to the new utility manuals that shall be adhered to:

https://connect.ncdot.gov/municipalities/Utilities/Pages/UtilitiesManuals.aspx

(B) *Federal Aid Policy Guide* - Subchapter G, Part 645, Subparts A & B

(C) Federal Highway Administration's *Program Guide, Utility Adjustments & Accommodations on Federal Aid Highway Projects*

(D) NCDOT *Construction Manual Section* 105-8

(E) NCDOT *Right of Way Manual*

(F) NCDEQ *Public Water Supply* - Rules governing public water supply

(G) NCDEQ *Division of Water Resources* - Title 15A - Environment and Natural Resources

Agreements

If a utility company can provide evidence of prior rights of way or a compensable interest in their facilities, the Design-Build Team shall coordinate the non-betterment utility relocation costs with the utility company and develop the Utility Relocation Agreement, (URA).

The NCDOT Division Utility Engineer or designee must execute approved agreements on Design-Build projects. The URA's and Encroachment Agreements are available from the NCDOT Utilities Unit. Reference the NCDOT *Utility Manual Policies & Procedures for Accommodating Utilities on Highway Rights of Way* for the different types of Encroachment Agreements available for use.

The Design-Build Team shall develop a preliminary Utility Analysis and Routing Report (UARR (p)) to identify potential utility conflicts, determine preliminary alignments and schedules for the relocation of each utility, and identify any anticipated Permanent Utility Easements (PUE). The aforementioned UARR (p) shall be submitted to the NCDOT Division Utility Engineer or designee via the Division Construction Engineer, for review a minimum of ten days before the Right of Way Plans submittal.

The Design-Build Team shall submit all utility agreements, and all supporting documents to the NCDOT Division Utility Engineer or designee, via the Division Construction Engineer, in electronic format. Prior to submittal, all agreements shall be signed electronically by an authorized representative of the utility owner. These electronic agreement packets will be reviewed, approved and signed electronically by the NCDOT Division Utility Engineer or designee, or designated representative, before being distributed to the field.

The Design-Build Team shall utilize the NCDOT Standard Utility Encroachment Agreements, as necessary, in relocating utilities. The Encroachment Agreements shall be used under the following conditions:

(A) If a utility company is not occupying a valid right of way / compensable interest and the proposed relocation will place the relocated utilities within the existing or proposed highway right of way.

(B) For **all** new utility installations, not covered under a Utility Construction Agreement and within the existing or proposed highway right of way. This includes all water, sewer and gas lines owned by entities covered under *General Statute 136-27.1* and *136-27.2*.